

Florida Department of Education
Curriculum Framework

Program Title: Landscape Operations
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

| | |
|----------------------------|--|
| Program Number | 8002100 |
| CIP Number | 0101060511 |
| Grade Level | 9-12 |
| Standard Length | 6 credits |
| Teacher Certification | Refer to the <u>Program Structure</u> section. |
| CTSO | FFA |
| SOC Codes (all applicable) | 37-3011 - Landscaping and Groundskeeping Workers 37-1012 - First-Line Supervisors of Landscaping, Lawn Service, an Groundskeeping Workers |

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety and environmental issues.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of three occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

This program is a planned sequence of instruction consisting of a core and two completion points.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the secondary program structure:

| OCP | Course Number | Course Title | Teacher Certification | Length | SOC Code | Level | Graduation Requirement |
|-----|---------------|---|--------------------------------|----------|----------|---------|------------------------|
| A | 8106810 | Agriscience Foundations 1 | AGRICUTUR 1 @2 | 1 credit | 37-3011 | 3 | EQ |
| | 8121510 | Introductory Horticulture 2 | | 1 credit | | 3 | PA |
| | 8121520 | Horticulture Science 3 | | 1 credit | | 3 | PA |
| B | 8121310 | Landscape and Turf Science 4 | AGRICUTUR 1 @2 HORTICULT #7 | 1 credit | 37-1012 | 2 | |
| | 8121320 | Landscape and Turf Science 5 | | 1 credit | | 2 | |
| C | 8121410 | Sports & Recreational Turf Operations 6 | | | 1 credit | 37-1012 | 2 |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Academic Alignment Table

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

| Courses | Anatomy/ Physiology Honors | Astronomy Solar/Galactic Honors | Biology 1 | Chemistry 1 | Earth- Space Science | Environmental Science | Genetics | Integrated Science | Marine Science 1 Honors | Physical Science | Physics 1 |
|--|----------------------------------|---------------------------------------|--------------|----------------|----------------------------|--------------------------|--------------|-----------------------|-------------------------------|---------------------|--------------|
| Agriscience Foundations 1 | 29/87 33% | 18/80 23% | 55/83 66% | 11/69 16% | 36/67 54% | 30/70 42% | 20/69 29% | 49/82 60% | 25/66 38% | 38/74 51% | 12/72 16% |
| Introductory Horticulture 2 | 4/87 5% | 5/80 6% | 39/83 47% | 6/69 7% | 24/67 39% | 9/70 13% | 7/69 10% | 38/82 46% | 7/66 11% | 28/74 38% | 4/72 6% |
| Horticulture Science 3 | 26/87 30% | 23/80 29% | 19/83 23% | 26/69 38% | 4/67 6% | 30/70 43% | 26/69 38% | 18/82 22% | 24/66 36% | 9/74 12% | 21/72 29% |
| Landscape and Turf Science 4 | 12/87 14% | 13/80 16% | 13/83 16% | 12/69 17% | 11/67 16% | 15/70 21% | 13/69 19% | 14/82 17% | 11/66 17% | 13/74 18% | 15/72 21% |
| Landscape and Turf Science 5 | 1/87 1% | 4/80 5% | 4/83 5% | 2/69 3% | 3/67 4% | 4/70 6% | 1/69 1% | 5/82 6% | 3/66 5% | 5/74 7% | 6/72 8% |
| Sports & Recreational Turf Operations 6 | 1/87 1% | 3/80 4% | 1/83 1% | 3/69 4% | 3/67 4% | 2/70 3% | 1/69 1% | 1/82 1% | 3/66 5% | 3/74 4% | 3/72 4% |

** Alignment pending review

Alignment attempted, but no correlation to academic course

| Courses | Algebra 1 | Algebra 2 | Geometry | English 1 | English 2 | English 3 | English 4 |
|---|--------------|------------|-------------|--------------|--------------|--------------|--------------|
| Agriscience Foundations 1 | 14/67 21% | 4/75 5% | 8/54 15% | 11/46 24% | 11/45 24% | 11/45 24% | 11/45 24% |
| Introductory Horticulture 2 | ** | ** | ** | ** | ** | ** | ** |
| Horticulture Science 3 | ** | ** | ** | ** | ** | ** | ** |
| Landscape and Turf Science 4 | ** | ** | ** | ** | ** | ** | ** |
| Landscape and Turf Science 5 | ** | ** | ** | ** | ** | ** | ** |
| Sports & Recreational Turf Operations 6 | ** | ** | ** | ** | ** | ** | ** |

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. The FS for Mathematical Practices are designed for grades K-12 and describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education.

Instructors must incorporate the Florida Standards for Technical Subjects and Mathematical Practices throughout instruction of this CTE program.

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL’s need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. If so, the standards have been identified and cross walked with the corresponding CTE standard and/or benchmark.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Describe the history of agriculture and its influence on the global economy.
- 02.0 Practice agriscience safety skills and procedures.
- 03.0 Apply scientific and technological principles to agriscience issues.
- 04.0 Apply environmental principles to the agricultural industry.
- 05.0 Investigate and utilize basic scientific skills and principles in plant science.
- 06.0 Investigate and utilize basic scientific skills and principles in animal science.
- 07.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 08.0 Demonstrate agribusiness, employability and human relation skills.
- 09.0 Apply leadership and citizenship skills.
- 10.0 Discuss components of food safety and handling practices in agriculture.
- 11.0 Describe the horticulture industry.
- 12.0 Identify safety procedures in the workplace.
- 13.0 Identify and classify plants.
- 14.0 Demonstrate plant propagation techniques.
- 15.0 Identify growing media and fertilizers.
- 16.0 Explain irrigation techniques for plants and turf.
- 17.0 Describe Integrated Pest Management approaches.
- 18.0 Describe the principles and requirements of plant growth.
- 19.0 Apply best management practices in the horticulture industry.
- 20.0 Identify principles of landscape design.
- 21.0 Describe varieties and care of indoor plants.
- 22.0 Apply safety procedures in the workplace.
- 23.0 Classify plants based on scientific principles.
- 24.0 Demonstrate proper use of growing media and fertilizers
- 25.0 Demonstrate Integrated Pest Management approaches.
- 26.0 Identify the principles and requirements of plant growth.
- 27.0 Apply best management practices in landscape design.
- 28.0 Demonstrate customer service skills that are essential in dealing with clients.
- 29.0 Apply principles of landscape design and maintenance.
- 30.0 Harvest, transport, and install plant materials.
- 31.0 Identify procedures to operate, repair, and maintain tools and equipment.
- 32.0 Identify emerging technologies in the horticulture industry.
- 33.0 Demonstrate leadership, employability, communications and human relations skills.
- 34.0 Describe personal traits, attitudes, customer approaches, and activities that help successful selling.
- 35.0 Maintain tools and equipment.
- 36.0 Demonstrate application of chemicals and calibrate spray equipment.
- 37.0 Classify plants and turfgrass.
- 38.0 Demonstrate fertilization skills.

- 39.0 Irrigate plants and turf.
- 40.0 Layout and/or install landscape and/or interiorscape.
- 41.0 Maintain customer relations and observe follow-up procedures.
- 42.0 Perform service on tools and equipment.
- 43.0 Apply chemicals and calibrate spray equipment.
- 44.0 Perform classification of plants and turfgrass.
- 45.0 Use fertilization skills.
- 46.0 Perform irrigation of plants and turf.
- 47.0 Maintain landscape.
- 48.0 Identify components of athletic fields.
- 49.0 Maintain athletic fields.
- 50.0 Develop recreational areas.
- 51.0 Maintain sports turf.
- 52.0 Establish turfgrass.
- 53.0 Tending and rejuvenating turf.

**Florida Department of Education
Student Performance Standards**

Course Title: Agriscience Foundations 1
Course Number: 8106810
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of agricultural history and the global impact of agriculture; career opportunities; scientific and research concepts; biological and physical science principles; environmental principles; agriscience safety; principles of leadership; and agribusiness, employability, and human relations skills in agriscience. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students will interact with materials and primary sources of data or with secondary sources of data to observe and understand the natural world. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 20% of classroom time will be dedicated to laboratory experiences.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|------------------------------------|---|--------------------|
| 01.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to: | | SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2; | |
| 01.01 Investigate the origin and history of agriculture and its relationship to science and technology. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.01.01.02.c |
| 01.02 Analyze the impact of agriculture on the local, state, national and global economy. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | CS.02.02.03.b |
| 01.03 Identify significant career patterns/shifts in the history of the agricultural industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.01.01.01.a |
| 01.04 Examine the role of the agricultural industry in the interaction of | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.06.02.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|--|---|---|--------------------|
| population, food, energy, and the environment. | | | |
| 02.0 Practice agriscience safety skills and procedures--The student will be able to: | | SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7; | |
| 02.01 Identify the common causes and prevention of accidents in agriscience operations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.a |
| 02.02 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | CS.03.04.03.a |
| 02.03 Identify proper disposal of hazardous waste materials and biohazards. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | ESS.04.01.02.c |
| 02.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.b |
| 03.0 Apply scientific and technological principles to agriscience issues--The student will be able to: | | SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1; | |
| 03.01 Employ scientific measurement skills. | | | |
| 03.02 Demonstrate safe and effective use of common laboratory equipment. | | | ESS.01.02.01.b |
| 03.03 Identify the parts and functions of plant and animal cells. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |
| 03.04 Describe the phases of cell reproduction. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 03.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.3.8 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|--------------------|
| | LAFS.1112.W.3.8 | | |
| 03.06 Interpret, analyze, and report data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | BS.02.01.01.b |
| 03.07 Investigate DNA and genetics applications in agriscience including the theory of probability. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | BS.01.01.01.a |
| 03.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.). | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | BS.03.01.03.b |
| 04.0 Apply environmental principles to the agricultural industry--The student will be able to: | | SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12 | |
| 04.01 Research how different climactic and geological activity influences agriculture. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | NRS.01.03.02.b |
| 04.02 Describe various ecosystems as they relate to the agriculture industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.03 Describe the environmental resources (soil, water, air) necessary for agriculture production. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.08.02.01.a |
| 04.04 Identify regulatory agencies that impact agricultural practices. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6 | | NRS.02.01.02.a |
| 04.05 Apply Best Management Practices that enhance the natural environment. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.06 Identify conservation practices related to natural resources. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.02.02.b |
| 05.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to: | | SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7; | |
| 05.01 Identify and describe the specializations within the plant science industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|---|---|
| 05.02 Categorize plants based on specific characteristics according to industry and scientific standards. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.01.01.a |
| 05.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc.... | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.03.01.a PS.02.03.02.a PS.02.03.05.a |
| 05.04 Identify the nutrients required for plant growth from the periodic table and explain their functions. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.01.02.01.a |
| 05.05 Analyze information from a fertilizer label. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | PS.01.03.04.b |
| 05.06 Propagate and grow plants through sexual and/or asexual reproduction. | | | PS.03.01.03.a PS.03.01.01.b |
| 05.07 Investigate the impacts of various pests and propose solutions for their control. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.03.03.01.c |
| 05.08 Investigate the nature and properties of food, fiber, and by-products from plants. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.09 Explore career opportunities in plant science. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.05.01.01.a |
| 06.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to: | | SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19; | |
| 06.01 Explain the economic importance of animals and the products obtained from animals. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.02 Analyze commercially important livestock breeds in Florida. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |
| 06.04 Compare and contrast animal welfare issues. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | AS.02.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|---|--------------------|
| 06.05 Investigate the nature and properties of food, fiber, and by-products from animals. | | | AS.06.03.03.a |
| 06.06 Explore career opportunities in animal science. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | CS.05.01.01.a |
| 07.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to | | SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9; | |
| 07.01 Select and demonstrate proper use of hand tools in agriculture. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.04.02.a |
| 07.02 Operate service and maintain agriscience equipment, and instruments. | | | CS.03.04.03.b |
| 07.03 Manage facilities and supplies. | | | |
| 08.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to: | | | |
| 08.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE). | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 08.02 Utilize a record keeping system to collect, interpret, and analyze data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 08.03 Enhance oral communications through telephone, interview and presentation skills. | LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | CRP.04.01.02.b |
| 08.04 Enhance written communication by developing resumes and business letters. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2 | | CRP.04.02.02.b |
| 08.05 Demonstrate interpersonal (nonverbal) communication skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 08.06 Demonstrate good listening skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.04.03.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|-----------|---------------------------------|
| 09.0 Apply leadership and citizenship skills--The student will be able to: | | | |
| 09.01 Identify and describe leadership characteristics. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.01.a |
| 09.02 Identify opportunities to apply acquired leadership skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.02.a |
| 09.03 Identify and demonstrate ways to be an active citizen. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.01.03.02.c |
| 09.04 Participate in community based learning activities. | | | CRP.01.03.01.a |
| 09.05 Demonstrate the ability to work cooperatively. | | | CRP.09.03.01.a |
| 09.06 Conduct formal and informal meetings using correct parliamentary procedure skills. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 09.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 09.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks. | | | CS.05.01.01.b CRP.10.02.02.b |
| 10.0 Discuss components of food safety and handling practices in agriculture - The student will be able to: | | | |
| 10.01 Demonstrate proper safety precautions and use of personal protective equipment. | | | FPP.01.01.01.b |
| 10.02 Evaluate the food safety responsibilities that occur along the food supply chain. | | | FPP.03.03.02.b |
| 10.03 Explain techniques and procedures for the safe handling of food products. | | | FPP.03.03.02.c |
| 10.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation). | | | FPP03.03.01.b |
| 10.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply. | | | FPP04.01.01.0b |

**Florida Department of Education
Student Performance Standards**

Course Title: **Introductory Horticulture 2**
Course Number: **8121510**
Course Credit: **1**

Course Description:

This course is designed to develop competencies in the areas of career opportunities; global importance of agriculture; plant classification; propagation; growing media; nutritional needs; fertilization; irrigation; pest identification; pest control, pruning; plant installation; transplanting; safe hand-tool use; and employability skills.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|----------------|--------------------|---------------------------|
| 11.0 Describe the horticulture industry – the student will be able to: | | | |
| 11.01 Describe the importance of horticulture to the American and global economies. | | | |
| 11.02 Identify career opportunities in horticulture and educational requirements and continuing education opportunities for horticulture careers. | | | |
| 11.03 Describe Florida laws and regulation as they apply to the horticulture industry. | | | |
| 11.04 Describe the importance of horticulture to the environment, including sustainability practices | | | |
| 12.0 Identify safety procedures in the workplace – the student will be able to: | | SC.912.L.17.14, 17 | |
| 12.01 Identify the common causes of accidents in the horticulture industry. | | | |
| 12.02 Demonstrate proper safety precautions and use of personal protective equipment specific to the horticulture industry. | | | |
| 12.03 Explain, identify and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) according to | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|--|--------------------------------|
| Environmental Protection Agency (EPA), Worker Protection Standard and Occupational Safety and Health Agency (OHSA) Regulations. | | | |
| 13.0 Identify and classify plants – the student will be able to: | | SC.912.L.14.2, 3, 7, 8, 10, 53 SC.912.L.15.4, 5, 6 SC.912.L.18.7, 8, 9 | |
| 13.01 Identify plants by botanical and common names. | | | PS.02.01.02.b |
| 13.02 Classify plants botanically. | | | PS.02.01.02.c |
| 13.03 Write botanical names for plants. | | | |
| 14.0 Demonstrate plant propagation techniques – the student will be able to: | | SC.912.L.14.7, 8 SC.912.L.16.3, 12, 14, 16 | |
| 14.01 Identify propagating and growing facilities and structures. | | | |
| 14.02 Prepare propagation media. | | | PS.01.02.01.a |
| 14.03 Select and collect propagation materials. | | | PS.01.02.01.c |
| 14.04 Demonstrate propagation by sexual and asexual methods. | | | PS.03.01.01.b PS.03.01.03.b |
| 14.05 Demonstrate environmental controls for propagation materials. | | | |
| 14.06 Identify and select proper rooting hormones based on plant characteristics. | | | |
| 15.0 Identify growing media and fertilizers – the student will be able to: | | SC.912.E.6.2, 4 SC.912.L.18.11 SC.912.P.8.1, 11 | |
| 15.01 Identify soil and media materials and appropriate containers. | | | |
| 15.02 Identify nutritional needs of plants. | | | PS.01.03.01.a |
| 15.03 Identify symptoms of nutritional deficiencies and toxicities of plants. | | | PS.01.03.02.c |
| 15.04 Identify types and kinds of fertilizers. | | | PS.01.03.04.a |
| 15.05 Identify methods of distributing fertilizers. | | | PS.01.03.04.c |
| 15.06 Interpret information on a label of fertilizer used in Florida. | | | |
| 16.0 Explain irrigation techniques for plants and turf – the student will be able | | SC.912.L.18.12 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|--|--------------------|
| to: | | SC.912.E.7.1 | |
| 16.01 Identify water needs of plants. | | | PS.01.01.03.a |
| 16.02 Irrigate plants at recommended rates. | | | |
| 16.03 Identify the symptoms of excessive water and water stress in plants. | | | |
| 16.04 Describe the basic irrigation systems and principles used in the landscape and nursery. | | | |
| 17.0 Describe Integrated Pest Management approaches – the student will be able to: | | SC.912.L.14.9 | |
| 17.01 Identify common pests and pathogens of plants. | | | PS.03.03.01.a |
| 17.02 Describe life cycles of common pests and pathogens of plants. | | | PS.03.03.02.a |
| 17.03 Recognize signs of damage from pests and pathogens. | | | PS.03.03.02 |
| 18.0 Describe the principles and requirements of plant growth – the student will be able to: | | SC.912.E.7.1 SC.912.L.18.7, 9, 10 SC.912.P.10.1 | |
| 18.01 Explain how the energy of sunlight is converted to chemical energy through the process of photosynthesis and respiration. | | | PS.02.03.01.a |
| 18.02 Explain how photosynthesis in plants is directly affected by various environmental factors such as light and temperature. | | | PS.02.03.01.b |
| 18.03 Explain the process of respiration and transpiration and describe the flow of energy in plants. | | | PS.02.03.02.b |
| 18.04 Describe the influence of light and temperature on plant growth including phototropism. | | | |
| 19.0 Apply best management practices in the horticulture industry – the student will be able to: | | SC.912.L.17.9, 11, 12, 13, 14, 15 SC.912.N.1.1 SC.912.N.2.4 | |
| 19.01 Identify and apply Best Management Practices to reduce pollution and conserve water. | | | |
| 19.02 Identify and apply Best Management Practices on fertilizer recommendations for Florida plants including turf.. | | | |
| 19.03 Explain the concept of nonpoint source pollution, and the watershed environment. | | | |
| 20.0 Identify principles of landscape design – the student will be able to: | | SC.912.L.17.17 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 20.01 Conduct a customer interview to determine needs and personal tastes of client. | | | PS.04.02.01.a |
| 20.02 Compare and contrast the use of line, form, texture and color in designing landscapes. | | | |
| 20.03 Identify the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes. | | | PS.04.02.02.b |
| 20.04 Identify points of emphasis and major design areas in the residential landscape. | | | |
| 20.05 Identify plant selection for a residential landscape using Florida Friendly Landscape Principles. | | | |
| 20.06 Read and interpret a landscape plan. | | | |
| 20.07 Develop skills for drawing and identifying symbols. | | | |
| 20.08 Draw and design a landscape plan for a small garden. | | | |
| 20.09 Construct a landscape display. | | | PS.04.02.02.c |
| 21.0 Describe varieties and care of indoor plants – the students should be able to: | | | |
| 21.01 Identify common indoor plants | | | |
| 21.02 Describe the lighting and environmental needs of indoor plants. | | | |
| 21.03 Describe water, cleaning, and fertilizations needs for plants used indoors. | | | |
| 21.04 Describe the most common problems with indoor foliage including pathogens, pests, and cultural damage. | | | |
| 21.05 Analyze the air quality benefits of indoor plants. | | | |

Florida Department of Education
Student Performance Standards

Course Title: Horticulture Science 3
Course Number: 8121520
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of industry regulations; plant classification; plant transportation; soil sampling and analysis; fertilizer calculations; recording keeping; irrigation components, water quality; drainage; integrated pest management; pesticide safety and regulations; equipment calibration; chemical growth regulators; xeriscaping; integrated landscape management; safe use of power equipment; record keeping; and employability skills.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|--|--------------------|
| 22.0 Apply safety procedures in the workplace – the student will be able to: | | | |
| 22.01 Describe emergency procedures in the horticulture workplace. | | | CS.03.03.02.b |
| 22.02 Create preventive measures to avoid hazardous situations. | | | CS.03.03.01.a |
| 22.03 Identify appropriate PPE (Personal Protective Equipment) for all activities. | | | CS.03.04.01.b |
| 22.04 Use MSDS for all materials used. | | | CS.03.01.01.a |
| 22.05 Identify specific hazards with industry specific equipment, and conduct equipment care and maintenance. | | | CS.03.04.02.a |
| 22.06 Apply problem solving skills to correct a hazardous situation. | | | CS.03.01.02.c |
| 23.0 Classify plants based on scientific principles – the student will be able to: | | SC.912.L.14.2, 3, 7, 8, 10, 53 SC.912.L.15.4, 5, 6 SC.912.L.18.7, 8, 9 | |
| 23.01 Describe principles of plant biology and growth. | | | PS.01.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|--|---------|--|--------------------|
| 23.02 Explain the role of plants in the ecosystem. | | | |
| 23.03 Describe the major classifications of plants based on life cycle. | | | PS.02.01.01.c |
| 23.04 Demonstrate the use of botanical and common names of plants including genus and specific epithet and cultivar. | | | PS.02.01.02.c |
| 23.05 Demonstrate proper use of botanical names. | | | PS.02.01.01.a |
| 24.0 Demonstrate proper use of growing media and fertilizers – the student will be able to: | | SC.912.E.6.2, 4 SC.912.L.18.11 SC.912.P.8.5, 7, 11 | |
| 24.01 Apply information on a label of fertilizer, including updated BMP rules, used in Florida. | | | PS.01.03.04.b |
| 24.02 Apply fertilizer and soil amendments. | | | |
| 24.03 Identify materials that are needed to alter pH and calculate the amount to apply to change the pH. | | | PS.01.03.02.a |
| 24.04 Demonstrate the procedure for calibrating a fertilizer spreader or injector using appropriate mathematical concepts. | | | PS.01.03.04.c |
| 24.05 Identify essential elements and nutrients in plant growth including macronutrients and micronutrients. | | | PS.01.03.01.a |
| 24.06 Using references make fertilizer recommendations for ornamental plants, turf grass, and palms. | | | PS.01.03.03.c |
| 25.0 Demonstrate Integrated Pest Management approaches – the student will be able to: | | SC.912.L.14.9 SC.912.L.17.6, 7, 12, 13, 15 | |
| 25.01 Classify insects according to feeding habits. | | | PS.03.03.01.a |
| 25.02 Describe IMP (Integrated Pest Management) methods of controlling plant pests. | | | PS.03.03.03.a |
| 25.03 Diagnose and outline a plan for controlling pests on a horticultural crop. | | | PS.03.03.03.c |
| 25.04 Describe methods of controlling nematode pests on ornamental plants, and use BMPs to prevent infestation.. | | | |
| 25.05 Develop a pest control program for a horticultural crop using Integrated Pest Management. | | | |
| 25.06 Identify specific cultural, mechanical, chemical, and biological methods of weed management. | | | |
| 25.07 Identify evasive and poisonous plants in Florida. | | | |
| 25.08 Identify types of weeds common to Florida. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|---|--------------------|
| 26.0 Identify the principles and requirements of plant growth – the student will be able to: | | SC.912.L.14.7, 15, 17, 31 SC.912.N.1.1, 7 SC.912.P.8.8, 9, 10 | |
| 26.01 Demonstrate methods of pruning plants. | | | |
| 26.02 Identify appropriate time to prune plants. | | | |
| 26.03 Identify and select pruning tools. | | | |
| 26.04 Demonstrate proper use of pruning tools and care. | | | |
| 26.05 Demonstrate sanitation of tools to prevent the spread of disease. | | | |
| 26.06 Identify Plant Growth Regulators and their use on horticulture and landscape plants. | | | |
| 26.07 Outline and use a record book for the use of a plant growth regulator on a horticultural or nursery crop. | | | |
| 26.08 Identify appropriate pruning techniques to achieve plant size, form, and shape. | | | |
| 27.0 Apply best management practices in landscape design – the student will be able to: | | SC.912.L.17.9, 11, 12, 13, 14, 15 SC.912.N.1.1 SC.912.N.2.4 | |
| 27.01 Identify and apply Best Management Practices for the design and installation of landscapes. | | | PS.04.01.01.a |
| 27.02 Identify and apply Best Management Practices on the management and handling of pesticides. | | | |
| 28.0 Demonstrate customer service skills that are essential in dealing with clients.- the student will be able to: | | | |
| 28.01 Demonstrate ability to communicate clearly with the client. | | | |
| 28.02 Conduct a walk through and interview with client to assure clear vision. | | | |
| 28.03 Identify future expectations of the client relationship. | | | |
| 29.0 Apply principles of landscape design and maintenance – the student will be able to: | | SC.912.L.17.17 | |
| 29.01 Demonstrate the use of line, form, texture and color in designing landscapes. | | | PS.04.01.01.c |
| 29.02 Demonstrate the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes. | | | PS.04.02.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|---|--------------------|
| 29.03 Apply points of emphasis and major design areas in the commercial landscape. | | | |
| 29.04 Identify plant selection for a commercial and residential landscape using Florida Friendly Landscape Principles. | | | |
| 29.05 Create a landscape plan for a residential or commercial property. | | | |
| 29.06 Calculate materials needed according to the identified landscape plan. | | | |
| 29.07 Identify factors in selecting turf for landscape installation. | | | |
| 30.0 Harvest, transport, and install plant materials – the student will be able to: | | SC.912.L.17.4, 15, 17 | |
| 30.01 Determine requirements for preserving plant viability. | | | |
| 30.02 Demonstrate proper landscape plant establishment techniques. | | | |
| 30.03 Select and prepare plants for transporting and transplanting. | | | |
| 30.04 Select horticultural products according to Florida grades and standards. | | | |
| 31.0 Identify procedures to operate, repair, and maintain tools and equipment – the student will be able to: | | SC.912.N.1.1 | |
| 31.01 Perform equipment pre-operational check. | | | |
| 31.02 Identify, maintain, and operate hand tools and power tools. | | | |
| 32.0 Identify emerging technologies in the horticulture industry – the student will be able to: | | SC.912.L.16.1, 2, 7, 9, 10 SC.912.L.17.15, 17 | |
| 32.01 Investigate DNA and genetic applications in horticulture including the theory of probability. | | | |
| 32.02 Evaluate advances in biotechnology that impact horticulture. (e.g. transgenic crops, biological controls, micro propagation etc.). | | | |
| 32.03 Investigate ways that GIS, Remote sensing, and precision agriculture, and UAV or RPA (Unmanned Ariel Vehicles) (Remotely Piloted Aircraft) are used in the Horticulture industry. | | | |
| 33.0 Demonstrate leadership, employability, communications and human relations skills – the student will be able to: | | SC.912.N.1.7 | |
| 33.01 Identify appropriate work habits and personal characteristics. | | | |
| 33.02 Identify proper employee hygiene habits. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|-----------|--------------------|
| 33.03 Identify or demonstrate appropriate responses to criticism from employer, | | | |
| 33.04 Describe the importance of employee industry certifications. | | | |
| 33.05 Discuss education opportunities available in the area of Horticulture. | | | |
| 34.0 Describe personal traits, attitudes, customer approaches, and activities that help successful selling. – the student will be able to: | | | |
| 34.01 Demonstrate proper customer communication techniques. | | | |
| 34.02 Determine your products pricing structure. | | | |
| 34.03 Discuss components of customer satisfaction. | | | |

Florida Department of Education
Student Performance Standards

Course Title: Landscape and Turf Science 4
Course Number: 8121310
Course Credit: 1

Course Description:

This course is designed to further develop competencies in the areas of use and maintenance of landscape and turf equipment; classification of plants and turfgrass; fertilization; and irrigation.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|---|--------------------|
| 35.0 Maintain tools and equipment – the student will be able to: | | SC.912.N.1.1 SC.912.N.2.4 SC.912.P.12.3, 5 | |
| 35.01 Maintain oil level in engines of power equipment. | | | |
| 35.02 Check and maintain tire air pressure on equipment. | | | |
| 35.03 Maintain fuel levels using proper fuel or fuel mixtures. | | | |
| 35.04 Demonstrate proper equipment operations. | | | |
| 35.05 Identify, operate, and maintain tractor and power equipment. | | | |
| 36.0 Demonstrate application of chemicals and calibrate spray equipment – the student will be able to: | | SC.912.L.16.6 SC.912.L.17.15, 16, 17 SC.912.N.1.1 SC.912.N.2.4 | |
| 36.01 Select, mix, and apply a non-restricted chemical according to the label and local, state, federal, and EPA regulations. | | | |
| 36.02 Discuss appropriate responses to chemical or fertilizer spills. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|---|--------------------|
| 36.03 Identify and report insect and disease damage on plants and turf. | | | |
| 36.04 Diagnose a plant or disease problem on turf. | | | |
| 37.0 Classify plants and turfgrass – the student will be able to: | | SC.912.L.14.5, 7, 10, 53 SC.912.L.15.4, 6 SC.912.L.17.7 SC.912.N.1.1 SC.912.N.2.4 | |
| 37.01 Classify plants including turfgrass as annuals, biennials, and perennials. | | | |
| 37.02 Identify plants including turfgrass that are specific to a region. | | | |
| 37.03 Identify common weeds in Florida turf grasses. | | | |
| 38.0 Demonstrate fertilization skills – the students will be able to: | | SC.912.N.1.1 SC.912.N.2.4 | |
| 38.01 Develop a fertilization schedule. | | | |
| 38.02 Interpret fertilizer charts and develop recommendations according to turf species. | | | |
| 39.0 Irrigate plants and turf – the student will be able to: | | SC.912.N.1.1 SC.912.N.2.4 SC.912.P.10.15 | |
| 39.01 Identify various types of irrigation systems. | | | |
| 39.02 Install and maintain piping and water distribution components. | | | |
| 39.03 Install valves, timers, rain shut-offs, moisture sensors, and back flow prevention devices. | | | |
| 39.04 Design a microirrigation system. | | | |
| 39.05 List problems associated with improper design, installation and maintenance. | | | |
| 40.0 Layout and/or install landscape and/or interiorscape – the student will be able to: | | | |
| 40.01 Prepare landscape and/or interiorscape. | | | |
| 40.02 Prepare final grade. | | | |
| 40.03 Install mulch and perform final cleanup. | | | |
| 40.04 Calculate labor costs associated with installation. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|-----------|--------------------|
| 41.0 Maintain customer relations and observe follow-up procedures – the student will be able to: | | | |
| 41.01 Conduct walk-through of project with client to assure satisfaction. | | | |
| 41.02 Identify current and future maintenance requirements. | | | |
| 41.03 Analyze project records for profitability and employee performance | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Landscape and Turf Science 5
Course Number: 8121320
Course Credit: 1

Course Description:

This course is designed to further develop competencies in the areas of chemical application; equipment calibration; analyzing and designing landscape and turf; preparing estimates and contracts; and lay out and installation of landscape, interiorscape and turf.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|--|--------------------|
| 42.0 Perform service on tools and equipment – the student will be able to: | | SC.912.N.1.1 SC.912.N.2.4 SC.912.P.10.3 SC.912.P.12.3, 4, 5 | |
| 42.01 Service and maintain battery and electrical systems. | | | |
| 42.02 Perform minor tune-up on engines. | | | |
| 42.03 Load, balance, secure, and transport equipment. | | | |
| 42.04 Demonstrate safety precautions while working with tools and equipment. | | | |
| 43.0 Apply chemicals and calibrate spray equipment – the student will be able to: | | SC.912.L.17.15 SC.912.N.1.1 SC.912.N.2.4 | |
| 43.01 Calibrate spray and spread equipment. | | | |
| 43.02 Determine chemical compatibility. | | | |
| 43.03 Determine appropriate time frequency and method of chemical application according to the label. | | | |
| 43.04 Apply Best Management Practices for fertilizer, and any additional chemicals. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|---|--------------------|
| 44.0 Perform classification of plants including turfgrass – the student will be able to: | | SC.912.L.14.5, 7, 10, 53 SC.912.L.15.4, 6 SC.912.L.17.7 SC.912.N.1.1 SC.912.N.2.4 | |
| 44.01 Classify plants including turfgrass according to growth habit. | | | |
| 44.02 Identify hazardous, poisonous, and evasive plants. | | | |
| 45.0 Use fertilization skills – the students will be able to: | | SC.912.N.1.1 | |
| 45.01 Determine rate of fertilizer application. | | | |
| 45.02 Calibrate fertilizer equipment. | | | |
| 46.0 Perform irrigation of plants including turf – the student will be able to: | | | |
| 46.01 Check and evaluate irrigation system performance. | | | |
| 46.02 Maintain irrigation system. | | | |
| 46.03 Recognize symptoms of water stress on plants including turf grasses. | | | |
| 46.04 Apply general knowledge of appropriate state laws to irrigation practices. | | | |
| 47.0 Maintain landscape – the student will be able to: | | | |
| 46.05 Perform maintenance inspection of the project. | | | |
| 46.06 Determine water requirements and apply at proper rates. | | | |
| 46.07 Identify weeds and apply herbicides safely. | | | |
| 46.08 Determine fertilization requirements and apply at proper rates. | | | |
| 46.09 Identify plant pest and disease problems and apply corrective measures. | | | |
| 46.10 Trim and prune landscape plants. | | | |
| 46.11 Maintain turf viability; mow at proper height and frequency, blade edge, line trim, and remove trash. | | | |
| 46.12 Explain cause and effect of soil compaction and thatch buildups, and determine appropriate methods of correction. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|-----------|--------------------|
| 46.13 Identify mulch selection to cultivate plantings. | | | |
| 46.14 Brace and repair trees including palms. | | | |
| 46.15 Provide protection for plants from adverse weather conditions. | | | |
| 46.16 Comply with local, state, and federal regulations and laws regarding landscape maintenance and pesticide applications. | | | |

Florida Department of Education
Student Performance Standards

Course Title: Sports and Recreational Turf Operations 6
Course Number: 8121410
Course Credit: 1

Course Description:

This course is designed to further develop competencies in the areas of chemical application; equipment calibration; analyzing and designing turf;; and lay out and installation of turf.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|----------------------------------|--------------------|
| 48.0 Identify components of athletic fields – the student will be able to: | | | |
| 48.01 Identify turf selection for various athletic fields. | | | |
| 48.02 Identify appropriate dimensions for different athletic fields and specific requirements. | | | |
| 49.0 Maintain athletic fields – the student will be able to: | | SC.912.N.1.1; SC.912.N.2.4, 5 | |
| 47.01 Apply proper line marks for athletic fields. | | | |
| 47.02 Painting fields (school logos or names) | | | |
| 47.03 Apply proper techniques for clay maintenance. | | | |
| 47.04 Mow grass to appropriate height for field use. | | | |
| 50.0 Develop recreational areas – the student will be able to: | | SC.912.N.1.1 SC.912.N.2.4, 5 | |
| 48.01 Establish plant beds with annuals, biennials, and perennials. | | | |
| 48.02 Plant accent trees and shrubs in a recreational area. | | | |

| | | | | |
|-------|--|--|---------------------------------|--|
| 48.03 | Establish sports turf. | | | |
| 51.0 | Maintain sports turf – the student will be able to: | | SC.912.N.1.1 SC.912.N.2.4, 5 | |
| 49.01 | Mow sport turf with reel mowers. | | | |
| 49.02 | Irrigate turf. | | | |
| 49.03 | Verticut turf. | | | |
| 49.04 | Aerate turf and remove debris. | | | |
| 52.0 | Establish turfgrass – the student will be able to: | | | |
| 51.01 | Level seedbed. | | | |
| 51.02 | Plant turf by sprigs, plugs or sod. | | | |
| 51.03 | Remove sod with sod cutter. | | | |
| 53.0 | Tending and rejuvenating turf – the student will be able to: | | SC.912.N.1.1 SC.912.N.2.4, 5 | |
| 53.01 | Apply top dressing. | | | |
| 53.02 | Overseed turf. | | | |
| 53.03 | Irrigate turf. | | | |
| 53.04 | Aerate turf. | | | |
| 53.05 | Apply fertilizer. | | | |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Extended Student Supervision

Because of the production and marketing cycle of the agriculture industry, this program requires individual instruction and supervision of students for the entire period beyond the 180-day school year.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

Florida Department of Education
Curriculum Framework

Program Title: Agriculture Biotechnology
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

| | |
|----------------------------|--|
| Program Number | 8003100 |
| CIP Number | 0126120101 |
| Grade Level | 9-12 |
| Standard Length | 5 credits |
| Teacher Certification | Refer to the <u>Program Structure</u> section |
| CTSO | FFA |
| SOC Codes (all applicable) | 19-4021 - Biological Technicians 19-1011 - Animal Scientists 19-1013 - Soil and Plant Scientists |

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety and environmental issues.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of three occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

This program can be taken by students as a three credit program by completing OCP A, a four credit program by completing OCP A and B or OCP A and C, or a 5 credit program by completing OCP A, B and C.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the secondary program structure:

| OCP | Course Number | Course Title | Teacher Certification | Length | SOC Code | Level | Graduation Requirement |
|-----|---------------|------------------------------|-----------------------|----------|----------|-------|------------------------|
| A | 8106810 | Agriscience Foundations 1 | AGRICULTUR 1 @2 | 1 credit | 19-4021 | 3 | EQ |
| | 8106850 | Agricultural Biotechnology 2 | | 1 credit | | 3 | |
| | 8106860 | Agricultural Biotechnology 3 | | 1 credit | | 3 | EQ |
| B | 8106120 | Animal Biotechnology | | 1 credit | 19-1011 | 3 | |
| | 8106510 | Plant Biotechnology | | 1 credit | 19-1013 | 3 | |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Academic Alignment Table

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

| Courses | Anatomy/ Physiology Honors | Astronomy Solar/Galactic Honors | Biology 1 | Chemistry 1 | Earth-Space Science | Environmental Science | Genetics | Integrated Science | Marine Science 1 Honors | Physical Science | Physics 1 |
|------------------------------|----------------------------|---------------------------------|--------------|--------------|---------------------|-----------------------|--------------|--------------------|-------------------------|------------------|--------------|
| Agriscience Foundations | 29/87 33% | 18/80 23% | 55/83 66% | 11/69 16% | 36/67 54% | 30/70 42% | 20/69 29% | 49/82 60% | 25/66 38% | 38/74 51% | 12/72 16% |
| Agricultural Biotechnology 2 | 9/87 10% | 9/80 11% | 44/83 53% | 10/69 14% | 25/67 37% | 11/70 16% | 19/69 28% | 16/82 21% | 11/66 17% | 33/74 45% | 7/72 10% |
| Agricultural Biotechnology 3 | 26/87 30% | 29/80 36% | 13/83 16% | 30/69 43% | 3/67 4% | 39/70 56% | 29/69 42% | 7/82 8% | 30/66 45% | 8/74 11% | 28/72 38% |
| Animal Biotechnology | 34/87 39% | 29/80 36% | 14/83 17% | 30/69 43% | 6/67 9% | 30/70 43% | 34/69 49% | 9/82 11% | 27/66 41% | 10/74 16% | 29/72 40% |
| Plant Biotechnology | 24/87 28% | 23/80 29% | 13/83 16% | 22/69 32% | 3/67 4% | 25/70 36% | 28/69 41% | 10/82 12% | 22/66 33% | 4/74 5% | 23/72 32% |

** Alignment pending review

Alignment attempted, but no correlation to academic course

| Courses | Algebra 1 | Algebra 2 | Geometry | English 1 | English 2 | English 3 | English 4 |
|------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Agriscience Foundations | 14/67 21% | 4/75 5% | 8/54 15% | 11/46 24% | 11/45 24% | 11/45 24% | 11/45 24% |
| Agricultural Biotechnology 2 | 19/67 28% | 14/75 19% | 17/54 31% | 10/46 21% | 10/45 22% | 3/45 7% | 3/45 7% |
| Agricultural Biotechnology 3 | 4/67 6% | 7/75 9% | # | 12/46 26% | 12/45 27% | 12/45 27% | 12/45 27% |
| Animal Biotechnology | 11/67 16% | 17/75 23% | 8/54 15% | # | # | 8/45 18% | 8/45 18% |
| Plant Biotechnology | 10/67 15% | 18/75 24% | 8/54 15% | # | # | 8/45 18% | 8/45 18% |

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. The FS for Mathematical Practices are designed for grades K-12 and describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education.

Instructors must incorporate the Florida Standards for Technical Subjects and Mathematical Practices throughout instruction of this CTE program.

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL’s need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. If so, the standards have been identified and cross walked with the corresponding CTE standard and/or benchmark.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Describe the history of agriculture and its influence on the global economy.
- 02.0 Practice agriscience safety skills and procedures.
- 03.0 Apply scientific and technological principles to agriscience issues.
- 04.0 Apply environmental principles to the agricultural industry.
- 05.0 Investigate and utilize basic scientific skills and principles in plant science.
- 06.0 Investigate and utilize basic scientific skills and principles in animal science.
- 07.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 08.0 Demonstrate agribusiness, employability and human relation skills.
- 09.0 Apply leadership and citizenship skills.
- 10.0 Discuss components of food safety and handling practices in agriculture
- 11.0 Identify the historical, social, cultural and potential applications of biotechnology.
- 12.0 Conduct scientific investigation and apply results.
- 13.0 Practice agricultural laboratory safety.
- 14.0 Apply genetic principles to agricultural production.
- 15.0 Demonstrate laboratory skills as applied to biotechnology.
- 16.0 Demonstrate the application of biotechnology to Agriculture, Food and Natural Resources (AFNR).
- 17.0 Recognize and follow quality control procedures and regulatory guidelines.
- 18.0 Analyze the historical, social, cultural and potential applications of biotechnology.
- 19.0 Demonstrate proper tissue/cell culture techniques.
- 20.0 Demonstrate the application of biotechnology to the Agriculture, Food and Natural Resources (AFNR) industries.
- 21.0 Demonstrate leadership, employability, communication and human relation skills.

Animal Biotechnology

- 22.0 Apply genetic principles to animal science.
- 23.0 Interpret the relationship between total digestible nutrients (TDN) in feeds and its utilization.
- 24.0 Examine the developmental processes that determine animal growth.
- 25.0 Investigate the reproduction system of animals.
- 26.0 Describe animal science and the role of animals in society.

Plant Biotechnology

- 27.0 Describe plant classifications and the economic impact to your region.
- 28.0 Apply genetic principles to plant improvement.
- 29.0 Demonstrate methods of micropropagating plants.
- 30.0 Demonstrate methods of plant production.
- 31.0 Use plants to demonstrate growth disorders (nutrients, pathogens, pests).

32.0 Identify the historical, social, cultural and potential applications of plant biotechnology.

**Florida Department of Education
Student Performance Standards**

Course Title: Agriscience Foundations 1
Course Number: 8106810
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of agricultural history and the global impact of agriculture; career opportunities; scientific and research concepts; biological and physical science principles; environmental principles; agriscience safety; principles of leadership; and agribusiness, employability, and human relations skills in agriscience. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students will interact with materials and primary sources of data or with secondary sources of data to observe and understand the natural world. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 20% of classroom time will be dedicated to laboratory experiences.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|------------------------------------|---|--------------------|
| 01.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to: | | SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2; | |
| 01.01 Investigate the origin and history of agriculture and its relationship to science and technology. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.01.01.02.c |
| 01.02 Analyze the impact of agriculture on the local, state, national and global economy. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | CS.02.02.03.b |
| 01.03 Identify significant career patterns/shifts in the history of the agricultural industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.01.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-------------------------------------|--|--------------------|
| 01.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.06.02.01.a |
| 02.0 Practice agriscience safety skills and procedures--The student will be able to: | | SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7; | |
| 02.01 Identify the common causes and prevention of accidents in agriscience operations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.a |
| 02.02 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | CS.03.04.03.a |
| 02.03 Identify proper disposal of hazardous waste materials and biohazards. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | ESS.04.01.02.c |
| 02.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.b |
| 03.0 Apply scientific and technological principles to agriscience issues--The student will be able to: | | SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1; | |
| 03.01 Employ scientific measurement skills. | | | |
| 03.02 Demonstrate safe and effective use of common laboratory equipment. | | | ESS.01.02.01.b |
| 03.03 Identify the parts and functions of plant and animal cells. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |
| 03.04 Describe the phases of cell reproduction. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 03.05 Implement the scientific method and science process skills through | LAFS.910.W.2.4 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|--------------------|
| the design and completion of an agriscience research project. | LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |
| 03.06 Interpret, analyze, and report data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | BS.02.01.01.b |
| 03.07 Investigate DNA and genetics applications in agriscience including the theory of probability. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | BS.01.01.01.a |
| 03.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.). | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | BS.03.01.03.b |
| 04.0 Apply environmental principles to the agricultural industry--The student will be able to: | | SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12 | |
| 04.01 Research how different climactic and geological activity influences agriculture. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | NRS.01.03.02.b |
| 04.02 Describe various ecosystems as they relate to the agriculture industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.03 Describe the environmental resources (soil, water, air) necessary for agriculture production. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.08.02.01.a |
| 04.04 Identify regulatory agencies that impact agricultural practices. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6 | | NRS.02.01.02.a |
| 04.05 Apply Best Management Practices that enhance the natural environment. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.06 Identify conservation practices related to natural resources. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.02.02.b |
| 05.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to: | | SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7; | |
| 05.01 Identify and describe the specializations within the plant science industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|---|
| | LAFS.1112.W.2.4 | | |
| 05.02 Categorize plants based on specific characteristics according to industry and scientific standards. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.01.01.a |
| 05.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc.... | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.03.01.a PS.02.03.02.a PS.02.03.05.a |
| 05.04 Identify the nutrients required for plant growth from the periodic table and explain their functions. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.01.02.01.a |
| 05.05 Analyze information from a fertilizer label. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | PS.01.03.04.b |
| 05.06 Propagate and grow plants through sexual and/or asexual reproduction. | | | PS.03.01.03.a PS.03.01.01.b |
| 05.07 Investigate the impacts of various pests and propose solutions for their control. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.03.03.01.c |
| 05.08 Investigate the nature and properties of food, fiber, and by-products from plants. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.09 Explore career opportunities in plant science. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.05.01.01.a |
| 06.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to: | | SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19; | |
| 06.01 Explain the economic importance of animals and the products obtained from animals. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.02 Analyze commercially important livestock breeds in Florida. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |
| 06.04 Compare and contrast animal welfare issues. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.02.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|---|--------------------|
| | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 06.05 Investigate the nature and properties of food, fiber, and by-products from animals. | | | AS.06.03.03.a |
| 06.06 Explore career opportunities in animal science. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | CS.05.01.01.a |
| 07.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to | | SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9; | |
| 07.01 Select and demonstrate proper use of hand tools in agriculture. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.04.02.a |
| 07.02 Operate service and maintain agriscience equipment, and instruments. | | | CS.03.04.03.b |
| 07.03 Manage facilities and supplies. | | | |
| 08.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to: | | | |
| 08.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE). | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 08.02 Utilize a record keeping system to collect, interpret, and analyze data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 08.03 Enhance oral communications through telephone, interview and presentation skills. | LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | CRP.04.01.02.b |
| 08.04 Enhance written communication by developing resumes and business letters. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2 | | CRP.04.02.02.b |
| 08.05 Demonstrate interpersonal (nonverbal) communication skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|-----------|---------------------------------|
| 08.06 Demonstrate good listening skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.04.03.01.a |
| 09.0 Apply leadership and citizenship skills--The student will be able to: | | | |
| 09.01 Identify and describe leadership characteristics. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.01.a |
| 09.02 Identify opportunities to apply acquired leadership skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.02.a |
| 09.03 Identify and demonstrate ways to be an active citizen. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.01.03.02.c |
| 09.04 Participate in community based learning activities. | | | CRP.01.03.01.a |
| 09.05 Demonstrate the ability to work cooperatively. | | | CRP.09.03.01.a |
| 09.06 Conduct formal and informal meetings using correct parliamentary procedure skills. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 09.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 09.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks. | | | CS.05.01.01.b CRP.10.02.02.b |
| 10.0 Discuss components of food safety and handling practices in agriculture - The student will be able to: | | | |
| 10.01 Demonstrate proper safety precautions and use of personal protective equipment. | | | FPP.01.01.01.b |
| 10.02 Evaluate the food safety responsibilities that occur along the food supply chain. | | | FPP.03.03.02.b |
| 10.03 Explain techniques and procedures for the safe handling of food products. | | | FPP.03.03.02.c |
| 10.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation). | | | FPP.03.03.01.b |
| 10.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply. | | | FPP.04.01.01.0b |

**Florida Department of Education
Student Performance Standards**

Course Title: Agricultural Biotechnology 2
Course Number: 8106850
Course Credit: 1

Course Description:

This course was developed as a core and is designed to develop competencies in the areas of agricultural biotechnology in agriculture, scientific investigation, laboratory safety, scientific and technological concepts; and the fundamentals of biotechnology.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|-----------------------------|--------------------|
| 11.0 Identify the historical, social, cultural and potential applications of biotechnology – the student will be able to: | | | |
| 11.01 Define biotechnology and explore the historical impact on agriculture. | LAFS.910.L.3.6 | SC.912.L.16.10 | |
| 11.02 Analyze the developmental progression of biotechnology and the evolution of scientific knowledge | | | BS.01.01.01.b |
| 11.03 Distinguish between current and emerging applications of biotechnology in agriculture. | LAFS.910.RI.3.8 | SC.912.N.1.1 | BS.01.01.03.a |
| 11.04 Explain the relationship between regulatory agencies and the protection of public interests such as health, safety, and the environment. | | | BS.01.02.03.a |
| 11.05 Compare and contrast differences between regulatory systems worldwide. | LAFS.910.SL.1.2 | SC.912.L.17.13 | BS.01.02.01.b |
| 11.06 Research and document major regulatory issues related to biotechnology in agriculture. | | SC.912.L.17.13 | BS.01.02.02.a |
| 11.07 Explore ethical, legal and social biotechnology issues. | LAFS.910.SL.1.2 | SC.912.L.16.10 | |
| 11.08 Evaluate the short-term and long-term benefits and risks of applying biotechnology to agriculture. | LAFS.910.W.3.7, 8 LAFS.910.SL.1.1, 2 | SC.912.L.16.10 | BS.01.01.04.c |
| 11.09 Investigate the emergence and evolution of biological organisms and their use in biotechnology. | LAFS.910.W.3.7, 8 LAFS.910.SL.1.1, 2 | SC.912.L.15.1, 2, 3, 8, 14; | |

| CTE Standards and Benchmarks | | FS-M/LA | NGSSS-Sci | National Standards |
|------------------------------|--|---|-----------------------------------|--------------------|
| 11.10 | Research and summarize legal issues related to biotechnology in agriculture (e.g., protection of intellectual property through patents, copyright, trademarks, ...) | LAFS.910.W.3.7, 8 LAFS.910.SL.1.1, 2 LAFS.1112.RI.3.8 | SC.912.L.16.10; SC.912.L.17.13 | BS.01.03.02.a |
| 11.11 | Devise and support an argument for or against an ethical issue associated with biotechnology in agriculture. | LAFS.910.RI.1.2 | SC.912.L.16.10 | BS.01.03.01.c |
| 12.0 | Conduct scientific investigation and apply results – the student will be able to: | | | |
| 12.01 | Discuss the differences between scientific laws and scientific theories. | LAFS.910.SL.1.1 | SC.912.N.3.1, 2, 3, 4; | |
| 12.02 | Design an agricultural experiment using appropriate control measures. | | SC.912.N.1.1 | |
| 12.03 | Collect and record data using SI units. | MAFS.912.N-Q.1.1, 3 | SC.912.N.1.1 | |
| 12.04 | Using the scientific method summarize data, draw conclusions, and plan follow-up experiments. | MAFS.912.S-IC.2.3, 4, 5, 6 | SC.912.N.1.1 | |
| 13.0 | Practice agricultural laboratory safety – the student will be able to: | | | |
| 13.01 | Identify first aid supplies, personnel and emergency protection areas. | | | |
| 13.02 | Monitor, use, store and dispose of hazardous materials and disposal of biological pathogens according to industry practices. | | SC.912.L.17.14 | |
| 13.03 | Document safety training and practices (reading and interpreting) using Safety Data Sheets (SDS) and Occupational Safety and Health Administration (OSHA) standards. | | SC.912.L.17.14, 16; | |
| 13.04 | Demonstrate and utilize safety equipment. | | | |
| 13.05 | Identify safety symbols and signs. | | | |
| 13.06 | Demonstrate appropriate safety procedures and guidelines, and discuss implications of safety violations. | | | |
| 14.0 | Apply genetic principles to agricultural production – the student will be able to: | | | |
| 14.01 | Describe the relationship between reproduction and genetic improvement. | LAFS.910.SL.2.4 | SC.912.L.16.17 | |
| 14.02 | Demonstrate how traits are inherited. | | SC.912.L.16.1, 2; | |
| 14.03 | Describe how genetic processes and structures control inheritance. | LAFS.910.SL.2.4 | SC.912.L.16.1, 2, 16; | |
| 14.04 | Predict probable results of single or multiple trait crosses. | MAFS.912.S-MD.2.7 MAFS.912.S-MD.1.1, 3 | SC.912.L.16.3, 16; | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|------------------------------------|---------------------------|
| 14.05 Differentiate between dominant and recessive traits. | LAFS.910.L.3.6 | SC.912.L.16.2 | |
| 14.06 Compare and contrast the structures of DNA and RNA and how they are manipulated. | | SC.912.L.16.3 | BS.02.05.02.a |
| 14.07 Investigate how genotype influences phenotype. | | | |
| 14.08 Hypothetically develop a genetic engineered species to solve an agriculture problem. | | SC.912.N.4.2 | |
| 14.09 Assess and debate the pros and cons of transgenic species in agriculture | LAFS.910.SL.1.1, 3 | SC.912.N.4.2; SC.912.L.16.10 | BS.03.01.02.b |
| 14.10 Perform DNA manipulations, such as cloning/subcloning, blotting, sequencing and amplification. | | SC.912.L.16.12 | |
| 14.11 Analyze factors that influence gene expression. | | SC.912.L.16.5, 6; | |
| 14.12 Describe the process of genetic marker assisted selection. | LAFS.910.SL.2.4 | SC.912.L.16.7 | |
| 15.0 Demonstrate laboratory skills as applied to biotechnology – the student will be able to: | | | |
| 15.01 Maintain and interpret laboratory and production records documented in a laboratory to ensure data accuracy and integrity | LAFS.910.W.1.2 | | BS.02.01.01.b |
| 15.02 Manipulate basic laboratory equipment and measurement devices. | | | BS.02.02.02.b |
| 15.03 Demonstrate advanced aseptic techniques in the biotechnology laboratory. | | | BS.02.03.01.b |
| 15.04 Analyze and select an appropriate standard operating procedure for working with biological materials based upon their classification. | | SC.912.P.8.7 | BS.02.03.02.b |
| 15.05 Formulate and prepare solutions using standard operating procedures (e.g., buffers, reagents, solutions and media). | MAFS.912.N-Q.1.2 MAFA.912.A-CED.1.3 | SC.912.P.8.11 | BS.02.03.03.b |
| 15.06 Inventory biological and chemical materials, and maintain accurate records of supplies and expiration dates. | | | BS.02.04.02.b |
| 15.07 Isolate, maintain, quantify and store cell cultures. | | SC.912.P.12.12 | |
| 15.08 Analyze and interpret the molecular basis for heredity and the tools and techniques used | LAFS.910.W.1.2 | SC.912.L.16.2, 11 | BS.02.05.02.b |
| 15.09 Extract and purify DNA and RNA according to standard operating procedures. | | SC.912.L.16.12 | BS.02.05.03.a |
| 15.10 Demonstrate protein separation techniques and interpret the results. | | SC.912.P.8.6, 11; SC.912.L.18.4 | BS.02.05.04.b |
| 15.11 Analyze and document how antibodies are formed and describe how they can be used in agriculture biotechnology. | LAFS.910.SL.2.4 | SC.912.L.14.52 | BS.02.05.05.b |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-------------------------------------|-------------------------------|--------------------|
| 15.12 Summarize reasons for detecting microbes and identify sources of microbes. | LAFS.910.W.3.7 LAFS.910.L.1.1, 6 | SC.912.L.14.52 | BS.03.02.01.a |
| 16.0 Demonstrate the application of biotechnology to Agriculture, Food and Natural Resources (AFNR) – the student will be able to: | | | |
| 16.01 Explain biological, social, agronomic and economic reasons for genetic engineering of eukaryotes and prokaryotes. | LAFS.910.SL.2.4 | SC.912.L.16.10 | BS.03.01.01.a |
| 16.02 Differentiate the roles of carbohydrates, fats, and proteins in biotechnology applications. | | SC.912.L.18.1 | |
| 16.03 Describe the role of fermentation in biotechnology applications. | | SC.912.L.18.8 | |
| 16.04 Analyze and document the processes and describe the techniques used to produce transgenic eukaryotes. | | SC.912.L.16.7 | BS.03.01.01.b |
| 16.05 Examine enzymes, the changes they cause in foods and the physical and chemical parameters that affect enzymatic reactions. | LAFS.910.SL.2.4 | SC.912.L.18.1, 11; | BS.03.02.02.a |
| 16.06 Describe how enzymatic reactions can be used in biotechnology based assays. | | | |
| 16.07 Analyze processes by which enzymes are produced through biotechnology. | LAFS.910.SL.2.4 | SC.912.L.18.1, 4; | BS.03.02.02.b |
| 16.08 Compare and contrast the use of natural organisms and genetically engineered organisms in the treatment of wastes. | | SC.912.L.17.14 | |
| 16.09 Analyze the process by which organisms are genetically engineered for waste treatment. | | SC.912.L.17.17 | BS.03.06.01.b |
| 16.10 Investigate-and report on-genetic engineering procedures used in the production of agricultural products. | | SC.912.L.16.10, 12; | |
| 16.11 Explain the functions of hormones in animals. | | SC.912.L.14.29, 32; | |
| 16.12 Describe the processes used to produce animal hormones from transgenic organisms. | | SC.912.L.16.7, 9; | |
| 16.13 Identify foods produced through fermentation. | | SC.912.L.18.8 | |
| 16.14 Compare and contrast bioengineering and conventional pathways used in food processing. | LAFS.910.RI.1.3 | SC.912.L.18.2, 8 | |
| 16.15 Explain biomass and sources of biomass. | LAFS.910.SL.2.4 | SC.912.L.17.11 | |
| 16.16 Assess the characteristics of biomass that make it useful for biofuels production. | | SC.912.L.18.7, 8, 9; | BS.03.05.02.b |
| 16.17 Correlate the relationship between fermentation and the process used to produce alcohol from biomass. | LAFS.910.SL.2.4 | SC.912.L.18.6, 8; | BS.03.05.03.b |
| 16.18 Analyze and document the process to produce biodiesel from biomass. | | SC.912.N.1.7; SC.912.N.3.5 | BS.03.05.04.b |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-----------------|--------------------|---------------------------|
| 16.19 Analyze and describe the process used to produce methane from biomass. | | SC.912.P.8.12, 13 | BS.03.05.05.b |
| 16.20 Research and describe the aims and techniques involved in selective plant and animal breeding process. | LAFS.910.SL.2.4 | SC.912.L.14.7, 53; | BS.03.04.01.a |

**Florida Department of Education
Student Performance Standards**

Course Title: Agricultural Biotechnology 3
Course Number: 8106860
Course Credit: 1

Course Description:

This course is designed to enhance competencies in the areas of current agricultural biotechnology applications, genetic principles, tissue/cell culture, and the potential for biotechnology in the area of agriculture.

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students will interact with materials and primary sources of data or with secondary sources of data to observe and understand the natural world. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 20% of classroom time will be dedicated to laboratory experiences.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

| CTE Standards and Benchmarks | | FS-M/LA | NGSSS-Sci | National Standards |
|------------------------------|--|---|---------------------|--------------------|
| 17.0 | Recognize and follow quality control procedures and regulatory guidelines – the student will be able to: | | | |
| 17.01 | Design and conduct an experiment using tools to evaluate biotechnology derived products. | | SC.912.N.1.1 | |
| 17.02 | Assess and summarize the role and scope of agencies that regulate biotechnology. | | SC.912.L.17.13, 14; | BS.01.02.01.b |
| 17.03 | Discuss quality control as it relates to products, safety, quality to the end user, and meeting regulatory specifications. | LAFS.1112.SL.1.1 | | |
| 17.04 | Perform quality control methods utilizing proper documentation. | | | |
| 17.05 | Conduct a polymerase chain reaction to determine the presence of genetic modifications in a common food item. | | SC.912.L.16.12 | |
| 17.06 | Troubleshoot aberrant results or parameters. | MAFS.912.S-ID.1.1, 1.3 MAFS.912.S-1D.2.6 | SC.912.N.1.1 | |
| 18.0 | Analyze the historical, social, cultural and potential applications of agricultural biotechnology – the student will be able to: | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|--|----------------------|
| 18.01 Research and report on the major innovators and milestones in the development of biotechnology. | LAFS.1112.W.3.7 LAFS.1112.L.1.1, LAFS.1112.L.3.6 | SC.912.L.16.10 | |
| 18.02 Assess and summarize current work in biotechnology being done to add value to agriculture and global society. | | SC.912.N.4.1, 2; SC.912.L.16.10 | BS.01.01.02.b |
| 18.03 Explain and critique a decision made by a major agency that regulates agriculture biotechnology. | LAFS.1112.W.3.7, 8 LAFS.1112.L.1.1, LAFS.1112.L.3.6 LAFS.1112.SL.1.2, 3 LAFS.1112.RI.3.8 | SC.912.N.4.1, 2; SC.912.L.16.10 | BS.01.02.01.c |
| 18.04 Research and summarize the emergence, evolution and implications of bioethics associated with biotechnology in agricultural production. | LAFS.1112.W.3.7, 8 LAFS.1112.L.1.1, LAFS.1112.L.3.6 LAFS.1112.SL.1.2 LAFS.1112.RI.3.8 | SC.912.N.4.1, 2; SC.912.N.2.2; SC.912.L.16.10 | BS.01.03.01.a |
| 18.05 Analyze the implications bioethics may have on future advancements in AFNR | LAFS.1112.SL.2.4 LAFS.1112.RI.3.8 | SC.912.N.4.1, 2; SC.912.N.2.2; SC.912.L.17.15 | BS.01.03.01.b |
| 18.06 Analyze an intellectual property issue associated with bioethics in agricultural production. | LAFS.1112.RI.3.8 | SC.912.N.4.1, 2; SC.912.N.2.2; SC.912.L.16.10 | |
| 18.07 Identify and discuss emerging technologies in agriculture production (transgenics, biologics, biosecurity, food safety, sustainability, etc.). | LAFS.1112.SL.1.1 | SC.912.N.1.6; SC.912.L.17.15, 20; SC.912.L.16.10 | |
| 18.08 Use web-based resources to find information on the genetic sequence of a protein using bioinformatics. | LAFS.1112.RI.3.7 | SC.912.L.18.4 | |
| 19.0 Demonstrate proper tissue/cell culture techniques – the student will be able to: | | | |
| 19.01 Conduct assays and experiments under aseptic conditions. | | SC.912.L.14.6 | BS.02.03.01.c |
| 19.02 Describe the effects of growth hormones on tissue/cell culture. | | SC.912.L.14.1,2, 7 | |
| 19.03 Perform sterilization techniques for equipment in a laboratory using standard operating procedures. | | | BS.02.02.03.c |
| 19.04 Produce plants using tissue culture methods and prepare a written report of data and results. | MAFS.912.S-ID.3.9 MAFS.912.S-ID.2.6 | | BS.03.04.01.c |
| 20.0 Demonstrate the application of biotechnology to the Agriculture, Food and Natural Resources (AFNR) industries – the student will be able to: | | | |
| 20.01 Create a standard operating procedure for a biological process. | | SC.912.L.14.6 | BS.02.03.02.c |
| 20.02 Perform ongoing maintenance of laboratory equipment according | | | BS.02.02.02.0 1.c |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|---------------------------------|--------------------|
| to the standard operating procedures (e.g., calibration, testing, ect.) | | | |
| 20.03 Simulate inventory control using processes such as material quarantine and release, the FIFO (first in first out) system, expiration dating, and proper storage methods for biologics and chemicals. | | | |
| 20.04 Summarize what happens to different types waste after it leaves the laboratory and identify opportunities to reduce waste and unnecessary costs. (eg. Bio hazardous, toxic, pathogenic..) | | | BS.02.04.03.a |
| 20.05 Evaluate the biochemical properties of proteins to explain their function and predict potential uses. | | SC.912.L.18.4; SC.912.P.8.13 | BS.02.05.04.c |
| 20.06 . | | SC.912.L.18.4 | |
| 20.07 Use antibodies to detect and quantify antigens by conducting an Enzyme-Linked Immunosorbent Assay (ELISA). | | SC.912.P.12.12 | BS.02.05.05.c |
| 20.08 Produce ethanol and co-products from biomass. | | SC.912.P.8.12, 13; | BS.03.05.03.c |
| 20.09 Produce biodiesel and co-products from biomass. | | SC.912.P.8.12, 13; | BS.03.05.04.c |
| 20.10 Produce methane and co-products from biomass. | | SC.912.P.8.12, 13; | BS.03.05.05.c |
| 20.11 Evaluate the technologies used to create biofuels from biomass. | | SC.912.N.1.3 | |
| 20.12 Discuss (or demonstrate) algae growth (culture to large scale) for biofuel production. | LAFS.1112.SL.1.1. MAFS.912.S-ID.2.6, MAFS.912.S-ID.3.9 | SC.912.L.17.2 | |
| 20.13 Describe the principles (purpose) of centrifugation and filtration. | LAFS.1112.SL.2.4 | SC.912.L.14.2 | |
| 20.14 Assess the benefits, risks and opportunities associated with using biotechnology to promote animal health. | | SC.912.N.4.2; SC.912.L.16.10 | BS.03.04.02.b |
| 20.15 Analyze and summarize the risks and benefits of using biotechnology for bioremediation. | LAFS.1112.SL.2.4 | SC.912.L.17.12, 17; | BS.03.06.04.b |
| 20.16 Analyze the role of microorganisms in industrial chemical waste treatment. | LAFS.1112.SL.2.4 | SC.912.L.17.16, 17; | BS.03.06.03.a |
| 20.17 Explain the global importance of biodiversity. | LAFS.1112.SL.2.4 | SC.912.L.17.8; SC.912.N.4.2 | |
| 20.18 Explain the positive and negative impacts of agricultural practices on wild populations. | LAFS.1112.SL.2.4 | SC.912.L.17.8 | |
| 20.19 Analyze how biotechnology tools can be used to monitor the effects of agricultural practices on wild populations. | LAFS.1112.SL.2.4 | SC.912.L.17.7 | BS.03.03.01.b |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|------------------------------------|--------------------|
| 20.20 Describe the processes used in the production of molecules for use in industrial applications. | LAFS.1112.SL.2.4 | SC.912.P.10.5; SC.912.P.8.9, 12 | BS.03.03.02.b |
| 21.0 Demonstrate leadership, employability, communication and human relation skills – the student will be able to: | | | |
| 21.01 Conduct group meetings using parliamentary procedure and public speaking skills. | LAFS.1112.SL.2.4 LAFS.1112.SL.2.6 SL.1.1 | | |
| 21.02 Follow acceptable work habits, personal characteristics and hygiene habits for the biotechnology workplace. | | | |
| 21.03 Identify or demonstrate appropriate responses to criticism and coaching from employer, supervisor, or other persons. | LAFS.1112.SL.1.2,3 | | |
| 21.04 Demonstrate appropriate methods for asking questions, and providing constructive criticism and feedback. | | | |
| 21.05 Conduct a job search and identify advanced training opportunities and the requirements. | LAFS.1112.RI.3.7 | | |
| 21.06 Update current resume. | LAFS.1112.W.4.1 | | |
| 21.07 Demonstrate appropriate methods for asking questions, and providing constructive criticism and feedback to supervisor, employer, supervisor, or other persons. | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Animal Biotechnology
Course Number: 8106120
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of biotechnology in animal science, animal growth and reproduction, and the role of animals in society.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|--|---------------------------|
| 22.0 Apply genetic principles to animal science – the student will be able to: | | | |
| 22.01 Describe how the concept of heritability is used in the selection of livestock. | LAFS.1112.SL.2.4 | SC.912.L.16.2, 3 | |
| 22.02 Chart the difference between phenotypic and genotypic characteristics and determine probabilities. | MAFS.912.S-MD.2.7 MAFS.912.S-MD.1.1, 3 | SC.912.L.16.2, 4 | |
| 22.03 Analyze performance data used in the selection process of livestock. (EPDs) | MAFS.912.S-IC.2.6 | SC.912.N.1.1 | |
| 22.04 Use computer data to assist in the selection process of livestock. | | SC.912.N.1.1 | |
| 22.05 Extract a visible mass of DNA from animal tissue. | | SC.912.N.1.1 | |
| 22.06 Develop a hypothetical species using genetic engineering. | | SC.912.N.4.2; SC.912.L.16.4, 7, 12; | |
| 22.07 Debate the safeguards used in research in genetic engineering. | LAFS.1112.SL.1.3 | SC.912.N.1.4; SC.912.L.17.15, 16 | |
| 23.0 Interpret the relationship between total digestible nutrients (TDN) in feeds and its utilization – the student will be able to: | | | |
| 23.01 Determine nutritional requirements of selected animals. | | SC.912.L.18.1, 2, 3, 4 | |
| 23.02 Select appropriate feed samples for analysis of nutritional values and develop a balanced ration. | MAFS.912.N-Q.1.1,1.3 | SC.912.L.18.9; SC.912.L.14.46 | |
| 23.03 Conduct experiments comparing growth rates using selected | MAFS.912.S-IC.2.5 | SC.912.N.1.1 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|-----------------------------------|--------------------|
| rations. | | | |
| 23.04 Compare how the body's cells metabolize fats, carbohydrates and proteins. | | SC.912.L.14.46 | |
| 23.05 Analyze the effect of diseases on nutritional utilization. | | SC.912.N.1.1 | |
| 24.0 Examine the developmental processes that determine animal growth – the student will be able to: | | | |
| 24.01 Develop a growth curve using selected animal species. | MAFS.912.S-ID.2.6 | SC.912.N.1.1 | |
| 24.02 Differentiate between muscle, fat, and bone development. | | SC.912.L.14.11, 12,16 | |
| 24.03 Evaluate the effects of hormones in animal production. | | SC.912.L.14.31, 32, 33 | |
| 24.04 Compare morphology of developing embryos. | | SC.912.L.15.1 | |
| 24.05 Analyze the diseases that affect development growth. | | SC.912.L.14.6 | |
| 25.0 Investigate the reproduction system of animals – the student will be able to: | | | |
| 25.01 Analyze the quality of semen of selected animals. | | SC.912.L.14.33 | |
| 25.02 Compare and contrast sperm anatomy of selected animal species. | | SC.912.L.14.33 | |
| 25.03 Analyze the factors that affect sperm mobility and development. | | SC.912.P.10.3, 5 | |
| 25.04 Compare and contrast the reproductive cycles of selected animal species. | | SC.912.L.14.33 | |
| 25.05 Compare and contrast the breeding time and conception rates of selected animal species. | | SC.912.L.14.33 | |
| 25.06 Describe the functions of hormones that control reproduction. | LAFS.1112.SL.2.4 | SC.912.L.16.10; SC.912.L.14.31 | |
| 25.07 Discuss the use of hormone therapy to manipulate ovarian activity. | LAFS.1112.SL.1.1, LAFS.1112.L.3.6 | SC.912.L.16.10; SC.912.L.14.31 | |
| 25.08 Describe and compare the different pathogens that cause animal diseases. | LAFS.1112.SL.2.4 LAFS.1112.W.2.4 LAFS.1112.L.3.6 | SC.912.L.14.6 | |
| 25.09 Analyze environmental factors the affect growth and development. | | | |
| 25.10 Analyze the mating process of selected animal species. | | SC.912.L.14.33 | |
| 26.0 Describe animal science and the role of animals in society – the student will be able to: | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|--------------------|
| 26.01 Debate current events concerning animal welfare and animal rights. | LAFS.1112.SL.2.6 | SC.912.N.4.1, SC.912.N.2.2 | |
| 26.02 Demonstrate safe procedures when working with animal related equipment in laboratory settings. | | | |
| 26.03 Practice safety precautions around animals. | | | |
| 26.04 Develop a research project related to biotechnology and animal science. | LAFS.1112.W.3.7. W.3.8 LAFS.1112.L.3.6 | SC.912.N.1.1, 7 SC.912.N.3.5 SC.912.L.17.13 | |
| 26.05 Discuss the benefits of biotechnology in producing and marketing animals and animal products. | LAFS.1112.SL.1.1 | SC.912.L.16.10; SC.912.N.4.1 | |
| 26.06 Research how biotechnology affects the consumer. | LAFS.1112.W.3.7, W.3.8. LAFS.1112.L.3.6 | SC.912.L.16.10; SC.912.N.4.2. | |

**Florida Department of Education
Student Performance Standards**

Course Title: Plant Biotechnology
Course Number: 8106510
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of biotechnology in plant science, growth and reproduction, and the role of plants in biotechnology.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--------------------------------------|---------------------------------|--------------------|
| 27.0 Describe plant classifications and the economic impact to your region – the student will be able to: | | | |
| 27.01 Classify plants based upon their regional use and importance. | | SC.912.L.14.2; SC.912.L.15.5 | |
| 27.02 Describe the economic impact of regionally produced products. | LAFS.1112.SL.2.4, LAFS.1112.L.3.6 | | |
| 27.03 Describe factors influencing the feasibility of plant products and approaches toward achieving food sustainability within a region or community. | LAFS.1112.SL.2.4, LAFS.1112.L.3.6 | SC.912.E.7.4 | |
| 27.04 Identify economically significant plant families. | | SC.912.L.14.53 | |
| 27.05 Identify at least fifty plants by common and scientific names. | | SC.912.L.14.7; SC.912.L.15.5 | |
| 28.0 Apply genetic principles to plant improvement – the student will be able to: | | | |
| 28.01 Describe the relationship between reproduction and plant improvement. | LAFS.1112.SL.2.4, LAFS.1112.L.3.6 | SC.912.L.15.5; SC.912.L.15.6 | |
| 28.02 Demonstrate the reproductive cycle in seed plants, angiosperms and gymnosperms, mosses and ferns. | | SC.912.L.16.1, 2, 4; | |
| 28.03 Describe how genetic processes and structures control inheritance in plants. | LAFS.1112.SL.2.4, LAFS.1112.L.3.6 | SC.912.L.16.1, 2, 4; | |
| 28.04 Explain polyploidy in both natural settings and in commercial plant production. | LAFS.1112.L.3.6 | SC.912.L.16.1, 2, 4; | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|--------------------|
| 28.05 Differentiate phenotypic versus genotypic expression in plant crosses. | | SC.912.L.16.1, 2, 4; | |
| 28.06 Describe the processes used for mutation induction. | LAFS.1112.SL.2.4, LAFS.1112.L.3.6 | SC.912.L.15.15 | |
| 29.0 Demonstrate methods of micropropagating plants – the student will be able to: | | | |
| 29.01 Evaluate the advantages and disadvantages of using micropropagation techniques. | | SC.912.L.16.17 | |
| 29.02 Demonstrate aseptic/sterile technique. | | SC.912.L.14.6 | |
| 29.03 Prepare and mix stock solutions of media for micro-propagation. | MAFS.912.N-Q.1.2 MAFS.912.A-CED.1.3 | | |
| 29.04 Produce a crop using tissue culture methods and prepare a written report of results. | | SC.912.L.16.17 | |
| 29.05 Propagate plants using tissue culture techniques for producing synthetic seed culture. | | SC.912.L.14.1, 2, 7; | |
| 29.06 Develop and write a protocol to insert a gene of interest in plants. | LAFS.1112.W.1.2, LAFS.1112.W.2.4 LAFS.1112.L.3.6, | SC.912.L.16.12 | |
| 29.07 Propagate plants using cell cultures, callus culture, and algae culture. | | SC.912.L.16.12 | |
| 29.08 Research uses of cryopreservation in seed and in-vitro propagation methods. | LAFS.1112.W.3.7, LAFS.1112.W.3.8 LAFS.1112.L.3.6 | SC.912.L.14.1, 2, 7; | |
| 30.0 Demonstrate methods of plant production – the student will be able to: | | | |
| 30.01 Evaluate the advantages and disadvantages of non-traditional crop production techniques (hydroponic/substrate, greenhouse, tunnel/hoop, etc.). | | SC.912.N.1.1; SC.912.L.17.7, 10; SC.912.E.7.1 | |
| 30.02 Demonstrate different production methods used in hydroponics production. | | SC.912.L.17.3, 7, 10; SC.912.E.7.1 | |
| 30.03 Determine the cultural needs in hydroponics production. | LAFS.1112.SL.2.4 LAFS.1112.L.3.6 | SC.912.E.7.1; SC.912.L.17.3 | |
| 30.04 Describe crops grown commercially by non-traditional techniques in your region. | | SC.912.E.7.1; SC.912.L.17.3 | |
| 31.0 Use plants to demonstrate growth disorders (nutrients, pathogens, pests) – the student will be able to: | | | |
| 31.01 Identify plant nutrient-related disorders. | | SC.912.E.7.1; SC.912.L.17.10 | |
| 31.02 Identify pathogen-related disorders in plants. | | SC.912.L.14.6 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|--|--|---------------------------------|--------------------|
| 31.03 Identify pest-related disorders in plants. | | | |
| 31.04 Discuss how IPM and biotechnology are used to solve plant disorders. | LAFS.1112.SL.1.1 LAFS.1112.L.3.6 | SC.912.L.17.1, 17; | |
| 31.05 Prepare plant tissue samples for submission to determine nutrient levels. | | SC.912.L.18.8 | |
| 31.06 Demonstrate factors that affect the nutrient levels in plant tissue. | | SC.912.L.18.8 | |
| 32.0 Identify the historical, social, cultural and potential applications of plant biotechnology – the student will be able to: | | | |
| 32.01 Research and report on the major innovators and milestones in the development of biotechnology. | LAFS.1112.L.3.6 LAFS.1112.W.3.7, LAFS.1112.W.3.8, | | |
| 32.02 Analyze the scope and impact of plant biotechnology in today's global society. | | SC.912.L.16.10; SC.912.N.4.2 | |
| 32.03 Assess the future impact plant biotechnology could have on world populations. | | SC.912.L.16.10; SC.912.N.4.2 | |
| 32.04 Research, evaluate, and articulate a major regulatory issue pertaining to plant biotechnology. | LAFS.1112.L.3.6 LAFS.1112.W.3.7, 8, LAFS.1112.SL.2.4 | SC.912.L.16.10; SC.912.N.4.2 | |
| 32.05 Research, evaluate, and articulate the implications of an ethical, legal, social, or cultural biotechnology issue in plant production. | LAFS.1112.L.3.6 LAFS.1112.W.3.7, 8 LAFS.1112.SL.2.4 | SC.912.L.16.10; SC.912.N.4.2 | |
| 32.06 Research and debate an ethical issue associated with plant biotechnology. | LAFS.1112.SL.2.6 LAFS.1112.L.3.6 LAFS.1112.W.3.7, 8, | SC.912.L.16.10; SC.912.N.4.2 | |
| 32.07 Analyze an intellectual/genetic property issue associated with bioethics in plant production. | | SC.912.L.16.10; SC.912.N.4.2 | |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different

competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

**Florida Department of Education
Curriculum Framework**

Program Title: Aquaculture
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

| | |
|----------------------------|--|
| Program Number | 8004100 |
| CIP Number | 0101030303 |
| Grade Level | 9-12 |
| Standard Length | 4 credits |
| Teacher Certification | Refer to the Program Structure Section. |
| CTSO | FFA |
| SOC Codes (all applicable) | 45-2093 - Farmworkers, Farm, Ranch, and Aquacultural Animals 11-9013 – Aquaculture Managers |

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to instruction in the planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety and environmental issues in the aquaculture industry.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of two occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the secondary program structure:

| OCP | Course Number | Course Title | Teacher Certification | Length | SOC Code | Level | Graduation Requirement |
|-----|---------------|-------------------------|-----------------------|----------|----------|-------|------------------------|
| A | 8106810 | Agriscience Foundations | AGRICULTUR 1 @2 | 1 credit | 45-2093 | 3 | EQ |
| | 8112010 | Aquaculture 2 | | 1 credit | | 3 | EQ |
| | 8112020 | Aquaculture 3 | | 1 credit | | 3 | EQ |
| B | 8112030 | Aquaculture 4 | | 1 credit | 11-9013 | 3 | |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Academic Alignment Table

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

| Courses | Anatomy/ Physiology Honors | Astronomy Solar/Galactic Honors | Biology 1 | Chemistry 1 | Earth-Space Science | Environmental Science | Genetics | Integrated Science | Marine Science 1 Honors | Physical Science | Physics 1 |
|-------------------------|----------------------------|---------------------------------|--------------|--------------|---------------------|-----------------------|--------------|--------------------|-------------------------|------------------|--------------|
| Agriscience Foundations | 29/87 33% | 18/80 23% | 55/83 66% | 11/69 16% | 36/67 54% | 30/70 42% | 20/69 29% | 49/82 60% | 25/66 38% | 38/74 51% | 12/72 16% |
| Aquaculture 2 | 33/87 38% | 27/80 34% | 63/83 76% | 25/69 36% | 46/67 64% | 34/70 49% | 25/69 36% | 10/82 12% | 34/66 51% | 55/74 74% | 26/72 36% |
| Aquaculture 3 | 41/87 47% | 45/80 56% | 38/83 46% | 42/69 60% | 23/67 34% | 51/70 73% | 41/69 59% | 32/82 39% | 44/66 67% | 33/74 45% | 44/72 61% |
| Aquaculture 4 | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** |

** Alignment pending review

Alignment attempted, but no correlation to academic course

| Courses | Algebra 1 | Algebra 2 | Geometry | English 1 | English 2 | English 3 | English 4 |
|---------------------------|--------------|------------|-------------|--------------|--------------|--------------|--------------|
| Agriscience Foundations 1 | 14/67 21% | 4/75 5% | 8/54 15% | 11/46 24% | 11/45 24% | 11/45 24% | 11/45 24% |
| Aquaculture 2 | ** | ** | ** | ** | ** | ** | ** |
| Aquaculture 3 | ** | ** | ** | ** | ** | ** | ** |
| Aquaculture 4 | ** | ** | ** | ** | ** | ** | ** |

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. The FS for Mathematical Practices are designed for grades K-12 and describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education.

Instructors must incorporate the Florida Standards for Technical Subjects and Mathematical Practices throughout instruction of this CTE program.

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL’s need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Describe the history of agriculture and its influence on the global economy.
- 02.0 Practice agriscience safety skills and procedures.
- 03.0 Apply scientific and technological principles to agriscience issues.
- 04.0 Apply environmental principles to the agricultural industry.
- 05.0 Investigate and utilize basic scientific skills and principles in plant science.
- 06.0 Investigate and utilize basic scientific skills and principles in animal science.
- 07.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 08.0 Demonstrate agribusiness, employability and human relation skills.
- 09.0 Apply leadership and citizenship skills.
- 10.0 Discuss components of food safety and handling practices in agriculture
- 11.0 Safely operate, maintain and repair machinery, equipment and facilities used in aquaculture
- 12.0 Describe the nature and origin of and career opportunities in aquaculture
- 13.0 Demonstrate the management and environmentally sound use of water and land resources.
- 14.0 Apply biological principles to the reproduction, identification and growth of aquaculture species.
- 15.0 Assist in the propagation and culture of an aquaculture organism.
- 16.0 Describe procedures used in locating markets and marketing aquaculture products.
- 17.0 Apply business management skills in managing an aquaculture operation.
- 18.0 Identify applicable local, state, and federal rules and regulations and assistance programs.
- 19.0 Discuss leadership, employability, communication, and human relations skills
- 20.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy
- 21.0 Exhibit the management and environmentally sound use of water and land resources
- 22.0 Complete the propagation and culture of an aquaculture organism
- 23.0 Demonstrate procedures used in locating markets and marketing aquaculture products
- 24.0 Incorporate business management skills in managing an aquaculture operation
- 25.0 Demonstrate leadership, employability, communication, networking, and human relations skills
- 26.0 Produce an aquaculture species in one or more of the following: pond, cage, tank, raceway, net pen
- 27.0 Control disease, pest and water quality problems
- 28.0 Assist in harvesting and processing aquaculture species
- 29.0 Identify biological components of reptiles, amphibians, and fish
- 30.0 Discuss production practices of reptiles, amphibians, and fish.
- 31.0 Investigate scientific skills and principles in aquatic plant science.
- 32.0 Describe techniques for producing marine ornamentals, clams, oysters, and shrimp.
- 33.0 Manage aquatic animal health
- 34.0 Determine nutritional needs of aquaculture organisms
- 35.0 Manage aquaculture systems
- 36.0 Perform economic practices involved with aquaculture enterprises
- 37.0 Participate in classroom extension activities

**Florida Department of Education
Student Performance Standards**

Course Title: Agriscience Foundations 1
Course Number: 8106810
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of agricultural history and the global impact of agriculture; career opportunities; scientific and research concepts; biological and physical science principles; environmental principles; agriscience safety; principles of leadership; and agribusiness, employability, and human relations skills in agriscience. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students will interact with materials and primary sources of data or with secondary sources of data to observe and understand the natural world. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 20% of classroom time will be dedicated to laboratory experiences.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-----------------------------------|---|--------------------|
| 01.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to: | | SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2; | |
| 01.01 Evaluate and explain emerging trends and the opportunities they may create within the AFNR systems. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.01.01.02.c |
| 01.02 Assess the economic impact of an AFNR system on a local, state, national and global level. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | CS.02.02.03.b |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-------------------------------------|---|--------------------|
| 01.03 Identify significant career patterns/shifts in the history of the agricultural industry. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.01.01.01.a |
| 01.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.06.02.01.a |
| 02.0 Practice agriscience safety skills and procedures--The student will be able to: | | SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7; | |
| 02.01 Identify the common causes and prevention of accidents in agriscience operations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.a |
| 02.02 Extract and utilize pertinent information from a container label and/or Safety Data Sheet (SDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | CS.03.04.03.a |
| 02.03 Identify proper disposal of hazardous waste materials and biohazards. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | ESS.04.01.02.c |
| 02.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.b |
| 03.0 Apply scientific and technological principles to agriscience issues--The student will be able to: | | SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1; | |
| 03.01 Employ scientific measurement skills. | | | |
| 03.02 Demonstrate safe and effective use of common laboratory equipment. | | | ESS.01.02.01.b |
| 03.03 Identify the parts and functions of plant and animal cells. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |
| 03.04 Describe the phases of cell reproduction. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|--------------------|
| 03.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |
| 03.06 Interpret, analyze, and report data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | BS.02.01.01.b |
| 03.07 Investigate DNA and genetics applications in agriscience including the theory of probability. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | BS.01.01.01.a |
| 03.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.). | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | BS.03.01.03.b |
| 04.0 Apply environmental principles to the agricultural industry--The student will be able to: | | SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12 | |
| 04.01 Research how different climactic and geological activity influences agriculture. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | NRS.01.03.02.b |
| 04.02 Describe various ecosystems as they relate to the agriculture industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.03 Describe the environmental resources (soil, water, air) necessary for agriculture production. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.08.02.01.a |
| 04.04 Identify regulatory agencies that impact agricultural practices. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6 | | NRS.02.01.02.a |
| 04.05 Apply Best Management Practices that enhance the natural environment. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.06 Identify conservation practices related to natural resources. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.02.02.b |
| 05.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to: | | SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7; | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|---|---|
| 05.01 Identify and describe the specializations within the plant science industry. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.02 Categorize plants based on specific characteristics according to industry and scientific standards. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.01.01.a |
| 05.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc.... | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.03.01.a PS.02.03.02.a PS.02.03.05.a |
| 05.04 Identify the nutrients required for plant growth from the periodic table and explain their functions. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.01.02.01.a |
| 05.05 Analyze information from a fertilizer label. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | PS.01.03.04.b |
| 05.06 Propagate and grow plants through sexual and/or asexual reproduction. | | | PS.03.01.03.a PS.03.01.01.b |
| 05.07 Investigate the impacts of various pests and propose solutions for their control. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.03.03.01.c |
| 05.08 Investigate the nature and properties of food, fiber, and by-products from plants. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.09 Explore career opportunities in plant science. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.05.01.01.a |
| 06.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to: | | SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19; | |
| 06.01 Explain the economic importance of animals and the products obtained from animals. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.02 Analyze commercially important livestock breeds in Florida. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|---|--------------------|
| 06.04 Compare and contrast animal welfare issues. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | AS.02.01.01.a |
| 06.05 Investigate the nature and properties of food, fiber, and by-products from animals. | | | AS.06.03.03.a |
| 06.06 Explore career opportunities in animal science. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | CS.05.01.01.a |
| 07.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to | | SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9; | |
| 07.01 Select and demonstrate proper use of hand tools in agriculture. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.04.02.a |
| 07.02 Operate service and maintain agriscience equipment, and instruments. | | | CS.03.04.03.b |
| 07.03 Manage facilities and supplies. | | | |
| 08.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to: | | | |
| 08.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE). | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 08.02 Utilize a record keeping system to collect, interpret, and analyze data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 08.03 Enhance oral communications through telephone, interview and presentation skills. | LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | CRP.04.01.02.b |
| 08.04 Enhance written communication by developing resumes and business letters. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2 | | CRP.04.02.02.b |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|-----------|---------------------------------|
| 08.05 Demonstrate interpersonal (nonverbal) communication skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 08.06 Demonstrate good listening skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.04.03.01.a |
| 09.0 Apply leadership and citizenship skills--The student will be able to: | | | |
| 09.01 Identify and describe leadership characteristics. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.01.a |
| 09.02 Identify opportunities to apply acquired leadership skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.02.a |
| 09.03 Identify and demonstrate ways to be an active citizen. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.01.03.02.c |
| 09.04 Participate in community based learning activities. | | | CRP.01.03.01.a |
| 09.05 Demonstrate the ability to work cooperatively. | | | CRP.09.03.01.a |
| 09.06 Conduct formal and informal meetings using correct parliamentary procedure skills. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 09.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 09.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks. | | | CS.05.01.01.b CRP.10.02.02.b |
| 10.0 Discuss components of food safety and handling practices in agriculture - The student will be able to: | | | |
| 10.01 Demonstrate proper safety precautions and use of personal protective equipment. | | | FPP.01.01.01.b |
| 10.02 Evaluate the food safety responsibilities that occur along the food supply chain. | | | FPP.03.03.02.b |
| 10.03 Explain techniques and procedures for the safe handling of food products. | | | FPP.03.03.02.c |
| 10.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation). | | | FPP03.03.01.b |
| 10.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply. | | | FPP04.01.01.0b |

**Florida Department of Education
Student Performance Standards**

Course Title: Aquaculture 2
Course Number: 8112010
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of nature and origin, career opportunities, biological principles, safety, water quality, seed production, market outlets, rules and regulations, technological advances, problem solving and leadership employability communication and human relations skills.

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students will interact with materials and primary sources of data or with secondary sources of data to observe and understand the natural world. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 20% of classroom time will be dedicated to laboratory experiences.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|---|-------------------------------------|--|
| 11.0 Safely operate, maintain and repair machinery, equipment and facilities used in aquaculture – the student will be able to: | MAFS.912.N-Q.1.3 MAFS.912.S-IC.2 | SC.912.L.17.7 SC.912.P.8.2 SC.912.P.10.2, 3, 4, 5, 7, 8, 14, 15 SC.912.P.12.2, 3, 5, 5, 9, 13 |
| 11.01 Recognize and observe safety practices necessary in carrying out aquaculture activities. | | |
| 11.02 Inspect, maintain and perform basic repairs on aquaculture machinery, equipment and facilities. | | |
| 11.03 Safely operate aquaculture machinery and equipment. | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|--|-------------------------------------|--|
| 11.04 Discuss the safety and maintenance of a re-circulating aquaculture system (RAS) including biological, chemical, and mechanical filtration, degassing, sterilization, and foam fractionation. | | |
| 12.0 Describe the nature and origin of and career opportunities in aquaculture – the students will be able to: | MAFS.912.N-Q.1.3 MAFS.912.S-IC.2 | SC.912.E.6.4, 5, 6 SC.912.L.14.2, 3, 6, 33 SC.912.L.15.3, 6, 7, 9, 13 SC.912.L.16.9, 14, 15, 16 SC.912.L.17.7, 9 10, 12, 13, 14, 15, 16, 17, 18 SC.912.N.1.2, 3, 4, 5, 6; SC.912.N.2.5; |
| 12.01 List the definition of aquaculture as defined by the Florida Division of Aquaculture. | | |
| 12.02 Compare and contrast aquaculture and fisheries. | | |
| 12.03 List and describe major global aquatic crops and animals. | | |
| 12.04 Explain the history of aquaculture. | | |
| 12.05 List and describe aquaculture related occupations. | | |
| 12.06 Determine the educational requirements and experience needed to enter and advance in aquaculture occupations. | | |
| 13.0 Demonstrate the management and environmentally sound use of water and land resources – the student will be able to: | MAFS.912.N-Q.1.3 MAFS.912.S-IC.2 | SC.912.E.5.6 SC.912.E.6.2, 4, 5, SC.912.E.7.1, 2, 3, 4, 5, 6, 7, 8 9 SC.912.L.17. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 18, 20 SC.912.L.18.6, 12 SC.912.P.8.2, 6, 10, 11, 12 SC.912.P.12.9, 12 |
| 13.01 Identify and describe the physical and chemical characteristics of water for use in aquaculture. | | |
| 13.02 Explain how changes in water affect aquatic life. | | |
| 13.03 Be able to measure the total ammonia nitrogen (TAN), unionized ammonia, nitrite, nitrate in a water system. | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|---|-------------------------------------|---|
| 13.04 Be able to measure the water temperature dissolved oxygen, pH, salinity, hardness, alkalinity, turbidity, chlorine/chloramine and carbon dioxide in a water system. | | |
| 13.05 Explain how the nitrogen cycle is related to maintaining healthy fish. | | |
| 13.06 Identify land masses, climates, and bodies of water on world and local maps. | | |
| 14.0 Apply biological principles to the reproduction, identification and growth of aquaculture species – the students will be able to: | MAFS.912.N-Q.1.3 MAFS.912.S-IC.2 | SC.912.L.14.1, 3, 4, 6, 11, 12, 13, 14, 16, 17, 18, 19, 21, 28, 29, 30, 31, 32, 33, 36, 42, 43, 44, 46, 48, 49, 50, 51, 52, 53 SC.912.L.15.4, 5, 6, 7 SC.912.L.15.7, 9 SC.912.L.17.13 SC.912.L.18.1, 2, 3, 4, 7, 8, 9, 10, 11, 12 SC.912.N.3.1, 2, 5 SC.912.N.4.1, 2 SC.912.P.8.7, 8, 11, 12, 13 |
| 14.01 Define morphology, anatomy, and physiology. | | |
| 14.02 Identify and describe the anatomy and physiology of crustaceans. | | |
| 14.03 Identify and describe the anatomy and physiology of mollusks. | | |
| 14.04 Identify and describe the anatomy and physiology of fish. | | |
| 14.05 Identify and describe the basic morphology of aquatic macroalgae and microalgae. | | |
| 14.06 List and describe important characteristics in choosing a production species. | | |
| 14.07 Identify and describe common aquaculture organism by family, genus and species. | | |
| 14.08 List and describe the chemical and physical factors, which influence the growth of aquatic fauna and flora. | | |
| 14.09 Identify aquaculture species of commercial importance in Florida. | | |
| 14.10 Describe necessary biosecurity measures for various aquaculture facilities. | | |
| 15.0 Assist in the propagation and culture of an aquaculture organism – the student will be able | MAFS.912.N-Q.1.3 MAFS.912.S-IC.2 | SC.912.L.15.12, 13, 15 SC.912.L.16.1, 2, |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|---|-------------------------------------|--|
| to: | | 3, 4, 7, 9, 10, 12, 14, 15, 16, 17 SC.912.L.17.4, 5, 6, 7, 8, 9, 11, 14, 15, 17 SC.912.N.1.7 SC.912.P.12.13 |
| 15.01 Identify/describe facilities used in a grow-out operation. | | |
| 15.02 List sources of aquaculture organisms and how they are produced. | | |
| 15.03 Determine the purpose and functions of a hatchery. | | |
| 15.04 Describe and contrast the reproductive anatomy of aquaculture organisms. | | |
| 15.05 Describe and contrast types of spawning exhibited by aquaculture organisms. | | |
| 15.06 Discuss proper broodstock conditioning and spawning techniques for aquaculture organisms. | | |
| 15.07 Discuss proper grow-out techniques for aquaculture organisms. | | |
| 16.0 Describe procedures used in locating markets and marketing aquaculture products – the student will be able to: | | SC.912.E.5.10 SC.912.N.1.1, 5, 7 SC.912.N.2.2, 3, 4, 5 SC.912.P.8.1, 2, 7, 10, 11, 12 |
| 16.01 Identify possible market outlets for aquaculture products. | | |
| 16.02 Identify the steps in securing a specific market outlet for a given species. | | |
| 16.03 Describe the product characteristics of marketable animal and plant products for both food and ornamental markets. | | |
| 17.0 Apply business management skills in managing an aquaculture operation – the student will be able to: | MAFS.912.S-IC.2 | |
| 17.01 Identify and list functions in the management process. | | |
| 17.02 Demonstrate basic bookkeeping skills. | | |
| 17.03 Complete Supervised Agricultural Experience (SAE) records. | | |
| 18.0 Identify applicable local, state and federal rules, regulations and assistance programs – the student will be able to: | MAFS.912.N-Q.1.3 MAFS.912.S-IC.2 | SC.912.N.4.1, 2 |
| 18.01 Identify and observe laws and regulations affecting the industry in the local area. | | |

| CTE Standards and Benchmarks | | FS-M/LA | NGSSS-Sci |
|-------------------------------------|---|----------------|------------------|
| 18.02 | Describe process to obtain required permits, licenses, leases, etc. for production and marketing. | | |
| 18.03 | Identify and list agencies regulating the industry and their functions. | | |
| 18.04 | Identify and list government assistance programs available to the industry. | | |
| 19.0 | Discuss leadership, employability, communication, and human relations skills – the student will be able to: | | SC.912.N.1.7 |
| 19.01 | Conduct group meetings, using parliamentary procedure and public-speaking skills. | | |
| 19.02 | Identify acceptable work habits (ethics) and desired personal characteristics. | | |
| 19.03 | Demonstrate acceptable employee-hygiene habits. | | |
| 19.04 | Secure information about a job. | | |
| 19.05 | Complete a job application. | | |
| 20.0 | Students evaluate the importance of the food and fiber system to understand the impact on global economy – the student will be able to: | | |
| 20.01 | Assess the impact of US aquaculture products to the total global aquaculture industry. | | |
| 20.02 | Recognize the value of aquaculture food products and agribusiness industry. | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Aquaculture 3
Course Number: 8112020
Course Credit: 1

Course Description:

This course is designed to develop competencies in the area of management and use of water, the propagation and rearing of seed, producing aquaculture species, control of diseases, pests and water quality problems, harvesting and processing, marketing and transportation, management skills and leadership, employability, communication and human relation skills.

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students will interact with materials and primary sources of data or with secondary sources of data to observe and understand the natural world. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 20% of classroom time will be dedicated to laboratory experiences.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|--|---------|---|
| 21.0 Exhibit the management and environmentally sound use of water and land resources – the student will be able to: | | SC.912.L.17.5, 7, 8, 13, 14, 15, 16, 17, 20 SC.912.L.18.12 SC.912.N.4.1, 2, 6 SC.912.P.8.1, 10, 11, 12, 13 SC.912.P.10.2, 3, 9; SC.912.P.12.2, 5, 6, 9, 12 |
| 21.01 Calculate volume in circular, rectangular and irregular shaped water structures. | | |
| 21.02 Identify and explain point and non-point pollution management associated with aquaculture. | | |
| 21.03 Determine soil types, land slope and other factors to consider in choosing a location | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|--|---------|---|
| for an aquaculture operation. | | |
| 21.04 Discuss Florida Department of Agriculture and Consumer Services (FDACS) Best Management Practices (BMP) for managing water usage and aquaculture affluent. | | |
| 21.05 Discuss different stages of construction of ponds and/or other aquaculture production facilities. | | |
| 21.06 Discuss the advantages and disadvantages of hydroponics and aquaponics. | | |
| 22.0 Complete the propagation and culture of an aquaculture organism. – the student will be able to: | | SC.912.E.5.8 SC.912.E.6.4, 5, 6 SC.912.E.7.1, 6, 8 SC.912.L.14.4, 6, 31, 33, 41, 43, 44, 46, 52 SC.912.L.15.6, 7, 9 SC.912.L.16.1, 2, 3, 7, 9, 12, 14 SC.912.L.17.1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20 SC.912.L.18.1, 2, 3, 4 SC.912.N.1.1 SC.912.N.2.4, 5 |
| 22.01 Identify and describe the methods of reproducing aquaculture organisms. | | |
| 22.02 Identify and describe the hatchery facilities used in aquaculture. | | |
| 22.03 Select a method of producing seed for a selected species. | | |
| 22.04 List and explain the process for hatching eggs in four aquaculture organisms. | | |
| 22.05 Determine the types and sizes of feeds to grow different life stages of aquaculture organisms. | | |
| 22.06 Discuss the proper methods for harvesting, grading and transporting seed, fry and juvenile aquaculture organisms. | | |
| 23.0 Demonstrate procedures used in locating markets and marketing aquaculture products – the student will be able to: | | SC.912.N.1.1, 3, 4, 5, 6 SC.912.N.2.2, 4, 5 SC.912.N.3.5 SC.912.N.4.1, 2 |
| 23.01 Develop a marketing plan for an aquaculture product. | | |
| 23.02 Determine laws and regulations involved in transporting and marketing aquaculture organisms. | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|---|-----------------|--|
| 23.03 Market aquaculture products. | | |
| 24.0 Incorporate business management skills in managing an aquaculture operation – the student will be able to: | MAFS.912.S-IC.2 | SC.912.N.2.5 SC.912.N.3.5 SC.912.N.4.1, 2 SC.912.P.8.2, 6, 9, 11, 12, 13 SC.912.P.10.2, 13, 14, 15 |
| 24.01 Determine cost of production/harvesting and profitability of different systems. | | |
| 24.02 Determine procedures and costs for acquiring the land/water, machinery, equipment structures, etc., needed for an operation specified by the instructor. | | |
| 24.03 Discuss the relevance of (a) land purchase, (b) water leases, (c) permits, (d) licenses, (e) financial loans, (f) insurance, in an aquaculture business. | | |
| 24.04 Discuss the relevance of: (a) property ownership, (b) equipment acquired, (c) equipment repair and maintenance, (d) income and expense, (e) employee time and days, (f) income tax and social security, (g) insurance, in aquaculture business. | | |
| 24.05 Manage a production/harvesting system. | | |
| 24.06 Complete Supervised Agriculture Experienced (SAE) records. | | |
| 25.0 Demonstrate leadership, employability, communication, networking, and human relations skills – the student will be able to: | | SC.912.N.1.1, 3, 5, 7 SC.912.N.2.2, 5 SC.912.N.4.1, 2 |
| 25.01 Demonstrate competence in job-interview techniques. | | |
| 25.02 Demonstrate appropriate response to criticism from employer, supervisor, or other persons in the workplace. | | |
| 25.03 Demonstrate knowledge of how to appropriately make a career change, including resigning from a job. | | |
| 25.04 Write a resume complete with cover letter. | | |
| 26.0 Produce an aquaculture species in one or more of the following: pond, cage, tank, raceway, net pen – the student will be able to: | | SC.912.E.5.8 SC.912.E.6.4, 5 SC.912.E.7.1, 2, 3, 4, 5, 6, 8, 9 SC.912.L.14.4, 6, 7, 16, 19, 46, 53 SC.912.L.17.2, 3, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20 |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|---|---------|---|
| | | SC.912.L.18.1, 2, 3, 4 SC.912.N.1.3, 4, 5, 6, 7 SC.912.N.2.4, 5 SC.912.N.3.5 SC.912.N.4.1, 2 SC.912.P.8.1, 6, 7, 8, 9, 10, 11, 12 SC.912.P.10.2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 18 SC.912.P.12.2, 3, 4, 5, 6, 7, 8, 9 |
| 26.01 Identify the types of growing systems and important factors in their selection, design and use. | | |
| 26.02 Determine economic factors to consider in choosing a system for commercial production. | | |
| 26.03 Identify and describe facility construction and site requirements. | | |
| 26.04 Select species for a specific culture facility. | | |
| 26.05 Determine feeding methods and calculate feeding rates for an aquaculture organism. | | |
| 26.06 Assist in managing water quality in one or more production systems. | | |
| 26.07 Maintain and perform repairs on aquaculture machinery, equipment, and facilities. | | |
| 27.0 Control disease, pest and water quality problems – the student will be able to: | | SC.912.E.5.8 SC.912.E.6.5, 6 SC.912.L.14.2, 3, 4, 6, 11, 12, 16, 19, 29, 42, 43, 44, 45, 46, 47, 52, 53 SC.912.L.15.15 SC.912.L.16. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 SC.912.L.17.1, 2, 3, 5, 6, 7, 8, 9, 13, 14, 15, 16, 17, 18 SC.912.L.18.5, 7, 8, 9, 11, 12 SC.912.N.2.4, 5 SC.912.N.3.5 SC.912.P.8.9 |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|---|---------|---|
| 27.01 Identify major diseases of several locally important commercial species and list different methods of prevention and treatment. | | |
| 27.02 Identify major pests of several locally important commercial species and list recommended control methods. | | |
| 27.03 Describe methods of prevention, treatment and control of the major diseases and pests previously identified. | | |
| 27.04 Identify water quality problems. | | |
| 27.05 Determine water quality parameters and describe corrective action where needed. | | |
| 27.06 Identify resources for assistance in disease prevention, identification, and treatment. | | |
| 28.0 Assist in harvesting and processing aquaculture species – the student will be able to: | | SC.912.E.5.8 SC.912.E.6.5, 6 SC.912.L.14.2, 3, 4, 6, 11, 12, 16, 19, 29, 42, 43, 44, 45, 46, 47, 52, 53 SC.912.L.15.15 SC.912.L.16. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 SC.912.L.17.1, 2, 3, 5, 6, 7, 8, 9, 13, 14, 15, 16, 17, 18 SC.912.L.18.5, 7, 8, 9, 11, 12 SC.912.N.2.4, 5 SC.912.N.3.5 SC.912.P.8.9 |
| 28.01 Recognize and observe safety and sanitary practices including biosecurity in harvesting and processing aquaculture organisms. | | |
| 28.02 Determine harvesting practices recommended for aquaculture organisms. | | |
| 28.03 Determine equipment, labor, financial and legal requirements for harvesting aquaculture organisms. | | |
| 28.04 Harvest aquaculture organisms using recommended practices. | | |
| 28.05 Determine processing and packaging practices recommended for aquaculture organisms. | | |
| 28.06 Determine equipment, labor, financial and legal requirements for processing and packaging aquaculture organisms. | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|---|----------------|------------------|
| 28.07 Process and/or package aquaculture organisms using recommended practices. | | |
| 28.08 Compare and contrast methods for shipping aquaculture organisms. | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Aquaculture 4
Course Number: 8112030
Course Credit: 1

Course Description:

This course is designed to develop competencies in the area of management and use of water, the propagation and rearing of seed, producing aquaculture species, control of diseases, pests and water quality problems, harvesting and processing, marketing and transportation, management skills and leadership, employability, communication and human relation skills.

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|--|----------------|------------------|
| 29.0 Identify biological components of reptiles, amphibians, and fish. – The student will be able to: | | |
| 29.01 Describe anatomy and physiology of alligators and turtles. | | |
| 29.02 Describe anatomy and physiology of frogs. | | |
| 29.03 Describe anatomy and physiology of marine and freshwater baitfish. | | |
| 29.04 Describe anatomy and physiology of sturgeon. | | |
| 30.0 Discuss production practices of reptiles, amphibians, and fish. – The student will be able to: | | |
| 30.01 Determine production needs of alligators and turtles. | | |
| 30.02 Determine production needs of frogs. | | |
| 30.03 Determine production needs of marine and freshwater baitfish. | | |
| 30.04 Determine production needs of sturgeon. | | |
| 31.0 Investigate scientific skills and principles in aquatic plant science. – the student will be able to: | | |
| 31.01 Explain nutrient uptake and photosynthesis in aquatic plants. | | |
| 31.02 Describe reproductive methods used by aquatic plants. | | |
| 31.03 Identify commercially important aquatic plants. | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|--|----------------|------------------|
| 32.0 Describe techniques for producing marine ornamentals, clams, oysters, and shrimp.- the student will be able to: | | |
| 32.01 Discuss practices necessary to produce marine ornamentals. | | |
| 32.02 Discuss practices necessary to produce clams. | | |
| 32.03 Discuss practices necessary to produce oysters. | | |
| 32.04 Discuss practices necessary to produce shrimp. | | |
| 33.0 Manage aquatic animal health. – the student will be able to: | | |
| 33.01 Outline general management measures for preventing disease outbreaks. | | |
| 33.02 Calculate treatment for aquatic systems. | | |
| 33.03 Discuss disease resistances. | | |
| 33.04 Discuss the role of stress in fish diseases. | | |
| 33.05 Create a biosecurity plan for an aquaculture production facility. | | |
| 33.06 Develop proper animal husbandry protocols for aquaculture production. | | |
| 34.0 Determine nutritional needs of aquaculture organisms – the student will be able to: | | |
| 34.01 Describe dietary requirements needed for aquatic organisms. | | |
| 34.02 Explain how anatomy and behavior affect feeding. | | |
| 34.03 Select the appropriate feed for different life stages of aquatic organisms. | | |
| 34.04 Design a feeding protocol from day one post hatch to mature adult. | | |
| 35.0 Manage aquaculture systems – student will be able to: | | |
| 35.01 Perform routine maintenance on the system. | | |
| 35.02 Record day to day observations on the system. | | |
| 35.03 Design standard operating procedures for an aquaculture system. | | |
| 35.04 Perform water quality checks on aquaculture systems. | | |
| 35.05 Design a recirculating system. | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|--|----------------|------------------|
| 36.0 Perform economic practices involved with aquaculture enterprises. – The student will be able to | | |
| 36.01 Create a cost analysis for producing an individual species. | | |
| 36.02 Determine the cost of installation and operation of an aquaculture system. | | |
| 36.03 Calculate a profit and loss analysis of an aquaculture system. | | |
| 37.0 Participate in classroom extension activities. – the student will be able to: | | |
| 37.01 Conduct a field experiment or research study on aquaculture topics. | | |
| 37.02 Complete a Proficiency Applications in an aquaculture area. | | |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Extended Student Supervision

Because of the production and marketing cycle of the agriculture industry, this program requires individual instruction and supervision of students for the entire period beyond the 180-day school year.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

Florida Department of Education
Curriculum Framework

Program Title: Equestrian Studies
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

| | |
|----------------------------|--|
| Program Number | 8004200 |
| CIP Number | 0101030211 |
| Grade Level | 9-12 |
| Standard Length | 5 credits |
| Teacher Certification | Refer to the <u>Program Structure</u> section. |
| CTSO | FFA |
| SOC Codes (all applicable) | 45-2093 - Farmworkers, Farm, Ranch, and Aquacultural Animals |

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the agriculture mechanics industry within the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to providing technical skill proficiency and includes competency-based applied learning that contributes to the academic knowledge, higher order reasoning and problem solving skills, work attitude, employability skills, technical skills, and knowledge of the equine industry.

This program offers a hands curriculum designed to further students’ knowledge of horses and their personal equitation and horsemanship skills. The fundamental purpose is to develop, through a standardized progression of training methods a horse and riders ability to perform at its maximum potential. A skilled rider should use minimal aids to request a desired movement from the horse while remaining relaxed and creating the illusion of being effortless.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

Program Structure

This program is a planned sequence of instruction consisting two occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

| OCP | Course Number | Course Title | Teacher Certification | Length | SOC Code | Level | Graduation Requirement |
|-----|---------------|------------------------------------|-----------------------|----------|----------|-------|------------------------|
| A | 8106810 | Agriscience Foundations 1 | AGRICULTUR 1 @2 | 1 credit | 45-2093 | 3 | EQ |
| | 8004210 | Introduction to Equestrian Studies | | 1 credit | | 2 | PA |
| | 8004220 | Beginning Equestrian | | 1 credit | | 2 | PA |
| B | 8004230 | Intermediate Equestrian | | 1 credit | 45-2093 | 2 | PA |
| | 8004240 | Advanced Equestrian | | 1 credit | | 2 | PA |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Academic Alignment Tables

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

| Courses | Anatomy/ Physiology Honors | Astronomy Solar/Galactic Honors | Biology 1 | Chemistry 1 | Earth- Space Science | Environmental Science | Genetics | Integrated Science | Marine Science 1 Honors | Physical Science | Physics 1 |
|--|----------------------------------|---------------------------------------|--------------|----------------|----------------------------|--------------------------|--------------|-----------------------|-------------------------------|---------------------|--------------|
| Agriscience Foundations 1 | 29/87 33% | 18/80 23% | 55/83 66% | 11/69 16% | 36/67 54% | 30/70 42% | 20/69 29% | 49/82 60% | 25/66 38% | 38/74 51% | 12/72 16% |
| Introduction to Equestrian Studies | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** |
| Beginning Equestrian | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** |
| Intermediate Equestrian | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** |
| Advanced Equestrian | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** |

** Alignment pending review

Alignment attempted, but no correlation to academic course

| Courses | Algebra 1 | Algebra 2 | Geometry | English 1 | English 2 | English 3 | English 4 |
|------------------------------------|--------------|------------|-------------|--------------|--------------|--------------|--------------|
| Agriscience Foundations 1 | 14/67 21% | 4/75 5% | 8/54 15% | 11/46 24% | 11/45 24% | 11/45 24% | 11/45 24% |
| Introduction to Equestrian Studies | ** | ** | ** | ** | ** | ** | ** |
| Beginning Equestrian | ** | ** | ** | ** | ** | ** | ** |
| Intermediate Equestrian | ** | ** | ** | ** | ** | ** | ** |
| Advanced Equestrian | ** | ** | ** | ** | ** | ** | ** |

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. The FS for Mathematical Practices are designed for grades K-12 and describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education.

Instructors must incorporate the Florida Standards for Technical Subjects and Mathematical Practices throughout instruction of this CTE program.

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL’s need for communication and social skills.

For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. If so, the standards have been identified and cross walked with the corresponding CTE standard and/or benchmark.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Describe the history of agriculture and its influence on the global economy
- 02.0 Practice agriscience safety skills and procedures
- 03.0 Apply scientific and technological principles to agriscience issues
- 04.0 Apply environmental principles to the agricultural industry
- 05.0 Investigate and utilize basic scientific skills and principles in plant science
- 06.0 Investigate and utilize basic scientific skills and principles in animal science
- 07.0 Demonstrate the use of agriscience tools, equipment, and instruments
- 08.0 Demonstrate agribusiness, employability and human relation skills
- 09.0 Apply leadership and citizenship skills
- 10.0 Discuss components of food safety and handling practices in agriculture
- 11.0 Discuss the various types of behavior associated with horses and proper safety procedures
- 12.0 Identify and apply proper safety rules and procedures
- 13.0 Identify and apply grooming tools, grooming equipment and proper grooming techniques
- 14.0 Identify and apply different types of equine tack and equipment
- 15.0 Demonstrate the ability to properly mount and dismount a horse
- 16.0 Identify and demonstrate the ability to maintain control of the horse while mounted at the walk.
- 17.0 Identify and demonstrate the ability to maintain control of the horse while mounted at the trot.
- 18.0 Examine the digestive system of the horse and examine nutritional need
- 19.0 Demonstrate selected competencies in leadership through the FFA and agricultural industry organization, and develops plans for a Supervised Agricultural Experience Program
- 20.0 Apply proper safety procedures
- 21.0 Identify and apply the organizational structure of the equestrian riding discipline.
- 22.0 Demonstrate the ability to maintain control of the horse while mounted at the walk.
- 23.0 Demonstrate the ability to maintain control of the horse while mounted at the trot
- 24.0 Identify and Demonstrate the ability to properly execute a transition
- 25.0 Investigate the sport of equestrian riding and show an understanding of riding the horse forward with a correctly balanced seat.
- 26.0 Discuss the organizational structure of the equestrian riding discipline
- 27.0 Determine the ability to maintain control of the horse while mounted at the walk
- 28.0 Determine the ability to maintain control of the horse while mounted at the trot
- 29.0 Demonstrate the ability to properly execute a transition
- 30.0 Explore the sport of equestrian riding and show an understanding of riding the horse forward with a correctly balanced seat.
- 31.0 Demonstrate proper preparation, grooming and exhibition of a horse
- 32.0 Analyze the importance safety procedures
- 33.0 Apply the organizational structure of the equestrian riding discipline
- 34.0 Exhibit the ability to maintain control of the horse while mounted at the walk
- 35.0 Exhibit the ability to maintain control of the horse while mounted at the trot
- 36.0 Exhibit the ability to maintain control of the horse while mounted at the canter

- 37.0 Exhibit the ability to properly execute a transition
- 38.0 Show the ability of riding the horse forward with a correctly balanced seat.
- 39.0 Prepare, groom and exhibit a horse

**Florida Department of Education
Student Performance Standards**

Course Title: Agriscience Foundations 1
Course Number: 8106810
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of agricultural history and the global impact of agriculture; career opportunities; scientific and research concepts; biological and physical science principles; environmental principles; agriscience safety; principles of leadership; and agribusiness, employability, and human relations skills in agriscience. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students will interact with materials and primary sources of data or with secondary sources of data to observe and understand the natural world. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 20% of classroom time will be dedicated to laboratory experiences.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|------------------------------------|---|--------------------|
| 01.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to: | | SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2; | |
| 01.01 Evaluate and explain emerging trends and the opportunities they may create within the AFNR systems. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.01.01.02.c |
| 01.02 Assess the economic impact of an AFNR system on a local, state, national and global level. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | CS.02.02.03.b |
| 01.03 Identify significant career patterns/shifts in the history of the agricultural industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.01.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-------------------------------------|--|--------------------|
| 01.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.06.02.01.a |
| 02.0 Practice agriscience safety skills and procedures--The student will be able to: | | SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7; | |
| 02.01 Identify the common causes and prevention of accidents in agriscience operations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.a |
| 02.02 Extract and utilize pertinent information from a container label and/or Safety Data Sheet (SDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | CS.03.04.03.a |
| 02.03 Identify proper disposal of hazardous waste materials and biohazards. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | ESS.04.01.02.c |
| 02.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.b |
| 03.0 Apply scientific and technological principles to agriscience issues--The student will be able to: | | SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1; | |
| 03.01 Employ scientific measurement skills. | | | |
| 03.02 Demonstrate safe and effective use of common laboratory equipment. | | | ESS.01.02.01.b |
| 03.03 Identify the parts and functions of plant and animal cells. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |
| 03.04 Describe the phases of cell reproduction. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|--------------------|
| 03.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |
| 03.06 Interpret, analyze, and report data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | BS.02.01.01.b |
| 03.07 Investigate DNA and genetics applications in agriscience including the theory of probability. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | BS.01.01.01.a |
| 03.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.). | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | BS.03.01.03.b |
| 04.0 Apply environmental principles to the agricultural industry--The student will be able to: | | SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12 | |
| 04.01 Research how different climactic and geological activity influences agriculture. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | NRS.01.03.02.b |
| 04.02 Describe various ecosystems as they relate to the agriculture industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.03 Describe the environmental resources (soil, water, air) necessary for agriculture production. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.08.02.01.a |
| 04.04 Identify regulatory agencies that impact agricultural practices. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6 | | NRS.02.01.02.a |
| 04.05 Apply Best Management Practices that enhance the natural environment. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.06 Identify conservation practices related to natural resources. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.02.02.b |
| 05.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to: | | SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7; | |
| 05.01 Identify and describe the specializations within the plant science industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|--|---|
| | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.02 Categorize plants based on specific characteristics according to industry and scientific standards. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.01.01.a |
| 05.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc.... | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.03.01.a PS.02.03.02.a PS.02.03.05.a |
| 05.04 Identify the nutrients required for plant growth from the periodic table and explain their functions. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.01.02.01.a |
| 05.05 Analyze information from a fertilizer label. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | PS.01.03.04.b |
| 05.06 Propagate and grow plants through sexual and/or asexual reproduction. | | | PS.03.01.03.a PS.03.01.01.b |
| 05.07 Investigate the impacts of various pests and propose solutions for their control. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.03.03.01.c |
| 05.08 Investigate the nature and properties of food, fiber, and by-products from plants. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.09 Explore career opportunities in plant science. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.05.01.01.a |
| 06.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to: | | SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19; | |
| 06.01 Explain the economic importance of animals and the products obtained from animals. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.02 Analyze commercially important livestock breeds in Florida. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |
| 06.04 Compare and contrast animal welfare issues. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.02.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|---|--------------------|
| | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 06.05 Investigate the nature and properties of food, fiber, and by-products from animals. | | | AS.06.03.03.a |
| 06.06 Explore career opportunities in animal science. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | CS.05.01.01.a |
| 07.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to | | SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9; | |
| 07.01 Select and demonstrate proper use of hand tools in agriculture. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.04.02.a |
| 07.02 Operate service and maintain agriscience equipment, and instruments. | | | CS.03.04.03.b |
| 07.03 Manage facilities and supplies. | | | |
| 08.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to: | | | |
| 08.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE). | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 08.02 Utilize a record keeping system to collect, interpret, and analyze data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 08.03 Enhance oral communications through telephone, interview and presentation skills. | LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | CRP.04.01.02.b |
| 08.04 Enhance written communication by developing resumes and business letters. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2 | | CRP.04.02.02.b |
| 08.05 Demonstrate interpersonal (nonverbal) communication skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|------------------|---------------------------------|
| 08.06 Demonstrate good listening skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.04.03.01.a |
| 09.0 Apply leadership and citizenship skills--The student will be able to: | | | |
| 09.01 Identify and describe leadership characteristics. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.01.a |
| 09.02 Identify opportunities to apply acquired leadership skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.02.a |
| 09.03 Identify and demonstrate ways to be an active citizen. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.01.03.02.c |
| 09.04 Participate in community based learning activities. | | | CRP.01.03.01.a |
| 09.05 Demonstrate the ability to work cooperatively. | | | CRP.09.03.01.a |
| 09.06 Conduct formal and informal meetings using correct parliamentary procedure skills. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 09.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 09.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks. | | | CS.05.01.01.b CRP.10.02.02.b |
| 10.0 Discuss components of food safety and handling practices in agriculture - The student will be able to: | | | |
| 10.01 Demonstrate proper safety precautions and use of personal protective equipment. | | | FPP.01.01.01.b |
| 10.02 Evaluate the food safety responsibilities that occur along the food supply chain. | | | FPP.03.03.02.b |
| 10.03 Explain techniques and procedures for the safe handling of food products. | | | FPP.03.03.02.c |
| 10.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation). | | | FPP03.03.01.b |
| 10.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply. | | | FPP04.01.01.0b |

**Florida Department of Education
Student Performance Standards**

Course Title: Introduction to Equestrian Studies
Course Number: 8004210
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of leadership, equine history and domestication, equine breeds and characteristics, anatomy, behavior, safety, grooming, handling and equitation skills with horses

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSSS-Sci.

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|-----------|--------------------|
| 11.0 Discuss the various types of behavior associated with horses and proper safety procedures | | | |
| 11.01 Name and describe behavioral categories associated with horses | | | |
| 11.02 Investigate the sense of vision, touch, smell and hearing of the horse | | | |
| 11.03 Predict how natural behavior is used to train a horse | | | |
| 12.0 Identify and apply proper safety rules and procedures | | | |
| 12.01 Demonstrate and apply proper safety rules when handling and haltering horses | | | |
| 12.02 Identify proper safety rules for various situations | | | |
| 12.03 Identify proper clothing that should be worn when working with horses. | | | |
| 13.0 Identify and apply grooming tools, grooming equipment and proper grooming techniques. | | | |
| 13.01 Identify grooming tools and equipment | | | |
| 13.02 Explain the use of grooming tools and equipment | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 13.03 Demonstrate proper grooming techniques and procedures | | | |
| 13.04 Understand the goals and purpose of grooming | | | |
| 14.0 Identify and apply different types of equine tack and equipment | | | |
| 14.01 Identify common bridle parts and their purpose | | | |
| 14.02 Identify common saddle parts and their purpose | | | |
| 14.03 Identify common equine equipment | | | |
| 14.04 Identify and Demonstrate proper bridling procedures | | | |
| 14.05 Identify and Demonstrate proper saddling procedures | | | |
| 14.06 Maintain equine tack and equipment | | | |
| 15.0 Demonstrate the ability to properly mount and dismount a horse | | | |
| 15.01 Identify and apply the proper procedure for mounting a horse | | | |
| 15.02 Identify and apply the proper procedure for dismounting a horse | | | |
| 15.03 Identify and demonstrate adjusting stirrup length specific to rider | | | |
| 15.04 Complete a tack check prior to mounting | | | |
| 16.0 Identify and demonstrate the ability to maintain control of the horse while mounted at the walk. | | | |
| 16.01 Apply correct rider position and seat including alignment, posture and stability at all times | | | |
| 16.02 Demonstrate correct rider form and position | | | |
| 16.03 Demonstrate correct rider form and position to encourage forward movement | | | |
| 16.04 Demonstrate an emergency stop | | | |
| 16.05 Demonstrate proper maneuvering techniques and procedures; including reversing, backing, and turning | | | |
| 17.0 Identify and demonstrate the ability to maintain control of the horse while mounted at the trot. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|-----------|--------------------|
| 17.01 Apply correct rider position and seat including alignment, posture and stability at all times | | | |
| 17.02 Demonstrate correct rider form and position to encourage forward movement | | | |
| 17.03 Demonstrate an emergency stop | | | |
| 17.04 Demonstrate proper maneuvering techniques and procedures; including reversing and turning | | | |
| 17.05 Demonstrate the proper technique of sitting the trot | | | |
| 17.06 Identify the actions of a posting trot | | | |
| 18.0 Examine the digestive system of the horse and examine nutritional needs. | | | |
| 18.01 Compare between simple stomach, ruminant and the cecum digestive systems. | | | |
| 18.02 Investigate the function of the small and large intestine and the roles these parts play in the digestive process. | | | |
| 18.03 Distinguish between the function of nutrients within the body | | | |
| 18.04 Identify and explain common feed stuffs incorporated in equine diets. | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: **Beginning Equestrian**
Course Number: **8004220**
Course Credit: **1**

Course Description:

This course is designed to develop competencies in the areas of leadership, equine safety procedures, the organizational structure of the equestrian riding discipline, and maintaining control of the horse at all times while mounted.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSSS-Sci.

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 22.0 Demonstrate selected competencies in leadership through the FFA and agricultural industry organization, and develops plans for a Supervised Agricultural Experience Program. | | | |
| 22.01 Explore professional equine organizations | | | |
| 22.02 Explore career opportunities in equine businesses through the FFA and Agricultural Education program. | | | |
| 22.03 Develop leadership and personal development skills through Career Development Event participation in the FFA. | | | |
| 23.0 Apply proper safety procedures | | | |
| 23.01 Demonstrate and apply proper safety rules and procedures when working with horses | | | |
| 23.02 Wear proper clothing when working with horses | | | |
| 24.0 Identify and apply the organizational structure of the equestrian riding discipline. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 24.01 Identify and describe the correct measurements within an equestrian riding arena. | | | |
| 24.02 Describe the proper letter placement around an equestrian riding arena | | | |
| 24.03 Explain the organizational outline of test and patterns available in equestrian riding | | | |
| 24.04 Illustrate the proper terminology that accompanies the equestrian riding discipline | | | |
| 25.0 Demonstrate the ability to maintain control of the horse while mounted at the walk. | | | |
| 25.01 Apply correct rider position and seat including body alignment, posture and stability at all times while walking | | | |
| 25.02 Identify and demonstrate the proper procedures for a free walk | | | |
| 25.03 Maintain the desired gait | | | |
| 26.0 Demonstrate the ability to maintain control of the horse while mounted at the trot | | | |
| 26.01 Apply correct rider position and seat including body alignment, posture and stability at all times while trotting | | | |
| 26.02 Demonstrate a posting trot | | | |
| 26.03 Identify and demonstrate the ability to properly pick up the correct posting diagonal | | | |
| 26.04 Demonstrate the gait of trotting with a clear rhythm | | | |
| 27.0 Identify and Demonstrate the ability to properly execute a transition | | | |
| 27.01 Properly demonstrate transitions (walk to halt, trot to halt, walk to trot, trot to walk) | | | |
| 27.02 Properly prepare and balance horse to execute a transition | | | |
| 28.0 Investigate the sport of equestrian riding and show an understanding of riding the horse forward with a correctly balanced seat. | | | |
| 28.01 Identify and demonstrate the ability to maneuver the horse on a straight line | | | |
| 28.02 Identify and demonstrate the ability to maneuver the horse correctly around the equestrian riding arena and through corners. | | | |
| 28.03 Identify and demonstrate the completion of a 20 meter circle | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|-----------|--------------------|
| 28.04 Identify and demonstrate the ability to navigate the horse on a diagonal | | | |
| 28.05 Demonstrate selected competencies in leadership through the FFA and agricultural industry organization, and develops plans for a Supervised Agricultural Experience Program. | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Intermediate Equestrian
Course Number: 8004230
Course Credit: 1

Course Description:

To introduce the horse and rider team to the sport of equestrian riding and to show understanding of riding the horse forward with steady hands and a correctly positioned seat.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSSS-Sci.

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|-----------|--------------------|
| 29.0 Discuss the organizational structure of the equestrian riding discipline | | | |
| 29.01 Apply the correct measurements of the equestrian riding arena while maneuvering through a equestrian riding pattern | | | |
| 29.02 Understand and apply the proper letter placement around a equestrian riding arena and properly navigate a equestrian riding pattern. | | | |
| 29.03 Understand the organizational outline of patterns and test available in equestrian riding | | | |
| 29.04 Illustrate the proper terminology that accompanies the equestrian riding discipline | | | |
| 30.0 Determine the ability to maintain control of the horse while mounted at the walk | | | |
| 30.01 Demonstrate the correct procedures for a free walk | | | |
| 30.02 Identify and demonstrate the horse's proper equestrian riding head carriage while walking | | | |
| 30.03 Maintain the desired gait while walking (Medium walk or free walk) | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 31.0 Determine the ability to maintain control of the horse while mounted at the trot | | | |
| 31.01 Demonstrate a posting trot while maintaining the correct posting diagonal | | | |
| 31.02 Demonstrate the gait of the trot with clear rhythm and balance | | | |
| 31.03 Demonstrate the gait of the trot while maintaining the horse's proper equestrian riding head carriage | | | |
| 32.0 Demonstrate the ability to properly execute a transition | | | |
| 32.01 Properly exhibit transitions (walk to halt, walk to trot, trot to walk and trot to halt) | | | |
| 32.02 Properly prepare and balance a horse to execute a transition in the given time allotment | | | |
| 33.0 Explore the sport of equestrian riding and show an understanding of riding the horse forward with a correctly balanced seat. | | | |
| 33.01 Demonstrate the ability to maneuver the horse on a straight line, including the long-sides and center line of the equestrian riding arena | | | |
| 33.02 Demonstrate the ability to maneuver the horse correctly around the equestrian riding arena including through corners, long-sides, center lines and circles. | | | |
| 33.03 Demonstrate the completion of a 20 meter circle in all areas of the arena | | | |
| 33.04 Demonstrate the ability to navigate the horse on a diagonal at a trot, walk or free walk | | | |
| 34.0 Demonstrate proper preparation, grooming and exhibition of a horse | | | |
| 34.01 Properly groom a horse to prepare for show | | | |
| 34.02 Properly braid a horse according to equestrian riding standards for show | | | |
| 34.03 Exhibit and train a horse for show | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Advanced Equestrian
Course Number: 8004240
Course Credit: 1

Course Description:

To continue training in the sport of equestrian riding with particular attention to maintaining a steady tempo, elastic contact with the horse, proper geometry of figures and corners, and moving freely forward with a clear rhythm and direct contact with the bit.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSSS-Sci.

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|-----------|--------------------|
| 35.0 Analyze the importance safety procedures | | | |
| 35.01 Apply proper safety rules and procedures when working with and around horses. | | | |
| 35.02 Describe the importance of wearing proper clothing when working with and around horses | | | |
| 36.0 Apply the organizational structure of the equestrian riding discipline | | | |
| 36.01 Apply the correct measurements of the equestrian riding arena while maneuvering through an equestrian riding pattern | | | |
| 36.02 Apply the proper letter placement around an equestrian riding arena and properly navigate an equestrian riding pattern. | | | |
| 36.03 Understand the organizational outline of patterns and test available in equestrian riding | | | |
| 36.04 Illustrate the proper terminology that accompanies the equestrian riding discipline | | | |
| 37.0 Exhibit the ability to maintain control of the horse while mounted at the walk | | | |
| 37.01 Demonstrate and apply the correct procedures for a free walk including freedom to stretch neck forward and downward and proper | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| ground cover | | | |
| 37.02 Demonstrate the horse's proper equestrian riding head carriage while walking | | | |
| 38.0 Exhibit the ability to maintain control of the horse while mounted at the trot | | | |
| 38.01 Exhibit correct rider position and seat including body alignment, posture and stability at all times while trotting | | | |
| 38.02 Demonstrate the ability to execute the gait of an extended trot | | | |
| 38.03 Demonstrate the ability to execute a 15 meter circle at a trot | | | |
| 39.0 Exhibit the ability to maintain control of the horse while mounted at the canter | | | |
| 39.01 Apply correct rider position and seat including body alignment, posture and stability at all times while cantering | | | |
| 39.02 Identify / demonstrate the ability to cue the horse for the correct canter lead | | | |
| 39.03 Identify / demonstrate the ability to maneuver the horse on a straight line while cantering | | | |
| 39.04 Identify / demonstrate the ability to maneuver the horse on a 20 meter circle while cantering | | | |
| 39.05 Identify /demonstrate the ability to maneuver the horse through a corner in the equestrian riding arena | | | |
| 40.0 Exhibit the ability to properly execute a transition | | | |
| 40.01 Demonstrate a straight, attentive immobile halt for a minimum of 3 seconds | | | |
| 41.0 Show the ability of riding the horse forward with a correctly balanced seat. | | | |
| 41.01 Demonstrate the ability to maneuver the horse on a straight line, including the long-sides and center line of the equestrian riding arena at the walk, trot and canter | | | |
| 41.02 Demonstrate the ability to maneuver the horse correctly around the equestrian riding arena including through corners, long-sides, center lines and circles at the walk, trot and canter | | | |
| 41.03 Demonstrate impulsion, the desire to encourage the horse to move forward with suppleness in the back and engagement of the hindquarters. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 41.04 Demonstrate submission, cooperation and harmony with the horse, acceptance of the bit and ease of movements | | | |
| 41.05 Demonstrate freedom and regularity of the desired gaits performed | | | |
| 42.0 Prepare, groom and exhibit a horse | | | |
| 42.01 Train a horse for show or exhibition. | | | |
| 42.02 Describe and demonstrate methods of restraining, loading, handling and transporting horses | | | |
| 42.03 Identify components of health certificates, and coggins test paperwork | | | |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization(s) providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Extended Student Supervision

Because of the production and marketing cycle of the agriculture industry, this program requires individual instruction and supervision of students for the entire period beyond the 180-day school year.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

**Florida Department of Education
Curriculum Framework**

Program Title: Technical Agriculture Operations
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

| | |
|----------------------------|--|
| Program Number | 8005100 |
| CIP Number | 0101020500 |
| Grade Level | 9-12 |
| Standard Length | 5 credits |
| Teacher Certification | Refer to the Program Structure section |
| CTSO | FFA |
| SOC Codes (all applicable) | 49-3041 - Farm Equipment Mechanics and Service Technicians 45-2091 - Agricultural Equipment Operators |

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the agriculture mechanics industry within the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to mechanical operations, welding, small engine maintenance and repair, planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting two occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the secondary program structure:

| OCP | Course Number | Course Title | Teacher Certification | Length | SOC Code | Level | Graduation Requirement |
|-----|---------------|------------------------------------|-----------------------|----------|----------|-------|------------------------|
| A | 8106810 | Agriscience Foundations 1 | AGRICULTUR 1 @2 | 1 credit | 45-2091 | 3 | EQ |
| | 8005110 | Technical Agriculture Operations 2 | AGRICULTUR 1 @2 | 1 credit | | 2 | |
| | 8005120 | Technical Agriculture Operations 3 | | 1 credit | | 2 | |
| B | 8005130 | Technical Agriculture Operations 4 | AGRI MECH #7 | 1 credit | 49-3041 | 2 | |
| | 8005140 | Technical Agriculture Operations 5 | | 1 credit | | 2 | |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Academic Alignment Table

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

| Courses | Anatomy/ Physiology Honors | Astronomy Solar/Galactic Honors | Biology 1 | Chemistry 1 | Earth-Space Science | Environmental Science | Genetics | Integrated Science | Marine Science 1 Honors | Physical Science | Physics 1 |
|------------------------------------|----------------------------|---------------------------------|--------------|--------------|---------------------|-----------------------|--------------|--------------------|-------------------------|------------------|--------------|
| Agriscience Foundations 1 | 29/87 33% | 18/80 23% | 55/83 66% | 11/69 16% | 36/67 54% | 30/70 42% | 20/69 29% | 49/82 60% | 25/66 38% | 38/74 51% | 12/72 16% |
| Technical Agriculture Operations 2 | 1/87 1% | 3/80 4% | 20/83 24% | 1/69 1% | 21/67 31% | 2/70 3% | 1/69 1% | 20/82 24% | 3/66 5% | 23/74 31% | 5/72 7% |
| Technical Agriculture Operations 3 | 20/87 23% | 23/80 29% | 3/83 4% | 24/69 35% | 4/67 6% | 27/70 39% | 21/69 30% | 5/82 6% | 18/66 27% | 10/74 14% | 30/72 42% |
| Technical Agriculture Operations 4 | 20/87 23% | 21/80 26% | 1/83 1% | 23/69 33% | 2/67 3% | 22/70 31% | 20/69 29% | 4/82 5% | 15/66 23% | 4/74 5% | 22/72 31% |
| Technical Agriculture Operations 5 | # | 3/80 4% | # | 2/69 3% | 2/67 3% | # | # | 1/82 1% | # | 5/74 7% | 6/72 8% |

** Alignment pending review

Alignment attempted, but no correlation to academic course

| Courses | Algebra 1 | Algebra 2 | Geometry | English 1 | English 2 | English 3 | English 4 |
|------------------------------------|--------------|-------------|--------------|--------------|--------------|--------------|--------------|
| Agriscience Foundations 1 | 14/67 21% | 4/75 5% | 8/54 15% | 11/46 24% | 11/45 24% | 11/45 24% | 11/45 24% |
| Technical Agriculture Operations 2 | 12/67 18% | 8/75 11% | 13/54 24% | ** | ** | ** | ** |
| Technical Agriculture Operations 3 | 7/67 10% | 9/75 12% | 6/54 11% | ** | ** | ** | ** |
| Technical Agriculture Operations 4 | 1/67 1% | 7/75 9% | 1/54 1% | ** | ** | ** | ** |
| Technical Agriculture Operations 5 | # | # | # | ** | ** | ** | ** |

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. The FS for Mathematical Practices are designed for grades K-12 and describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education.

Instructors must incorporate the Florida Standards for Technical Subjects and Mathematical Practices throughout instruction of this CTE program.

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL’s need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. If so, the standards have been identified and cross walked with the corresponding CTE standard and/or benchmark.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Describe the history of agriculture and its influence on the global economy.
- 02.0 Practice agriscience safety skills and procedures.
- 03.0 Apply scientific and technological principles to agriscience issues.
- 04.0 Apply environmental principles to the agricultural industry.
- 05.0 Investigate and utilize basic scientific skills and principles in plant science.
- 06.0 Investigate and utilize basic scientific skills and principles in animal science.
- 07.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 08.0 Demonstrate agribusiness, employability and human relation skills.
- 09.0 Apply leadership and citizenship skills.
- 10.0 Discuss components of food safety and handling practices in agriculture
- 11.0 Practice personal, equipment, and shop safety.
- 12.0 Select and use hand and power tools.
- 13.0 Install simple electrical circuits.
- 14.0 Plan, draw, and construct a project.
- 15.0 Perform basic plumbing procedures.
- 16.0 Mix and pour concrete and use masonry materials.
- 17.0 Construct and maintain agricultural structures.
- 18.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy.
- 19.0 Students examine the scope of career opportunities in and the importance of agriculture to the economy.
- 20.0 Demonstrate employability skills.
- 21.0 Demonstrate electric and gas welding.
- 22.0 Service and maintain small gasoline engines.
- 23.0 Perform preventative maintenance, checks, and services for agricultural equipment.
- 24.0 Perform minor repairs on an irrigation system.
- 25.0 Discuss the role of refrigeration in agriculture.
- 26.0 Demonstrate knowledge of new and emerging technologies in agriculture.
- 27.0 Explain the components of the American business system.
- 28.0 Investigate agricultural cooperatives structure and function.
- 29.0 Apply basic financial management skills.
- 30.0 Keep records.
- 31.0 Weld, braze, and cut, using appropriate equipment.
- 32.0 Operate, service, test, and maintain agricultural machinery and equipment.
- 33.0 Demonstrate positive customer-relations skills.
- 34.0 Diagnose, service, and repair the lubrication system.
- 35.0 Test, repair and/or replace, and maintain the cooling system.
- 36.0 Test, repair and/or replace the intake, exhaust, and turbo-charged systems.
- 37.0 Test, repair and/or replace the fuel-delivery system, using service manuals.

- 38.0 Test, repair and/or replace, and maintain the brake system.
- 39.0 Diagnose, service, repair, and maintain the hydraulic system.
- 40.0 Diagnose, service, and repair transmission systems.

**Florida Department of Education
Student Performance Standards**

Course Title: Agriscience Foundations 1
Course Number: 8106810
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of agricultural history and the global impact of agriculture; career opportunities; scientific and research concepts; biological and physical science principles; environmental principles; agriscience safety; principles of leadership; and agribusiness, employability, and human relations skills in agriscience. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students will interact with materials and primary sources of data or with secondary sources of data to observe and understand the natural world. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 20% of classroom time will be dedicated to laboratory experiences.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|------------------------------------|---|---------------------------|
| 01.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to: | | SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2; | |
| 01.01 Evaluate and explain emerging trends and the opportunities they may create within the AFNR systems. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.01.01.02.c |
| 01.02 Assess the economic impact of an AFNR system on a local, state, national and global level. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | CS.02.02.03.b |
| 01.03 Identify significant career patterns/shifts in the history of the agricultural industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.01.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-------------------------------------|--|--------------------|
| 01.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.06.02.01.a |
| 02.0 Practice agriscience safety skills and procedures--The student will be able to: | | SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7; | |
| 02.01 Identify the common causes and prevention of accidents in agriscience operations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.a |
| 02.02 Extract and utilize pertinent information from a container label and/or Safety Data Sheet (SDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | CS.03.04.03.a |
| 02.03 Identify proper disposal of hazardous waste materials and biohazards. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | ESS.04.01.02.c |
| 02.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.b |
| 03.0 Apply scientific and technological principles to agriscience issues--The student will be able to: | | SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1; | |
| 03.01 Employ scientific measurement skills. | | | |
| 03.02 Demonstrate safe and effective use of common laboratory equipment. | | | ESS.01.02.01.b |
| 03.03 Identify the parts and functions of plant and animal cells. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |
| 03.04 Describe the phases of cell reproduction. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 03.05 Implement the scientific method and science process skills through | LAFS.910.W.2.4 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|--------------------|
| the design and completion of an agriscience research project. | LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |
| 03.06 Interpret, analyze, and report data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | BS.02.01.01.b |
| 03.07 Investigate DNA and genetics applications in agriscience including the theory of probability. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | BS.01.01.01.a |
| 03.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.). | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | BS.03.01.03.b |
| 04.0 Apply environmental principles to the agricultural industry--The student will be able to: | | SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12 | |
| 04.01 Research how different climactic and geological activity influences agriculture. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | NRS.01.03.02.b |
| 04.02 Describe various ecosystems as they relate to the agriculture industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.03 Describe the environmental resources (soil, water, air) necessary for agriculture production. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.08.02.01.a |
| 04.04 Identify regulatory agencies that impact agricultural practices. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6 | | NRS.02.01.02.a |
| 04.05 Apply Best Management Practices that enhance the natural environment. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.06 Identify conservation practices related to natural resources. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.02.02.b |
| 05.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to: | | SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7; | |
| 05.01 Identify and describe the specializations within the plant science industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|---|
| | LAFS.1112.W.2.4 | | |
| 05.02 Categorize plants based on specific characteristics according to industry and scientific standards. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.01.01.a |
| 05.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc.... | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.03.01.a PS.02.03.02.a PS.02.03.05.a |
| 05.04 Identify the nutrients required for plant growth from the periodic table and explain their functions. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.01.02.01.a |
| 05.05 Analyze information from a fertilizer label. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | PS.01.03.04.b |
| 05.06 Propagate and grow plants through sexual and/or asexual reproduction. | | | PS.03.01.03.a PS.03.01.01.b |
| 05.07 Investigate the impacts of various pests and propose solutions for their control. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.03.03.01.c |
| 05.08 Investigate the nature and properties of food, fiber, and by-products from plants. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.09 Explore career opportunities in plant science. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.05.01.01.a |
| 06.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to: | | SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19; | |
| 06.01 Explain the economic importance of animals and the products obtained from animals. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.02 Analyze commercially important livestock breeds in Florida. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |
| 06.04 Compare and contrast animal welfare issues. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.02.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|---|--------------------|
| | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 06.05 Investigate the nature and properties of food, fiber, and by-products from animals. | | | AS.06.03.03.a |
| 06.06 Explore career opportunities in animal science. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | CS.05.01.01.a |
| 07.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to | | SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9; | |
| 07.01 Select and demonstrate proper use of hand tools in agriculture. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.04.02.a |
| 07.02 Operate service and maintain agriscience equipment, and instruments. | | | CS.03.04.03.b |
| 07.03 Manage facilities and supplies. | | | |
| 08.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to: | | | |
| 08.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE). | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 08.02 Utilize a record keeping system to collect, interpret, and analyze data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 08.03 Enhance oral communications through telephone, interview and presentation skills. | LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | CRP.04.01.02.b |
| 08.04 Enhance written communication by developing resumes and business letters. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2 | | CRP.04.02.02.b |
| 08.05 Demonstrate interpersonal (nonverbal) communication skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|-----------|---------------------------------|
| 08.06 Demonstrate good listening skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.04.03.01.a |
| 09.0 Apply leadership and citizenship skills--The student will be able to: | | | |
| 09.01 Identify and describe leadership characteristics. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.01.a |
| 09.02 Identify opportunities to apply acquired leadership skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.02.a |
| 09.03 Identify and demonstrate ways to be an active citizen. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.01.03.02.c |
| 09.04 Participate in community based learning activities. | | | CRP.01.03.01.a |
| 09.05 Demonstrate the ability to work cooperatively. | | | CRP.09.03.01.a |
| 09.06 Conduct formal and informal meetings using correct parliamentary procedure skills. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 09.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 09.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks. | | | CS.05.01.01.b CRP.10.02.02.b |
| 10.0 Discuss components of food safety and handling practices in agriculture - The student will be able to: | | | |
| 10.01 Demonstrate proper safety precautions and use of personal protective equipment. | | | FPP.01.01.01.b |
| 10.02 Evaluate the food safety responsibilities that occur along the food supply chain. | | | FPP.03.03.02.b |
| 10.03 Explain techniques and procedures for the safe handling of food products. | | | FPP.03.03.02.c |
| 10.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation). | | | FPP03.03.01.b |
| 10.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply. | | | FPP04.01.01.0b |

**Florida Department of Education
Student Performance Standards**

Course Title: **Technical Agriculture Operations 2**
Course Number: **8005110**
Course Credit: **1**

Course Description:

This course is designed to develop competencies in the areas of safety; selection and use of tools; planning and building projects and construction of agricultural structures, including the use of electrical circuits, plumbing, concrete and masonry; and employability skills.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|----------------|------------------|---------------------------|
| 11.0 Practice personal, equipment, and shop safety – the student will be able to: | | | |
| 11.01 Identify and eliminate hazards in agricultural mechanics settings. | | SC.912.N.1.1 | |
| 11.02 Observe color-coded warnings in work areas and on equipment and machinery. (Example Red= Danger, Orange = Warning, Yellow =caution, Blue = Information, Green = Safety) | | SC.912.N.1.1 | |
| 11.03 Describe appropriate actions in case of fire, accident, or other emergencies. | | SC.912.N.1.1 | CS.07.03.01.b |
| 11.04 Describe personal protective equipment (PPE) and appropriate clothing. (Clothing, closed toe shoes Eye wear, and hearing protection) | | SC.912.N.1.1 | CS.06.02.01.a |
| 11.05 Demonstrate safety procedures and workplace "housekeeping" practices. | | SC.912.N.1.1 | CS.06.03.01.a |
| 11.06 Safely handle and store flammable and non-restricted chemicals. | | SC.912.N.1.1 | CS.07.04.02.a |
| 11.07 Interpret the equipment instructions according to the operator’s manuals for equipment. | | SC.912.N.1.1 | CS.08.01.02.a |
| 11.08 Comply with the Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) rules and regulations within ag shop. | | SC.912.N.1.1 | CS.07.04.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|-------------------|--------------------------------|
| 11.09 Describe the Florida "Right-to-Know" law (as recorded in Florida Statutes, Chapter 442). | | | CS.07.04.01.a |
| 12.0 Select and use hand and power tools – the student will be able to: | | | |
| 12.01 Identify the capabilities and limitations of hand and power tools. | | | |
| 12.02 Select and safely use hand and power tools. | | SC.912.N.1.1 | CS.08.01.01.c CS.08.01.02.a |
| 12.03 Select and use proper PPE for hand and power tools. | | SC.912.N.1.1 | CS.06.02.01.a |
| 12.04 Identify worn, damaged, or abused tools and repair. | MAFS.912.G-MG.1.1 | | |
| 12.05 Select and demonstrate the appropriate procedures for sharpening tools. (Such as chisel, axe, shovel, and knife) | MAFS.912.G-CO.1.1 MAFS.912.G-CO.1.4 | SC.912.N.1.1 | |
| 12.06 Demonstrate the use of measurement tools common to agriculture. | MAFS.912.G-CO.1.1 | SC.912.N.1.1 | |
| 13.0 Plan, draw, and construct a project – the student will be able to: | | | |
| 13.01 Plan and sketch a project. | | | |
| 13.02 Design and draw a project using drawing instruments and/or computer-assisted design (CAD) software. | | | |
| 13.03 Calculate a bill of materials. | | | |
| 13.04 Construct a project (woodworking, metal working, PVC) . | | | |
| 13.05 Identify and select appropriate finishes (such as paint, varnish, and stain). | | | |
| 14.0 Install simple electrical circuits – the student will be able to: | | | |
| 14.01 Demonstrate appropriate safety precautions and equipment | | | |
| 14.02 Explain the principles of AC and DC circuitry. | MAFS.912.A-CED.1.1 | SC.912.P.10.2 | PST.03.04.02. a |
| 14.03 Explain series and parallel circuitry. | MAFS.912.A-CED.1.2 | | PST.03.04.01. b |
| 14.04 Explain the scientific principles of electrical systems. | MAFS.912.A-CED.1.4 | SC.912.P.10.13,15 | |
| 14.05 Plan and install a simple wiring circuit. | MAFS.912.A-CED.1.3 | SC.912.P.10.14 | PST.03.04.01. b |
| 14.06 Test electrical circuits using a multi-test meter. | | SC.912.P.10.2 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|-------------------|--------------------|
| 14.07 Identify and describe the use and function of sensors in Agriculture | | SC.912.P.10.16,17 | |
| 15.0 Perform basic plumbing and irrigation procedures – the student will be able to: | | | |
| 15.01 Demonstrate appropriate safety precautions and equipment | | | |
| 15.02 Identify and select plumbing and irrigation materials and tools. | | | |
| 15.03 Plan and construct a simple water-delivery system. | MAFS.912.A-CO.4.12 MAFS.912.G-SRT.2.5 | | |
| 15.04 Troubleshoot and perform minor plumbing and irrigation repairs. | | | PST.04.04.01. b |
| 15.05 Locate the state and local codes and standards and describe the importance of complying with them. | | | PST.04.02.03. b |
| 16.0 Mix and pour concrete and use masonry materials – the student will be able to: | | | |
| 16.01 Demonstrate appropriate safety precautions and equipment | | | |
| 16.02 Calculate concrete and other materials for a masonry project. | MAFS.912.G-MG.1.1 | | PST.04.04.05. a |
| 16.03 Prepare forms; mix and pour concrete. | MAFS.912.G.GMD.1.2 MAFS.912.G.GMD.1.3 | | PST.04.04.05. b |
| 17.0 Construct and maintain agricultural structures – the student will be able to: | | | |
| 17.01 Demonstrate appropriate safety precautions and equipment | | | |
| 17.02 Read and interpret basic construction plans. | | | PST.04.02.01. a |
| 17.03 Lay out an agricultural structure for construction with the use of a transit. | MAFS.912.S-ID.3.7 | | |
| 17.04 Demonstrate basic carpentry construction and procedures. | MAFS.912.G-GPE.2.5 MAFS.912.G-MG.1.1 | | |
| 17.05 Construct a fence. | MAFS.912.G-MG.1.3 MAFS.912.G-SRT.2.5 | SC.912.P.12.6 | PST.04.04.06. b |
| 17.06 Maintain and repair agricultural structures. | MAFS.912.G-MG.1.3 | | |
| 18.0 Evaluate the importance of the food and fiber system to understand the impact on global economy – the student will be able to: | | | |
| 18.01 Assess the agricultural impact upon the US gross national product and the total global economy. | MAFS.912.A-CED.1.1 | | CS.09.01.01.c |
| 18.02 Investigate local, state, and national regulatory laws, industry regulations, and legislation for agricultural businesses. | | | |

| CTE Standards and Benchmarks | | FS-M/LA | NGSSS-Sci | National Standards |
|------------------------------|--|---|--------------|--------------------|
| 18.03 | Identify and describe the primary government agencies involved with agriculture. | | | |
| 18.04 | Research new and emerging technologies and their impact on the economy. | MAFS.912.S-ID.1.2 MAFS.912.S-ID.3.9 | SC.912.N.4.2 | CS.10.02.01.b |
| 18.05 | Recognize the value of the food and agribusiness industry. | | | |
| 19.0 | Examine the scope of career opportunities in and the importance of agriculture to the economy – the student will be able to: | | | |
| 19.01 | Explore agriculture and agribusinesses and their role in the economy. | MAFS.912.A-CED.1.3 MAFS.912.S-IC.1.1 | | |
| 19.02 | Evaluate and explore the agribusiness career opportunities in agriculture. | MAFS.912.S-CP.1.1 | | |
| 19.03 | Compare how key organizational structures and processes affect organizational performance and the quality of products and services. | MAFS.912.S-CP.1.4 | SC.912.N.4.2 | |
| 19.04 | Demonstrate those qualities, attributes and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society. | MAFS.912.S-IC.2.6 | SC.912.N.1.1 | |
| 20.0 | Demonstrate employability skills – the student will be able to: | | | |
| 20.01 | Conduct group meetings, using parliamentary procedures and public-speaking skills. | | SC.912.N.1.1 | |
| 20.02 | Identify the documents that are required for a job application. | | | |
| 20.03 | Complete a job application form. | | | |
| 20.04 | Demonstrate competencies in job-interview techniques. | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: **Technical Agriculture Operations 3**
Course Number: **8005120**
Course Credit: **1**

Course Description:

This course is designed to develop competencies in the areas of welding; small gasoline engine service and repair; preventative maintenance procedures; irrigation system repair; refrigeration; new and emerging technologies; financial management skills; and employability skills.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---|----------------------|----------------------------------|
| 21.0 Demonstrate welding skills – the student will be able to: | | | |
| 21.01 Demonstrate appropriate safety precautions and equipment. | | | |
| 21.02 Select and use gas to complete a weld. | | | PST.04.04.07.b PST.04.04.07.c |
| 21.03 Select and use electric arc to complete a weld. | | SC.912.P.10.13,14,15 | PST.04.04.07.b PST.04.04.07.c |
| 21.04 Select and use MIG to complete a weld. | | | |
| 22.0 Service and maintain small gasoline engines – the student will be able to: | | | |
| 22.01 Demonstrate appropriate safety precautions and equipment | | | |
| 22.02 Explain the scientific principles of small engines. | MAFS.912.A-APR.4.6 MAFS.912.F-BF.1.1 | SC.912.P.10.3,4 | |
| 22.03 Identify major parts and describe the general operation of small gasoline engines (2- and 4-stroke cycle). | | SC.912.P.12.2 | PST.03.01.02.a |
| 22.04 Troubleshoot and perform minor repairs on small gasoline engines. | MAFS.912.A-APR.4.6 MAFS.912.F-BF.1.1 | SC.912.P.12.1 | PST.03.01.01.c |
| 23.0 Perform preventive maintenance, checks, and services for agricultural equipment – the student will be able to: | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|---|----------------------------------|
| 23.01 Explain the scientific principles of hydraulic and transmission systems. | MAFS.912.A-APR.4.6 MAFS.912.F-BF.1.1 | SC.912.P.8.2, SC.912.10.8, SC.912.12.2,12 | PST.03.02.01.a PST.03.03.01.b |
| 23.02 Perform daily operator maintenance checks for equipment. | | | |
| 23.03 Determine the preventive-maintenance procedures, using the equipment's operator manual. | | | |
| 23.04 Perform scheduled preventive-maintenance procedures. | | | |
| 23.05 Interpret and perform operator's trouble-shooting procedures as described in the manual. | MAFS.912.S-IC.2.6 | SC.912.P.8.2 | |
| 23.06 Keep records of equipment maintenance and services. | MAFS.912.A-REI.4.11 | | |
| 24.0 Design and maintain an irrigation system – the student will be able to: | | | |
| 24.01 Demonstrate appropriate safety precautions and equipment | | | |
| 24.02 Identify the basic components of irrigation systems. | | | |
| 24.03 Differentiate various types of irrigation systems. | MAFS.912.G-C.1.2 MAFS.912.G-C.2.5 | | |
| 24.04 Identify state and local regulatory agencies for water management. | | SC.912.N.4.1, SC.912.L.17.13 | |
| 24.05 Perform minor repair on an irrigation system. | MAFS.912.G-MG.1.3 MAFS.912.A-APR.4.6 MAFS.912.F-BF.1.1 | | |
| 24.06 Identify irrigation based on volume and pressure. | | | |
| 24.07 Calculate water consumption for an irrigation system. | | | |
| 25.0 Discuss the role of refrigeration in agriculture – the student will be able to: | | | |
| 25.01 Demonstrate appropriate safety precautions and equipment | | | |
| 25.02 Describe the primary components of a refrigeration system. | | SC.912.I.17.13 | |
| 26.0 Demonstrate knowledge of new and emerging technologies in agriculture – the student will be able to: | | | |
| 26.01 Discuss new power technologies. | | | |
| 26.02 Discuss developing energy sources | | SC.912.L.17.11,15,19, SC.912.P.10.1,2 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------------------|--|--------------------|
| 26.03 Discuss energy management issues. | | SC.912.L.17.11,15,19, SC.912.P.10.1,2 | |
| 27.0 Explain the components of the American business system – the student will be able to: | | | |
| 27.01 Describe the five basic ways American business is organized. | | | |
| 27.02 Distinguish and identify between the characteristics of each method of doing business. | MAFS.912.A-REI.4.11 | | |
| 27.03 Evaluate the advantages and disadvantages provided by each business method. | MAFS.912.S-CP.1.4 | | |
| 27.04 Evaluate how cooperative principles and practices differentiate cooperatives from other businesses. | MAFS.912.S-CP.1.4 | | |
| 28.0 Investigate agricultural cooperatives structure and function – the student will be able to: | | | |
| 28.01 Explain the definition of a cooperative. | | | |
| 28.02 Understand the history of cooperative principles and practices. | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: **Technical Agriculture Operations 4**
Course Number: **8005130**
Course Credit: **1**

Course Description:

This course is designed to develop competencies in the areas of welding; small gasoline engine service and repair; preventative maintenance procedures; irrigation system repair; refrigeration; new and emerging technologies; financial management skills; and employability skills.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS- LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---|--------------------------------|---------------------------|
| 29.0 Keep records – the student will be able to: | | | |
| 29.01 Explain the purpose and importance of keeping records. | | | |
| 29.02 Demonstrate procedures for keeping records of equipment maintenance and services. | | | |
| 29.03 Keep records on each job or project assignment. | MAFS.912.A.CED.1.2 | | |
| 29.04 Complete work orders, service invoices, and requisitions. | MAFS.912.A-CED.1.2 MAFS.912.N-VM.3.8 | | |
| 29.05 Prepare a written cost estimate of repair work. | MAFS.912.N-VM.3.8 MAFS.912.A-CED.1.2 | | |
| 30.0 Weld, braze, and cut, using appropriate equipment – the student will be able to: | | | |
| 30.01 Practice all recommended safety precautions. | | | |
| 30.02 Set up, adjust, operate, and maintain MIG (metal inert gas) and TIG (tungsten inert gas) welding equipment. | | SC.912.P.8.2, SC.912.P.10.4 | PST.04.04.07 |
| 30.03 Set up, adjust, and operate plasma cutting equipment. | | SC.912.P.10.1, 4 | PST.04.04.07 |
| 30.04 Select recommended operational procedures and supplies for specific jobs. | | SC.912.N.1.1 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|-------------------|--|--------------------|
| 30.05 Demonstrate the different welding positions. | MAFS.912.G-CO.1.1 | SC.912.E.6.6, SC.912.N.1.1 | PST.04.04.07 |
| 30.06 Cut and pierce metals, using oxyacetylene and plasma. | | SC.912.P.8.2,6,13, SC.912.P.10.4, SC.912.P.12.12 | PST.04.04.07 |
| 30.07 Braze metals. | | SC.912.P.8.2,6, SC.912.P.10.4 | PST.04.04.07 |
| 30.08 Store welding equipment and supplies according to the recommended storage procedures. | | SC.912.N.1.1 | |
| 31.0 Operate, service, test, and maintain agricultural machinery and equipment – the student will be able to: | | | |
| 31.01 Follow safety precautions when operating, servicing, and maintaining machines and equipment. | | | |
| 31.02 Operate, diagnose, and adjust common agricultural machinery and equipment, according to the operator's manuals. (Examples include tractors, mowers, sprayers, and fertilizer spreaders) | | | |
| 31.03 Diagnose, remove, clean, test, repair, and reinstall parts of machinery and equipment, using repair manuals. | | SC.912.N.1.1 | |
| 31.04 Discuss the principles of GPS & GIS and its use with precision farming equipment. | | SC.912.N.1.1 | PST.05.03.01 |
| 31.05 Demonstrate techniques in land measurement. (including Differential and profile techniques) | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: **Technical Agriculture Operations 5**
Course Number: **8005140**
Course Credit: **1**

Course Description:

This course is designed to develop competencies in the areas of service, repair and maintenance of the following: the lubrication system; the cooling system; the intake, exhaust, and turbo-charged systems; the fuel-delivery system; hydraulics and pneumatics; transmissions; and the brake system.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS- LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|----------------|---|---------------------------|
| 32.0 Diagnose, service, and repair the lubrication system – the student will be able to: | | SC.912.P.10.3, 4, 5, 6, 8; SC.912.P.12.1, 2, 7 | |
| 32.01 Change oil filters. | | | |
| 32.02 Check and change oils and other lubricants in engines. | | | |
| 32.03 Diagnose and replace damaged or worn components of the system. | | | |
| 33.0 Test, repair and/or replace, and maintain the cooling system – the student will be able to: | | SC.912.P.10.3, 4, 5, 6, 8; SC.912.P.12.1, 2, 7 | |
| 33.01 Test coolant. | | | PST.03.05.01.c |
| 33.02 Flush and clean the system. | | | PST.03.05.01.c |
| 33.03 Test, repair and/or replace parts of the system. | | | PST.03.05.01.c |
| 33.04 Adjust parts of the system for proper operation. | | | PST.03.05.01.c |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|---|---------|--|--------------------|
| 34.0 Test, repair and/or replace the intake, exhaust, and turbo-charged systems – the student will be able to | | SC.912.P.10.3, 4, 5, 6, 8; SC.912.P.12.1, 2, 7 | |
| 34.01 Troubleshoot the intake, exhaust, and turbo-charged systems, using recommended diagnostic equipment. | | | |
| 34.02 Repair and replace parts of the systems. | | | |
| 34.03 Service and adjust the systems for proper operation. | | | |
| 35.0 Test, repair and/or replace the fuel-delivery system, using service manuals – the student will be able to: | | | |
| 35.01 Identify how to remove, clean, rebuild, and reinstall carburetors. | | | |
| 35.02 Bleed the diesel-fuel system. | | | |
| 35.03 Remove and reinstall a diesel-fuel-injection pump, according to the manufacturer's specifications. | | | |
| 35.04 Discuss how to replace components of the fuel system. | | | |
| 35.05 Service and adjust parts of the fuel system for proper operation. | | | |
| 35.06 Service electronic fuel injection for gas engines. | | | |
| 36.0 Test, repair and/or replace, and maintain the brake system – the student will be able to: | | | |
| 36.01 Drain, refill, and adjust the brake system. | | | |
| 36.02 Repair and replace parts of the system. | | | |
| 36.03 Service and adjust the system for proper operation. | | | |
| 37.0 Diagnose, service, repair, and maintain the hydraulic system – the student will be able to: | | SC.912.P.10.3, 4, 5, 5, 6, 8; SC.912.P.12.1, 2; | |
| 37.01 Change filters and drain, flush, and refill the hydraulic system. | | | |
| 37.02 Troubleshoot hydraulic-system components, using recommended diagnostic equipment. | | | PST.03.03.03.c |
| 37.03 Repair and replace parts of the system. | | | PST.03.03.03.c |
| 37.04 Service and adjust the system for proper operation | | | PST.03.03.03.c |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|--|---------|--|--------------------|
| 38.0 Diagnose, service, and repair transmission systems – the student will be able to: | | SC.912.P.10.3, 4, 5, 5, 6, 8; SC.912.P.12.1, 2; | |
| 38.01 Troubleshoot transmission components, using recommended diagnostic equipment. | | | |
| 38.02 Repair and replace parts of transmission systems. | | | |
| 38.03 Service and adjust parts of different transmission systems for proper operation. | | | |
| 38.04 Service and repair transfer case | | | |
| 38.05 Troubleshoot transfer case components. | | | |
| 38.06 Service and adjust system components. | | | |
| 38.07 Repair and replace system components. | | | |
| 38.08 Change filters and drain, flush, and refill the transfer case system. | | | |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization for providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different

competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

**Florida Department of Education
Curriculum Framework**

Course Title: Agricultural Use of UAS Technology
Course Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

| | |
|----------------------------|---|
| Program Number | 8005200 |
| CIP Number | 0141039901 |
| Grade Level | 11-12 |
| Standard Length | 1 credit |
| Teacher Certification | Refer to the Course Structure section. |
| CTSO | FFA |
| SOC Codes (All applicable) | 19-4099 – Precision Agriculture Technicians |

Capstone Course

The purpose of this course is to provide students who have completed or are currently completing an OCP (occupational completion point) in an agricultural program, a capstone experience in UAS Technology for agriculture. This course is designed to enhance competencies in the areas of agricultural science and UAS technology. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This course may be taken only by a student who has completed or is currently completing an occupational completion point in an agriculture program.

| OCP | Course Number | Course Title | Teacher Certification | Length | SOC Code | Level | Graduation Requirement |
|-----|---------------|------------------------------------|-----------------------|----------|----------|-------|------------------------|
| A | 8005233 | Agricultural use of UAS Technology | AGRICULTUR 1* | 1 credit | 19-4099 | 3 | |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Teacher Certification

Teachers must hold the traditional agriculture teacher certification and an Unmanned Safety Credential to teach this course.

Academic Alignment Tables

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

| Courses | Anatomy/ Physiology Honors | Astronomy Solar/Galactic Honors | Biology 1 | Chemistry 1 | Earth-Space Science | Environmental Science | Genetics | Integrated Science | Marine Science 1 Honors | Physical Science | Physics 1 |
|------------------------------------|----------------------------|---------------------------------|-----------|-------------|---------------------|-----------------------|----------|--------------------|-------------------------|------------------|-----------|
| Agricultural use of UAS Technology | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** |

** Alignment pending review

Alignment attempted, but no correlation to academic course

| Courses | Algebra 1 | Algebra 2 | Geometry | English 1 | English 2 | English 3 | English 4 |
|------------------------------------|-----------|-----------|----------|-----------|-----------|-----------|-----------|
| Agricultural use of UAS Technology | ** | ** | ** | ** | ** | ** | ** |

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. The FS for Mathematical Practices are designed for grades K-12 and describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education.

Instructors must incorporate the Florida Standards for Technical Subjects and Mathematical Practices throughout instruction of this CTE program.

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or

interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Investigate the origins and development of unmanned aviation.
- 02.0 Develop a plan for powered flight in the National Airspace System
- 03.0 Explain aviation rules and regulations as they pertain to UAS.
- 04.0 Explain concepts and differences in human factors related manned and unmanned aviation.
- 05.0 Demonstrate Crew Resource Management principles.
- 06.0 Demonstrate the appropriate attitudes and behaviors associated with the safety mindset.
- 07.0 Analyze UAS technologies, platforms, and systems.
- 08.0 Select appropriate UAV to complete a given objective.
- 09.0 Analyze the ethics and privacy considerations in the operation of unmanned aircraft.
- 10.0 Model methods to communicate with air traffic control and conflict aircraft
- 11.0 Analyze UAS Operating standards and restrictions
- 12.0 Explain components of airworthiness
- 13.0 Explain aviation safety systems as they apply to UAS
- 14.0 Explain new careers that have emerged using technology in agriculture.
- 15.0 Determine uses for Unmanned Aircraft Systems (UAS) to monitor plant growth.
- 16.0 Describe how UAS can be used to evaluate soil conditions.
- 17.0 Develop an integrated pest management (IPM) plan using information from UAS technology.
- 18.0 Develop fertilizer recommendations by interpreting multiple data sources.
- 19.0 Determine uses for UAS to monitor animal operations.
- 20.0 Determine the applications of UAS to provide data forage producers.
- 21.0 Determine the applications of UAS to provide data on agricultural crops.
- 22.0 Determine the applications of UAS to provide data to foresters.

**Florida Department of Education
Student Performance Standards**

Course Title: **Agriculture and UAS Technology**
Course Number: **8005233**
Course Credit: **1**

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 01.0 Investigate the origins and development of unmanned aviation. | | | |
| 01.01 Actively participate in a group to present important systems, people, and technologies important to the development of the industry. | | | |
| 01.02 Summarize the evolution of commercial UAS operations in the United States. | | | |
| 01.03 Explain the limitations and constraints placed on the development of commercial UAS. | | | |
| 01.04 Describe the process and evolution of a UAS regulatory framework. | | | |
| 01.05 Explain technologies that led to modern day UAS. | | | |
| 01.06 Describe the events important to the development of UAS. | | | |
| 01.07 Explain classification schemes of UAS. | | | |
| 01.08 Explain intelligence modes of control for UAS. | | | |
| 01.09 Explain the difference between direct control versus supervisory control. | | | |
| 01.10 Design a diagram illustrating the differences and similarities between beyond line of sight, beyond visual line of sight, electronic line of sight, and visual line of sight. | | | |
| 02.0 Develop a plan for powered flight in the National Airspace System. | | | |
| 02.01 Interpret Aeronautical Charts to determine airspace for a given location. | | | |
| 02.02 Explain the classes of airspace. | | | |
| 02.03 Describe weather and associated hazards to aviation. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|-----------|--------------------|
| 02.04 Interpret "official" sources of weather to make sound decision. | | | |
| 02.05 Interpret the Notices to Airman Information reporting system. | | | |
| 02.06 Interpret both airport and center NOTAMs. | | | |
| 03.0 Explain aviation rules and regulations as they pertain to UAS. | | | |
| 03.01 Explain the limitations and requirements of Visual Flight Rules as they pertain to UAS. | | | |
| 03.02 Explain state and local rules and regulations governing UAS. | | | |
| 04.0 Explain concepts and differences of in human factors related to manned and unmanned aviation. | | | |
| 04.01 Explain the human factors of UAS operations. | | | |
| 04.02 Explain how ground control stations operate. | | | |
| 04.03 Describe personnel required for UAS operations. | | | |
| 04.04 Explain how human factors effect operation. | | | |
| 04.05 Demonstrate an understanding of human imitations in perception, processing and performance | | | |
| 04.06 Describe the type and causes of human errors | | | |
| 04.07 Describe the physiological effects of drugs and alcohol | | | |
| 04.08 Describe methods for dealing with automation and the lack of sensory cues | | | |
| 05.0 Demonstrate Crew Resource Management principles. | | | |
| 05.01 Explain the purpose of Crew Resource Management | | | |
| 05.02 Describe situational awareness | | | |
| 05.03 Demonstrate effective crew communication and coordination | | | |
| 05.04 Utilize advocacy and inquiry to champion a course of action | | | |
| 05.05 Describe strategies for dealing with task saturation or overloads | | | |
| 05.06 Demonstrate the skills associated with aeronautical decision | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|-----------|--------------------|
| making and operational analysis | | | |
| 05.07 Demonstrate proper site survey and analysis skills | | | |
| 06.0 Demonstrate the appropriate attitudes and behaviors associated with the safety mindset. | | | |
| 06.01 Describe and demonstrate professional conduct | | | |
| 06.02 Demonstrate the importance of being risk averse in UAS planning and flight | | | |
| 07.0 Analyze UAS technologies, platforms, and systems. | | | |
| 07.01 Summarize UAS intelligence and components. | | | |
| 07.02 Summarize platform capabilities and limitations. | | | |
| 07.03 Analyze the control station of UAS. | | | |
| 07.04 Summarize the payload element of UAS | | | |
| 07.05 Analyze the environment in which the UAS operate. | | | |
| 07.06 Explain frequency management in the United States. | | | |
| 07.07 Assess UAS lifecycle and its implication on UAS operations. | | | |
| 07.08 Compare UAS component reliability and operational considerations. | | | |
| 07.09 Describe UAS user interfaces. | | | |
| 07.10 Analyze levels of automation in robotic systems. | | | |
| 07.11 Analyze when to use UAS rather than manned aircraft. | | | |
| 07.12 Describe UAS sensors used for navigation and stabilization. | | | |
| 08.0 Select appropriate UAV to complete a given objective. | | | |
| 08.01 Explain characteristics of airborne robotic systems. | | | |
| 08.02 Compare wing designs and benefits of each to the field of UAS. | | | |
| 08.03 Analyze criteria set forth via a request for proposal to identify | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| appropriate aircraft to conduct operations. | | | |
| 08.04 Compare energy sources available for UAS. | | | |
| 08.05 Compare payload options and apply them to appropriate operations. | | | |
| 08.06 Explain uses of infrared technology. | | | |
| 09.0 Analyze the ethics and privacy considerations in the operation of unmanned aircraft. | | | |
| 09.01 Explain the regulations and policies currently in place for UAS operations. | | | |
| 09.02 Describe the foundations of an ethical code of conduct for UAS operators. | | | |
| 09.03 Define professional use of UAS. | | | |
| 09.04 Demonstrate standards of professionalism in everyday operations. | | | |
| 09.05 Analyze ethical use of robotic aircraft. (safety of people) | | | |
| 10.0 Model methods to communicate with air traffic control and conflict aircraft. | | | |
| 10.01 Describe aviation communications practices. | | | |
| 10.02 Explain the essential information required in aviation communication. | | | |
| 10.03 Use the Aeronautical Information Manual to make a radio call. | | | |
| 11.0 Analyze UAS Operating standards and restrictions. | | | |
| 11.01 Analyze UAS limitations and regulations. | | | |
| 11.02 Explain guidelines and safety protocols. | | | |
| 11.03 Explain the reporting requirements for UAS operations. | | | |
| 12.0 Explain components of airworthiness. | | | |
| 12.01 Explain the concept of system limitations. | | | |
| 12.02 Prepare airworthiness inspections. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|--|---------|----------|--------------------|
| 13.0 Explain aviation safety systems as they apply to UAS. | | | |
| 13.01 Explain the four pillars of a safety management system (SMS). | | | |
| 13.02 Conduct a risk assessment. | | | |
| 13.03 Develop risk mitigation strategies. | | | |
| 13.04 Explain methods for safety assurance and promotion. | | | |
| 13.05 Describe how a well working SMS can recover from an accident. | | | |
| 14.0 Explain new careers that have emerged using technology in agriculture. | | | |
| 14.01 Identify significant career shifts with technology in the agriculture industry. | | | |
| 14.02 Examine the role of technology in the agriculture industry. | | | |
| 14.03 Solve mathematical applications using technology. | | | |
| 14.04 Describe technologies associated with active and passive remote sensing payloads. | | | |
| 14.05 Explain the limitations of remote sensing. | | | |
| 15.0 Determine uses for Unmanned Aircraft Systems (UAS) to monitor plant growth. | | | |
| 15.01 Describe the uses of UAS remote sensing technology to examine the processes of plant growth. | | | |
| 15.02 Determine the health of plant using chlorophyll counts. | | | |
| 15.03 Identify nutrient deficiencies in plants using UAS remote sensing technology. | | | |
| 16.0 Describe how UAS can be used to evaluate soil conditions. | | | |
| 16.01 Analyze soil properties using UAS remote sensing technology. | | | |
| 16.02 Develop a plan to use UAS technology in best management practices for irrigation. | | | |
| 16.03 Examine irrigation application effectiveness using UAS technology. | | | |
| 17.0 Develop an integrated pest management (IPM) plan using information from UAS technology. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 17.01 Identify pests and diseases and the damage they cause. | | | |
| 17.02 Recommend appropriate solutions for pest and disease control. | | | |
| 17.03 Differentiate between nutrient deficiencies and pest/disease damage in plants. | | | |
| 18.0 Develop fertilizer recommendations by interpreting multiple data sources. | | | |
| 18.01 Identify nutrient deficiencies plan using UAS remote sensing. | | | |
| 18.02 Make fertilizer recommendations based on data from visual appraisal of plants and soil samples. | | | |
| 18.03 Determine the appropriate type and rate of fertilizer to apply to plants. | | | |
| 19.0 Determine uses for UAS to monitor animal operations. | | | |
| 19.01 Describe the uses of UAS technology to observe animals. | | | |
| 19.02 Identify animals using UAS remote sensing. | | | |
| 19.03 Determine calving percentages using UAS remote sensing. | | | |
| 19.04 Identify the systems of common diseases of cattle, sheep, and goats. | | | |
| 20.0 Determine the applications of UAS to provide data forage producers. | | | |
| 20.01 Identify common forages, pests, and diseases using UAS remote sensing. | | | |
| 20.02 Identify the growth stage of forage crops. | | | |
| 20.03 Identify common diseases that impact forage crops. | | | |
| 20.04 Evaluate forage and hay as a source of nutrition for animals. | | | |
| 21.0 Determine the applications of UAS to provide data on agricultural crops. | | | |
| 21.01 Use UAS remote sensing technology to identify pest and diseases. | | | |
| 21.02 Analyze the use of UAS for early detection of diseases. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|-----------|--------------------|
| 21.03 Calculate yield estimates using UAS data. | | | |
| 21.04 Evaluate and monitor crops using UAS remote sensing technology to predict harvest times. | | | |
| 22.0 Determine the applications of UAS to provide data to foresters. | | | |
| 22.01 Identify economically important tree species. | | | |
| 22.02 Identify forest pests, insects and diseases using UAS remote sensing techniques. | | | |
| 22.03 Make forest management decisions using data from UAS images and data. | | | |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Extended Student Supervision

Because of the production and marketing cycle of the agriculture industry, this program requires individual instruction and supervision of students for the entire period beyond the 180-day school year.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization for providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different

competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

**Florida Department of Education
Curriculum Framework**

Program Title: Natural Resources
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

| | |
|----------------------------|---|
| Program Number | 8006200 |
| CIP Number | 0103010302 |
| Grade Level | 9-12 |
| Standard Length | 5 credits |
| Teacher Certification | Refer to the <u>Program Structure</u> section. |
| CTSO | FFA |
| SOC Codes (all applicable) | 19-4091 - Environmental Science and Protection Technicians, Including Health 19-1031 - Conservation Scientists |

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety and environmental issues.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of four courses with two occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the secondary program structure:

| OCP | Course Number | Course Title | Teacher Certification | Length | SOC Code | Level | Graduation Requirement |
|-----|---------------|-------------------------------------|-----------------------|----------|----------|-------|------------------------|
| A | 8106810 | Agriscience Foundations 1 | AGRICULTUR 1 @2 | 1 credit | 19-4091 | 3 | EQ |
| | 8006220 | Introduction to Natural Resources 2 | | 1 credit | | 3 | |
| | 8006230 | Natural Resource Technology 3 | | 1 credit | | 3 | |
| B | 8006240 | Natural Resource Management 4 | | 1 credit | 19-1031 | 3 | |
| | 8006250 | Advanced Natural Resources 5 | | 1 credit | | 3 | |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Academic Alignment Table

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

| Courses | Anatomy/ Physiology Honors | Astronomy Solar/Galactic Honors | Biology 1 | Chemistry 1 | Earth-Space Science | Environmental Science | Genetics | Integrated Science | Marine Science 1 Honors | Physical Science | Physics 1 |
|-------------------------------------|----------------------------|---------------------------------|--------------|--------------|---------------------|-----------------------|--------------|--------------------|-------------------------|------------------|--------------|
| Agriscience Foundations 1 | 29/87 33% | 18/80 23% | 55/83 66% | 11/69 16% | 36/67 54% | 30/70 42% | 20/69 29% | 49/82 60% | 25/66 38% | 38/74 51% | 12/72 16% |
| Introduction to Natural Resources 2 | 3/87 3% | 10/80 13% | 32/83 39% | 6/69 9% | 30/67 48% | 22/70 31% | 7/69 10% | 31/82 28% | 20/66 30% | 27/74 36% | 6/72 8% |
| Natural Resource Technology 3 | 21/87 24% | 25/80 31% | 6/83 7% | 23/69 33% | 7/67 10% | 28/70 40% | 22/69 32% | 7/82 9% | 23/66 35% | 5/74 7% | 23/72 32% |
| Natural Resource Management 4 | 21/87 24% | 22/80 28% | 5/83 6% | 22/69 32% | 5/67 7% | 29/70 41% | 25/69 36% | 4/82 5% | 22/66 33% | 3/74 4% | 23/72 32% |
| Advanced Natural Resources 5 | 2/87 2% | 3/80 4% | 7/83 8% | 3/69 4% | 4/67 6% | 11/70 16% | 5/69 7% | 4/82 5% | 9/66 14% | 3/74 4% | 3/72 4% |

** Alignment pending review

Alignment attempted, but no correlation to academic course

| Courses | Algebra 1 | Algebra 2 | Geometry | English 1 | English 2 | English 3 | English 4 |
|-------------------------------------|--------------|------------|-------------|--------------|--------------|--------------|--------------|
| Agriscience Foundations 1 | 14/67 21% | 4/75 5% | 8/54 15% | 11/46 24% | 11/45 24% | 11/45 24% | 11/45 24% |
| Introduction to Natural Resources 2 | ** | ** | ** | ** | ** | ** | ** |
| Natural Resource Technology 3 | ** | ** | ** | ** | ** | ** | ** |
| Natural Resource Management 4 | ** | ** | ** | ** | ** | ** | ** |
| Advanced Natural Resources 5 | ** | ** | ** | ** | ** | ** | ** |

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the 6-12 literacy standards in history/social studies, science, and technical subjects are not meant to replace content standards in those areas but rather to supplement them.

This curriculum framework incorporates the grades 9-10 reading and writing literacy standards in the first two courses of this CTE program and grade 11-12 reading and writing literacy standards in the third and fourth courses of this CTE program. The standards for Mathematical Practices describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. This curriculum framework incorporates the appropriate mathematical practices in the first four courses of this CTE program.

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary

for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. If so, the standards have been identified and cross walked with the corresponding CTE standard and/or benchmark.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Describe the history of agriculture and its influence on the global economy.
- 02.0 Practice agriscience safety skills and procedures.
- 03.0 Apply scientific and technological principles to agriscience issues.
- 04.0 Apply environmental principles to the agricultural industry.
- 05.0 Investigate and utilize basic scientific skills and principles in plant science.
- 06.0 Investigate and utilize basic scientific skills and principles in animal science.
- 07.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 08.0 Demonstrate agribusiness, employability and human relation skills.
- 09.0 Apply leadership and citizenship skills.
- 10.0 Discuss components of food safety and handling practices in agriculture.
- 11.0 Identify major ecosystems in Florida.
- 12.0 Describe hydrology.
- 13.0 Practice safety skills and procedures.
- 14.0 Demonstrate sampling procedures.
- 15.0 Collect and test samples used to determine soil characteristics.
- 16.0 Describe related geologic principles.
- 17.0 Discuss related standards and regulations.
- 18.0 Identify wetland management practices.
- 19.0 Describe methods to manage wildlife.
- 20.0 Describe procedures to manage forests.
- 21.0 Utilize data and resources.
- 22.0 Determine the quality and quantity of water resources.
- 23.0 Describe stormwater systems.
- 24.0 Develop map reading skills.
- 25.0 Use Geographic Informational (GIS) and Global Positioning (GPS) Systems.
- 26.0 Describe procedures for managing hazardous materials.
- 27.0 Prepare a plan for a mock disaster activity.
- 28.0 Identify career opportunities and organizational dynamics.
- 29.0 Analyze wildlife management procedures.
- 30.0 Analyze forest management techniques.
- 31.0 Identify forest fire management techniques.
- 32.0 Discuss Pest management for insects.
- 33.0 Analyze the management of ecosystems.
- 34.0 Discuss ecology restoration.
- 35.0 Discuss the principles of land use planning.
- 36.0 Discuss managing and disposing of solid waste.
- 37.0 Evaluate the importance of the food and fiber system to understand the impact on global economy.

- 38.0 Examine the scope of career opportunities in and the importance of agriculture and natural resources to the economy.
- 39.0 Demonstrate the use of weather and climate data.
- 40.0 Discuss sustainable agriculture.

**Florida Department of Education
Student Performance Standards**

Course Title: Agriscience Foundations 1
Course Number: 8106810
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of agricultural history and the global impact of agriculture; career opportunities; scientific and research concepts; biological and physical science principles; environmental principles; agriscience safety; principles of leadership; and agribusiness, employability, and human relations skills in agriscience. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students will interact with materials and primary sources of data or with secondary sources of data to observe and understand the natural world. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 20% of classroom time will be dedicated to laboratory experiences.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|------------------------------------|---|--------------------|
| 01.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to: | | SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2; | |
| 01.01 Evaluate and explain emerging trends and the opportunities they may create within the AFNR systems. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.01.01.02.c |
| 01.02 Assess the economic impact of an AFNR system on a local, state, national and global level. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | CS.02.02.03.b |
| 01.03 Identify significant career patterns/shifts in the history of the agricultural industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.01.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|--|--------------------|
| 01.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.06.02.01.a |
| 02.0 Practice agriscience safety skills and procedures--The student will be able to: | | SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7; | |
| 02.01 Identify the common causes and prevention of accidents in agriscience operations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.a |
| 02.02 Extract and utilize pertinent information from a container label and/or Safety Data Sheet (SDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | CS.03.04.03.a |
| 02.03 Identify proper disposal of hazardous waste materials and biohazards. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | ESS.04.01.02.c |
| 02.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.b |
| 03.0 Apply scientific and technological principles to agriscience issues--The student will be able to: | | SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1; | |
| 03.01 Employ scientific measurement skills. | | | |
| 03.02 Demonstrate safe and effective use of common laboratory equipment. | | | ESS.01.02.01.b |
| 03.03 Identify the parts and functions of plant and animal cells. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |
| 03.04 Describe the phases of cell reproduction. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 03.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|--------------------|
| 03.06 Interpret, analyze, and report data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | BS.02.01.01.b |
| 03.07 Investigate DNA and genetics applications in agriscience including the theory of probability. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | BS.01.01.01.a |
| 03.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.). | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | BS.03.01.03.b |
| 04.0 Apply environmental principles to the agricultural industry--The student will be able to: | | SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12 | |
| 04.01 Research how different climactic and geological activity influences agriculture. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | NRS.01.03.02.b |
| 04.02 Describe various ecosystems as they relate to the agriculture industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.03 Describe the environmental resources (soil, water, air) necessary for agriculture production. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.08.02.01.a |
| 04.04 Identify regulatory agencies that impact agricultural practices. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6 | | NRS.02.01.02.a |
| 04.05 Apply Best Management Practices that enhance the natural environment. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.06 Identify conservation practices related to natural resources. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.02.02.b |
| 05.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to: | | SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7; | |
| 05.01 Identify and describe the specializations within the plant science industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.02 Categorize plants based on specific characteristics according to industry and scientific standards. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|---|---|
| 05.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc.... | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.03.01.a PS.02.03.02.a PS.02.03.05.a |
| 05.04 Identify the nutrients required for plant growth from the periodic table and explain their functions. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.01.02.01.a |
| 05.05 Analyze information from a fertilizer label. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | PS.01.03.04.b |
| 05.06 Propagate and grow plants through sexual and/or asexual reproduction. | | | PS.03.01.03.a PS.03.01.01.b |
| 05.07 Investigate the impacts of various pests and propose solutions for their control. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.03.03.01.c |
| 05.08 Investigate the nature and properties of food, fiber, and by-products from plants. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.09 Explore career opportunities in plant science. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.05.01.01.a |
| 06.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to: | | SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19; | |
| 06.01 Explain the economic importance of animals and the products obtained from animals. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.02 Analyze commercially important livestock breeds in Florida. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |
| 06.04 Compare and contrast animal welfare issues. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | AS.02.01.01.a |
| 06.05 Investigate the nature and properties of food, fiber, and by-products from animals. | | | AS.06.03.03.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|---|--------------------|
| 06.06 Explore career opportunities in animal science. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | CS.05.01.01.a |
| 07.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to | | SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9; | |
| 07.01 Select and demonstrate proper use of hand tools in agriculture. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.04.02.a |
| 07.02 Operate service and maintain agriscience equipment, and instruments. | | | CS.03.04.03.b |
| 07.03 Manage facilities and supplies. | | | |
| 08.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to: | | | |
| 08.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE). | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 08.02 Utilize a record keeping system to collect, interpret, and analyze data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 08.03 Enhance oral communications through telephone, interview and presentation skills. | LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | CRP.04.01.02.b |
| 08.04 Enhance written communication by developing resumes and business letters. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2 | | CRP.04.02.02.b |
| 08.05 Demonstrate interpersonal (nonverbal) communication skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 08.06 Demonstrate good listening skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.04.03.01.a |
| 09.0 Apply leadership and citizenship skills--The student will be able to: | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|-----------|---------------------------------|
| 09.01 Identify and describe leadership characteristics. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.01.a |
| 09.02 Identify opportunities to apply acquired leadership skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.02.a |
| 09.03 Identify and demonstrate ways to be an active citizen. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.01.03.02.c |
| 09.04 Participate in community based learning activities. | | | CRP.01.03.01.a |
| 09.05 Demonstrate the ability to work cooperatively. | | | CRP.09.03.01.a |
| 09.06 Conduct formal and informal meetings using correct parliamentary procedure skills. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 09.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 09.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks. | | | CS.05.01.01.b CRP.10.02.02.b |
| 10.0 Discuss components of food safety and handling practices in agriculture - The student will be able to: | | | |
| 10.01 Demonstrate proper safety precautions and use of personal protective equipment. | | | FPP.01.01.01.b |
| 10.02 Evaluate the food safety responsibilities that occur along the food supply chain. | | | FPP.03.03.02.b |
| 10.03 Explain techniques and procedures for the safe handling of food products. | | | FPP.03.03.02.c |
| 10.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation). | | | FPP.03.03.01.b |
| 10.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply. | | | FPP.04.01.01.0b |

**Florida Department of Education
Student Performance Standards**

Course Title: Introduction to Natural Resources 2
Course Number: 8006220
Course Credit: 1

Course Description:

This course was developed as a core and is designed to develop competencies in the areas of Environmental Resources in agriculture, scientific investigation, laboratory safety, scientific and technological concepts; and the fundamentals of biotechnology.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|----------------------|---|--------------------|
| 11.0 Identify major ecosystems in Florida – the student will be able to: | | SC.912.L.15.3 SC.912.L.17.1, 6, 7, 8, 9, 15, 16 | |
| 11.01 Identify common plant and animal species of the major ecosystems. | | SC.912.L.17.7 | |
| 11.02 Identify the boundary between uplands and wetlands using resources such as: aerial photographs, soils, plants, and/or hydrology. | MAFS.912.G-GMD.2.4 | SC.912.L.17.7 | |
| 11.03 Identify environmental factors affecting Florida’s major ecosystems. | | SC.912.L.17.10 | |
| 11.04 Identify threatened and endangered plant and animal species of specific habitats. | | SC.912.L.17.7 | |
| 11.05 Analyze biological and economical, impacts on managing ecosystems. | MAFS.912.G-MG.1.2, 3 | SC.912.L.17.12 SC.912.N.1.1 | |
| 11.06 Trace the effects of pollution through an ecosystem. | | SC.912.L.17.8 | |
| 11.07 Explain how lack of predation contributes to uncontrollable exotic populations. | | SC.912.L.17.6, 8 | |
| 11.08 Explain how exotic populations stress native. | | SC.912.L.17.8 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---|--|---------------------------|
| 12.0 Describe hydrology – the student will be able to: | | | |
| 12.01 Define basic hydrological terms. | | SC.912.E.7.3 | |
| 12.02 Explain surface water systems. | | SC.912.E.7.8 SC.912.L.17.16 | |
| 12.03 Explain ground water systems. | | SC.912.E.6.4 SC.912.E.7.8 SC.912.L.17.16 | |
| 12.04 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles. | MAFS.912.A-SSE.1.1, 2 MAFS.912.A-SSE.2.3 | SC.912.L.17.10 SC.912.E.7.1 SC.912.N.3.5 | |
| 12.05 Discuss the Clean Water Act. | | | |
| 12.06 List the components of Florida's fresh water systems (lakes, ground water, aquifer, springs, rivers, sink holes and swamps) and explain the importance of managing these resources. | | SC.912.E.7.8 SC.912.E.6.4 SC.912.N.3.5 | |
| 13.0 Practice safety skills and procedures – the student will be able to: | | | |
| 13.01 Demonstrate proper safety precautions and use of common laboratory, testing, and personal protective equipment. | | SC.912.L.14.6 | |
| 13.02 Identify and utilize safe practices with equipment.. | | SC.912.L.14.6 | |
| 13.03 Identify physical, chemical, biological, and zoological hazards. | | SC.912.L.14.6 | |
| 13.04 Extract and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) following Environmental Protection Agency (EPA) regulations. | | SC.912.L.14.6 SC.912.L.17.13 | |
| 13.05 Determine, review, and follow relevant regulations. | | SC.912.L.17.13 | |
| 13.06 Maintain appropriate safety records. | | | |
| 13.07 Identify and describe “on the job” hazards and risks including fire/explosive, lead asbestos, and weather hazards. | | SC.912.L.14.6 | |
| 14.0 Demonstrate sampling procedures – the student will be able to: | | | |
| 14.01 Define sampling objectives and protocol. | | SC.912.N.1.1 | |
| 14.02 Operate, calibrate, and maintain sampling equipment. | | SC.912.N.1.1 | |
| 14.03 Develop sampling strategy. | MAFS.912.S-IC.1.1, 2 | SC.912.N.1.1 SC.912.N.3.5 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|---|--|---|--------------------|
| 14.04 Perform applicable field measurements. | | SC.912.N.1.1 | |
| 14.05 Appropriately preserve, document, and dispose of samples. | MAFS.912.S-ID.1.1, 2, 3 MAFS.912.S-CP.1.5 | SC.912.N.1.1 | |
| 14.06 Identify cross-contamination and other risks associated with sampling. | | SC.912.N.1.1 | |
| 14.07 Describe, plan, and utilize quality assurance practices. | MAFS.912.S-ID.3.9 | SC.912.N.1.1 SC.912.N.3.5 | |
| 14.08 Perform periodic follow-up sampling. | | SC.912.N.1.1 | |
| 15.0 Collect and test samples used to determine soil characteristics – the student will be able to: | | SC.912.L.17.10 SC.912.N.1.1, 3, 4, 5, 6 | |
| 15.01 Collect soil samples from test area and complete soil data forms. | | SC.912.N.1.1 | |
| 15.02 Determine soil pH using pH test kit. | | SC.912.N.1.1 | |
| 15.03 Conduct soil and mineral analysis using soil test kit. | | SC.912.N.1.1 | |
| 15.04 Determine and record texture, structure, temperature and color of each soil layer. | | SC.912.N.1.1 | |
| 15.05 Analyze soil data and write lab report. | MAFS.912.S-IC.2.6 | SC.912.N.1.1 | |
| 15.06 Determine the effect of texture, density, and porosity on permeability/infiltration rates and seasonal high groundwater table. | | SC.912.L.17.2 | |
| 15.07 Examine the relationship between soil texture, water movement and water holding capacity. | | SC.912.L.17.2 | |
| 15.08 Determine land class capability utilizing resources, such as: NRCS County Soil Survey, using Geographic Information Systems or other resources. | MAFS.912.G-GMD.2.4 | SC.912.L.17.2 | |
| 16.0 Describe related geologic principles – the student will be able to: | | | |
| 16.01 Explain the geological history of Florida. | | SC.912.E.7.3 SC.912.N.3.5 SC.912.E.6.2, 4 | |
| 16.02 Analyze a soil profile and describe the associated components. | | SC.912.E.7.3 SC.912.N.3.5 SC.912.E.6.4 | |
| 16.03 Evaluate soil profiles, land-capability classes, and soil conservation practices. | MAFS.912.A-SSE.1.1 MAFS.912.F-IF.2.5 | SC.912.E.7.3 SC.912.N.3.5 SC.912.E.6.4 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---|--|--------------------|
| 16.04 Interpret legal descriptions of land. | | SC.912.L.17.13 | |
| 16.05 Identify mapping and surveying techniques and equipment. | MAFS.912.N-Q.1.2, 3 MAFS.912.G-GMD.2.4 MAFS.912.G-SRT.1.1 MAFS.912.G-CO.4.12 | SC.912.N.1.1 SC.912.N.3.5 SC.912.E.6.2 | |
| 17.0 Discuss related standards and regulations – the student will be able to: | | | |
| 17.01 Identify where local state, and federal regulations are documented and describe their impact. | | SC.912.L.17.13 | |
| 17.02 Identify local, state, and national regulatory agencies and discuss their roles in relation to state and federal laws and statures. | | SC.912.L.17.13 | |
| 17.03 Research how rules and laws are made and implemented. | | SC.912.L.17.13 | |
| 17.04 Research and report how endangered species get listed at the state and federal level. | | SC.912.L.17.13 | |
| 18.0 Identify wetland management practices – the student will be able to: | | | |
| 18.01 Identify ecosystems. | | SC.912.L.17.7, 9 SC.912.N.3.5 | |
| 18.02 Discuss the structure, function, and delineation of wetlands. (Including characteristics, habitat value, and wetland fauna and flora. | | SC.912.L.17.2, 9 SC.912.N.3.5 | |
| 18.03 Define characteristics of wetlands. | | SC.912.L.17.2, 4, 13 | |
| 18.04 Discuss habitat value. | | SC.912.L.17.7, 8, 17 | |
| 18.05 Identify wetland fauna and flora. | | SC.912.L.17.9 | |
| 18.06 Determine desirable vs. invasive plant and animal species in Florida wetlands. | | SC.912.L.17.6, 8 | |
| 18.07 Research control treatments for invasive plants. | | | |
| 18.08 Discuss mitigation techniques. | | | |
| 18.09 Evaluate impacts on wetlands. | | | |
| 19.0 Describe methods to manage wildlife – the student will be able to: | | | |
| 19.01 Identify wildlife species in the various Florida environments. | | SC.912.L.17.6 | |
| 19.02 Identify and describe life cycle of game species and non-game. | | SC.912.L.17.6 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|---|--|--|--------------------|
| 19.03 Discuss urban wildlife management. | | SC.912.L.17.6, 13, 17 SC.912.N.3.5 | |
| 19.04 Identify wildlife management techniques and principles. | | SC.912.N.1.1 SC.912.L.17.1, 5, 17 | |
| 19.05 Identify common wildlife diseases and parasites. | | | |
| 19.06 Discuss wildlife population dynamics. | MAFS.912.S-MD.2.5, 6, 7 MAFS.912.S-CP.1.2, 3, 5 MAFS.912.G-MG.1.2 | SC.912.L.17.1, 5 | |
| 20.0 Describe procedures to manage forests – the student will be able to: | | | |
| 20.01 Describe dendrology. | | SC.912.L.17.4, 19 | |
| 20.02 Describe silviculture. (Including harvesting techniques, timber stand improvements) | MAFS.912.G-SRT.3.8 MAFS.912.G-SRT.4.11 MAFS.912.G-SRT.2.5 MAFS.912.G-SRT.1.3 MAFS.912.G-MG.1.2 | SC.912.L.17.4, 8 SC.912.E.7.8 SC.912.N.3.5 | |
| 20.03 Describe replanting techniques. | | SC.912.L.17.4, 17, 19 | |
| 20.04 Describe the need for prescribed fires. | | | |
| 20.05 Identify timber and forest products. | | SC.912.L.17.8, 19 | |

**Florida Department of Education
Student Performance Standards**

Course Title: Natural Resource Technology 3
Course Number: 8006230
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of water treatment, stormwater systems, Geographic Informational and Global Positioning Systems, environmental standards and regulations, career opportunities; scientific and research concepts; principles of leadership; and employability, and human relations skills. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|-----------|--------------------|
| 21.0 Utilize data and resources – the student will be able to: | | | |
| 21.01 Utilize word processing, databases, computer graphics, statistics programs, spreadsheets, Internet, and GIS. | | | |
| 21.02 Locate and interpret reference materials. | | | |
| 21.03 Maintain necessary/required record keeping practices and procedures. | | | |
| 21.04 Discuss Federal and state requirements for (TMDL) Total Maximum daily loads and minimum flows and levels. | | | |
| 21.05 Describe the establishment and implementation of TMDL in Florida. | | | |
| 21.06 Identify potential sources of point and non-point pollution. | | | |
| 21.07 Identify the five water management districts in Florida. | | | |
| 21.08 Define minimum flows and levels for a water management district. | | | |

| CTE Standards and Benchmarks | | FS-M/LA | NGSSS-Sci | National Standards |
|------------------------------|---|---|--|--------------------|
| 22.0 | Determine the quality and quantity of water resources – the student will be able to | | | |
| 22.01 | Understand pretreatment, primary, secondary, and tertiary treatment processes of wastewater. | | SC.912.L.17.11, 14, 15, 16, 17, 20 SC.912.N.3.5 SC.912.N.4.2 | |
| 22.02 | Describe wastewater disposal options. | | SC.912.L.17.11, 13, 14, 15, 16, 17, 20 | |
| 22.03 | Identify septic tanks types and functions. | | SC.912.L.17.11, 14, 15, 16 | |
| 22.04 | Determine water quality of groundwater, rivers, lakes, and spring water. | | SC.912.L.17.2 | |
| 22.05 | Determine stream flow. | MAFS.912.F-LE.1.1, 2, 3, 4 MAFS.912.F-LE.2.5 | SC.912.N.1.1 | |
| 22.06 | Collect, store and label water samples from a representative test site. | | SC.912.N.1.1 | |
| 22.07 | Determine the quality of water samples by measuring for pH, turbidity, dissolved solids and dissolved oxygen. | | SC.912.N.1.1 | |
| 22.08 | Investigate water shed boundaries and drainage patterns. | MAFS.912.G-GMD.2.4 | SC.912.L.17.2 | |
| 22.09 | Monitor water levels of rivers, streams, ponds and lakes. | | SC.912.N.1.1 | |
| 23.0 | Describe stormwater systems – the student will be able to: | | | |
| 23.01 | Demonstrate knowledge of runoff through use of terminology | | SC.912.L.17.2, 11, 14, 15, 16 | |
| 23.02 | Recognize soil types and land cover as related to runoff. | | | |
| 23.03 | Recognize erosion, non-point source pollution and erosion control methods. | | | |
| 23.04 | Define topography and groundcover and its effects on stormwater. | | SC.912.L.17.11, 14, 20 SC.912.N.3.5 | |
| 24.0 | Develop map reading skills – the student will be able to: | | | |
| 24.01 | Review aerial maps. | MAFS.912.G-SRT.1.1 | SC.912.L.17.15 | |
| 24.02 | Interpret topographical and flood plain maps. | MAFS.912.G-GMD.2.4 | SC.912.E.7.3 | |
| 24.03 | Interpret legal land descriptions. | MAFS.912.G-GMD.2.4 | SC.912.L.17.15 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--------------------|---|--------------------|
| 24.04 Interpret current and historical aerial photography for land cover and land use applications. | MAFS.912.G-GMD.2.4 | SC.912.L.17.13, 15 | |
| 24.05 Explain topographic map symbols and legends. | | SC.912.L.17.15 | |
| 24.06 Measure acreage on maps. | MAFS.912.N-Q.1.3 | SC.912.N.1.1 | |
| 24.07 Determine location and other information from maps, using technology such as Global Positioning System (GPS) and/or compass. | MAFS.912.G-GMD.2.4 | SC.912.L.17.15 | |
| 25.0 Use Geographic Informational (GIS) and Global Positioning (GPS) Systems – the student will be able to: | | | |
| 25.01 Define GIS and its function. | | SC.912.E.7.3 SC.912.E.6.2 | |
| 25.02 Use GIS software. | MAFS.912.G-GMD.2.4 | SC.912.E.7.3 SC.912.E.6.2, 4 SC.912.L.17.15 | |
| 25.03 Learn GIS applications. | MAFS.912.G-GMD.2.4 | SC.912.E.7.3 SC.912.L.17.15 | |
| 25.04 Define GPS and its function. | | SC.912.E.7.3 SC.912.L.17.15 | |
| 25.05 Collect GPS data and load on GIS. | MAFS.912.G-GMD.2.4 | SC.912.E.7.3 SC.912.L.17.15 | |
| 25.06 Identify other remote sensing tools. | | SC.912.N.3.5 SC.912.E.7.3 | |
| 26.0 Describe procedures for managing hazardous materials – the student will be able to: | | | |
| 26.01 Describe flow and life cycles of materials. | | SC.912.N.4.4 SC.912.N.3.5 | |
| 26.02 Identify proper chemical handling and storage guidelines. | | SC.912.L.17.14, 17 | |
| 26.03 Describe material management procedures. | | SC.912.L.17.14 SC.912.N.3.5 | |
| 26.04 Identify waste minimization, pollution prevention and alternatives to disposal. | | SC.912.L.17.14, 17 SC.912.N.4.1, 2 | |
| 26.05 Describe shipping and transportation procedures for hazardous materials. | | SC.912.L.17.14 | |
| 26.06 Identify principles of toxicology. | | | |
| 26.07 Identify routes of exposure. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|--|--------------------|
| 26.08 Discuss common chemical compatibility. | | | |
| 27.0 Prepare a plan for a mock disaster activity – the student will be able to: | | | |
| 27.01 Describe the need for and types of pre-planning. | | | |
| 27.02 Identify and select necessary agency involvement for the type of disaster. | | SC.912.L.17.13 | |
| 27.03 Identify possible areas and types of impacts | | | |
| 27.04 Write and evaluate contingency plans. | | | |
| 27.05 Create a plan for a disaster clean up including needed materials and equipment. | | | |
| 28.0 Identify career opportunities and organizational dynamics – the student will be able to: | | | |
| 28.01 Identify careers and opportunities in the following fields: agriculture, Surface/stormwater, drinking water, wastewater, groundwater, land resources, air quality, solid waste, and HAZMAT. | | SC.912.L.17.11, 16, 20 SC.912.N.3.5 | |
| 28.02 Identify the opportunities for leadership development available through an appropriate student and/or professional organization. | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Natural Resource Management 4
Course Number: 8006240
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of land management, weather systems, wildlife programs, commodity and non-commodity resources, sustainable agriculture and environmental research.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|------------------|---------------------------|
| 29.0 Analyze wildlife management procedures – the student will be able to: | | | |
| 29.01 Discuss basic mammalogy, ornithology, and herpetology. | | | |
| 29.02 Use a dichotomous key. | | SC.912.N.3.5 | |
| 29.03 Conduct experimental design and statistical analysis. | MAFS.912.S-MD.1.1, 2 | SC.912.N.1.1 | |
| 29.04 Collect and interpret data from a wildlife study. | | SC.912.N.1.1 | |
| 30.0 Analyze forest management techniques – the student will be able to: | | | |
| 30.01 Identify related forestry equipment. | | SC.912.L.17.17 | |
| 30.02 Identify surveying techniques. | MAFS.912.N-Q.1.2, 3 MAFS.912.G-GMD.2.4 MAFS.912.G-SRT.1.1 MAFS.912.G-CO.4.12 | SC.912.L.17.15 | |
| 30.03 Describe a timber cruising activity. | MAFS.912.G-SRT.3.8 MAFS.912.G-SRT.4.11 MAFS.912.G-SRT.2.5 MAFS.912.G-SRT.1.3 MAFS.912.G-MG.1.1 | SC.912.L.17.17 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|-----------------------------------|--------------------|
| 30.04 Perform a pacing exercise. | | SC.912.L.17.17 | |
| 30.05 Describe how to calculate timber volumes using a Biltmore stick. | MAFS.912.G-MG.1.1, 2, 3 MAFS.912.G-GMD.1.3 | SC.912.L.17.17 | |
| 30.06 Identify and discuss Forestry Best Management Practices (BMP). | | SC.912.E.7.8 | |
| 31.0 Identify forest fire management techniques – the student will be able to: | | | |
| 31.01 Describe the history of prescribed fire usage in Florida. | | SC.912.E.7.3 | |
| 31.02 Discuss the effects of prescribed burns and wildfires on communities in Florida. | | SC.912.L.17.20 | |
| 31.03 Discuss fire weather behavior. | | SC.912.E.7.3, 8 | |
| 31.04 Discuss seasonal ecological effects of burning. | | SC.912.E.7.3, 8 | |
| 31.05 Identify and discuss wildfire suppression techniques. | | SC.912.E.7.3, 8 | |
| 31.06 Describe prescribed burn techniques. | | SC.912.N.3.5 SC.912.E.7.3, 8 | |
| 31.07 Identify and discuss safety equipment and practices related to fire management. | | | |
| 31.08 Discuss how burning of vegetation releases nutrients into the soil and carbon in the atmosphere. | | SC.912.L.17.19 SC.912.E.7.3, 8 | |
| 31.09 Investigate the merits of growing season burns versus non-growing season burns. | | SC.912.L.17.19 SC.912.E.7.8 | |
| 31.10 Discuss safety precautions for controlled burns and legal ramifications. | | SC.912.L.17.13 | |
| 32.0 Discuss Pest management for insects – the student will be able to: | | | |
| 32.01 Assess environmental impact of pests. | | SC.912.L.17.1, 6 | |
| 32.02 Discuss common pests. | | | |
| 32.03 Describe life cycles of common pests. | | SC.912.L.17.8 | |
| 32.04 Classify insects using a dichotomous key | | SC.912.N.3.5 | |
| 32.05 Describe the principles and benefits of integrated pest management. (biological, chemical, and cultural). | | SC.912.L.17.8, 15, 17 | |
| 32.06 Conduct pest population studies. | MAFS.912.F-LE.1.1, 2, 3, 4 | SC.912.L.17.1 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-------------------|-------------------|--------------------|
| | MAFS.912.F-LE.2.5 | | |
| 32.07 Identify diseases and pests that impact agriculture production. | | SC.912.L.17.8 | |
| 32.08 Explain methods to control and eradicate diseases and pests. | | SC.912.L.17.8, 17 | |
| 32.09 Describe isolation or quarantine methods to minimize spread of diseases and pests. | | SC.912.L.17.8, 17 | |

**Florida Department of Education
Student Performance Standards**

Course Title: Advanced Natural Resources 5
Course Number: 8006250
Course Credit: 1

Course Description:

This course is designed to develop competencies in the management of pests and ecosystems, planning and administering land usage, ecology restoration, career opportunities; scientific and research concepts; principles of leadership; and employability, and human relations skills. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|----------------------|--------------------------------|--------------------|
| 33.0 Analyze the management of ecosystems – the student will be able to: | | | |
| 33.01 Describe biological and economic, impacts on managing ecosystems. | | SC.912.L.17.13, 17 | |
| 33.02 Describe the effects of manipulating species with in an ecosystem. | | SC.912.L.17.1, 5 | |
| 33.03 Discuss bio-diversity and discuss effect of bio diversity. | | SC.912.L.17.8 | |
| 33.04 Evaluate how external factors affect communities. | MAFS.912.S-IC.2.4, 5 | | |
| 33.05 Identify vegetation monitoring techniques | | SC.912.L.17.15, 17 | |
| 33.06 Conduct vegetation sampling and analysis. | | SC.912.N.3.5 SC.912.L.17.17 | |
| 34.0 Discuss ecology restoration – the student will be able to: | | | |
| 34.01 Research of vegetation dynamics. | | SC.912.L.17.19 | |
| 34.02 Describe restoration techniques. | | SC.912.L.17.8 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|--|--------------------|
| 34.03 Research wetlands reclamation and uplands restoration. | | SC.912.L.17.8 | |
| 34.04 Diagnose restoration from a systems approach. | | SC.912.L.17.8 | |
| 34.05 Research applicable monitoring techniques. | | | |
| 35.0 Discuss the principles of land use planning. – the student will be able to: | | | |
| 35.01 Identify typical land use types in Florida and environmental issues | | SC.912.L.17.13 | |
| 35.02 List the elements of a growth management plan | | | |
| 35.03 Describe the principles of growth management | | SC.912.L.17.17 SC.912.E.6.4 | |
| 35.04 Discuss the role of local government in growth management | | | |
| 35.05 Describe buffer areas and protected lands. | | | |
| 36.0 Discuss managing and disposing of solid waste – the student will be able to: | | | |
| 36.01 Describe history of solid waste disposal. | | SC.912.L.17.13, 14 | |
| 36.02 Identify types of waste. | | SC.912.L.17.14 | |
| 36.03 Research and evaluate solid waste disposal options. (Landfill, incineration, and composting, etc.) | | SC.912.L.17.14, 16, 17 SC.912.N.3.5 | |
| 36.04 Identify pollution prevention and source reduction options. | | | |
| 37.0 Evaluate the importance of the food and fiber system to understand the impact on global economy – the student will be able to: | | | |
| 37.01 Assess the agricultural impact upon the US gross national product and the total global economy. | | SC.912.L.17.12, 19 | |
| 37.02 Investigate local, state, and national regulatory laws, industry regulations, and legislation for agricultural businesses. | | SC.912.L.17.2 | |
| 37.03 Identify and describe the primary government agencies involved with agriculture. | | SC.912.L.17.2 | |
| 37.04 Research new and emerging technologies and their impact on the economy. | | SC.912.L.17.15 | |
| 37.05 Recognize the value of the food and agribusiness industry. | | | |
| 38.0 Examine the scope of career opportunities in and the importance of agriculture and natural resources to the economy – the student will be able | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------------------|-------------------------------|--------------------|
| to: | | | |
| 38.01 Define and explore natural resources and agribusinesses and their role in the economy. | | | |
| 38.02 Evaluate and explore the agribusiness and natural resource career opportunities.. | | | |
| 38.03 Compare how key organizational structures and processes affect organizational performance and the quality of products and services. | | | |
| 39.0 Demonstrate the use of weather and climate data – the student will be able to: | MAFS.912.S-IC.2 | SC.912.L.17.8 SC.912.N.1.1 | |
| 39.01 Interpret a weather map. | | SC.912.L.17.5, 6 | |
| 39.02 Obtain and record measurements of local rainfall, temperature, air pressure, relative humidity, cloud cover and type, and wind speed.. | MAFS.912.N-Q.1.2, 3 | SC.912.N.1.1 | |
| 39.03 Analyze the impact of weather and climate in regard to risk management. | | SC.912.L.17.6 | |
| 40.0 Discuss sustainable agriculture – the student will be able to: | MAFS.912.N-Q.1.3 | SC.912.L.17.12, 13, 14, 20 | |
| 40.01 Describe why it is important to sustain domestic agriculture. | | SC.912.L.17.12 | |
| 40.02 Explain international issues affecting domestic agriculture. | | SC.912.L.17.12 | |
| 40.03 Apply principles of nutrient, water, and waste management to environmental problems. | MAFS.912.N-Q.1.2, 3 | SC.912.L.17.13 | |
| 40.04 Compare practices that either enhance or hinder the sustainability of agriculture. | | SC.912.L.17.1, 18, 20 | |
| 40.05 Analyze the benefit of recent technological advances on the agricultural industry. | | | |
| 40.06 Identify and monitor erosion hazards and environmental quality. | | SC.912.L.17.16 | |
| 40.07 Describe Best Management Practices (BMP) and their significance. (Including management for water quality and conservation, and pesticide use) | | SC.912.L.17.12, 15, 17 | |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If

needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

**Florida Department of Education
Curriculum Framework**

Program Title: Environmental Water & Reclamation Technology
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

| | |
|----------------------------|---|
| Program Number | 8007300 |
| CIP Number | 0115050601 |
| Grade Level | 9-12 |
| Standard Length | 4 credits |
| Teacher Certification | Refer to the <u>Program Structure</u> section. |
| CTSO | FFA |
| SOC Codes (all applicable) | 51-8031 - Water and Wastewater Treatment Plant and System Operators |

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to applications of water resource management, application of safety procedures, record keeping and sampling, wetland management, reclamation treatment techniques, solid waste disposal, storm water management, hazardous material storage, government water technology regulations, filtrations, sedimentation, fluoridation process, and perform maintenance and inspections on equipment..

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of four courses and two occupational completion point points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

To teach the courses listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the secondary program structure:

| OCP | Course Number | Course Title | Teacher Certification | Length | SOC Code | Level | Graduation Requirement |
|-----|---------------|---|-----------------------|----------|----------|-------|------------------------|
| A | 8007110 | Introduction to Environmental Water Technology | ENV WAT TE 7G | 1 credit | 51-8031 | 2 | |
| | 8007120 | Intermediate Environmental Water Technology | | 1 credit | | 2 | |
| B | 8007130 | Advanced Environmental Water Technology and/or | | 1 credit | 51-8031 | 2 | |
| | 8007210 | Advanced Environmental Water Reclamation Technology | | 1 credit | | 2 | |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Academic Alignment Tables

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

| Courses | Anatomy/ Physiology Honors | Astronomy Solar/Galactic Honors | Biology 1 | Chemistry 1 | Earth-Space Science | Environmental Science | Genetics | Integrated Science | Marine Science 1 Honors | Physical Science | Physics 1 |
|--|----------------------------|---------------------------------|--------------|--------------|---------------------|-----------------------|--------------|--------------------|-------------------------|------------------|--------------|
| Introduction to Environmental Water Technology | 7/87 8% | 5/80 6% | 36/83 43% | 13/69 19% | 33/67 49% | 14/70 20% | 11/69 16% | 38/82 46% | 10/66 15% | 35/74 47% | 5/72 7% |
| Intermediate Environmental Water Technology | 3/87 3% | 13/80 16% | 26/83 31% | 19/69 28% | 27/67 30% | 9/70 13% | 3/69 4% | 34/82 41% | 11/66 17% | 41/74 55% | 14/72 19% |
| Advanced Environmental Water Technology | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** |

| | | | | | | | | | | | |
|---|----|----|----|----|----|----|----|----|----|----|----|
| Advanced Environmental Water Reclamation Technology | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** |
|---|----|----|----|----|----|----|----|----|----|----|----|

** Alignment pending review

Alignment attempted, but no correlation to academic course

| Courses | Algebra 1 | Algebra 2 | Geometry | English 1 | English 2 | English 3 | English 4 |
|---|-----------|-----------|----------|-----------|-----------|-----------|-----------|
| Introduction to Environmental Water Technology | ** | ** | ** | ** | ** | ** | ** |
| Intermediate Environmental Water Technology | ** | ** | ** | ** | ** | ** | ** |
| Advanced Environmental Water Technology | ** | ** | ** | ** | ** | ** | ** |
| Advanced Environmental Water Reclamation Technology | ** | ** | ** | ** | ** | ** | ** |
| Introduction to Environmental Water Technology | ** | ** | ** | ** | ** | ** | ** |

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. The FS for Mathematical Practices are designed for grades K-12 and describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education.

Instructors must incorporate the Florida Standards for Technical Subjects and Mathematical Practices throughout instruction of this CTE program.

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. If so, the standards have been identified and cross walked with the corresponding CTE standard and/or benchmark.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Identify the historical, social, cultural and potential applications of water resource management.
- 02.0 Describe and discuss hydrology.
- 03.0 Practice safety skills and procedures.
- 04.0 Demonstrate record keeping and sampling procedures.
- 05.0 Describe and discuss geologic principles of water resources.
- 06.0 Manage wetlands.
- 07.0 Identify career opportunities and organizational dynamics.
- 08.0 Apply scientific and technological principles.
- 09.0 Describe reclaimed water treatment techniques.
- 10.0 Collect and dispose of solid waste.
- 11.0 Explain water treatment techniques.
- 12.0 Discuss and manage stormwater systems.
- 13.0 Describe water distribution.
- 14.0 Demonstrate the management and environmentally sound use of water resources.
- 15.0 Describe water treatment equipment and facilities.
- 16.0 Discuss related standards and regulations.
- 17.0 Conduct site assessment.
- 18.0 Practice safety skills and procedures.
- 19.0 Manage data and physical resources.
- 20.0 Use Geographic Informational (GIS) and Global Positioning (GPS) Systems.
- 21.0 Control incidents.
- 22.0 Prepare a plan.
- 23.0 Perform remediation.
- 24.0 Collect and dispose of solid waste.
- 25.0 Identify continuing education needs and opportunities.
- 26.0 Conduct recordkeeping and sampling procedures.
- 27.0 Review stormwater permit procedures.
- 28.0 Demonstrate the use of industry appropriate tools, equipment, and instruments
- 29.0 Demonstrate industry specific mathematical calculations.
- 30.0 Demonstrate industry specific science skills and techniques.
- 31.0 Identify career opportunities and organizational dynamics in water resources.
- 32.0 Demonstrate water treatment techniques.
- 33.0 Discuss an Industrial Pretreatment Program/Inspection.
- 34.0 Discuss comprehensive quality assurance plan.
- 35.0 Identify professions related to the water technology field.
- 36.0 Identify scientific concepts common in water and wastewater treatment.
- 37.0 Identify safety hazards associated with water technologies.

- 38.0 Identify federal, state, and local regulations for the handling, storage, and use of toxic and hazardous materials.
- 39.0 Solve basic math problems common to water technologies.
- 40.0 Define pumping and basic hydraulic principles.
- 41.0 Define principles of disinfection.
- 42.0 Define sampling techniques.
- 43.0 Define federal, state, and local regulations that apply to water technologies.
- 44.0 Demonstrate employability skills.
- 45.0 Identify sampling techniques and explain the significance of the steps.
- 46.0 Identify chemical, biological, and physical constituents of water entering the water treatment facility or distribution systems.
- 47.0 Describe the principles, operational and troubleshooting practices of the aeration process.
- 48.0 Describe the principles, operational and troubleshooting practices of the mixing, coagulation, and flocculation processes.
- 49.0 Describe the principles, operational and troubleshooting practices of the sedimentation process.
- 50.0 Describe the principles, operational and troubleshooting practices of the filtration process.
- 51.0 Describe the principles, operational and troubleshooting practices of the water-softening process.
- 52.0 Describe the principles, operational and troubleshooting practices of the stabilization process.
- 53.0 Describe the principles, operational and troubleshooting practices of the corrosion control process.
- 54.0 Describe the principles, operational and troubleshooting practices of the disinfection process.
- 55.0 Describe the principles, operational and troubleshooting practices for the control and treatment of trihalomethanes.
- 56.0 Describe the principles, operational and troubleshooting practices of the iron and manganese removal processes.
- 57.0 Describe the principles, operational and troubleshooting practices for taste and odor control.
- 58.0 Describe the principles, operational and troubleshooting practices of the demineralization processes.
- 59.0 Describe the principles, operational and troubleshooting practices of the fluoridation process.
- 60.0 Identify facility operational problems.
- 61.0 Describe basic hydraulics and pumping operations.
- 62.0 Identify appropriate federal, state, and local regulations for the operation and maintenance of a public potable water facility.
- 63.0 Perform equipment inspection, and identify basic maintenance for the treatment train, treatment residuals disposal, and solids management.
- 64.0 Identify the basic characteristics and principles of wastewater treatment.
- 65.0 Identify sampling techniques and interpret the results
- 66.0 Describe the sources of wastewater and the types of collection systems
- 67.0 Describe the process and the operational principles for the preliminary, primary, secondary, and tertiary treatment (the treatment train); effluent disposal; and solids management.
- 68.0 Perform treatment-process control and troubleshooting for the treatment train, effluent disposal, and solids management.
- 69.0 Identify and correct facility operational problems.
- 70.0 Identify appropriate federal, state, and local regulations.
- 71.0 Describe federal, state and local laws for the handling, storage, and use of toxic and hazardous materials.

**Florida Department of Education
Student Performance Standards**

Course Title: Introduction to Environmental Water Technology
Course Number: 8007110
Course Credit: 1

Course Description:

This course is designed to develop competencies in the area of hydrology, safety skills and procedures, geological principles of water resources, management of wetlands, storm water systems, environmental water resources, equipment and facility maintenance, scientific and research concepts; principles of leadership; and employability, and human relations skills. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|---|--------------------|
| 01.0 Identify the historical, social, cultural and potential applications of water resource management – the student will be able to: | | SC.912.E.7.8; HE.912.C.1.3; SC.912.L.15.8, 13; SC.912.L.16.4, 7, 8, 9, 10, SC.912.L.17.1, 8, 11, 16, 19, 20; SC.912.L.18.12; SC.912.N.1.1 | |
| 01.01 Explain the developmental progression of water resource management. | | | |
| 01.02 Research emerging problems and issues with water resource management. | | | |
| 01.03 Explain the local global importance of water conservation. | | | |
| 01.04 Explain international issues affecting water resources and water quality. | | | |
| 01.05 Compare practices that either enhance or hinder water quality. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|---|--------------------|
| 01.06 Differentiate between point and non-point sources of pollution. | | | ESS.04.01.01.a |
| 01.07 Identify diseases and illnesses associated with water borne pathogens. | | | |
| 01.08 Explain methods to control and eradicate diseases and illnesses associated with water borne pathogens. | | | |
| 01.09 Explain the significance genetic factors, environmental factors and pathogenic agents to health from the perspective of both individual and public health. | | | |
| 01.10 Analyze how population size is affected by water quantity and quality. | | | |
| 01.11 Evaluate the cost and benefits of various water reclamation technologies. | | | |
| 01.12 Discuss the impact of individuals on water quality and quantity and how human lifestyles affect sustainability. | | | |
| 01.13 Discuss the special properties of water that contribute to earth's suitability as an environment for life. | | | |
| 02.0 Describe and discuss hydrology – the student will be able to: | | SC.912.E.5.2, 4; SC.912.E.6.2, 3, 4, 5; SC.912.E.7.1, 3; SC.912.L.17.16; SC.912.P.8.1, 5, 7 | |
| 02.01 Define basic hydrological terms. | | | ESS.03.02.05.a |
| 02.02 Describe surface water systems. | | | |
| 02.03 Describe ground water systems. | | | ESS.03.02.04.b |
| 02.04 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles. | | | |
| 02.05 List the components of Florida's fresh water systems (lakes, ground water, aquifer, springs, rivers, and wetlands) and explain the importance of managing these resources. | | | |
| 02.06 Identify alternative sources of water. | | | |
| 02.07 Identify the relationship of various soil conditions to water quality. | | | ESS.03.03.01.c |
| 02.08 Research and explain the effects of saltwater intrusion. | | | |
| 02.09 Identify and discuss water wells and water reservoirs. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|--|--------------------|
| 03.0 Practice safety skills and procedures – the student will be able to: | | SC.912.P.8.5, 7, 11 | |
| 03.01 Demonstrate proper safety precautions and use of common laboratory, testing, and personal protective equipment. | | | |
| 03.02 Identify and utilize safe work & laboratory practices. | | | |
| 03.03 Identify physical, chemical, biological, and zoological hazards. | | | |
| 03.04 Extract and utilize pertinent information from a container label and/or Safety Data Sheets (SDS) following Environmental Protection Agency (EPA), Worker Protection Standard, Occupational Safety and Health Administration (OSHA), and Globally Harmonized System (GHS) regulations. | | | |
| 03.05 Determine, review, and follow regulations. | | | |
| 03.06 Develop and maintain appropriate safety & laboratory records. | | | |
| 03.07 Identify and describe “on the job” & laboratory hazards and risks including fire/explosive, lead asbestos, weather hazards and emergency response preparedness | | | |
| 03.08 Describe how to conduct a Job Hazard Analysis | | | |
| 03.09 Perform lifting activities safely. | | | |
| 03.10 Identify ladder safety and fall protection. | | | |
| 03.11 Become certified in first aid/CPR and describe First Responder responsibilities. | | | |
| 04.0 Demonstrate record keeping and sampling procedures – the student will be able to: | | SC.912.N.1.1, 4, 6; SC.912.P.8.8, 11; | |
| 04.01 Define sampling objectives, protocol and Chain of Custody. | | | |
| 04.02 Operate, calibrate, and maintain sampling equipment. | | | |
| 04.03 Develop sampling strategy. | | | ESS.04.03.01.c |
| 04.04 Perform applicable field measurements including pH, dissolved oxygen, temperature, disinfection residuals, and turbidity. | | | |
| 04.05 Describe bacterial and viral sampling. | | | |
| 04.06 Appropriately preserve, document, and dispose of samples. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|--|--------------------|
| 04.07 Identify cross-contamination and other risks associated with sampling. | | | |
| 04.08 Describe, plan, and utilize quality assurance practices. | | | |
| 04.09 Submit samples for analysis. | | | |
| 04.10 Perform periodic follow-up sampling. | | | |
| 04.11 Identify permit requirements and procedures. | | | |
| 04.12 Define and follow federal, state and local sampling guidelines. | | | |
| 05.0 Describe and discuss geologic principles of water resources – the student will be able to: | | SC.912.E.6.1, 2, 4; SC.912.L.17.13; SC.912.P.8.6, 7, 8, 11 | |
| 05.01 Explain the geological history of Florida. | | | |
| 05.02 Describe Florida aquifer system. | | | |
| 05.03 Discuss basic groundwater chemistry and the geological factors that contribute to the varying chemical components of water. | | | |
| 05.04 Describe local geology related problems. | | | |
| 06.0 Manage wetlands – the student will be able to: | | SC.912.E.5.4; SC.912.L.14.35; SC.912.L.17.4, 8, 16, 19, 20; | |
| 06.01 Identify environmental significance of ecosystems. | | | |
| 06.02 Discuss the structure and function of wetlands. | | | |
| 06.03 Define limits of wetlands. | | | |
| 06.04 Discuss habitat value. | | | |
| 06.05 Identify fauna and flora. | | | |
| 06.06 Determine desirable vs. nuisance plant and animal species. | | | |
| 06.07 Describe changes in ecosystems resulting from seasonal variations, climate change, environmental impacts, and succession. | | | |
| 06.08 Explain the general distribution of life in aquatic systems as a function of effluent discharge, stormwater runoff and drought. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|-----------|--------------------|
| 07.0 Identify career opportunities and organizational dynamics – the student will be able to: | | | |
| 07.01 Describe the nature of career opportunities in water, water reclamation and environmental industries. | | | |
| 07.02 Compare supervisory and administrative responsibilities. | | | |
| 07.03 Identify team building communication skills. | | | |
| 07.04 Identify problem-solving techniques. | | | |
| 07.05 Identify employee responsibility/benefits. | | | |
| 07.06 Identify legal aspects of personnel relations. | | | |
| 07.07 Communicate effectively in verbal, written, and nonverbal modes. | | | |
| 07.08 Recognize and demonstrate good listening skills. | | | |
| 07.09 Conduct small informal and formal group meetings. | | | |
| 07.10 Identify the opportunities for leadership development available through an appropriate student and/or professional organization. | | | |
| 07.11 Recognize and demonstrate effective communications skills in the workplace. | | | |
| 07.12 Identify related professional associations. | | | |
| 07.13 List and describe the careers associated with water treatment, distribution, and management. | | | |
| 07.14 Determine the educational requirements and experience needed to enter and advance in water, water reclamation and environmental occupations. | | | |
| 08.0 Apply scientific and technological principles – the student will be able to: | | | |
| 08.01 Employ scientific measurement skills. | | | |
| 08.02 Demonstrate safe and effective use of common laboratory equipment. | | | |
| 08.03 Implement the scientific method and science process skills through the design and completion of a research project. | | | |
| 08.04 Interpret, analyze, and report data. | | | |
| 08.05 Describe and evaluate emerging technologies in environmental and | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|---|---------|--|--------------------|
| water treatment technologies | | | |
| 08.06 Compare and contrast structure and function of various types of microscopes. | | | |
| 09.0 Describe reclaimed water treatment techniques – the student will be able to: | | SC.912.L.17.16, 19, 20 SC.912.L.18.6, 8; | |
| 09.01 Understand pretreatment, primary, secondary, and tertiary treatment processes of wastewater. | | | |
| 09.02 Describe disposal options. | | | |
| 09.03 Identify septic tanks types and functions. | | | |
| 09.04 Apply principles of nutrients, water and waste management to environmental problems. | | | |
| 10.0 Collect and dispose of solid waste – the student will be able to: | | SC.912.17.16, 19, 20 | |
| 10.01 Describe the history of solid waste disposal. | | | ESS.04.02.01.a |
| 10.02 Identify types of waste. | | | |
| 10.03 Identify household hazardous waste collection and disposal programs. | | | ESS.04.02.02.a |
| 10.04 Research and evaluate solid waste disposal options. (landfill, incineration, and composting, etc.) | | | |
| 11.0 Explain water treatment techniques – the student will be able to: | | SC.912.E.6.5; SC.912.L.17.16, 19, 20; SC.912.L.18.6, 8; SC.912.P.8.2; | |
| 11.01 Describe drinking water treatments. | | | ESS.04.03.01.b |
| 11.02 Identify and describe the desirable water qualities. | | | |
| 11.03 Explain how changes in water quality affect life cycles. | | | |
| 11.04 Explain, monitor, and maintain freshwater/salt water quality standards. | | | |
| 11.05 Calculate volume in circular, rectangular and irregular shaped water structures. | | | |
| 11.06 List and explain sources of pollution and methods of preventing and/or correcting these pollution problems. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|--|---------|---|--------------------|
| 12.0 Discuss and manage stormwater systems – the student will be able to: | | SC.912.E.6.2; SC.912.L.17.16, 19, 20; | |
| 12.01 Determine boundaries of watersheds. | | | |
| 12.02 Identify runoff coefficients. | | | |
| 12.03 Identify the relationship between construction sites and stormwater systems. | | | |
| 12.04 Research rules and regulations in regards to stormwater systems. | | | |
| 12.05 Contact local municipalities to determine stormwater regulations. | | | |
| 12.06 Research current construction trends and methods of stormwater systems. | | | |
| 12.07 Define topography and discuss it in relation to stormwater management. | | | |
| 12.08 Discuss the effects that uncollected stormwater has on lakes, rivers, ponds and wetlands. | | | |
| 13.0 Describe water distribution – the student will be able to: | | SC.912.P.12.11 | |
| 13.01 Identify the need for backflow prevention and cross connections controls. | | | |
| 13.02 Identify necessary equipment for water distribution purposes e.g.; pumps, motors, valves, storage tanks, pipes and fittings. | | | |
| 13.03 Understand to purpose and function of water meters. | | | |
| 13.04 Identify maintenance requirements for fire hydrants, pipes, and valves. | | | |
| 13.05 Identify proper procedures for operation and maintenance of Booster Stations. | | | |
| 13.06 Discuss importance of period flushing of water distribution systems. | | | |
| 13.07 Identify water quality monitoring requirements for distribution systems. | | | |
| 13.08 Explain Supervisory Control and Data Acquisition Systems (SCADA) | | | |
| 14.0 Demonstrate the management and environmentally sound use of water resources – the student will be able to: | | | |
| 14.01 Determine quality of groundwater and surface water. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|--|--------------------|
| 14.02 Identify solids and dissolved solids found in water. | | | |
| 14.03 Identify primary and secondary contaminants. | | | |
| 14.04 Identify unregulated organic compounds. | | | |
| 15.0 Describe water treatment equipment and facilities – the student will be able to: | | SC.912.N.1.1; SC.912.P.10.4, 5, 7; | |
| 15.01 Research water treatment equipment and facility components. | | | |
| 15.02 Identify appropriate temperatures and other external conditions that may affect the water treatment processes. | | | |
| 15.03 Identify the effect of weather conditions and changes that may affect the water treatment processes. | | | |
| 15.04 Describe appropriate flow rates and tank levels. | | | |
| 15.05 Create a checklist of policies and related procedures necessary to handle daily conditions, hazards and/or malfunctions. | | | |
| 15.06 Describe maintenance procedures and techniques of filters, pipes, generators, meters, motors, valves, instruments, injectors, storage basins etc. | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Intermediate Environmental Water Technology
Course Number: 8007120
Course Credit: 1

Course Description:

This course is designed to develop competencies in the area of standards and regulations, site assessments, safety, managing data and physical resources, prepare a plan, perform remediation, collect and dispose of solid waste, record keeping and sampling procedures, career opportunities, leadership, teamwork, and money management concepts. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|---------------------|--------------------|
| 16.0 Discuss related standards and regulations – the student will be able to: | | SC.912.N.1, 2, 3, 4 | |
| 16.01 Explain the importance and impacts of local, state, and federal regulations and required documentation. | | | |
| 16.02 Identify where local, state, and federal regulations are documented. | | | |
| 16.03 Discuss the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA). | | | |
| 16.04 Identify local, state, and national regulatory agencies and discuss their roles in relation to state and federal laws and statures. | | | |
| 16.05 Research how rules and laws are made and mandated. | | | |
| 16.06 Describe permitting procedures. | | | |
| 16.07 Identify regulation resources. | | | |
| 16.08 Describe various licensing procedures. | | | |
| 16.09 Research governmental regulation authorities associated with Florida’s water sources. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|----------------------------------|--------------------|
| 16.10 Describe the National Pollution Discharge Elimination System (NPDES). | | | |
| 16.11 Identify appropriate agencies and their functions | | | |
| 16.12 Create, evaluate and present a well-head protection plan. | | | |
| 16.13 Discuss the need for adequate monitoring of environmental parameters when making policy decisions. | | | |
| 17.0 Conduct site assessment – the student will be able to: | | SC.912.L.17.20; SC.912.N.1.1; | |
| 17.01 Identify the purposes of site assessment. | | | |
| 17.02 Describe required documentation. | | | |
| 17.03 Interpret blueprints | | | |
| 17.04 Describe location and legal description of property and design a map to locate site characteristics. | | | |
| 17.05 Obtain physical and performance measurements. | | | |
| 17.06 Assess needed equipment and processes. | | | |
| 18.0 Practice safety skills and procedures – the student will be able to: | | SC.912.N.4.2 | |
| 18.01 Identify safety procedures for: wells, pumps, electrical equipment, motor vehicles, buildings, and other necessary equipment. | | | |
| 18.02 Handle compressed gasses, solids, and liquids safely. | | | |
| 18.03 Summarize “Right of Access” law. | | | |
| 18.04 Summarize “Confined Space” regulations. | | | |
| 18.05 Identify Zero Tolerance policies related to safe practices. | | | |
| 18.06 Identify employee limitations. | | | |
| 18.07 Identify appropriate decontamination procedures. | | | |
| 18.08 Identify principles of toxicology. | | | |
| 18.09 Identify routes of exposure. | | | |
| 18.10 Identify respirator safety procedures. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|---------------------------------|--------------------|
| 18.11 Discuss history of hazardous materials and hazardous categories. | | | |
| 18.12 Discuss common chemical compatibility. | | | |
| 18.13 Describe and discuss OSHA concepts. | | | |
| 18.14 Describe and discuss the Vulnerability Assessment process. | | | |
| 19.0 Manage data and physical resources – the student will be able to: | | SC.912.N.1, 2, 3, 4, 5, 6, 7 | |
| 19.01 Utilize word processing, databases, computer graphics, statistics programs, spreadsheets, Internet, and security. | | | |
| 19.02 Identify possible funding sources. | | | |
| 19.03 Prepare budgets and purchase orders. | | | |
| 19.04 Prepare a time management plan. | | | |
| 19.05 Utilize information databases. | | | |
| 19.06 Locate and interpret printed reference materials. | | | |
| 19.07 Describe network opportunities. | | | |
| 19.08 Maintain necessary/required record keeping practices and procedures. | | | |
| 19.09 Keep inventory, time sheets, and equipment maintenance logs. | | | |
| 19.10 Identify suppliers and technical resources. | | | |
| 20.0 Use Geographic Informational (GIS) and Global Positioning (GPS) Systems – the student will be able to: | | SC.912.N.1.1 | |
| 20.01 Define GIS and its function in water treatment and utilities. | | | |
| 20.02 Use GIS software. | | | |
| 20.03 Learn GIS applications. | | | |
| 20.04 Develop a GIS model. | | | |
| 20.05 Define GPS and its function in water treatment and utilities. | | | |
| 20.06 Collect GPS data and load on GIS. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|--------------|--------------------|
| 20.07 Research and identify other remote sensing tools. | | | |
| 20.08 Identify and plot points on a map. | | | |
| 21.0 Control incidents – the student will be able to: | | SC.912.N.1.1 | |
| 21.01 Identify and describe reasons for controlling incidents. | | | |
| 21.02 Describe levels of response. | | | |
| 21.03 Determine and use proper chain of command. | | | |
| 21.04 Determine methods of control. | | | |
| 21.05 Demonstrate site access restriction methods. | | | |
| 21.06 Identify appropriate authorities to be notified. | | | |
| 21.07 Place equipment appropriately. | | | |
| 21.08 Orient zones. | | | |
| 21.09 Identify possible geographic hazards. | | | |
| 21.10 Identify media protocol and procedures for communicating with the public. | | | |
| 21.11 Prepare a press release for a mock incident. | | | |
| 21.12 Identify abnormal event management processes utilizing the National Information Management System (NIMS). | | | |
| 22.0 Prepare a plan – the student will be able to: | | SC.912.N.1.1 | |
| 22.01 Describe the need for and the types of pre-planning. | | | |
| 22.02 Identify and select necessary agency involvement. | | | |
| 22.03 Identify possible contamination zones. | | | |
| 22.04 Review contingency plans | | | |
| 22.05 Understand the need for contingency plans for hurricanes, tornadoes, floods, fires, and/or nuclear accidents (emergency response plan). | | | |
| 22.06 Discuss Superfund Amendments Reauthorization Act (SARA) also known as the Emergency Planning and Community Right-to-Know Act | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|-----------------|--------------------|
| (EPCRA) regulations. | | | |
| 22.07 Create plan for deployment. | | | |
| 22.08 Conduct mock disaster activities. | | | |
| 22.09 Review FEMA forms management and documentation | | | |
| 23.0 Perform remediation – the student will be able to: | | SC.912.L.17.16 | |
| 23.01 Research appropriate cleaning methods. | | | |
| 23.02 Create a plan for a disaster clean up including needed materials and equipment. | | | |
| 23.03 Understand entry and closure methods. | | | |
| 23.04 Identify contamination removal procedures. | | | |
| 23.05 Design a site/system cleanliness verification procedure. | | | |
| 23.06 Identify tear down and demobilization procedures. | | | |
| 24.0 Collect and dispose of solid waste – the student will be able to: | | SC.912.L.17.20 | |
| 24.01 Describe the history of solid waste disposal and review the laws that regulate it. | | | |
| 24.02 Identify types of waste. | | | |
| 24.03 Research and evaluate solid waste disposal options. (Landfill, incineration, and composting, etc.) | | | |
| 25.0 Identify continuing education needs and opportunities – the student will be able to: | | | |
| 25.01 Determine continuing education needs/goals. | | | |
| 25.02 Identify available educational and financial resources. | | | |
| 25.03 Identify appropriate professional associations and attend meetings where applicable. | | | |
| 25.04 Read and review trade journals. | | | |
| 26.0 Conduct recordkeeping and sampling procedures – the student will be able to: | | SC.912.N.1.1, 2 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|----------------------|--------------------|
| 26.01 Demonstrate sampling, testing and recordkeeping. | | | |
| 26.02 Collect and analyze water samples: grab, composite and representative. | | | |
| 26.03 Record data into identified database program. | | | |
| 26.04 Interpret lab results. | | | |
| 26.05 Evaluate data. | | | |
| 26.06 Measure well volumes. | | | |
| 26.07 Describe organism sampling and record observations. | | | |
| 27.0 Review stormwater permit procedures – the student will be able to: | | | |
| 27.01 Research and demonstrate Best Management Practices (BMP), Standard Operating Procedures (SOP) and Preventive Maintains (PM). | | | |
| 27.02 Describe proper ditch, pond, culvert, and manhole inspection techniques. | | | |
| 27.03 Evaluate a storm cleanup and prevention plan. | | | |
| 27.04 Discuss pollutants, illegal dumping and discharge and demonstrate appropriate handling procedures. | | | |
| 27.05 Describe the importance of outfall structures, inlets, and treatment systems. | | | |
| 27.06 Describe the procedures to clean and televise pipes. | | | |
| 27.07 Describe the importance of ditch banks and right of ways. | | | |
| 27.08 Maintain, repair and replace pipe sections. | | | |
| 28.0 Demonstrate the use of industry appropriate tools, equipment, and instruments – the student will be able to: | | SC.912.P.10.2, 3, 10 | |
| 28.01 Select and demonstrate proper use of industry appropriate tools, equipment, and instruments. | | | |
| 28.02 Demonstrate various physical science principles as applied in selected mechanical applications (e.g. levers, pulleys, hydraulics, and internal combustion). | | | |
| 28.03 Service and maintain industry appropriate equipment, instruments, facilities, and supplies. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|---|--------------------|
| 29.0 Demonstrate industry specific mathematical calculations – the student will be able to: | | SC.912.E.5.6; SC.912.N.1.1; SC.912.P.8.9; SC.912.P.10.5; SC.912.P.12.2, 3 | |
| 29.01 Calculate area and volume. | | | |
| 29.02 Convert temperature. | | | |
| 29.03 Calculate velocities and flow rates. | | | |
| 29.04 Calculate detention time. | | | |
| 29.05 Calculate parts per million/mg/L. | | | |
| 29.06 Calculate chemical concentrations and chemical dosages. | | | |
| 29.07 Utilize conversion factors. | | | |
| 29.08 Calculate ratios and percentages. | | | |
| 29.09 Calculate water, brake and motor horsepower for chemical pumps. | | | |
| 29.10 Calculate force. | | | |
| 29.11 Calculate sedimentation and loading rates. | | | |
| 29.12 Use calculations to determine activated sludge characteristics. | | | |
| 29.13 Use calculations to determine sludge digestion characteristics. | | | |
| 29.14 Use a variety of problem-solving strategies such as drawing a diagram, making a chart, guessing-and-checking, solving a simpler problem, writing an equation working backwards, and creating a table. | | | |
| 30.0 Demonstrate industry specific science skills and techniques – the student will be able to: | | SC.912.L.18.12; SC.912.P.8.1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11; SC.912.P.10.7 | |
| 30.01 Differentiate between chemical and physical properties of solids, dissolved solids, gases and liquids. | | | |
| 30.02 Identify chemical symbols on the periodic table and explain their relationships. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|---------------------------------|--------------------|
| 30.03 Interpret formula representations of molecules and compounds in water treatment. | | | |
| 30.04 Characterize chemical reactions in water treatment processes for example redox, acid base, synthesis and single and double replacement reactions. | | | |
| 30.05 Utilize the mole concept and the law of conservation of mass to calculate quantities of chemicals precipitating in reactions occurring in water treatment processes. | | | |
| 30.06 Describe the properties of the water molecule. | | | |
| 30.07 Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH in environmental processes. | | | |
| 30.08 Distinguish between endothermic and exothermic chemical processes in environmental systems. | | | |
| 31.0 Identify career opportunities and organizational dynamics in water resources – the student will be able to: | | | |
| 31.01 Research and create a presentation about occupations in water resources. | | | |
| 31.02 Determine the educational requirements and experience needed to enter and advance in water resource occupations | | | |
| 31.03 Prepare a resume. | | | |
| 32.0 Demonstrate water treatment techniques – the student will be able to: | | SC.912.N.1.1 | |
| 32.01 Determine soil types, land slope, and other factors to consider in choosing a location for a manmade pond. | | | |
| 32.02 Identify/explain environmentally safe methods of wastewater disposal. | | | |
| 32.03 Identify and consult agencies regulating water quality standards in order to prevent compliance problems. | | | |
| 32.04 Observe different stages of construction of ponds. | | | |
| 33.0 Discuss an industrial pretreatment program/inspection – the student will be able to: | | SC.912.L.18.11; SC.912.N.1.1 | |
| 33.01 Utilize spot location program. | | | |
| 33.02 Survey business and industry water consumption and discharge. | | | |
| 33.03 Conduct pretreatment sampling. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|-----------|--------------------|
| 33.04 Analyze data and document reports. | | | |
| 33.05 Design monitoring plan. | | | |
| 33.06 Monitor sites. | | | |
| 34.0 Discuss comprehensive quality assurance plan – the student will be able to: | | | |
| 34.01 Discuss quality assurance rules. | | | |
| 34.02 Develop and follow standard operating procedures. | | | |
| 34.03 Describe preventative maintenance techniques. | | | |
| 34.04 Describe cleaning/decontamination techniques. | | | |
| 34.05 Determine accuracy and precision of sampling techniques. | | | |
| 34.06 Discuss need for corrective action. | | | |
| 34.07 Document Quality Assurance per regulatory agencies. | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: **Advanced Environmental Water Technology**
Course Number: **8007130**
Course Credit: **1**

Course Description:

This course is designed to develop competencies in the area of standards and regulations, site assessments, safety, managing data and physical resources, prepare a plan, perform remediation, collect and dispose of solid waste, record keeping and sampling procedures, career opportunities, leadership, teamwork, and money management concepts. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|----------------|------------------|---------------------------|
| 35.0 Identify professions related to the water technology field – the student will be able to: | | | |
| 35.01 List duties of water technology workers such as wastewater operator, water operator, systems operator, stormwater operator, residual (bio-solids) hauler operator, cross connection operator, pretreatment operator, and meter reading/maintenance operator. | | | |
| 35.02 Identify the basic terms and concepts involved in processes used in these professions. | | | |
| 35.03 List potential employers in the water technology field: federal, municipal, county, state and private. | | | |
| 35.04 Identify resources to assist in finding employment in the field. | | | |
| 35.05 Identify professional organizations related to the water technology field. | | | |
| 35.06 Identify career ladder levels in the water technology field: trainee, C Level, B Level, A Level. | | | |
| 36.0 Identify scientific concepts common in water and wastewater treatment – the student will be able to: | | | |
| 36.01 Identify chemical symbols used in water and wastewater treatment. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|-----------|--------------------|
| 36.02 Describe how the hydrologic cycle is related to water treatment | | | |
| 36.03 Describe the basic concepts of the pH scale and its importance in the treatment process. | | | |
| 36.04 Identify the differences between mixtures, elements, and compounds, and organic and inorganic chemicals. | | | |
| 36.05 Identify the basic nitrogen, phosphorous, and carbon cycles. | | | |
| 37.0 Identify safety hazards associated with water technologies – the student will be able to: | | | |
| 37.01 Identify the types of hazards common to water technology facilities. | | | |
| 37.02 Recognize unsafe conditions and prescribe corrective measures. | | | |
| 37.03 Identify and safely handle hazardous chemicals common to water technology facilities. | | | |
| 37.04 Recognize electrical hazards. | | | |
| 37.05 Recognize fire hazards, identify types of fires, and describe appropriate extinguishing techniques. | | | |
| 38.0 Identify federal, state, and local regulations for the handling, storage, and use of toxic and hazardous materials – the student will be able to: | | | |
| 38.01 Identify the kinds of information presented on Safety Data Sheets. | | | |
| 38.02 Describe requirements for in-plant training and the accessibility of information on hazardous and toxic substances (chapter 442, F.S.). | | | |
| 39.0 Solve basic math problems common to water technologies – the student will be able to: | | | |
| 39.01 Perform basic arithmetic problems, including addition, subtraction, multiplication, division, fractions, decimals, percentages, rounding (significant figures), graphing, etc. | | | |
| 39.02 Identify metric measurements and perform conversions. | | | |
| 39.03 Perform calculations that involve areas, volumes, capacities, retention times, pounds, mg/L, velocities, flow rates, pressure, and head. | | | |
| 40.0 Define pumping and basic hydraulic principles – the student will be able to: | | | |
| 40.01 Identify types of pumps. | | | |
| 40.02 Discuss application and use of different types of pumps. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 40.03 Identify components/characteristics of pumps including pump operation and basic pump curves including centrifugal pumps, positive displacement pumps, and air lift pumps. | | | |
| 40.04 Identify types of pipes, valves, and fittings. | | | |
| 40.05 Define cross connections. | | | |
| 40.06 Identify the appropriate equipment used in the treatment processes. | | | |
| 41.0 Define principles of disinfection – the student will be able to: | | | |
| 41.01 List the need/reasons for disinfection (list of waterborne diseases). | | | |
| 41.02 Define concepts related to disinfection. | | | |
| 41.03 List methods and chemicals used in disinfection. | | | |
| 41.04 Define the physical properties of chlorine. | | | |
| 41.05 List kinds of disinfection equipment used. | | | |
| 42.0 Define sampling techniques – the student will be able to: | | | |
| 42.01 Define the reasons for sampling and types of samples. | | | |
| 42.02 Define methods of sample collection and handling, transportation, and proper disposal. | | | |
| 42.03 Define the basic procedure for quality control and quality assurance in sampling. | | | |
| 42.04 Define the chain of custody for samples. | | | |
| 42.05 Perform chlorine residual analysis. | | | |
| 42.06 Perform pH analysis. | | | |
| 43.0 Describe federal, state, and local regulations that apply to water technologies – the student will be able to: | | | |
| 43.01 List regulatory agencies and their roles in monitoring the water technology field. | | | |
| 43.02 Identify regulations associated with the appropriate federal, state or local agencies. | | | |
| 43.03 Identify training and certification requirements for water technology workers. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 44.0 Demonstrate employability skills – the student will be able to: | | | |
| 44.01 Conduct a job search. | | | |
| 44.02 Secure information about a job. | | | |
| 44.03 Identify documents that may be required for a job application. | | | |
| 44.04 Complete a job application. | | | |
| 44.05 Demonstrate competence in job-interview techniques. | | | |
| 44.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons. | | | |
| 44.07 Identify acceptable work habits and ethical behaviors. | | | |
| 44.08 Demonstrate knowledge of how to make job changes appropriately. | | | |
| 44.09 Demonstrate acceptable employee-health habits for the treatment facility environment. | | | |
| 44.10 Identify materials and documents needed for a professional library. | | | |
| 44.11 Demonstrate productive and positive customer interactions. | | | |
| 44.12 Demonstrate effective interpersonal communication skills and leadership skills. | | | |
| 45.0 Identify sampling techniques and explain the significance of the steps – the student will be able to: | | | |
| 45.01 Identify the laboratory tests that are commonly performed by operators in Florida water-treatment facilities, including those required by the Safe Drinking Water Regulation. | | | |
| 45.02 Define pathogenic organisms, including bacteria, protozoa, and virus, and describe their disease associations. | | | |
| 45.03 Describe the laboratory test performed for the presence of bacteria. | | | |
| 45.04 Describe the correct procedure for obtaining a bacteriological sample. | | | |
| 45.05 Describe correct sample collection procedures for inorganic and organic analyses. | | | |
| 45.06 Describe the laboratory quality-control checks and required documentation. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 46.0 Identify chemical, biological, and physical constituents of water entering the water treatment facility or distribution systems – the student will be able to: | | | |
| 46.01 Determine which constituents are inherent to groundwater and/or surface water. | | | |
| 46.02 Describe the relationship between turbidity and the microbiological quality of water. | | | |
| 46.03 Describe the uses of chemical analysis in water-treatment operations. | | | |
| 46.04 Identify symbols and common names for elements and chemical compounds. | | | |
| 46.05 Select the primary constituents to be measured and the most commonly used units of measurement for each. | | | |
| 46.06 Explain the importance of water treatment for the control of coliform bacteria and algae. | | | |
| 47.0 Describe the principles, operational and troubleshooting practices of the aeration process – the student will be able to: | | | |
| 47.01 Describe the aeration and air stripping processes and explain how they differ. | | | |
| 47.02 Identify the types of aeration systems. | | | |
| 47.03 Identify the benefits of aeration. | | | |
| 47.04 Describe the components of an air-stripping system. | | | |
| 47.05 Troubleshoot aeration and air stripping processes. | | | |
| 48.0 Describe the principles, operational and troubleshooting practices of the mixing, coagulation, and flocculation processes – the student will be able to: | | | |
| 48.01 Define concepts such as turbidity, color, coagulation, and flocculation. | | | |
| 48.02 Define the difference between sweep and enhanced coagulation. | | | |
| 48.03 Identify the kinds of equipment used in the coagulation process. | | | |
| 48.04 Identify coagulant <i>and coagulant aid</i> chemicals used in water-treatment facilities. | | | |
| 48.05 Identify the steps of coagulation, in order. | | | |
| 48.06 Identify the specific sampling locations for process control in a coagulation process. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 48.07 Identify factors that would contribute to poor floc formation. | | | |
| 48.08 Compute the feed rate in pounds per day (lbs/d) when the chemical coagulant (mg/1) and flow rate (MGD) are known. | | | |
| 48.09 Compute the dosage (mg/1) of coagulant when the rate of flow (MGD) and the feed rate (lbs/day) of the chemical coagulant are known. | | | |
| 48.10 Compute the dosage rate that is needed to treat a different flow (MGD) at the current dosage when the current rate of flow (MGD) and the current coagulant feed rate (lbs/d) are known. | | | |
| 48.11 Describe troubleshooting techniques for basic mixing, coagulation, and flocculation processes. | | | |
| 49.0 Describe the principles, operational and troubleshooting practices of the sedimentation process – the student will be able to: | | | |
| 49.01 Describe an upflow clarifier and basin sedimentation. | | | |
| 49.02 Identify factors that contribute to efficient sedimentation. | | | |
| 49.03 Identify the measures that would be effective in preventing or controlling algae growth on surfaces of coagulation and sedimentation basins. | | | |
| 49.04 Identify methods of sludge removal <i>and disposal</i> from sedimentation basins | | | |
| 49.05 Describe troubleshooting techniques for sedimentation and upflow clarifier processes. | | | |
| 50.0 Describe the principles, operational and troubleshooting practices of the filtration process – the student will be able to: | | | |
| 50.01 Describe materials and methods related to filtration, including types of filters, filter-system components, and the steps for normal filtration operations. | | | |
| 50.02 Explain common problems of filtering systems, including head loss, mud balls, and filter media loss. | | | |
| 50.03 Determine when to backwash a filter. | | | |
| 50.04 Identify the steps for backwashing a filter. | | | |
| 50.05 Describe troubleshooting techniques for filtration processes. | | | |
| 51.0 Describe the principles, operational and troubleshooting practices of the water-softening process – the student will be able to: | | | |
| 51.01 Describe the two types of hardness. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|---|---------|----------|--------------------|
| 51.02 Identify the appropriate chemical(s) to use in chemical-precipitation softening processes for the two kinds of hardness. | | | |
| 51.03 Describe alkalinity and its components. | | | |
| 51.04 Identify treatment processes used for water softening. | | | |
| 51.05 Calculate the distribution of bicarbonate, carbonate, and/or hydroxide ions when given the total alkalinity and phenolphthalein alkalinity. | | | |
| 51.06 Describe selective carbonate removal. | | | |
| 51.07 Identify the important zones of an upflow clarifier unit. | | | |
| 51.08 Describe the lime soda ash softening process, including its control. | | | |
| 51.09 Compute lime demand from raw-water analyses. | | | |
| 51.10 Describe the reasons for recarbonation. | | | |
| 51.11 Compute carbon dioxide demands for recarbonation. | | | |
| 51.12 Compute hardness removal when the ion-exchange capacity is known. | | | |
| 51.13 Describe troubleshooting techniques for water-softening processes. | | | |
| 51.14 Describe the ion exchange softening process | | | |
| 52.0 Describe the principles, operational and troubleshooting practices of the stabilization process – the student will be able to: | | | |
| 52.01 Identify the chemicals used in stabilization. | | | |
| 52.02 Identify two stabilization indices. | | | |
| 52.03 Determine water stability, using the Langelier index and the marble test. | | | |
| 52.04 Troubleshoot stabilization processes. | | | |
| 53.0 Describe the principles, operational and troubleshooting practices of the corrosion control process – the student will be able to: | | | |
| 53.01 Identify the factors that influence corrosion. | | | |
| 53.02 Describe the problems that can be created by corrosive waters. | | | |
| 53.03 Describe the basic concepts related to electrolysis. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|-----------|--------------------|
| 53.04 Define electrochemical reaction. | | | |
| 53.05 Identify proper maintenance <i>and safety</i> procedures for equipment chlorination. | | | |
| 53.06 Describe the conditions for calcium carbonate film formation. | | | |
| 53.07 Define cathode film formation. | | | |
| 53.08 Define cathodic protection and describe its application in water-treatment facilities. | | | |
| 53.09 Describe troubleshooting techniques for corrosion-control processes. | | | |
| 54.0 Describe the principles, operational and troubleshooting practices of the disinfection process – the student will be able to: | | | |
| 54.01 Identify the chemicals used in primary disinfection. | | | |
| 54.02 Identify commonly used chlorinators and hypochlorinators. | | | |
| 54.03 Determine the maximum amount of chlorine gas (in pounds) that may be taken from a cylinder in a 24-hour period. | | | |
| 54.04 Identify proper maintenance procedures for equipment chlorination. | | | |
| 54.05 Identify terminology related to chlorination and disinfection. | | | |
| 54.06 Identify common safety problems or emergency situations that might occur during chlorination. | | | |
| 54.07 Identify the properties of chlorine and describe its use in water treatment. | | | |
| 54.08 Explain the points at which chlorine is applied most effectively in water treatment. | | | |
| 54.09 Compute the feed rate (lbs/d) when given the rate of flow (MGD) and dosage of chlorine (mg/l). | | | |
| 54.10 Compute the feed rate (lbs/d) of a hypochlorite compound that contains a given percentage of available chlorine when given a problem where the rate of flow (MGD) and the chlorine dosage (mg/l) are known. | | | |
| 54.11 Compute the new rate of flow and the feed rate that will be needed to maintain the current dosage when given the current rate of flow (MGD); the current chlorine feed rate (lbs/d), and the amount by which the rate of flow is to be increased or decreased. | | | |
| 54.12 Compute the feed rate needed to treat a given amount of water when given a chlorine demand and the desired chlorine residual. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 54.13 Describe troubleshooting techniques for disinfection processes. | | | |
| 55.0 Describe the principles, operational and troubleshooting practices for the control and treatment of trihalomethanes – the student will be able to: | | | |
| 55.01 Describe the formation of total trihalomethanes (TTHM). | | | |
| 55.02 Identify the specific procedure for collecting samples to determine trihalomethane levels. | | | |
| 55.03 Compute the quarterly average and the annual TTHM measurements when sample results are given. | | | |
| 55.04 Identify processes that remove trihalomethane precursors. | | | |
| 55.05 Identify processes that remove trihalomethanes after they are formed. | | | |
| 55.06 Identify the benefits of alternate disinfectants. | | | |
| 55.07 Describe chloramination as a control of TTHM. | | | |
| 55.08 Describe troubleshooting techniques for the control and treatment of trihalomethanes. | | | |
| 56.0 Describe the principles, operational and troubleshooting practices of the iron and manganese removal processes – the student will be able to: | | | |
| 56.01 Explain the occurrence of iron and manganese in source water and in treated water. | | | |
| 56.02 Describe the importance of controlling iron and manganese. | | | |
| 56.03 Describe sample-collection and analysis procedures for iron and manganese. | | | |
| 56.04 Describe remedial processes for controlling iron and manganese. | | | |
| 56.05 Compute the potassium permanganate dosage for a known concentration of iron and manganese in the water being treated. | | | |
| 56.06 Describe troubleshooting techniques for iron and manganese-removal processes. | | | |
| 57.0 Describe the principles, operational and troubleshooting practices for taste and odor control – the student will be able to: | | | |
| 57.01 Identify common types of complaints about water quality. | | | |
| 57.02 Identify causes of tastes and odors. | | | |
| 57.03 Describe how microbial growths affect tastes and odors. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 57.04 Describe how eutrophication contributes to surface-water tastes and odors. | | | |
| 57.05 Describe a cross-connection. | | | |
| 57.06 Identify the chemicals used in the control and treatment of tastes and odors. | | | |
| 57.07 Describe the Threshold Odor Number (TON) test. | | | |
| 57.08 Determine the TON when dilution volumes and positive samples are given. | | | |
| 57.09 Describe troubleshooting techniques for taste and odor control. | | | |
| 58.0 Describe the principles, operational and troubleshooting practices of the demineralization processes – the student will be able to: | | | |
| 58.01 Define concepts related to demineralization, such as reverse osmosis (RO), flux, feedwater, permeate, and salinity. | | | |
| 58.02 Describe the structure, composition, and performance of an RO membrane. | | | |
| 58.03 Describe feedwater impurities, physical parameters, and conditions potentially harmful to the RO process. | | | |
| 58.04 Identify items included in a typical RO-facility-operation checklist. | | | |
| 58.05 Describe the common causes of membrane damage. | | | |
| 58.06 Describe the procedure for membrane cleaning. | | | |
| 58.07 Compute the percent of recovery when product flow and feed flow are known. | | | |
| 58.08 Compute the percent of mineral rejection when total dissolved solids are known for the feedwater and product water. | | | |
| 58.09 Describe the basic concepts of electrodialysis (ED), such as the cathode and anode relationship and the removal of typical inorganic salts. | | | |
| 58.10 Describe the most common problem of ED operation in a facility. | | | |
| 58.11 Explain how the cation membrane and the anion membrane differ. | | | |
| 58.12 Describe the multi-compartment unit used in the ED process. | | | |
| 58.13 Describe ED operating procedures in detail. | | | |
| 58.14 Describe the two most common chemical solutions used to flush ED | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| stack membranes. | | | |
| 58.15 Describe troubleshooting techniques for demineralization processes. | | | |
| 59.0 Describe the principles, operational and troubleshooting practices of the fluoridation process – the student will be able to: | | | |
| 59.01 Define the basic concepts related to fluoridation, including its purpose and the kinds of chemicals used. | | | |
| 59.02 Identify the properties of fluoride and describe its use. | | | |
| 59.03 Identify the types of equipment used in fluoridation. | | | |
| 59.04 Describe proper maintenance procedures for fluoridation equipment. | | | |
| 59.05 Describe potential safety problems or emergency situations in the fluoridation process, and ways to avoid them. | | | |
| 59.06 Compute the feed rate of chemicals used in the fluoridation process. | | | |
| 59.07 Describe troubleshooting techniques for the fluoridation processes. | | | |
| 60.0 Identify facility operational problems – the student will be able to: | | | |
| 60.01 Respond to customer questions about taste or odor in the water. | | | |
| 60.02 Respond to customer questions about red water or rust stains. | | | |
| 60.03 Identify the probable cause(s) for a sudden change in chlorine demand; take corrective action. | | | |
| 61.0 Describe basic hydraulics and pumping operations – the student will be able to: | | | |
| 61.01 Describe the relationship between the system head and pressure, and make conversions between them. | | | |
| 61.02 Describe three types of head, i.e., pressure, suction, and atmospheric. | | | |
| 61.03 Describe proper operation of centrifugal and displacement pumps. | | | |
| 61.04 Describe causes and methods that are effective in preventing “water hammer.” | | | |
| 61.05 Troubleshoot pump operations. | | | |
| 62.0 Identify appropriate federal, state, and local regulations for the operation and maintenance of a public potable water facility – the student will be able to: | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|-----------|--------------------|
| 62.01 Complete the Drinking Water Bacteriological Analysis Form correctly. | | | |
| 62.02 Complete the DEP daily operation report (DOR) form correctly. | | | |
| 62.03 Complete the DEP monthly operation report (MOR) form correctly. | | | |
| 62.04 Identify the DEP requirements for the operation of standby and emergency equipment. | | | |
| 62.05 Identify the DEP requirements for microbiological monitoring and analyses. | | | |
| 62.06 Identify the DEP requirements for sampling and testing. | | | |
| 63.0 Perform equipment inspection, and identify basic maintenance for the treatment train, treatment residuals disposal, and solids management – the student will be able to: | | | |
| 63.01 Identify the appropriate equipment used in the treatment train, treatment residuals disposal, and solids management. | | | |
| 63.02 Describe a preliminary site inspection of the equipment used in the treatment train, treatment residuals disposal, and solids management. | | | |
| 63.03 Identify the maintenance needs of equipment used in the treatment train, treatment residuals disposal, and solids management, including safe procedures for maintenance. | | | |
| 63.04 Describe proper record keeping for preventive and corrective maintenance. | | | |
| 63.05 Describe preventive and corrective maintenance procedures for equipment used in the treatment process, treatment residuals disposal, and solids management. | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: **Advanced Environmental Water Reclamation Technology**
Course Number: **8007210**
Course Credit: **1**

Course Description:

This course is designed to develop competencies in the area of career opportunities, scientific concepts in water treatment, safety hazards, government regulations, facility operational principles, and equipment inspections. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|----------------|------------------|---------------------------|
| 64.0 Identify the basic characteristics and principles of wastewater treatment – the student will be able to: | | | |
| 64.01 Identify the sources of wastewater and the objectives of wastewater treatment. | | | |
| 64.02 Identify terms used in wastewater treatment. | | | |
| 64.03 Identify the impact of wastewater on receiving bodies of water. | | | |
| 64.04 Identify biological organisms present in treatment processes. | | | |
| 64.05 Identify waterborne diseases. | | | |
| 64.06 Identify commonly measured wastewater parameters. | | | |
| 64.07 Identify factors affecting raw wastewater. | | | |
| 64.08 Correlate treatment processes to types of facility influent and solids. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 65.0 Identify sampling techniques and interpret the results – the student will be able to: | | | |
| 65.01 Identify the reasons for sampling and the types of samples (e.g., simple, representative, grab, composite). | | | |
| 65.02 Describe methods of sample collection and handling. | | | |
| 65.03 Identify specific samples (biological or chemical) and determine the significance of sample results required for process quality control, for compliance with standards, and for reporting. | | | |
| 65.04 Identify representative sampling points. | | | |
| 65.05 Identify the significance of the flow measurement on process control. | | | |
| 66.0 Describe the sources of wastewater and the types of collection systems – the student will be able to: | | | |
| 66.01 Describe the types of wastewater collection systems. | | | |
| 66.02 Identify flow variations and conditions that affect plant treatment, including infiltration, inflow, and lift stations. | | | |
| 66.03 Identify methods to detect and correct infiltration. | | | |
| 66.04 Identify dissolved gases in wastewater and the effect of their presence/absence on treatment. | | | |
| 67.0 Describe the process and the operational principles for the preliminary, primary, secondary, and tertiary treatment (the treatment train); effluent disposal; and solids management – the student will be able to: | | | |
| 67.01 Describe concepts related to preliminary and primary treatment. | | | |
| 67.02 Describe the types of preliminary treatment equipment, the way they function, and the relationship of each to the treatment train. | | | |
| 67.03 Describe the types of primary treatment equipment, the way they function, and the relationship of each to the treatment train. | | | |
| 67.04 Describe concepts related to secondary treatment, including attached growth processes, suspended growth processes, aeration, and clarification. | | | |
| 67.05 Describe the types of secondary treatment equipment, the way they function, and the relationship of each to the treatment train. | | | |
| 67.06 Describe concepts related to tertiary treatment processes, including sand filtration, nitrification/denitrification, oxic/anoxic, activated carbon, and artificial wetlands. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 67.07 Describe the types of tertiary treatment equipment, the way they function, and the relationship of each to the treatment train. | | | |
| 67.08 Describe concepts related to disinfection and effluent disposal, including surface water, reuse reclamation, deep well, and ocean outfall. | | | |
| 67.09 Describe the types of disinfection and the types of effluent-disposal equipment, the way they function, and the relationship of each to the system. | | | |
| 67.10 Describe concepts related to solids management, including thickening, aerobic and anaerobic digestion, stabilization, de-watering, and reuse. | | | |
| 67.11 Describe the types of solids-management equipment, the way they function, and the relationship of each to the system. | | | |
| 68.0 Perform treatment-process control and troubleshooting for the treatment train, effluent disposal, and solids management – the student will be able to: | | | |
| 68.01 Describe the grit-removal process and the operational efficiency of each step. | | | |
| 68.02 Describe the laboratory tests performed on influent. | | | |
| 68.03 Describe the primary-clarifier removal efficiencies, including settleable solids, suspended solids, total solids, BOD, and bacteria. | | | |
| 68.04 Describe sampling points, frequency of sampling, and the laboratory tests and results that are used for the proper operation of the primary clarifier. | | | |
| 68.05 Select and plot on a trend chart the parameters for primary clarification. | | | |
| 68.06 Use the operational data required to evaluate the performance of secondary-treatment processes, including attached growth, suspended growth, aeration, and clarification. | | | |
| 68.07 Describe sampling points, the frequency of sampling, and the laboratory tests and results used for proper operation of the secondary-treatment processes. | | | |
| 68.08 Select and plot on a trend chart the parameters for secondary clarification. | | | |
| 68.09 Describe how nitrification affects secondary processes and clarification. | | | |
| 68.10 Describe how denitrification affects secondary processes and clarification. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 68.11 Use operational data to evaluate the performance of sand filtration. | | | |
| 68.12 Describe sampling points, the frequency of sampling, and the laboratory tests and results used for checking the proper operation of sand filtration. Select and plot on a trend chart the parameters for sand filtration. | | | |
| 68.13 Use operational data to evaluate the nitrification/denitrification process. | | | |
| 68.14 Use operational data to evaluate the performance of effluent-disposal processes, including disinfection and dechlorination. | | | |
| 68.15 Describe sampling points, the frequency of sampling, and the laboratory tests used for checking the proper operation of effluent disposal. | | | |
| 68.16 Select and plot on a trend chart the parameters for effluent disposal. | | | |
| 68.17 Describe various methods of effluent disinfection including UV, chlorination, and ozonation. | | | |
| 68.18 Describe the chemical and physical properties of chlorine, and describe the reactions of chlorine with water, ammonia compounds, and sulfides. | | | |
| 68.19 Describe the safe storage and handling of chlorine, including the use of testing compounds. | | | |
| 68.20 Explain the points of application of chlorine in wastewater treatment. | | | |
| 68.21 Describe the methods of dechlorination. | | | |
| 68.22 Describe the methods commonly used to dispose of wastewater effluents, including reuse applications. | | | |
| 68.23 Describe the laboratory tests commonly used on the reuse of effluent. | | | |
| 68.24 Describe the types of sludge and their characteristics. | | | |
| 68.25 Use operational data to evaluate the performance of solids management, including sludge thickening, digestion, de-watering, and disposal processes. | | | |
| 68.26 Describe sampling points, the frequency of sampling, and the laboratory tests and results used for checking the proper operation of solids management and for compliance with Chapter 62-640 F.A.C. | | | |
| 69.0 Identify and correct facility operational problems – the student will be able to: | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|--|---------|----------|--------------------|
| 69.01 Describe common facility operational problems in the treatment train, effluent disposal, and solids management. | | | |
| 69.02 Describe methods to evaluate operational problems in preliminary, primary, secondary, and tertiary treatment, effluent disposal, and solids management. | | | |
| 69.03 Select appropriate corrective actions for common problems in preliminary, primary, secondary, and tertiary treatment, effluent disposal, and solids management. | | | |
| 69.04 Describe the methods for monitoring results of corrective action taken for common problems in preliminary, primary, secondary, and tertiary treatment, effluent disposal, and solids management. | | | |
| 70.0 Identify appropriate federal, state, and local regulations – the student will be able to: | | | |
| 70.01 Identify federal, state and local regulations that apply to the operation of a wastewater-treatment facility. | | | |
| 70.02 Describe the operator's duties and responsibilities, certification requirements, testing, renewal, staffing, and facility classification (sections of Chapter 62-602 F.A.C.). | | | |
| 70.03 Explain and describe the contents of an operating permit. | | | |
| 70.04 Identify state regulations that apply to procedures such as reclaimed water, reuse, and residuals management. | | | |
| 71.0 Describe federal, state and local laws for the handling, storage, and use of toxic and hazardous materials – the student will be able to: | | | |
| 71.01 Identify the kinds of information presented on the SDS. | | | |
| 71.02 Describe requirements for in-plant training and the accessibility of information on hazardous and toxic substances (Chapter 442, F.S.). | | | |
| 71.03 Identify the reporting requirements as specified in SARA Title III and Chapter 252, F.S. | | | |
| 71.04 Describe the responsibilities toward the community as specified in SARA Title III and Chapter 252, F.S. | | | |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization for providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different

competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

**Florida Department of Education
Curriculum Framework**

Program Title: Principles of Agribusiness & Management
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

| | |
|----------------------------|--|
| Program Number | 8009100 |
| CIP Number | 0101010200 |
| Grade Level | 9-12 |
| Standard Length | 3 credits |
| Teacher Certification | Refer to the Program Structure section |
| CTSO | FFA |
| SOC Codes (all applicable) | 11-9013 - Farmers, Ranchers, and Other Agricultural Managers |

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Agriculture, Food and Natural Resources career cluster.

The purpose of this program is to serve as a supplemental program to provide Agriculture, Food, and Natural Resource Education students with the opportunity, to learn the business side of agriculture commodities as well as essential functions of leadership and management.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of an agricultural mechanics core with two occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the secondary program structure:

| OCP | Course Number | Course Title | Teacher Certification | Length | SOC Code | Level | Graduation Requirement |
|-----|---------------|-------------------------------------|-----------------------|----------|----------|-------|------------------------|
| A | 8106810 | Agriscience Foundations 1 | AGRICUTUR 1 @2 | 1 credit | 11-9013 | 3 | EQ |
| | 8009110 | Agriculture Leadership & Management | | 1 credit | | 3 | |
| | 8009120 | Principles of Agribusiness | | 1 credit | | 3 | EC |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Academic Alignment Table

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

| Courses | Anatomy/ Physiology Honors | Astronomy Solar/Galactic Honors | Biology 1 | Chemistry 1 | Earth-Space Science | Environmental Science | Genetics | Integrated Science | Marine Science 1 Honors | Physical Science | Physics 1 |
|-------------------------------------|----------------------------|---------------------------------|--------------|--------------|---------------------|-----------------------|--------------|--------------------|-------------------------|------------------|--------------|
| Ag. Foundations | 29/87 33% | 18/80 23% | 55/83 66% | 11/69 16% | 36/67 54% | 30/70 42% | 20/69 29% | 49/82 60% | 25/66 38% | 38/74 51% | 12/72 16% |
| Agriculture Leadership & Management | 3/87 3% | 3/80 4% | 22/83 27% | 3/69 4% | 22/67 33% | 3/70 4% | 3/69 4% | 3/82 4% | 3/66 5% | 22/74 30% | 3/72 4% |
| Principles of Agribusiness | 23/87 26% | 23/80 29% | 3/83 4% | 22/69 32% | 3/67 4% | 20/70 29% | 23/69 33% | 10/82 12% | 18/66 27% | 3/74 4% | 22/72 31% |

** Alignment pending review

Alignment attempted, but no correlation to academic course

| Courses | Algebra 1 | Algebra 2 | Geometry | English 1 | English 2 | English 3 | English 4 |
|-------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Agriscience Foundations 1 | 14/67 21% | 4/75 5% | 8/54 15% | 11/46 24% | 11/45 24% | 11/45 24% | 11/45 24% |
| Agriculture Leadership & Management | ** | ** | ** | 12/46 26% | 12/45 27% | 11/45 24% | 11/45 24% |
| Principles of Agribusiness | 25/67 37% | 24/75 32% | 16/54 30% | 17/46 37% | 17/45 38% | 17/45 38% | 17/45 38% |

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. The FS for Mathematical Practices are designed for grades K-12 and describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education.

Instructors must incorporate the Florida Standards for Technical Subjects and Mathematical Practices throughout instruction of this CTE program.

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL’s need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. If so, the standards have been identified and cross walked with the corresponding CTE standard and/or benchmark.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Describe the history of agriculture and its influence on the global economy.
- 02.0 Practice agriscience safety skills and procedures.
- 03.0 Apply scientific and technological principles to agriscience issues.
- 04.0 Apply environmental principles to the agricultural industry.
- 05.0 Investigate and utilize basic scientific skills and principles in plant science.
- 06.0 Investigate and utilize basic scientific skills and principles in animal science.
- 07.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 08.0 Demonstrate agribusiness, employability and human relation skills
- 09.0 Apply leadership and citizenship skills.
- 10.0 Discuss components of food safety and handling practices in agriculture.
- 11.0 Compare and contrast differing theories of leadership styles.
- 12.0 Develop personal leadership qualities.
- 13.0 Associate leadership styles for specific situations.
- 14.0 Establish a clear image of what the future of the organization should look like.
- 15.0 Acquire the skills necessary to complete a project as a team.
- 16.0 Build a constituency through listening, coaching, understanding and appreciating others.
- 17.0 Conduct professional and personal activities based on ethical reasoning
- 18.0 Demonstrate personal awareness of community relations.
- 19.0 Pursue learning and growth opportunities related to professional and personal aspirations.
- 20.0 Interact with others in a manner that respects the differences of a diverse and changing society.
- 21.0 Develop awareness and apply skills necessary for achieving career success
- 22.0 Demonstrate the effective application of reasoning, thinking, and coping skills to solve problems.
- 23.0 Demonstrate leadership opportunities available in FFA
- 24.0 Prepare documents and skills for pursuing career success.
- 25.0 Explain the components of the American business system.
- 26.0 Analyze the basic concepts of agribusiness.
- 27.0 Evaluate the importance of the food and fiber system to understand the impact on global economy.
- 28.0 Examine the scope of career opportunities in and the importance of agriculture to the economy.
- 29.0 Compose and analyze a business plan for an enterprise.
- 30.0 Prepare and maintain all files needed to accomplish effective record keeping
- 31.0 Use accounting fundamentals to accomplish dependable bookkeeping and fiscal management.
- 32.0 Maintain and interpret financial information (income statements, balance sheets, inventory, purchase orders, accounts receivable and cash-flow analyses) for businesses
- 33.0 Conduct appropriate market and marketing research
- 34.0 Develop a marketing plan
- 35.0 Develop specific tactics to market AFNR products and services.
- 36.0 Develop a production and operational plan.

- 37.0 Apply appropriate management skills to organize a business.
- 38.0 Summarize the changes in American agricultural cooperatives from their beginning to today.
- 39.0 Differentiate between agricultural cooperative principles and practices.
- 40.0 Explain the responsibilities of people involved with agriculture cooperatives.
- 41.0 Explain the benefits and limitations of agricultural cooperatives.
- 42.0 Describe the various organization that serve agricultural cooperatives.
- 43.0 Construct a plan for financing and taxation within an agricultural cooperative.
- 44.0 Explain the steps for starting an agricultural cooperative.
- 45.0 Validate the necessity of leadership skills development in conjunction with participation in The National FFA Organization (FFA) as a critical component to a well-rounded agricultural education.
- 46.0 Complete a Supervised Agricultural Experience (SAE) program as a critical component to a well-rounded agricultural education.
- 47.0 Interpret and apply state and federal rules and regulations to enterprise
- 48.0 Perform accounting activities
- 49.0 Perform communication activities.
- 50.0 Demonstrate an understanding of legal and ethical issues in a business environment.
- 51.0 Develop financial literacy skills.

**Florida Department of Education
Student Performance Standards**

Course Title: Agriscience Foundations 1
Course Number: 8106810
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of agricultural history and the global impact of agriculture; career opportunities; scientific and research concepts; biological and physical science principles; environmental principles; agriscience safety; principles of leadership; and agribusiness, employability, and human relations skills in agriscience. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students will interact with materials and primary sources of data or with secondary sources of data to observe and understand the natural world. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 20% of classroom time will be dedicated to laboratory experiences.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|------------------------------------|---|--------------------|
| 01.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to: | | SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2; | |
| 01.01 Evaluate and explain emerging trends and the opportunities they may create within the AFNR systems. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.01.01.02.c |
| 01.02 Assess the economic impact of an AFNR system on a local, state, national and global level. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | CS.02.02.03.b |
| 01.03 Identify significant career patterns/shifts in the history of the agricultural industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.01.01.01.a |
| 01.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.06.02.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|---|--------------------|
| 02.0 Practice agriscience safety skills and procedures--The student will be able to: | | SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7; | |
| 02.01 Identify the common causes and prevention of accidents in agriscience operations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.a |
| 02.02 Extract and utilize pertinent information from a container label and/or Safety Data Sheet (SDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | CS.03.04.03.a |
| 02.03 Identify proper disposal of hazardous waste materials and biohazards. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | ESS.04.01.02.c |
| 02.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.b |
| 03.0 Apply scientific and technological principles to agriscience issues--The student will be able to: | | SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1; | |
| 03.01 Employ scientific measurement skills. | | | |
| 03.02 Demonstrate safe and effective use of common laboratory equipment. | | | ESS.01.02.01.b |
| 03.03 Identify the parts and functions of plant and animal cells. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |
| 03.04 Describe the phases of cell reproduction. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 03.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|--------------------|
| 03.06 Interpret, analyze, and report data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | BS.02.01.01.b |
| 03.07 Investigate DNA and genetics applications in agriscience including the theory of probability. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | BS.01.01.01.a |
| 03.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.). | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | BS.03.01.03.b |
| 04.0 Apply environmental principles to the agricultural industry--The student will be able to: | | SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12 | |
| 04.01 Research how different climactic and geological activity influences agriculture. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | NRS.01.03.02.b |
| 04.02 Describe various ecosystems as they relate to the agriculture industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.03 Describe the environmental resources (soil, water, air) necessary for agriculture production. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.08.02.01.a |
| 04.04 Identify regulatory agencies that impact agricultural practices. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6 | | NRS.02.01.02.a |
| 04.05 Apply Best Management Practices that enhance the natural environment. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.06 Identify conservation practices related to natural resources. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.02.02.b |
| 05.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to: | | SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7; | |
| 05.01 Identify and describe the specializations within the plant science industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.02 Categorize plants based on specific characteristics according to industry and scientific standards. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|---|---|
| 05.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc.... | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.03.01.a PS.02.03.02.a PS.02.03.05.a |
| 05.04 Identify the nutrients required for plant growth from the periodic table and explain their functions. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.01.02.01.a |
| 05.05 Analyze information from a fertilizer label. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | PS.01.03.04.b |
| 05.06 Propagate and grow plants through sexual and/or asexual reproduction. | | | PS.03.01.03.a PS.03.01.01.b |
| 05.07 Investigate the impacts of various pests and propose solutions for their control. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.03.03.01.c |
| 05.08 Investigate the nature and properties of food, fiber, and by-products from plants. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.09 Explore career opportunities in plant science. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.05.01.01.a |
| 06.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to: | | SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19; | |
| 06.01 Explain the economic importance of animals and the products obtained from animals. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.02 Analyze commercially important livestock breeds in Florida. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |
| 06.04 Compare and contrast animal welfare issues. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | AS.02.01.01.a |
| 06.05 Investigate the nature and properties of food, fiber, and by-products from animals. | | | AS.06.03.03.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|---|--------------------|
| 06.06 Explore career opportunities in animal science. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | CS.05.01.01.a |
| 07.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to | | SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9; | |
| 07.01 Select and demonstrate proper use of hand tools in agriculture. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.04.02.a |
| 07.02 Operate service and maintain agriscience equipment, and instruments. | | | CS.03.04.03.b |
| 07.03 Manage facilities and supplies. | | | |
| 08.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to: | | | |
| 08.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE). | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 08.02 Utilize a record keeping system to collect, interpret, and analyze data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 08.03 Enhance oral communications through telephone, interview and presentation skills. | LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | CRP.04.01.02.b |
| 08.04 Enhance written communication by developing resumes and business letters. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2 | | CRP.04.02.02.b |
| 08.05 Demonstrate interpersonal (nonverbal) communication skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 08.06 Demonstrate good listening skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.04.03.01.a |
| 09.0 Apply leadership and citizenship skills--The student will be able to: | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|-----------|---------------------------------|
| 09.01 Identify and describe leadership characteristics. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.01.a |
| 09.02 Identify opportunities to apply acquired leadership skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.02.a |
| 09.03 Identify and demonstrate ways to be an active citizen. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.01.03.02.c |
| 09.04 Participate in community based learning activities. | | | CRP.01.03.01.a |
| 09.05 Demonstrate the ability to work cooperatively. | | | CRP.09.03.01.a |
| 09.06 Conduct formal and informal meetings using correct parliamentary procedure skills. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 09.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 09.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks. | | | CS.05.01.01.b CRP.10.02.02.b |
| 10.0 Discuss components of food safety and handling practices in agriculture - The student will be able to: | | | |
| 10.01 Demonstrate proper safety precautions and use of personal protective equipment. | | | FPP.01.01.01.b |
| 10.02 Evaluate the food safety responsibilities that occur along the food supply chain. | | | FPP.03.03.02.b |
| 10.03 Explain techniques and procedures for the safe handling of food products. | | | FPP.03.03.02.c |
| 10.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation). | | | FPP03.03.01.b |
| 10.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply. | | | FPP04.01.01.0b |

**Florida Department of Education
Student Performance Standards**

Course Title: Agriculture Leadership & Management
Course Number: 8009110
Course Credit: 1

Course Description:

This course provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of leadership and careers within the Agriculture, Food and Natural Resources career cluster.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M and NGSS- Sci

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|-----------|--------------------|
| 11.0 Compare and contrast differing theories of leadership styles – the student will be able to: | | | |
| 11.01 Define different types of leadership. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.0.07.01.c |
| 11.02 Research different theories of leadership. | LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |
| 11.03 Determine expectations of a leader. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 11.04 Determine what type of leadership style best fits you. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.02.b |
| 11.05 Compare commonalities of differing styles of leadership. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 11.06 Analyze Maslow's hierarchy of human needs as it relates to leadership development. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |
| 11.07 Analyze motivation necessary for a leader as it relates to perception, judgment, and groups. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |
| 12.0 Develop personal leadership qualities – the student will be able to: | | | |
| 12.01 Define personal leadership. | LAFS.910.SL.1.1 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|-----------|--------------------|
| | LAFS.1112.SL.1.1 LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |
| 12.02 Develop personal responsibility in leadership. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 13.0 Associate leadership styles for specific situations – the student will be able to: | | | |
| 13.01 Define situational leadership. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.L.3.6 LAFS.1112.L.3.6 | | CRP.09.01.02.a |
| 13.02 Identify the different types of problem solving models and their applicability to specific situations. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.02.01.01.c |
| 13.03 Select the best leadership style for a given situation. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 14.0 Establish a clear image of what the future of the organization should look like – the student will be able to: | | | |
| 14.01 Utilize visioning skills to develop a plan. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 14.02 Develop vision statements and plans for an organization. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 14.03 Analyze the risks and rewards of new experiences. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 14.04 Conduct a self-evaluation for personal reactions to new experiences. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 14.05 Describe techniques used to build consensus. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 14.06 Lead a meeting or activity that engages all participants in the process. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | |
| 15.0 Acquire the skills necessary to complete a project as a team – the student will be able to: | | | |
| 15.01 Discuss stages of group dynamics (eg. Inclusion, control, and intimacy). | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 15.02 Create a task analysis. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 15.03 Create measurable short term, intermediate and long term goals. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|-----------|--------------------|
| 15.04 Set personal goals using the SMART goals method (Specific, Measurable, Approved by you, Realistic, Time-stamped). | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 15.05 Assess the physical, financial and professional risks associated with a particular task. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 15.06 Facilitate the movement of team members through the stages of group development. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 15.07 Evaluate the strengths/talents of team members needed to achieve a desired task. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.12.02.01.b |
| 15.08 Delegate project parts equitably amongst team members to achieve a given task. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.12.02.01.a |
| 15.09 Use a variety of strategies to evaluate goals (e.g., observe, apply, and demonstrate). | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.SL.1.2 LAFS.1112.SL.1.2 | | |
| 15.10 Identify characteristics of effective teams. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.12.01.01.c |
| 16.0 Build a constituency through listening, coaching, understanding and appreciating others – the student will be able to: | | | |
| 16.01 Demonstrate human relation skills including compassion, empathy, unselfishness, trustworthiness, reliability and being friendly to co-workers. | LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | |
| 16.02 Use communication (verbal and non-verbal) skills to collaborate in a group setting. | LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | CRP.04.01.01.b |
| 16.03 Formulate a strategy in a conflict management plan that responds to obstacles. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 16.04 Describe the role and purpose of a personal mentor. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 16.05 Synthesize strategies to successfully coach/mentor others. (eg. Building trust, praising, reprimanding). | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 16.06 Identify strategies for motivating others. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 17.0 Conduct professional and personal activities based on ethical reasoning – the student will be able to: | | | |
| 17.01 Explain a personal decision where integrity played a role in the decision. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|-----------|--------------------|
| 17.02 Compare and contrast the benefits of living by positive ethical choices. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 17.03 Analyze the causes for team members to accept or reject responsibility. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 17.04 Explain the benefits of mutual respect. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 17.05 Differentiate between habits, practices and behaviors consistent with principles of self-discipline. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 17.06 Evaluate professional and personal values and how they are applied in the service to others. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 18.0 Demonstrate personal awareness of community relations – the student will be able to: | | | |
| 18.01 Analyze the impact of trends and issues on the community. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910W.3.7 LAFS.1112.W.3.7 | | |
| 18.02 Articulate current issues that are important to the local, state, national and global communities. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 18.03 Identify civic leadership role opportunities. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |
| 18.04 Demonstrate responsible citizenship. | | | |
| 18.05 Perform leadership tasks associated with citizenship. | | | |
| 18.06 Explain benefits and challenges of working in a diverse group. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 18.07 Engage in activities to help develop personal awareness of diversity. | | | |
| 18.08 Plan an activity that promotes appreciation of diversity. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 19.0 Pursue learning and growth opportunities related to professional and personal aspirations – the student will be able to: | | | |
| 19.01 Explain the reasons for having a leadership/personal growth plan. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 19.02 Develop a plan that includes specific goals for leadership and personal growth. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 19.03 Explain the importance of self-concept. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|-----------|----------------------------------|
| 19.04 Use problem solving strategies to solve a professional or personal issue. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CRP.02.02.01.c CRP.02.02.02.c |
| 19.05 Use various emerging technologies to enhance a program or project. | LAFS.910.W.2.6 LAFS.1112.W.2.6 LAFS.910.SL.2.5 LAFS.1112.SL.2.5 | | |
| 19.06 Describe the value of being a life-long learner and the need for continuous development. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 20.0 Interact with others in a manner that respects the differences of a diverse and changing society – the student will be able to: | | | |
| 20.01 Discover the different cultures that exist in one’s community. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 20.02 Compare and contrast the customs of different cultures. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 20.03 Engage in a project that educates others about different cultures from within the community. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 LAFS.910.RI.1.2 LAFS.1112.RI.1.2 | | |
| 20.04 Demonstrate proper conduct and appearances for diverse settings. | | | |
| 20.05 Practice personal etiquette that is respectful of your environment. | | | |
| 21.0 Develop awareness and apply skills necessary for achieving career success – the student will be able to: | | | |
| 21.01 Implement a plan to achieve career goals and priorities. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 21.02 Determine the level of acceptable non-essential actions/tasks related to a balanced personal and work life. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 21.03 Identify employability skills for a specific career. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-------------------------------------|-----------|--------------------|
| 21.04 Identify successful time management strategies. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 21.05 Develop a model for managing stress related to personal and work environments. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 22.0 Demonstrate the effective application of reasoning, thinking, and coping skills to solve problems – the student will be able to: | | | |
| 22.01 Discuss the benefits of thinking critically and creatively. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 22.02 Demonstrate critical and creative thinking skills while completing a task. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 22.03 Analyze problems that were solved well and problems that were not solved well. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |
| 22.04 Implement effective problem solving strategies. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 22.05 Discuss the skills and techniques needed to negotiate effectively. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 22.06 Demonstrate the skills needed to negotiate with others. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 23.0 Demonstrate leadership opportunities available in FFA – the student will be able to: | | | |
| 23.01 Assess the leadership opportunities available in the leadership organization, including SAE, conferences, scholarships and travel. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 23.02 Identify key leaders in the history of the FFA organization. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 23.03 State the National FFA’s mission, and structure. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 23.04 Submit a proficiency award application based on your SAE. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 23.05 Submit application for FFA degree status. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 23.06 Participate in an FFA Career Development Event. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 24.0 Prepare documents and skills for pursuing career success – the student will be able to: | | | |
| 24.01 Complete a college / job application. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 24.02 Write a resume. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 24.03 Participate in a mock interview. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|-----------------------------------|-----------|--------------------|
| 24.04 Write a sample college admission, scholarship, or employment essay. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 24.05 Complete financial aid or employment documents. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Principles of Agribusiness
Course Number: 8009120
Course Credit: 1

Course Description:

This course provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the agribusiness sector within the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to instruction that prepares individuals to apply the economic and business principles involved in the organization, operation and management of farms and agricultural business. Subject matter includes finance, laws, labor, machinery, facilities, and marketing, as well as leadership, communication, employability and human relations skills.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: Social Studies alignments are included in this course to show the alignment for Financial Literacy Standards in the Social Studies content area.

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci & Soc. Studies | National Standards |
|---|---|--------------------------|--------------------|
| 25.0 Explain the components of the American business system – the student will be able to: | | | |
| 25.01 Compare different forms of business organizations. | LAFS.910.SL.1.1 LAFS.1112.SL1.1 | SS.912.E.1.5 | |
| 25.02 Distinguish and identify between the characteristics of each type of market structures (monopoly, oligopoly, monopolistic competition, pure competition). | LAFS.910.SL.1.1 LAFS.1112.SL1.1 | SS.912.E.1.6 | |
| 25.03 Evaluate the advantages and disadvantages provided by each business method. | LAFS.910.SL.1.1 LAFS.1112.SL1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 25.04 Research the factors that contribute to the four phases of the business cycle (peak, contraction – unemployment, trough, expansion – inflation). | LAFS.910.W.3.8 LAFS.1112.W.3.8 | SS.912.E.1.12 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci & Soc. Studies | National Standards |
|---|--|--------------------------|--------------------|
| 25.05 Determine how changes in government legislation (spending, taxation, regulations, subsidies, etc...) can affect American businesses and the national debt. | LAFS.910.SL.1.1 LAFS.1112.SL1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 25.06 Evaluate how cooperative principles and practices differentiate cooperatives from other businesses. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |
| 26.0 Analyze the basic concepts of agribusiness – the student will be able to: | | | |
| 26.01 Explain the following concepts: <ul style="list-style-type: none"> • business cycle • profit / loss • competition • supply/ demand • quantity supplied – graphically illustrate situations that would cause change • quantity demanded – graphically illustrate situations that would cause change • equilibrium price | LAFS.910.SL.1.1 LAFS.1112.SL1.1 LAFS.910.L.3.6 LAFS.1112.L.3.6 | SS.912.E1.4 | |
| 26.02 Identify and discuss ethical issues in agribusiness. | LAFS.910.SL.1.1 LAFS.1112.SL1.1 | | |
| 27.0 Evaluate the importance of the food and fiber system to understand the impact on global economy – the student will be able to: | | | |
| 27.01 Assess the agricultural impact upon the US gross national product and the total global economy. | LAFS.910.SL.1.1 LAFS.1112.SL1.1 | | |
| 27.02 Discuss the impact global trade has US agribusiness industries, including barriers and regulations. | LAFS.910.SL.1.1 LAFS.1112.SL1.1 | SS.912.E.3.3 | |
| 27.03 Compare regulations in the US to those in other countries we import from. | LAFS.910.SL.1.1 LAFS.1112.SL1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.RI.3.9 LAFS.1112.RI.3.9 | | |
| 27.04 Examine the use of subsidies in American agriculture. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |
| 27.05 Research new and emerging technologies and their impact on the economy. | LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci & Soc. Studies | National Standards |
|---|---|--------------------------------|--------------------|
| | LAFS.1112.W.3.8 | | |
| 28.0 Examine the scope of career opportunities in and the importance of agriculture to the economy – the student will be able to: | | | |
| 28.01 Evaluate and explore the agribusiness career opportunities in agriculture. | LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 | SS.912.FL.1.1 | |
| 28.02 Calculate the total educational cost of an agricultural career. | LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 MAFS.912.N-Q.1.3 | SS.912.FL.1.2 | |
| 28.03 Compare and contrast different types of student loans available for agriculture careers. | LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |
| 28.04 Construct a one year budget plan for a specific career path including expenses and construction of a credit plan for purchasing a major item. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 MAFS.912.N-Q.1.1 MAFS.912.N-Q.1.2 MAFS.912.N-Q.1.3 | SS.912.FL.1.3 SS.912.E.1.16 | |
| 28.05 Analyze how changes in the market and changes in product quality can affect wages, and employment status. | | SS.912.FL.1.4 SS.912.FL.1.5 | |
| 29.0 Compose and analyze a business plan for an enterprise – the student will be able to: | | | |
| 29.01 Analyze quality AFNR business plan components that have been developed using the SMART (specific, measurable, attainable, realistic and timely) format. | LAFS.910.RI.3.9 LAFS.1112.RI.3.9 LAFS.910.SL.1.1 LAFS.1112.SL1.1 | | |
| 29.02 Identify components of business plans and demonstrate how to write such components using the SMART format. | LAFS.910.SL.1.1 LAFS.1112.SL1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 29.03 Identify and observe ethical standards in planning and operating AFNR businesses. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci & Soc. Studies | National Standards |
|--|---|--------------------------------|--------------------|
| 29.04 Utilize methods of AFNR business enterprise analysis, such as SWOT (strengths, weaknesses, opportunities and threats). | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 30.0 Prepare and maintain all files needed to accomplish effective record keeping – the student will be able to: | | | |
| 30.01 Maintain production and agribusiness records. | LA.910.W.2.4 LA1112.W.2.4 | | |
| 30.02 Analyze records to improve efficiency and profitability of an AFNR business. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.RI.1.2 LAFS.1112.RI.1.2 MAFS.912.S-IC.2.6 | | |
| 30.03 Demonstrate understanding of inventory relative to maintaining optimal levels and calculating costs. | MAFS.912.F-LE.1.1 MAFS.912.F-LE.1.2 MAFS.912.F-LE.1.3 MAFS.912.F-LE.1.4 MAFS.912.F-LE.2.5 | | |
| 31.0 Use accounting fundamentals to accomplish dependable bookkeeping and fiscal management – the student will be able to: | | | |
| 31.01 Identify financial concepts associated with production and profit and compare various economic systems (traditional, market, command, mixed) in how they answer the questions 1) what to produce, 2) how to produce, 3) for whom to produce. | LAFS.910.SL.1.1 LAFS.1112.SL1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 | SS.912.E.1.3 | |
| 31.02 Evaluate characteristics of lines of credit, loan terms and alternatives in sources of capital such as savings and investment services. | LAFS.910.RI.3.8 LAFS.1112.RI.3.8 | SS.912.FL.4.3 SS.912.FL.4.4 | |
| 31.03 Explain the importance of return on investment for an agribusiness enterprise. | LAFS.910.SL.1.1 LAFS.1112.SL1.1 | | |
| 31.04 Analyze contracts, leases and other legal documents. | LAFS.910.RI.3.9 LAFS.1112.RI.3.9 | | |
| 31.05 Determine the tax structure applicable to different agribusinesses. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | SS.912.FL.1.6 | |
| 32.0 Maintain and interpret financial information (income statements, balance sheets, inventory, purchase orders, accounts receivable and cash-flow analyses) for businesses – the student will be able to: | | | |
| 32.01 Maintain accounting information needed to prepare an income statement, balance sheet and cash-flow analysis for an AFNR business. | LA.910.W.2.4 LA1112.W.2.4 MAFS.912.A-REI.2.3 | | |
| 32.02 Name and explain the impact of external economic factors on an AFNR business such as inflation. | LAFS.910.SL.1.1 LAFS.1112.SL1.1 | SS.912.E.2.7 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci & Soc. Studies | National Standards |
|---|---|--------------------------|--------------------|
| 32.03 Predict the consequences of delayed payment of expenses, prepayment of expenses and delayed receipts on a financial statement. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 MAFS.912.S-MD.2.5 | SS.912.FL.4.5 | |
| 32.04 Interpret and evaluate financial statements, including income statements, balance sheets and cash-flow analyses. | LAFS.910.RI.1.2 LAFS.1112.RI.1.2 MAFS.912.S-IC.2.6 | | |
| 33.0 Conduct appropriate market and marketing research – the student will be able to: | | | |
| 33.01 Investigate the meaning and methods of marketing in AFNR as related to agricultural commodities, products and services and to agricultural goods in domestic and international markets including why firms engage in price and non-price competition. | LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 | SS.912.E.1.8 | |
| 33.02 Apply benefit/cost analysis to marketing in AFNR businesses. | MAFS.912.S-MD.2.5 | | |
| 33.03 Implement and evaluate marketing strategies with agricultural commodities, products and services. | LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |
| 33.04 Evaluate alternative marketing strategies, such as valueadding, branding and niche marketing, and propose and implement appropriate modifications to achieve AFNR business goals. | LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 | SS.912.FL.2.1 | |
| 33.05 Use data to compare historical rates of return on investments with investment claims to make informed decisions and identify potential fraud. | LAFS.910.RI.1.2 LAFS.1112.RI.1.2 MAFS.912.S-MD.2.5 MAFS.912.S-MD.2.6 MAFS.912.S-MD.2.7 MAFS.912.S-IC.2.6 | SS.912.F.4.14 | |
| 33.06 Explain how buyer and sellers actions can determine the rate of return on an investment. | | SS.912.FL.5.3 | |
| 34.0 Develop a marketing plan – the student will be able to: | | | |
| 34.01 Identify the purpose, components and developmental processes of marketing plans. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 34.02 Perform a marketing analysis, including evaluation of the competitors, customers, international and domestic policy environment, regulations and rules, standards and AFNR business resources. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | SS.912.FL.2.2 | |
| 34.03 Establish marketing plan goals/objectives, including monitoring, measuring and analyzing goal achievement. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci & Soc. Studies | National Standards |
|--|---|--------------------------------|--------------------|
| 35.0 Develop specific tactics to market AFNR products and services – the student will be able to: | | | |
| 35.01 Explain the meaning and use of the four Ps (product, price, place, and promotion) in marketing. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | SS.912.FL.2.3 SS.912.FL.2.4 | |
| 35.02 Develop advertising campaigns that promote products and services. | LAFS.910.W.1.1 LAFS.1112.W.1.1 | SS.912.FL.2.5 SS.912.FL.4.2 | |
| 35.03 Implement sales goals and incentive programs, and identify pricing strategies used by competitors. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | SS.912.FL.2.5 SS.912.FL.4.2 | |
| 36.0 Develop a production and operational plan – the student will be able to: | | | |
| 36.01 Prepare a flowchart that shows production processes, including the resources and capital needed for each step and graphically explain how to determine prices and output through marginal cost analysis. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.1.2 LAFS.1112.W.1.2 LAFS.910.W.2.6 LAFS.1112.W.2.6 | SS.912.E.1.7 | |
| 36.02 Develop and implement a product supply and distribution plan that meets the goals and objectives of an AFNR business. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 36.03 Develop a production facility plan that includes building, equipment, personnel, utilities and logistics components. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 37.0 Apply appropriate management skills to organize a business – the student will be able to: | | | |
| 37.01 Identify organizational structures and chains of command in AFNR businesses. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 37.02 Identify management types in AFNR businesses. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 37.03 Determine appropriate human resources for AFNR businesses. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 37.04 Identify usual employee benefits and wages in AFNR businesses. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 | SS.912.E.1.9 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci & Soc. Studies | National Standards |
|--|--|--------------------------|--------------------|
| 38.0 Summarize the changes in American agricultural cooperatives from their beginning to today – the student will be able to: | | | |
| 38.01 Describe the basis for the original formation of agricultural cooperatives and how they were organized. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 38.02 Construct a timeline of important dates involved with cooperatives that includes highlights contributions of entrepreneurs, inventors, and other key individuals in the development of agriculture cooperatives. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 39.0 Differentiate between agricultural cooperative principles and practices – the student will be able to: | | | |
| 39.01 Identify and describe the Rochdale Principles. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 39.02 Examine and simplify the seven traditional principles and practices of cooperatives. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 39.03 Explain the contemporary principles of a cooperative. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 40.0 Explain the responsibilities of people involved with agriculture cooperatives – the student will be able to: | | | |
| 40.01 Understand and explain the responsibilities of members in a cooperative. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 40.02 Understand and explain the responsibilities of the board of directors in a cooperative. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 40.03 Understand and explain the responsibilities of a manager in a cooperative. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 40.04 Understand and explain the responsibilities of an employee in a cooperative. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 41.0 Explain the benefits and limitations of agricultural cooperatives – the student will be able to: | | | |
| 41.01 Understand and evaluate the benefits of being a cooperative member. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 41.02 Compare and contrast the successes and failures of a cooperative. | LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |
| 41.03 Evaluate the importance of knowing the benefits and successes/failures of a cooperative. | LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci & Soc. Studies | National Standards |
|---|--|-------------------------------|--------------------|
| | LAFS.1112.W.3.8 | | |
| 42.0 Describe the various organization that serve agricultural cooperatives – the student will be able to: | | | |
| 42.01 Identify and evaluate the different cooperatives involved in communities. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 42.02 Identify and evaluate the organizations that serve cooperatives. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 43.0 Construct a plan for financing and taxation within an agricultural cooperative – the student will be able to: | | | |
| 43.01 Explain the difference between the two forms of capital debt and equity. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 43.02 Explain how equity capital is provided. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 43.03 Describe the various ways a cooperative can obtain borrowed capital. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 43.04 Explain the single-tax principle and how it works for cooperatives and differentiate between direct and indirect taxes and describe the progressivity of taxes. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | SS.912.FL.1.7 SS.912.E.2.8 | |
| 44.0 Explain the steps for starting an agricultural cooperative – the student will be able to: | | | |
| 44.01 Become familiar with the basic legal and financial documents needed to operate a cooperative business. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 44.02 Learn how a cooperative business functions and operates. | LAFS.910.RI.1.2 LAFS.1112.RI.1.2 | | |
| 45.0 Validate the necessity of leadership skills development in conjunction with participation in The National FFA Organization (FFA) as a critical component to a well-rounded agricultural education – the student will be able to: | | | |
| 45.01 Acquire and demonstrate communication skills such as writing, public speaking, and listening while refining oral, written, and verbal skills. | LAFS.910.SL.2.4, 2.6 LAFS.1112.SL.2.4, 2.6 LAFS.910.W.2.5 LAFS.1112.W.2.5 | | |
| 45.02 Recognize and explain the role of the FFA in the development of leadership, education, employability, communications and human relations skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 45.03 Examine roles within teams, work units, departments, organizations, inter-organizational systems, and the larger | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci & Soc. Studies | National Standards |
|--|---|--------------------------|--------------------|
| environment. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 45.04 Acquire the skills necessary to positively influence others. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 46.0 Complete a Supervised Agricultural Experience (SAE) program as a critical component to a well-rounded agricultural education – the student will be able to: | | | |
| 46.01 Explain the nature of and become familiar with those terms related to an SAE program. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 46.02 Explore the numerous possibilities for an SAE program which a student might develop. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |
| 46.03 Develop an individual SAE program and implement record keeping skills. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 46.04 Compose an FFA Proficiency Application or State Degree Application. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 47.0 Interpret and apply state and federal rules and regulations to enterprise – the student will be able to: | | | |
| 47.01 List agencies responsible for inspecting and regulating operation or product. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | SS.912.FL.2.7 | |
| 47.02 Investigate EPA, DEP, and FDAC environmental policies. | LAFS.910.RI.3.9 LAFS.910.RI.3.9 | | |
| 47.03 Determine the impact of water restriction on agribusiness operations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 47.04 Maintain a file of current rules and regulations relative to operation. | | | |
| 47.05 List reasons for the necessity of inspections, certification and regulations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | SS.912.FL.2.7 | |
| 47.06 Diagram and explain the problems that occur when government institutes wage and price controls, and explain the rational for these controls | LAFS.910.SL.2.5 LAFS.1112.SL.2.5 LAFS.910.W.2.4 LAFS.1112.W.2.4 MAFS.912.N-Q.1.2 MAFS.912.F-IF.3.7 | SS.912.E.2.4 | |
| 48.0 Perform accounting activities – the student will be able to: | | | |
| 48.01 Prepare a balance sheet. | | | |
| 48.02 Prepare a cash flow statement. | | | |
| 48.03 Demonstrate knowledge of checking account records and bank reconciliation. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci & Soc. Studies | National Standards |
|--|--|--|---------------------------|
| 48.04 Interpret financial statements. | MAFS.912.S-IC.2.6 MAFS.912.S-MD.2.5 MAFS.912.S-MD.2.6 | | |
| 48.05 Demonstrate knowledge of the accounting cycle. | | | |
| 48.06 Create and interpret a budget for one year. | | | |
| 48.07 Establish a plan to pay off debt. | | SS.912.FL.3.1 SS.912.FL.4.2 | |
| 48.08 Calculate and record depreciation, net worth, and income. | | | |
| 48.09 Explain cash management strategies including debit accounts, checking accounts, and savings accounts. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | SS.912.FL.4.2 | |
| 48.10 Analyze credit scores and reports and there uses. | MAFS.912.S-IC.2.6 | SS.912.FL.4.2 SS.912.FL.4.5 SS.912.FL.4.6 SS.912.FL.4.7 SS.912.FL.4.13 | |
| 48.11 Complete a profit and loss statement. | | | |
| 48.12 Calculate the finance charges and total amount due on a credit card bill; include any fees that could be included. | MAFS.912.A-REI.2.3 | SS.912.FL.4.1 SS.912.FL.4.2 | |
| 48.13 Examine inflation, its effects on interest, value of goods & services, and employment. | | SS.912.FL.3.2 SS.912.FL.3.3 | |
| 48.14 Analyze consequences for not repaying a loan, or having missing/late payments on loans or credit cards. | | SS.912.FL.4.7 SS.912.FL.4.8 | |
| 48.15 Compare different tax models at the federal, state, and local level. | | SS.912.FL.5.1 | |
| 49.0 Perform communication activities – the student will be able to: | | | |
| 49.01 Compose business correspondence and related documents and demonstrate correct spelling, grammar, punctuation, and work choice. | LAFS.910.SL.W.2.4 LAFS.1112.SL.W.2.4 LAFS.910.L.1.2 LAFS.1112.L.1.2 | | |
| 49.02 Prepare visual material, including electronic media, to support an oral presentation. | LAFS.910.SL.2.5 LAFS.1112.SL.2.5 | | |
| 49.03 Demonstrate ability to communicate effectively with diverse populations. | LAFS.910.SL.W.2.4 LAFS.1112.SL.W.2.4 LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | |
| 50.0 Demonstrate an understanding of legal and ethical issues in a business environment – the student will be able to: | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci & Soc. Studies | National Standards |
|---|---|---|--------------------|
| 50.01 Demonstrate understanding of intellectual property rights. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 50.02 Demonstrate understanding of appropriate use of employer property. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 50.03 Demonstrate understanding of confidentiality. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 50.04 Demonstrate understanding of role of ethical decision making in dealing with stakeholders. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 50.05 Demonstrate knowledge of legal and privacy issues regarding e-mail, voice mail, internet, telephone, and other communication methods. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 50.06 Explain regulations or laws that are put in place to regulate financial institutions and protect business or consumers. | | SS.912.FL.3.5 SS.912.FL.4.12 SS.912.FL.5.12 | |
| 51.0 Develop financial literacy skills – the student will be able to: | | | |
| 51.01 Analyze types of loans, including the importance of down payments, and collateral on securing funding sources. | | SS.912.FL.4.11 | |
| 51.02 Calculate the effects on the monthly payment in the change of interest rate based on an adjustable rate mortgage. | MAFS.912.F-LE.2.5 MAFS.912.F-LE.1.3 MAFS.912.S-ID.1.4 MAFS.912.N-Q.1.3 MAFS.912.A-SSE.1.1 | | |
| 51.03 Analyze diversification in investments. | | SS.912.FL.5.4 SS.912.FL.5.5 SS.912.FL.5.6 | |
| 51.04 Explain the risk benefit in investment areas. | | SS.912.FL.5.6 SS.912.FL.5.7 SS.912.FL.5.9 SS.912.FL.5.10 | |
| 51.05 Analyze stock with a set amount of money, and follow the process through gains, losses, and selling. | | SS.912.FL.3.4 SS.912.FL.5.8 SS.912.FL.6.1 | |
| 51.06 Compare and contrast income from purchase of common stock, preferred stock, and bonds. | | SS.912.FL.5.5 SS.912.FL.6.1 | |
| 51.07 Given current exchange rates be able to convert from one form of currency to another. | MAFS.912.A-REI.2.3 MAFS.912.N-Q.1.2 MAFS.912.N-Q.1.3 | SS.912.FL.5.8 | |
| 51.08 Compare different insurance options and fees. | | SS.912.FL.6.2 SS.912.FL.6.3 SS.912.FL.6.6 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci & Soc. Studies | National Standards |
|---|--|---|--------------------|
| | | SS.912.FL.6.7 | |
| 51.09 Compare and contrast the role of insurance as a device to mitigate risk and calculate expenses of various options. | | SS.912.FL.6.2 SS.912.FL.6.3 SS.912.FL.6.7 | |
| 51.10 Collect, organize, and interpret data to determine an effective retirement savings plan to meet personal financial goals. | MAFS.912.A-SSE.1.1 MAFS.912.F-LE.1.1 MAFS.912.F-LE.1.2 MAFS.912.F-LE.1.3 MAFS.912.F-LE.1.4 MAFS.912.F-LE.2.5 MAFS.912.S-IC.2.6 | | |
| 51.11 Calculate, compare, and contrast different types of retirement plans, including IRAs, ROTH accounts, and annuities. | MAFS.912.S-IC.2.6 | | |
| 51.12 Discuss when bankruptcy should be used as an action and the repercussions involved with filing. | | SS.912.FL.4.10 | |
| 51.13 Determine how identity theft can occur and what assistance is in place for victims. | | SS.912.FL.6.9 SS.912.FL.6.10 | |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Extended Student Supervision

Because of the production and marketing cycle of the agriculture industry, this program requires individual instruction and supervision of students for the entire period beyond the 180-day school year.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization for providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

**Florida Department of Education
Curriculum Framework**

Program Title: Floral Design and Marketing
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

| | |
|----------------------------|---|
| Program Number | 8012100 |
| CIP Number | 0201060801 |
| Grade Level | 9-12 |
| Standard Length | 4 credits |
| Teacher Certification | Refer to Program Structure section |
| CTSO | FFA |
| SOC Codes (all applicable) | 41-2031 - Retail Salespersons 27-1023 - Floral Designers 41-1011 - First-Line Supervisors of Retail Sales Workers |

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to planning and preparing floral designs, selling, buying, transporting, storing, advertising, displaying, and managing the floral goods and services industry.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of three occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the secondary program structure:

| OCP | Course Number | Course Title | Teacher Certification | Length | SOC Code | Level | Graduation Requirement |
|-----|---------------|--|---|----------|----------|-------|------------------------|
| A | 8012110 | Introductory Floral Design | AGRICULTUR 1 @2 Retailing@7 7G MKTG 1 | 1 credit | 27-1023 | 2 | PA |
| | 8012120 | Floral Design 2 | | 1 credit | | 2 | PA |
| B | 8012130 | Floral Design and Marketing Services 3 | | 1 credit | 41-2031 | 2 | PA |
| C | 8012140 | Floral Design and Management 4 | | 1 credit | 41-1011 | 2 | PA |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Academic Alignment Tables

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

| Courses | Anatomy/ Physiology Honors | Astronomy Solar/Galactic Honors | Biology 1 | Chemistry 1 | Earth-Space Science | Environmental Science | Genetics | Integrated Science | Marine Science 1 Honors | Physical Science | Physics 1 |
|--|----------------------------|---------------------------------|--------------|--------------|---------------------|-----------------------|-------------|--------------------|-------------------------|------------------|--------------|
| Introductory Floral Design | 1/53 2% | 11/52 21% | 11/56 20% | 14/55 25% | 13/58 22% | ** | 5/35 14% | ** | 16/42 38% | 13/56 23% | 11/53 21% |
| Floral Design 2 | 2/53 4% | 2/52 4% | 8/56 14% | 5/55 9% | 6/58 10% | ** | 2/35 6% | ** | 11/42 26% | 6/56 11% | 3/53 6% |
| Floral Design and Marketing Services 3 | 1/53 2% | 12/52 23% | 6/56 11% | 13/55 24% | 12/58 21% | ** | 3/35 9% | ** | 12/42 29% | 12/56 21% | 12/53 22% |
| Floral Design and Management 4 | 1/53 2% | 9/52 17% | 4/56 7% | 12/55 21% | 8/58 14% | ** | 2/35 6% | ** | 8/42 19% | 9/56 16% | 9/53 17% |

** Alignment pending review

Alignment attempted, but no correlation to academic course

| Courses | Algebra 1 | Algebra 2 | Geometry | English 1 | English 2 | English 3 | English 4 |
|----------------------------|-----------|-----------|----------|-----------|-----------|-----------|-----------|
| Introductory Floral Design | ** | ** | ** | ** | ** | ** | ** |
| Floral Design 2 | ** | ** | ** | ** | ** | ** | ** |

| | | | | | | | |
|--|----|----|----|----|----|----|----|
| Floral Design and Marketing Services 3 | ** | ** | ** | ** | ** | ** | ** |
| Floral Design and Management 4 | ** | ** | ** | ** | ** | ** | ** |
| Introductory Floral Design | ** | ** | ** | ** | ** | ** | ** |

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. The FS for Mathematical Practices are designed for grades K-12 and describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education.

Instructors must incorporate the Florida Standards for Technical Subjects and Mathematical Practices throughout instruction of this CTE program.

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL’s need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Discuss the floral design and marketing industry.
- 02.0 Demonstrate the application of post-harvest care and handling of floral products.
- 03.0 Identify procedures for creating floral designs.
- 04.0 Identify mechanical components of floral design.
- 05.0 Demonstrate knowledge in non-floral and gift packaging.
- 06.0 Identify procedures to create fresh and permanent floral designs
- 07.0 Demonstrate effective communication skills.
- 08.0 Apply techniques for post-harvest care and handling of floral products.
- 09.0 Create fresh and permanent floral designs
- 10.0 Demonstrate order processing skills.
- 11.0 Perform merchandising operations unique to floral marketing.
- 12.0 Apply sales techniques and procedures to the marketing of floral products.
- 13.0 Create designs for live plants.
- 14.0 Identify factors for the promotion of florist store products and services
- 15.0 Demonstrate knowledge of merchandising activities
- 16.0 Apply sales promotion techniques and procedures to the marketing of floral products.
- 17.0 Create fresh and permanent special occasion floral pieces
- 18.0 Create fresh and/or permanent sympathy designs.
- 19.0 Create fresh and/or permanent wedding designs.
- 20.0 Demonstrate distribution skills involved in floral marketing.
- 21.0 Identify factors to consider when opening/managing a floral business.
- 22.0 Demonstrate an understanding of the functions of management.

**Florida Department of Education
Student Performance Standards**

Course Title: Introduction to Floral Design 1
Course Number: 8012110
Course Credit: 1

Course Description:

This course is designed to develop the fundamental competencies necessary for employment in the floral design industry. Topics include: introduction to the floral industry, safety regulations, mechanical components of design, history of design, and basic floral design techniques.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|--|---------|--|
| 01.0 Discuss the floral design and marketing industry – the student will be able to: | | |
| 01.01 Identify careers in the floral design and marketing industry. | | |
| 01.02 Describe trends in the floral design and marketing industry. | | SC.912.N.1.4, 6 |
| 01.03 Explain floral services. | | |
| 01.04 Discuss global floral sourcing. | | SC.912.L.17.11, 13, 19, 20 SC.912.L.15.13 |
| 02.0 Demonstrate the application of post-harvest care and handling of floral products – the student will be able to: | | |
| 02.01 Identify safety procedures. | | |
| 02.02 Identify varieties of flowers and plants utilized in floral arrangements. | | |
| 02.03 Perform specialized care and handling of flowers and plants utilized in floral arrangements. | | SC.912.E.5.4 |
| 02.04 Store plants, flowers, and prepared floral arrangements according to established procedures. | | SC.912.L.17.17 SC.912.E.5.4 SC.912.E.7.4 |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|--|---------|--------------|
| 02.05 Demonstrate maintenance of fresh flowers and foliage. | | SC.912.E.7.4 |
| 03.0 Identify procedures and creating floral designs – the student will be able to: | | |
| 03.01 Identify and practice safety procedures. | | |
| 03.02 Identify fundamentals of the elements of design. | | |
| 03.03 Identify principles of design. | | |
| 03.04 Apply fundamentals of creativity. | | |
| 03.05 Identify, use, and maintain hand tools and equipment. | | |
| 03.06 Select appropriate containers based on mechanics of design. | | |
| 04.0 Identify mechanical components of floral design – the student will be able to: | | |
| 04.01 Demonstrate proper wiring techniques. | | |
| 04.02 Demonstrate appropriate use of floral oasis. | | |
| 04.03 Create different types of bows. | | |
| 04.04 Select containers for specific designs. | | |
| 04.05 Demonstrate proper use of a helium tank. | | |
| 05.0 Demonstrate knowledge in non-floral and gift packaging – the student will be able to: | | |
| 05.01 Create balloon arrangements. | | |
| 05.02 Identify mechanics of gift baskets. | | |
| 05.03 Construct presentation of non-floral and packaging items. | | |
| 05.04 Create a non-floral product. | | |
| 06.0 Identify procedures to create fresh and permanent floral designs – the student will be able to: | | |
| 06.01 Create geometric designs. | | |
| 06.02 Create horizontal and vertical designs. | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|--|---------|-----------|
| 06.03 Create symmetrical and asymmetrical designs. | | |
| 06.04 Create personal flowers to wear. | | |
| 06.05 Apply principles of mass production skills. | | |
| 07.0 Demonstrate effective communication skills – the student will be able to: | | |
| 07.01 Discuss the role of communications in marketing. | | |
| 07.02 Demonstrate a proficiency in the effective use of speech and vocabulary. | | |
| 07.03 Demonstrate effective written communication skills. | | |
| 07.04 Demonstrate effective oral communication skills. | | |
| 07.05 Demonstrate effective listening skills. | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Floral Design 2
Course Number: 8012120
Course Credit: 1

Course Description:

This course prepares the student in the skills of merchandising math, pricing, and selling. In addition the course includes skills for ordering fresh and silk flowers, maintaining stock, receiving and processing wholesale and retail sales orders, pricing stock, and utilizing appropriate sales techniques and customer relations.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|--|----------------|--|
| 08.0 Apply techniques for post-harvest care and handling of floral products – the student will be able to: | | |
| 08.01 Discuss operation of underwater floral cutting equipment. | | SC.912.E.7.1, 4 |
| 08.02 Discuss use of electric floral stem stripper. | | SC.912.L.14.2, 3, 6 |
| 08.03 Apply knowledge in the use of floral preservatives and pre-hydrating solutions. | | SC.912.L.14.2 SC.912.L.17.4, 11, 17 |
| 08.04 Demonstrate knowledge and application of refrigeration, sanitation, and ethylene control. | | SC.912.L.14.6 SC.912.L.17.11 |
| 08.05 Identify grower-packaging quantities used for cut flowers and foliage. | | |
| 08.06 Apply knowledge of specialized techniques for conditioning post-harvest plant material. | | SC.912.L.14.2, 3, 6 SC.912.E.7.1, 4 SC.912.L.17.11, 16, 11 |
| 08.07 Discuss the benefits of chain of life. | | SC.912.E.7.1 |
| 09.0 Create fresh and permanent floral designs – the student will be able to: | | |
| 09.01 Identify and create advanced geometric designs. | | |

| CTE Standards and Benchmarks | | FS-M/LA | NGSSS-Sci |
|-------------------------------------|--|----------------|-------------------------------|
| 09.02 | Identify design styles. | | |
| 09.03 | Apply knowledge of the color wheel. | | |
| 09.04 | Apply use of color harmonies. | | |
| 09.05 | Describe differences in period design. | | |
| 09.06 | Create seasonal arrangements. | | |
| 10.0 | Demonstrate order processing skills – the student will be able to: | | |
| 10.01 | Tag floral orders. | | |
| 10.02 | Package products. | | |
| 10.03 | Price orders. | | |
| 11.0 | Perform merchandising operations unique to floral marketing – the student will be able to: | | |
| 11.01 | Demonstrate correct procedures for handling customer sales transactions. | | |
| 11.02 | Explain pricing policies. | | |
| 11.03 | Calculate mark-up of floral products. | | |
| 11.04 | Describe opening and closing procedures for a floral operation. | | |
| 12.0 | Apply sales techniques and procedures to the marketing of floral products – the student will be able to: | | |
| 12.01 | Demonstrate steps of a sale utilizing floral products. | | SC.912.L.17.1 SC.912.N.1.5 |
| 12.02 | Perform telephone sales. | | SC.912.L.17.1 SC.912.N.1.5 |
| 12.03 | Distinguish between a local, incoming, and outgoing order. | | SC.912.L.17.1 SC.912.N.1.5 |
| 12.04 | Demonstrate the process of using both telephone and computer wire service. | | SC.912.L.17.1 SC.912.N.1.5 |

**Florida Department of Education
Student Performance Standards**

Course Title: Floral Design and Marketing Services 3
Course Number: 8012130
Course Credit: 1

Course Description:

This course prepares the student to market floral designs. Content includes construction and use of display items, sales promotions, and inventory control. Content will also help build team building skills, and build critical thinking skills.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | | FS-M/LA | NGSSS-Sci |
|-------------------------------------|--|----------------|------------------|
| 13.0 | Create designs for live plants – the student will be able to: | | |
| 13.01 | Construct dish gardens | | |
| 13.02 | Decorate blooming plants. | | |
| 14.0 | Identify factors for the promotion of florist store products and services – the student will be able to: | | |
| 14.01 | Identify the major classifications of retail flower operations. | | |
| 14.02 | Describe product presentation and importance of window and store display. | | |
| 14.03 | Identify primary goals of display. | | |
| 15.0 | Demonstrate knowledge of merchandising activities – the student will be able to: | | |
| 15.01 | Explain the role of buying and purchasing in a retailing situation. | | |
| 15.02 | Follow accepted procedures for inventory control. | | |
| 15.03 | Demonstrate stock-keeping procedures. | | |
| 15.04 | Operate appropriate weighing and measuring devices for floral products and materials. | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|---|----------------|------------------|
| 16.0 Apply sales promotion techniques and procedures to the marketing of floral products – the student will be able to: | | |
| 16.01 Discuss the purposes of advertising, display, and public relations. | | |
| 16.02 Explain the importance of sales promotion. | | |
| 16.03 Identify various forms of advertising media including the Internet | | |
| 16.04 Plan and present a sales promotion for a product. | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Floral Design and Management 4
Course Number: 8012140
Course Credit: 1

Course Description:

This course prepares the student with basic skills in specialty designs, weddings, funerals, and special events. The course allows the students opportunities to use creative concepts to create floral designs and personal pieces, beginning management and business skills are also part of the course.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|---|----------------|------------------|
| 17.0 Create fresh and permanent special occasion floral pieces – the student will be able to: | | |
| 17.01 Create unique corsages & boutonnieres. | | |
| 17.02 Create seasonal/holiday designs. | | |
| 17.03 Create special event pieces: conventions, parties, banquets, showers, and receptions. | | |
| 18.0 Create fresh and/or permanent sympathy designs – the student will be able to: | | |
| 18.01 Create a casket spray. | | |
| 18.02 Create funeral baskets. | | |
| 18.03 Create set pieces (using manufactured form). | | |
| 18.04 Create easel pieces. | | |
| 18.05 Create interior lid pieces. | | |
| 18.06 Create a non-traditional memorial design. | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|---|---------|--------------|
| 18.07 Conduct a funeral consultation. | | |
| 19.0 Create fresh and/or permanent wedding designs – the student will be able to: | | |
| 19.01 Create designs for church/synagogue weddings. | | |
| 19.02 Create designs for theme weddings. | | |
| 19.03 Create designs for wedding receptions. | | |
| 19.04 Design a bridal bouquet. | | |
| 19.05 Create designs for wedding party members. | | |
| 19.06 Conduct a wedding consultation. | | |
| 20.0 Demonstrate distribution skills involved in floral marketing – the student will be able to: | | |
| 20.01 Route and organize deliveries according to priority, location, and time. | | |
| 20.02 Make confirmation phone calls. | | |
| 20.03 Maintain general floral shop upkeep. | | |
| 21.0 Identify factors to consider when opening/managing a floral business – the student will be able to: | | |
| 21.01 Identify primary functions of a retail flower shop. | | |
| 21.02 Explain the characteristics of store location options. | | |
| 21.03 Characterize the principle responsibilities of employees. | | |
| 21.04 Summarize the key management responsibilities required for a successful and profitable flower shop. | | |
| 22.0 Demonstrate an understanding of the functions of management – the student will be able to: | | |
| 22.01 Identify and describe steps in the planning process. | | SC.912.N.1.4 |
| 22.02 Define Management by Objectives (MBO). | | |
| 22.03 Develop an organizational chart to illustrate line and staff relationships. | | SC.912.N.1.5 |
| 22.04 Describe the responsibilities for selecting, training, and appraising employees. | | SC.912.N.1.4 |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|---|---------|--------------|
| 22.05 Define the principles of “chain of command” and “span of control.” | | |
| 22.06 Justify the importance of accountability. | | |
| 22.07 Name and define the functions of management (planning, organizing, staffing, directing, controlling). | | |
| 22.08 Explain how motivation, leadership, and communication influence people within an organization. | | SC.912.N.1.5 |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If

needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

Florida Department of Education
Curriculum Framework

Course Title: Introduction to Agriculture, Food, & Natural Resources
Course Type: Orientation/Exploratory
Career Cluster: Agriculture, Food, and Natural Resources

Secondary – Middle School

| | |
|-----------------------|--|
| Course Number | 8021100 |
| CIP Number | 148021100M |
| Grade Level | 6-8 |
| Standard Length | Semester |
| Teacher Certification | Refer to the <u>Course Structure</u> section. |
| CTSO | FFA |

Purpose

The purpose of this course is to assist students in making informed decisions regarding their future academic and occupational goals and to provide information regarding careers in the Agriculture, Food and Natural Resource career cluster. The content includes but is not limited to agricultural literacy, importance of agriculture, the role of science, math, reading, writing, geography, history, and technology in agriculture, plants and animals, and sources of consumer goods from agriculture. Reinforcement of academic skills occurs through classroom instruction and applied laboratory procedures.

Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the equipment, materials and technology appropriate to the course content and in accordance with current practices.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Course Structure

The length of this course is one semester. It may be offered for two semesters when appropriate. When offered for one semester, it is recommended that it be at the exploratory level and more in-depth when offered for two semesters.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the course structure:

| Course Number | Course Title | Teacher Certification | Length |
|---------------|--|------------------------------|----------|
| 8021100 | Introduction to Agriculture, Food, & Natural Resources | AGRICULTUR 1 @2 EXP AG @4 | Semester |

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

Standards

After successfully completing this course, the student will be able to perform the following:

- 01.0 Demonstrate an understanding of the Food Products & Processing Systems career pathway.
- 02.0 Demonstrate an understanding of the Plant Systems career pathway.
- 03.0 Demonstrate an understanding of the Animal Systems career pathway.
- 04.0 Demonstrate an understanding of the Power, Structure, and Technical Systems career pathway.
- 05.0 Demonstrate an understanding of the Natural Resource Systems career pathway.
- 06.0 Demonstrate an understanding of the Environmental Service Systems career pathway.
- 07.0 Demonstrate an understanding of the Agribusiness Systems career pathway.
- 08.0 Apply leadership and communication skills.
- 09.0 Describe how information technology is used in the Agriculture, Food & Natural Resources career cluster.
- 10.0 Use information technology tools.

**Florida Department of Education
Student Performance Standards**

Course Title: Introduction to Agriculture, Food, & Natural Resources
Course Number: 8021100
Course Length: Semester

Course Description:

Beginning with a broad overview of the Agriculture, Food, and Natural Resources career cluster, students are introduced to the terminology, careers, history, required skills, and technologies associated with each pathway in the Agriculture, Food, and Natural Resources career cluster. Additionally, they will be provided with opportunities to acquire and demonstrate beginning leadership skills.

| CTE Standards and Benchmarks | |
|-------------------------------------|--|
| 01.0 | Demonstrate an understanding of the Food Products & Processing Systems career pathway – the student will be able to: |
| 01.01 | Define and use proper terminology associated with the Food Products & Processing Systems career pathway. |
| 01.02 | Describe some of the careers available in the Food Products & Processing Systems career pathway. |
| 01.03 | Identify common characteristics of the careers in the Food Products & Processing Systems career pathway. |
| 01.04 | Research the history of the Food Products & Processing Systems career pathway and describe how the associated careers have evolved and impacted society. |
| 01.05 | Identify skills required to successfully enter any career in the Food Products & Processing Systems career pathway. |
| 01.06 | Describe technologies associated in careers within the Food Products & Processing Systems career pathway. |
| 02.0 | Demonstrate an understanding of the Plant Systems career pathway – the student will be able to: |
| 02.01 | Define and use proper terminology associated with the Plant Systems career pathway. |
| 02.02 | Describe some of the careers available in the Plant Systems career pathway. |
| 02.03 | Identify common characteristics of the careers in the Plant Systems career pathway. |
| 02.04 | Research the history of the Plant Systems career pathway and describe how the careers have evolved and impacted society. |
| 02.05 | Identify skills required to successfully enter any career in the Plant Systems career pathway. |
| 02.06 | Describe technologies associated in careers within the Plant Systems career pathway. |

CTE Standards and Benchmarks

03.0 Demonstrate an understanding of the Animal Systems career pathway – the student will be able to:

03.01 Define and use proper terminology associated with the Animal Systems career pathway.

03.02 Describe some of the careers available in the Animal Systems career pathway.

03.03 Identify common characteristics of the careers in the Animal Systems career pathway.

03.04 Research the history of the Animal Systems career pathway and describe how the careers have evolved and impacted society.

03.05 Identify skills required to successfully enter any career in the Animal Systems career pathway.

03.06 Describe technologies associated in careers within the Animal Systems career pathway.

04.0 Demonstrate an understanding of the Power, Structural and Technological Systems career pathway – the student will be able to:

04.01 Define and use proper terminology associated with the Power, Structural and Technological Systems career pathway.

04.02 Describe some of the careers available in the Power, Structural and Technological Systems career pathway.

04.03 Identify common characteristics of the careers in the Power, Structural and Technological Systems career pathway.

04.04 Research the history of the Power, Structural and Technological Systems career pathway and describe how the careers have evolved and impacted society.

04.05 Identify skills required to successfully enter any career in the Power, Structural and Technological Systems career pathway.

04.06 Describe technologies associated in careers within the Power, Structural, and Technological Systems career pathway.

05.0 Demonstrate an understanding of the Natural Resource Systems career pathway – the student will be able to:

05.01 Define and use proper terminology associated with the Natural Resource Systems career pathway.

05.02 Describe some of the careers available in the Natural Resource Systems career pathway.

05.03 Identify common characteristics of the careers in the Natural Resource Systems career pathway.

05.04 Research the history of the Natural Resource Systems career pathway and describe how the careers have evolved and impacted society.

05.05 Identify skills required to successfully enter any career in the Natural Resource Systems career pathway.

05.06 Describe technologies associated in careers within the Natural Resource Systems career pathway.

06.0 Demonstrate an understanding of the Environmental Service Systems career pathway – the student will be able to:

CTE Standards and Benchmarks

06.01 Define and use proper terminology associated with the Environmental Service Systems career pathway.

06.02 Describe some of the careers available in the Environmental Service Systems career pathway.

06.03 Identify common characteristics of the careers in Environmental Service Systems career pathway.

06.04 Research the history of the Environmental Service Systems career pathway and describe how the careers have evolved and impacted society.

06.05 Identify skills required to successfully enter any career in the Environmental Service Systems career pathway.

06.06 Describe technologies associated in careers within the Environmental Service Systems career pathway.

07.0 Demonstrate an understanding of the Agribusiness Systems career pathway – the student will be able to:

07.01 Define and use proper terminology associated with the Agribusiness Systems career pathway.

07.02 Describe some of the careers available in the Agribusiness Systems career pathway.

07.03 Identify common characteristics of the careers in Environmental Service Systems career pathway.

07.04 Research the history of the Agribusiness Systems career pathway and describe how the careers have evolved and impacted society.

07.05 Identify skills required to successfully enter any career in the Agribusiness Systems career pathway.

07.06 Describe technologies associated in careers within the Agribusiness Systems career pathway.

08.0 Apply leadership and communication skills – the student will be able to:

08.01 Discuss the establishment and history of the FFA organization.

08.02 Identify the characteristics and responsibilities of organizational leaders.

08.03 Demonstrate parliamentary procedure skills during a meeting.

08.04 Participate on a committee which has an assigned task and report to the class.

08.05 Demonstrate effective communication skills through delivery of a speech, a slide presentation, or conducting a demonstration.

08.06 Use a computer to assist in the completion of project related to the Agriculture, Food, & Natural Resources career cluster.

09.0 Describe how information technology is used in the Agriculture, Food & Natural Resources career cluster – the student will be able to:

09.01 Identify information technology (IT) careers in the Agriculture, Food & Natural Resources career cluster, including the responsibilities, tasks and skills they require.

CTE Standards and Benchmarks

| | |
|-------|--|
| 09.02 | Relate information technology project management concepts and terms to careers in the Agriculture, Food & Natural Resources career cluster. |
| 09.03 | Manage information technology components typically used in professions of the Agriculture, Food & Natural Resources career cluster. |
| 09.04 | Identify security-related ethical and legal IT issues faced by professionals in the Agriculture, Food & Natural Resources career cluster. |
| 10.0 | Use information technology tools – the student will be able to: |
| 10.01 | Identify the functions of web browsers, and use them to access the World Wide Web and other computer resources typically used in the Agriculture, Food & Natural Resources career cluster. |
| 10.02 | Use e-mail clients to send simple messages and files to other Internet users. |
| 10.03 | Demonstrate ways to communicate effectively using Internet technology. |
| 10.04 | Use different types of web search engines effectively to locate information relevant to the Agriculture, Food & Natural Resources career cluster. |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

National FFA Organization (FFA) is the intercurricular career and technical student organization(s) providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Florida Department of Education
Curriculum Framework

Course Title: Introduction to Agriculture, Food, & Natural Resources and Career Planning*
Course Type: Orientation/Exploratory
Career Cluster: Agriculture, Food, and Natural Resources

Secondary – Middle School

| | |
|-----------------------|--|
| Course Number | 8021110 |
| CIP Number | 148021100M |
| Grade Level | 6-8 |
| Standard Length | Semester |
| Teacher Certification | Refer to the <u>Course Structure</u> section. |
| CTSO | FFA |

*Effective July 1, 2017, there is no longer a promotion requirement for middle grades students to complete a Career and Education Planning course. However, these courses will continue to be available and should be taught integrating the eight career and education planning course standards. The MyCareerShines powered by Kuder® career planning system is available free of charge to all Florida middle and high schools to assist students in exploring career options and developing an academic and career plan.

Purpose

The purpose of this course is to assist students in making informed decisions regarding their future academic and occupational goals and to provide information regarding careers in the Agriculture, Food and Natural Resource career cluster. The content includes but is not limited to agricultural literacy, importance of agriculture, the role of science, math, reading, writing, geography, history, and technology in agriculture, plants and animals, and sources of consumer goods from agriculture. Reinforcement of academic skills occurs through classroom instruction and applied laboratory procedures.

Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the equipment, materials and technology appropriate to the course content and in accordance with current practices.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Course Structure

The length of this course is one semester. It may be offered for two semesters when appropriate. When offered for one semester, it is recommended that it be at the exploratory level and more in-depth when offered for two semesters.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the course structure:

| Course Number | Course Title | Teacher Certification | Length |
|---------------|--|------------------------------|----------|
| 8021110 | Introduction to Agriculture, Food, & Natural Resources and Career Planning | AGRICULTUR 1 @2 EXP AG @4 | Semester |

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

Standards

After successfully completing this course, the student will be able to perform the following:

- 01.0 Demonstrate an understanding of the Food Products & Processing Systems career pathway.
- 02.0 Demonstrate an understanding of the Plant Systems career pathway.
- 03.0 Demonstrate an understanding of the Animal Systems career pathway.
- 04.0 Demonstrate an understanding of the Power, Structure, and Technical Systems career pathway.
- 05.0 Demonstrate an understanding of the Natural Resource Systems career pathway.
- 06.0 Demonstrate an understanding of the Environmental Service Systems career pathway.
- 07.0 Demonstrate an understanding of the Agribusiness Systems career pathway.
- 08.0 Apply leadership and communication skills.
- 09.0 Describe how information technology is used in the Agriculture, Food & Natural Resources career cluster.
- 10.0 Use information technology tools.

Listed below are the eight career and education planning course standards.

- 11.0 Describe the influences that societal, economic, and technological changes have on employment trends and future training.
- 12.0 Develop skills to locate, evaluate, and interpret career information.
- 13.0 Identify and demonstrate processes for making short and long term goals.
- 14.0 Demonstrate employability skills such as working in a group, problem-solving and organizational skills, and the importance of entrepreneurship.
- 15.0 Understand the relationship between educational achievement and career choices/postsecondary options.
- 16.0 Identify a career cluster and related pathways through an interest assessment that match career and education goals.
- 17.0 Develop a career and education plan that includes short and long-term goals, high school program of study, and postsecondary/career goals.
- 18.0 Demonstrate knowledge of technology and its application in career fields/clusters.

**Florida Department of Education
Student Performance Standards**

Course Title: Introduction to Agriculture, Food, & Natural Resources and Career Planning
Course Number: 8021110
Course Length: Semester

Course Description:

Beginning with a broad overview of the Agriculture, Food, and Natural Resources career cluster, students are introduced to the terminology, careers, history, required skills, and technologies associated with each pathway in the Agriculture, Food, and Natural Resources career cluster. Additionally, they will be provided with opportunities to acquire and demonstrate beginning leadership skills.

| CTE Standards and Benchmarks | |
|-------------------------------------|--|
| 01.0 | Demonstrate an understanding of the Food Products & Processing Systems career pathway – the student will be able to: |
| 01.01 | Define and use proper terminology associated with the Food Products & Processing Systems career pathway. |
| 01.02 | Describe some of the careers available in the Food Products & Processing Systems career pathway. |
| 01.03 | Identify common characteristics of the careers in the Food Products & Processing Systems career pathway. |
| 01.04 | Research the history of the Food Products & Processing Systems career pathway and describe how the associated careers have evolved and impacted society. |
| 01.05 | Identify skills required to successfully enter any career in the Food Products & Processing Systems career pathway. |
| 01.06 | Describe technologies associated in careers within the Food Products & Processing Systems career pathway. |
| 02.0 | Demonstrate an understanding of the Plant Systems career pathway – the student will be able to: |
| 02.01 | Define and use proper terminology associated with the Plant Systems career pathway. |
| 02.02 | Describe some of the careers available in the Plant Systems career pathway. |
| 02.03 | Identify common characteristics of the careers in the Plant Systems career pathway. |
| 02.04 | Research the history of the Plant Systems career pathway and describe how the careers have evolved and impacted society. |
| 02.05 | Identify skills required to successfully enter any career in the Plant Systems career pathway. |
| 02.06 | Describe technologies associated in careers within the Plant Systems career pathway. |

CTE Standards and Benchmarks

03.0 Demonstrate an understanding of the Animal Systems career pathway – the student will be able to:

03.01 Define and use proper terminology associated with the Animal Systems career pathway.

03.02 Describe some of the careers available in the Animal Systems career pathway.

03.03 Identify common characteristics of the careers in the Animal Systems career pathway.

03.04 Research the history of the Animal Systems career pathway and describe how the careers have evolved and impacted society.

03.05 Identify skills required to successfully enter any career in the Animal Systems career pathway.

03.06 Describe technologies associated in careers within the Animal Systems career pathway.

04.0 Demonstrate an understanding of the Power, Structural and Technological Systems career pathway – the student will be able to:

04.01 Define and use proper terminology associated with the Power, Structural and Technological Systems career pathway.

04.02 Describe some of the careers available in the Power, Structural and Technological Systems career pathway.

04.03 Identify common characteristics of the careers in the Power, Structural and Technological Systems career pathway.

04.04 Research the history of the Power, Structural and Technological Systems career pathway and describe how the careers have evolved and impacted society.

04.05 Identify skills required to successfully enter any career in the Power, Structural and Technological Systems career pathway.

04.06 Describe technologies associated in careers within the Power, Structural, and Technological Systems career pathway.

05.0 Demonstrate an understanding of the Natural Resource Systems career pathway – the student will be able to:

05.01 Define and use proper terminology associated with the Natural Resource Systems career pathway.

05.02 Describe some of the careers available in the Natural Resource Systems career pathway.

05.03 Identify common characteristics of the careers in the Natural Resource Systems career pathway.

05.04 Research the history of the Natural Resource Systems career pathway and describe how the careers have evolved and impacted society.

05.05 Identify skills required to successfully enter any career in the Natural Resource Systems career pathway.

05.06 Describe technologies associated in careers within the Natural Resource Systems career pathway.

06.0 Demonstrate an understanding of the Environmental Service Systems career pathway – the student will be able to:

CTE Standards and Benchmarks

06.01 Define and use proper terminology associated with the Environmental Service Systems career pathway.

06.02 Describe some of the careers available in the Environmental Service Systems career pathway.

06.03 Identify common characteristics of the careers in Environmental Service Systems career pathway.

06.04 Research the history of the Environmental Service Systems career pathway and describe how the careers have evolved and impacted society.

06.05 Identify skills required to successfully enter any career in the Environmental Service Systems career pathway.

06.06 Describe technologies associated in careers within the Environmental Service Systems career pathway.

07.0 Demonstrate an understanding of the Agribusiness Systems career pathway – the student will be able to:

07.01 Define and use proper terminology associated with the Agribusiness Systems career pathway.

07.02 Describe some of the careers available in the Agribusiness Systems career pathway.

07.03 Identify common characteristics of the careers in Environmental Service Systems career pathway.

07.04 Research the history of the Agribusiness Systems career pathway and describe how the careers have evolved and impacted society.

07.05 Identify skills required to successfully enter any career in the Agribusiness Systems career pathway.

07.06 Describe technologies associated in careers within the Agribusiness Systems career pathway.

08.0 Apply leadership and communication skills – the student will be able to:

08.01 Discuss the establishment and history of the FFA organization.

08.02 Identify the characteristics and responsibilities of organizational leaders.

08.03 Demonstrate parliamentary procedure skills during a meeting.

08.04 Participate on a committee which has an assigned task and report to the class.

08.05 Demonstrate effective communication skills through delivery of a speech, a slide presentation, or conducting a demonstration.

08.06 Use a computer to assist in the completion of project related to the Agriculture, Food, & Natural Resources career cluster.

09.0 Describe how information technology is used in the Agriculture, Food & Natural Resources career cluster – the student will be able to:

09.01 Identify information technology (IT) careers in the Agriculture, Food & Natural Resources career cluster, including the responsibilities, tasks and skills they require.

CTE Standards and Benchmarks

09.02 Relate information technology project management concepts and terms to careers in the Agriculture, Food & Natural Resources career cluster.

09.03 Manage information technology components typically used in professions of the Agriculture, Food & Natural Resources career cluster.

09.04 Identify security-related ethical and legal IT issues faced by professionals in the Agriculture, Food & Natural Resources career cluster.

10.0 Use information technology tools – the student will be able to:

10.01 Identify the functions of web browsers, and use them to access the World Wide Web and other computer resources typically used in the Agriculture, Food & Natural Resources career cluster.

10.02 Use e-mail clients to send simple messages and files to other Internet users.

10.03 Demonstrate ways to communicate effectively using Internet technology.

10.04 Use different types of web search engines effectively to locate information relevant to the Agriculture, Food & Natural Resources career cluster.

Listed below are the eight career and education planning course standards:

The student will be able to:

11.0 Describe the influences that societal, economic, and technological changes have on employment trends and future training.

12.0 Develop skills to locate, evaluate, and interpret career information.

13.0 Identify and demonstrate processes for making short and long term goals.

14.0 Demonstrate employability skills such as working in a group, problem-solving and organizational skills, and the importance of entrepreneurship.

15.0 Understand the relationship between educational achievement and career choices/postsecondary options.

16.0 Identify a career cluster and related pathways that match career and education goals.

17.0 Develop a career and education plan that includes short and long-term goals, high school program of study, and postsecondary/career goals.

18.0 Demonstrate knowledge of technology and its application in career fields/clusters.

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

National FFA Organization (FFA) is the intercurricular career and technical student organization(s) providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Florida Department of Education
Curriculum Framework

Course Title: Fundamentals of Agriculture, Food, and Natural Resource Systems
Course Type: Orientation/Exploratory
Career Cluster: Agriculture, Food, and Natural Resources

| Secondary – Middle School | |
|---------------------------|--|
| Course Number | 8021300 |
| CIP Number | 148021300M |
| Grade Level | 6-8 |
| Standard Length | year |
| Teacher Certification | Refer to the <u>Course Structure</u> section. |
| CTSO | FFA |

Purpose

The purpose of this course is to assist students in making informed decisions regarding their future academic and occupational goals and to provide information regarding careers in the Agriculture, Food and Natural Resource career cluster. The content includes but is not limited to agricultural literacy, importance of agriculture, the role of science, math, reading, writing, geography, history, and technology in agriculture, plants and animals, and sources of consumer goods from agriculture. Reinforcement of academic skills occurs through classroom instruction and applied laboratory procedures.

Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the equipment, materials and technology appropriate to the course content and in accordance with current practices.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Course Structure

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the course structure:

| Course Number | Course Title | Teacher Certification | Length |
|---------------|---|------------------------------|--------|
| 8021300 | Fundamentals of Agriculture, Food, and Natural Resource Systems | AGRICULTUR 1 @2 EXP AG @4 | year |

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

Standards

After successfully completing this course, the student will be able to perform the following:

- 01.0 Summarize the evolution of production agriculture.
- 02.0 Differentiate between animal welfare and ethical treatment of animals
- 03.0 Explain skills and principles used in dairy production.
- 04.0 Explain skills and principles used in livestock production.
- 05.0 Explain skills and principles used in poultry production.
- 06.0 Explain skills and principles used in aquaculture production
- 07.0 Explain skills and principles used in vegetable production.
- 08.0 Investigate and demonstrate skills and principles used in nursery production.
- 09.0 Apply scientific and technical skills in production agriculture.
- 10.0 Manage leadership and communication skills
- 11.0 Examine good work habits, and career planning in agriculture production.
- 12.0 Integrate the use of science, mathematics, reading, geography, history, writing, and communication in production agriculture.
- 13.0 Identify components of network systems.
- 14.0 Describe and use communication features of information technology.

**Florida Department of Education
Student Performance Standards**

Course Title: Fundamentals of Agriculture, Food, and Natural Resource Systems
Course Number: 8021300
Course Length: Semester

Course Description:

The next series in the world of the Agriculture, Food, and Natural Resources career cluster, students will be engaged in activities with terminology, careers, history, required skills, and technologies associated with each pathway in the Agriculture, Food, and Natural Resources career cluster. Additionally, they will be provided with opportunities to acquire and demonstrate beginning leadership skills.

| CTE Standards and Benchmarks | |
|-------------------------------------|--|
| 01.0 | Summarize the evolution of production agriculture – the student will be able to: |
| 01.01 | Describe the importance of agriculture on a world, national, state and community scale. |
| 01.02 | Distinguish the major agricultural production areas of the United States. |
| 01.03 | Distinguish agriculture products produced in Florida. |
| 01.04 | Interpret how changes in production practices, population, and land use have influenced the agriculture economy. |
| 01.05 | Demonstrate how development of new technology has affected agriculture production. |
| 01.06 | Examine the changes in agriculture careers that reflect the changes in production methods. |
| 02.0 | Differentiate between animal welfare and ethical treatment of animals – the student will be able to: |
| 02.01 | Describe the proper handling of production animals. |
| 02.02 | Compare animal welfare and animal rights. |
| 02.03 | Explain how animal welfare and animal rights advocate groups impact production agriculture. |
| 02.04 | Summarize animal cruelty and the consequences of cruel treatment of animals. |
| 03.0 | Explain skills and principles used in dairy production – the student will be able to: |
| 03.01 | Explain the difference between breeds of dairy cattle. |

CTE Standards and Benchmarks

03.02 Demonstrate knowledge of proper health and nutrition for dairy animals.

03.03 Explain the safety procedures used for dairy products.

03.04 Compare different styles of dairies and milking parlors.

03.05 Identify the varieties of dairy products and the methods of processing.

03.06 Create a dairy product.

04.0 Explain skills and principles used in livestock production – the student will be able to:

04.01 Compare the different breeds of livestock.

04.02 Differentiate the different cuts and grading of meat.

04.03 Evaluate proper health and nutrition for livestock animals.

04.04 Demonstrate knowledge of terminology for animals based on species and condition (eg. age, sex, bred, etc...)

04.05 Determine different reproduction methods, and the process of selective breeding.

04.06 Explain how the use of biotechnology has impacted the livestock industry.

05.0 Explain skills and principles used in poultry production – the student will be able to:

05.01 Compare different types of poultry and their uses in production agriculture.

05.02 Differentiate proper techniques for classification and grading of poultry and poultry products.

05.03 Describe proper safe handling techniques for poultry products.

05.04 Evaluate knowledge of health and nutrition for poultry.

05.05 Explain how the use of biotechnology has impacted the poultry industry.

06.0 Explain skills and principles used in aquaculture production – the student will be able to:

06.01 Compare the different breeds of aquatic species.

06.02 Evaluate proper health and nutrition for aquatic species.

06.03 Demonstrate knowledge of terminology for aquatic species.

CTE Standards and Benchmarks

06.04 Determine different reproduction methods.

06.05 Explain how the use of biotechnology has impacted the aquatic species industry.

07.0 Explain skills and principles used in vegetable production – the student will be able to:

07.01 Produce a vegetable crop.

07.02 Compare the components of soil.

07.03 Perform a soil test.

07.04 Describe how climate can affect crop production.

07.05 Compile knowledge of growing seasons for a geographic region.

07.06 Explain the use of Best Management Practices in crop production.

07.07 Investigate the impact of pests on crop yields.

07.08 Model the safety precautions on a pesticide and fertilizer label.

07.09 Assess proper irrigation methods for crops.

07.10 Analyze knowledge of harvesting techniques and equipment

07.11 Compare types of storage facilities.

07.12 Explain how the use of biotechnology has impacted vegetable crop production.

08.0 Explain skills and principles used in nursery production – the student will be able to:

08.01 Perform plant propagation.

08.02 Develop a growing schedule for nursery plants.

08.03 Model methods for Integrated Pest Management.

08.04 Compare types of growing media.

08.05 Identify nutrients necessary for plant growth from the periodic table and their functions.

08.06 Identify plants based on common and scientific names.

CTE Standards and Benchmarks

08.07 Describe principles for plant growth.

08.08 Explain different methods of irrigation.

08.09 Explain how the use of biotechnology has impacted plant production.

09.0 Apply scientific and technical skills in production agriculture – the student will be able to:

09.01 Formulate scientifically investigable questions, construct investigations, collect and evaluate data, and develop scientific recommendations based on findings.

09.02 Employ technological tools to expedite workflow including word processing, databases, reports, spreadsheets, multimedia presentations, electronic calendar, contacts, email, and internet applications

10.0 Manage leadership and communication skills – the student will be able to:

10.01 Discuss the establishment and history of the FFA organization.

10.02 Compare the characteristics and responsibilities of organizational leaders.

10.03 Demonstrate parliamentary procedure skills during a meeting.

10.04 Participate on a committee which has an assigned task and report to the class.

10.05 Demonstrate effective communication skills through delivery of a speech or conducting a demonstration.

10.06 Use a computer to assist in the completion of an agricultural project.

11.0 Demonstrate good work habits, and career planning in agriculture production – the student will be able to:

11.01 Identify attitudes and habits necessary to achieve career success.

11.02 Describe personality aspects to consider when choosing a career.

11.03 Identify the basic steps in career planning.

11.04 Identify and research careers within a specific area of agriscience.

12.0 Integrate the use of science, mathematics, reading, geography, history, writing, and communication in production agriculture – the student will be able to:

12.01 Apply basic mathematics operations to solve agricultural problems.

12.02 Correctly use measuring devices and utilize measurements to solve agricultural problems.

12.03 Prepare written and/or oral materials using correct English grammar.

CTE Standards and Benchmarks

12.04 Identify the main idea in oral presentations and/or written materials.

12.05 Locates, organizes, and interprets information from a variety of agricultural sources.

12.06 Describe the historical evolution of agriculture.

12.07 Select and study a problem that can be tested under controlled conditions to establish a hypothesis or to illustrate a known law.

13.0 Identify components of network systems – the student will be able to:

13.01 Identify structure to access internet, including hardware and software components.

13.02 Identify and configure user customization features in web browsers, including preferences, caching, and cookies.

13.03 Recognize essential database concepts.

13.04 Define and use additional networking and internet services.

14.0 Describe and use communication features of information technology – the student will be able to:

14.01 Define important internet communications protocols and their roles in delivering basic Internet services.

14.02 Identify basic principles of the Domain Name System (DNS).

14.03 Identify security issues related to Internet clients.

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Extended Student Supervision

Because of the production and marketing cycle of the agriculture industry, this program requires individual instruction and supervision of students for the entire period beyond the 180-day school year.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

National FFA Organization (FFA) is the intercurricular career and technical student organization(s) providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Florida Department of Education
Curriculum Framework

Course Title: Fundamentals of Agriculture, Food, and Natural Resource Services
Course Type: Orientation/Exploratory
Career Cluster: Agriculture, Food, and Natural Resources

| Secondary – Middle School | |
|---------------------------|--|
| Course Number | 8021400 |
| CIP Number | 148021300M |
| Grade Level | 6-8 |
| Standard Length | year |
| Teacher Certification | Refer to the <u>Course Structure</u> section. |
| CTSO | FFA |

Purpose

The purpose of this course is to assist students in making informed decisions regarding their future academic and occupational goals and to provide information regarding careers in the Agriculture, Food and Natural Resource career cluster. The content includes but is not limited to agricultural literacy, importance of agriculture, the role of science, math, reading, writing, geography, history, and technology in agriculture, plants and animals, and sources of consumer goods from agriculture. Reinforcement of academic skills occurs through classroom instruction and applied laboratory procedures.

Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the equipment, materials and technology appropriate to the course content and in accordance with current practices.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Course Structure

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the course structure:

| Course Number | Course Title | Teacher Certification | Length |
|---------------|--|-------------------------------|--------|
| 8021400 | Fundamentals of Agriculture, Food, and Natural Resource Services | Agriculture 1 @2 EXP AG @4 | year |

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

Standards

After successfully completing this course, the student will be able to perform the following:

- 01.0 Identify components of agribusiness.
- 02.0 Recommend appropriate agriculture communications concepts
- 03.0 Summarize skills used in landscape services.
- 04.0 Incorporate knowledge and skills involved with food science.
- 05.0 Construct a floral design.
- 06.0 Communicate skills gained from small, companion animal care.
- 07.0 Recommend leadership and communication styles.
- 08.0 Integrate the use of science, mathematics, reading, geography, history, writing, and communication in agriscience and technology.
- 09.0 Recognize the value of responsibility, good work habits, and planning for career opportunities in agriculture services.
- 10.0 Identify components of network systems
- 11.0 Describe and use communication features of information technology

**Florida Department of Education
Student Performance Standards**

Course Title: Fundamentals of Agriculture, Food and Natural Resource Services
Course Number: 8021400
Course Length: 1 Year

Course Description:

This course is designed to develop competencies in the area of agriculture services. This includes: the global impact of agribusiness, communications, landscaping, food science, floral design, companion animal care, as well leadership skills. Laboratory-based activities are an integral part of this course. These include safe use and application of appropriate technology, scientific testing and observation equipment.

| CTE Standards and Benchmarks | |
|-------------------------------------|---|
| 01.0 | Identify components of agribusiness – the student will be able to: |
| 01.01 | Describe the business cycle. |
| 01.02 | Complete a profit/loss statement. |
| 01.03 | Distinguish between types of competition practices. |
| 01.04 | Demonstrate proper methods of recording merchandise. |
| 01.05 | Summarize proper use of customer service skills. |
| 01.06 | Explain proper management techniques. |
| 02.0 | Recommend appropriate agriculture communications concepts – the student will be able to : |
| 02.01 | Sort and classify types of communication used in Agriculture. |
| 02.02 | Create messages using various forms of communication. |
| 02.03 | Generate a speech. |
| 02.04 | Compare and contrast different types of media. |
| 02.05 | Create a photo story. |
| 02.06 | Demonstrate proper ethics in communication. |

CTE Standards and Benchmarks

02.07 Identify and compare regulating agencies.

02.08 Evaluate careers in agriculture communications.

03.0 Summarize skills used in landscape services – the student will be able to:

03.01 Distinguish plants based on common and scientific name.

03.02 Conduct a soil test.

03.03 Construct an irrigation system.

03.04 Compare and contrast landscape styles.

03.05 Select plants based on environmental factors.

03.06 Design a landscape.

03.07 Model personal safety and knowledge of equipment.

03.08 Explain proper procedures for applying pesticides and fertilizer based on Best Management practices.

03.09 Inventory an ecosystem.

03.10 Apply knowledge of invasive plants.

03.11 Apply knowledge of customer interactions

04.0 Incorporate knowledge and skills involved with food science – the student will be able to:

04.01 Explain the process from farm to consumer

04.02 Investigate safe food handling practices, and their regulating agencies

04.03 Document changes in food preservation and how it impacted our civilization

04.04 Recognize food processing and packaging procedures.

04.05 Explain how to develop and market a food product.

04.06 Describe the components of a nutrition label

04.07 Create and market a food product.

CTE Standards and Benchmarks

05.0 Construct a floral design – the student will be able to:

05.01 Compare and contrast historical and cultural contributions to design.

05.02 Identify types of arrangements and products.

05.03 Demonstrate knowledge of floral pricing.

05.04 Verify flowers by common and scientific name.

05.05 Assemble a floral arrangement.

05.06 Summarize knowledge of inventory skills.

05.07 Develop a marketing plan.

06.0 Communicate skills gained from small, companion animal care – the student will be able to:

06.01 Demonstrate knowledge of proper nutrition and health in small and companion animals.

06.02 Differentiate between animal welfare and animal rights.

06.03 Describe the training process for service animals

06.04 Compare and contrast career opportunities available for companion animals based on animal type and breed.

06.05 Explain proper care for a small animal.

07.0 Recommend leadership and communication styles – the student will be able to:

07.01 Explore the establishment and history of the FFA organization.

07.02 Analyze the characteristics and responsibilities of organizational leaders.

07.03 Demonstrate parliamentary procedure skills during a meeting.

07.04 Evaluate a committee which has an assigned task and report to the class.

07.05 Demonstrate effective communication skills through delivery of a speech or conducting a demonstration.

07.06 Use a computer to assist in the completion of an agricultural project.

08.0 Integrate the use of science, mathematics, reading, geography, history, writing, and communication in agriscience and technology – the student will be able to:

CTE Standards and Benchmarks

08.01 Apply basic mathematics operations to solve agricultural problems.

08.02 Correctly use measuring devices and utilize measurements to solve agricultural problems.

08.03 Apply the scientific method to solve an agricultural problem.

08.04 Prepare written and/or oral materials using correct English grammar.

08.05 Identify the main idea in oral presentations and/or written materials.

08.06 Locates, organizes, and interprets information from a variety of agricultural sources.

08.07 Describe the historical evolution of agriculture.

09.0 Recognize the value of responsibility, good work habits, and planning for career opportunities in agriculture services – the student will be able to:

09.01 Identify attitudes and habits necessary to achieve career success.

09.02 Describe personality aspects to consider when choosing a career.

09.03 Identify the basic steps in career planning.

09.04 Develop basic career plan.

09.05 Identify and research careers within a specific area of agriscience.

10.0 Identify components of network systems – the student will be able to:

10.01 Identify structure to access internet, including hardware and software components.

10.02 Identify and configure user customization features in web browsers, including preferences, caching, and cookies.

10.03 Recognize essential database concepts.

10.04 Define and use additional networking and internet services.

11.0 Describe and use communication features of information technology – the student will be able to:

11.01 Define important internet communications protocols and their roles in delivering basic Internet services.

11.02 Identify basic principles of the Domain Name System (DNS).

11.03 Identify security issues related to Internet clients.

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Extended Student Supervision

Because of the production and marketing cycle of the agriculture industry, this program requires individual instruction and supervision of students for the entire period beyond the 180-day school year.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

National FFA Organization (FFA) is the intercurricular career and technical student organization(s) providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Florida Department of Education
Curriculum Framework

Course Title: Agriculture, Food and Natural Resource Directed Study
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

| | |
|-----------------------|--|
| Course Number | 8100100 |
| CIP Number | 0101999901 |
| Grade Level | 11-12 |
| Standard Length | 1 credit - Multiple credits |
| Teacher Certification | Refer to the <u>Course Structure</u> section. |
| CTSO | FFA |

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Agriculture, Food and Natural Resources career cluster.

The purpose of this course is to provide students with learning opportunities in a prescribed program of study within the Agriculture, Food and Natural Resources cluster that will enhance opportunities for employment in the career field chosen by the student.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Course Structure

The content is prescribed by the instructor based upon the individual student's assessed needs for directed study.

This course may be taken only by a student who has completed or is currently completing a specific secondary job preparatory program or occupational completion point for additional study in this career cluster. A student may earn multiple credits in this course.

The selected standards and benchmarks, which the student must master to earn credit, must be outlined in an instructional plan developed by the instructor.

To teach the course listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the secondary course structure:

| Course Number | Course Title | Teacher Certification | Length | Level | Graduation Requirement |
|---------------|---|----------------------------------|--------------------------------|-------|------------------------|
| 8100100 | Agriculture, Food and Natural Resource Directed Study | AGRICULTUR 1 @2 ANY AG EDUC G | 1 credit – Multiple credits | 2 | |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Demonstrate expertise in a specific occupation contained within the career cluster.
- 02.0 Conduct investigative research on a selected topic related to the career cluster using approved research methodology, interpret findings, and prepare presentation to defend results.
- 03.0 Apply enhanced leadership and professional career skills.
- 04.0 Demonstrate higher order critical thinking and reasoning skills appropriate for the selected program of study.

**Florida Department of Education
Student Performance Standards**

Course Title: Agriculture, Food and Natural Resource Directed Study
Course Number: 8100100
Course Credit: 1

| CTE Standards and Benchmarks | |
|-------------------------------------|---|
| 01.0 | Demonstrate expertise in a specific occupation within the career cluster – the student will be able to: |
| 01.01 | The benchmarks will be selected from the appropriate curriculum frameworks and determined by the instructor based upon the individual students assessed needs. |
| 02.0 | Conduct investigative research on a selected topic related to the career cluster using approved research methodology, interpret findings, and prepare presentation to defend results – The student will be able to: |
| 02.01 | Select investigative study referencing prior research and knowledge. |
| 02.02 | Collect, organize and analyze data accurately and precisely. |
| 02.03 | Design procedures to test the research. |
| 02.04 | Report, display and defend the results of investigations to audiences that may include professionals and technical experts. |
| 03.0 | Apply enhanced leadership and professional career skills – the student will be able to: |
| 03.01 | Develop and present a professional presentation offering potential solutions to a current issue. |
| 03.02 | Enhance leadership and career skills through work-based learning including job placement, job shadowing, entrepreneurship, internship, or a virtual experience. |
| 03.03 | Participate in leadership development opportunities available through the appropriate student organization and/or other professional organizations. |
| 03.04 | Enhance written and oral communications through the development of presentations, public speaking, and live and/or virtual interviews. |
| 04.0 | Demonstrate higher order critical thinking and reasoning skills appropriate for the selected program of study – the student will be able to: |
| 04.01 | Use mathematical and/or scientific skills to solve problems encountered in the chosen occupation. |
| 04.02 | Read and interpret information relative to the chosen occupation. |
| 04.03 | Locate and evaluate key elements of oral and written information. |
| 04.04 | Analyze and apply data and/or measurements to solve problems and interpret documents. |

04.05 Construct charts/tables/graphs using functions and data.

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Extended Student Supervision

Because of the production and marketing cycle of the agriculture industry, this program requires individual instruction and supervision of students for the entire period beyond the 180-day school year.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified

for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

Florida Department of Education
Curriculum Framework

Course Title: Orientation to Agriscience and Career Planning*
Course Type: Orientation/Exploratory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Middle School

| | |
|-----------------------|--|
| Course Number | 8100110 |
| CIP Number | 01019910OR |
| Grade Level | 6-8 |
| Standard Length | Semester |
| Teacher Certification | Refer to the <u>Course Structure</u> section. |
| CTSO | FFA |

*Effective July 1, 2017, there is no longer a promotion requirement for middle grades students to complete a Career and Education Planning course. However, these courses will continue to be available and should be taught integrating the eight career and education planning course standards. The MyCareerShines powered by Kuder® career planning system is available free of charge to all Florida middle and high schools to assist students in exploring career options and developing an academic and career plan.

Purpose

This course provides an overview of agriculture, and will help students to be educated about their food supply. The content includes but is not limited to agricultural literacy, importance of agriculture, the role of science, math, reading, writing, geography, history, and technology in agriculture, plants and animals, and sources of consumer goods from agriculture. Reinforcement of academic skills occurs through classroom instruction and applied laboratory procedures. Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the equipment, materials and technology appropriate to the course content and in accordance with current practices.

Student will learn a basic understanding of agriculture with focuses on plants, animals, and natural resources. Students will also learn about our food system and the safety procedures in agriculture systems.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Course Structure

The length of this course is one semester. It may be offered for two semesters when appropriate. When offered for one semester, it is recommended that it be at the exploratory level and more in-depth when offered for two semesters.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the course structure:

| Course Number | Course Title | Teacher Certification | Length |
|---------------|--|------------------------------|----------|
| 8100110 | Orientation to Agriscience and Career Planning | AGRICULTUR 1 @2 EXP AG @4 | Semester |

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

Standards

After successfully completing this course, the student will be able to perform the following:

- 01.0 Demonstrate knowledge and skills in agriscience research.
- 02.0 Demonstrate knowledge and skills in the importance of agriculture.
- 03.0 Demonstrate knowledge and skills in agriscience laboratories and workshops.
- 04.0 Demonstrate knowledge and skills plant sciences.
- 05.0 Demonstrate knowledge and skills in animal sciences.
- 06.0 Demonstrate knowledge and skills in food science.
- 07.0 Demonstrate product knowledge and skills in agricultural processing and marketing.
- 08.0 Demonstrate knowledge and skills in natural resources.
- 09.0 Demonstrate leadership and communication skills.
- 10.0 Integrate the use of science, mathematics, reading, geography, history, writing, and communication in agriscience and technology.

Listed below are the eight career and education planning course standards.

- 11.0 Describe the influences that societal, economic, and technological changes have on employment trends and future training.
- 12.0 Develop skills to locate, evaluate, and interpret career information.
- 13.0 Identify and demonstrate processes for making short and long term goals.
- 14.0 Demonstrate employability skills such as working in a group, problem-solving and organizational skills, and the importance of entrepreneurship.
- 15.0 Understand the relationship between educational achievement and career choices/postsecondary options.
- 16.0 Identify a career cluster and related pathways through an interest assessment that match career and education goals.
- 17.0 Develop a career and education plan that includes short and long-term goals, high school program of study, and postsecondary/career goals.
- 18.0 Demonstrate knowledge of technology and its application in career fields/clusters.

**Florida Department of Education
Student Performance Standards**

Course Title: Orientation to Agriscience and Career Planning
Course Number: 8100110
Course Length: Semester

Course Description:

This course is designed to provide an understanding of the agricultural food system, environmental resources, and strategies used to produce and market agricultural products, and an exploration of research through the use of the scientific method. Throughout the semester/year student will take a closer look at agriculture and learn about the research and development of our food supply.

| CTE Standards and Benchmarks | |
|-------------------------------------|---|
| 01.0 | Demonstrate knowledge and skills in agriscience research – the student will be able to: |
| 01.01 | Define agriscience. |
| 01.02 | Describe products of agriscience. |
| 01.03 | Define the scope of research in agriscience. |
| 01.04 | Discuss the impact of research on agriculture on consumer opinion. |
| 01.05 | Identify the steps of the scientific method. |
| 01.06 | Apply the scientific method to solve an agricultural problem. |
| 02.0 | Demonstrate knowledge and skills in the importance of agriculture – the student will be able to: |
| 02.01 | Describe the historical evolution of agriculture and its impact on civilization. |
| 02.02 | Discuss the scope of agriculture and its impact on daily life. |
| 02.03 | Identify specific areas of commodity production in the state, nation and world. |
| 03.0 | Demonstrate knowledge and skills in agriscience laboratories and workshops – the student will be able to: |
| 03.01 | Identify tools, machines and equipment used in agriculture. |
| 03.02 | Demonstrates proper laboratory/ workshop safety techniques. |

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| 03.03 | Complete a project demonstrating the safe use of agricultural tools, machinery or equipment. |
| 03.04 | Discuss the impact of agricultural mechanization and engineering on society. |
| 03.05 | Conduct an experiment using proper laboratory techniques. |
| 04.0 | Demonstrate knowledge and skills in plant sciences – the student will be able to: |
| 04.01 | Distinguish between horticulture, forestry, and agronomic. |
| 04.02 | Propagate and grow an agricultural plant. |
| 04.03 | Identify supplies and services industries related to plant science. |
| 04.04 | Develop a specimen collection of local plant materials. |
| 04.05 | Demonstrate proper planting techniques. |
| 04.06 | Discuss organic agriculture and conventional agriculture as it relates to plants |
| 05.0 | Demonstrate knowledge and skills in animal sciences – the student will be able to: |
| 05.01 | Distinguish between food, service and companion animals. |
| 05.02 | Identify breeds of food, service and companion animals. |
| 05.03 | Identify supplies and services industries related to animal science. |
| 05.04 | Identify the needs of an animal and describe and describe proper care for that animal. |
| 05.05 | Identify consumer foods and products derived from animals. |
| 05.06 | Discuss organic and conventional agriculture as it relates to livestock production. |
| 06.0 | Demonstrate knowledge and skills in food science – the student will be able to: |
| 06.01 | Describe the proper handling techniques and storage of food products from farm to plate. |
| 06.02 | List and explain methods of food preservation. |
| 06.03 | Conduct a food taste test. |
| 06.04 | Develop a production and marketing plan for a food product. |
| 06.05 | Read and interpret a food label. |

| | |
|-------|--|
| 07.0 | Demonstrate product knowledge and skills in agricultural processing and marketing – the student will be able to: |
| 07.01 | Define agricultural product processing and marketing. |
| 07.02 | Describe the processing and marketing of an agriculture product from farm to consumer. |
| 07.03 | Prepare, process, and market an agricultural product. |
| 08.0 | Demonstrate knowledge and skills in natural resources – the student will be able to: |
| 08.01 | Define and identify renewable and nonrenewable natural resources. |
| 08.02 | Describe agricultural management practices that conserve natural resources. |
| 08.03 | Describe effects of pollution on the environment. |
| 08.04 | Demonstrate how to recycle or conserve a natural resource. |
| 09.0 | Demonstrate leadership and communication skills – the student will be able to: |
| 09.01 | Describe the aims and purposes of the FFA organization. |
| 09.02 | Identify opportunities available to FFA members. |
| 09.03 | Identify characteristics of a good leader. |
| 09.04 | Participate in a cooperative leadership development activity or FFA Career Development Event. |
| 09.05 | Identify the importance of effective communication skills. |
| 09.06 | Demonstrate effective communication skills. |
| 10.0 | Integrate the use of science, mathematics, reading, geography, history, writing and communication in agriscience and technology – the student will be able to: |
| 10.01 | Apply basic mathematic operations to solve agricultural problems. |
| 10.02 | Correctly use measuring instruments and utilize measurements to solve agricultural problems. |
| 10.03 | Prepare written and oral materials using correct English grammar. |
| 10.04 | Identify the main idea in oral presentations and written materials. |
| 10.05 | Locates, organizes and interprets information from a variety of agricultural sources. |
| | |

Listed below are the eight career and education planning course standards:

The student will be able to:

11.0 Describe the influences that societal, economic, and technological changes have on employment trends and future training.

12.0 Develop skills to locate, evaluate, and interpret career information.

13.0 Identify and demonstrate processes for making short and long term goals.

14.0 Demonstrate employability skills such as working in a group, problem-solving and organizational skills, and the importance of entrepreneurship.

15.0 Understand the relationship between educational achievement and career choices/postsecondary options.

16.0 Identify a career cluster and related pathways through an interest assessment that match career and education goals.

17.0 Develop a career and education plan that includes short and long-term goals, high school program of study, and postsecondary/career goals.

18.0 Demonstrate knowledge of technology and its application in career fields/clusters.

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Extended Student Supervision

Because of the production and marketing cycle of the agriculture industry, this program requires individual instruction and supervision of students for the entire period beyond the 180-day school year.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

National FFA Organization (FFA) is the intercurricular career and technical student organization(s) providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Florida Department of Education
Curriculum Framework

Course Title: Introduction to Agriscience
Course Type: Orientation/Exploratory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Middle School

| | |
|-----------------------|--|
| Course Number | 8100120 |
| CIP Number | 01019921EX |
| Grade Level | 6-8 |
| Standard Length | Semester |
| Teacher Certification | Refer to the <u>Course Structure</u> section. |
| CTSO | FFA |

Purpose

This course is the first in a sequence of courses designed to assist students in making informed decisions regarding their future academic and occupational goals and to provide information regarding careers in the Agriculture, Food and Natural Resource career cluster. The content includes but is not limited to agricultural literacy, importance of agriculture, the role of science, math, reading, writing, geography, history, and technology in agriculture, plants and animals, and sources of consumer goods from agriculture. Reinforcement of academic skills occurs through classroom instruction and applied laboratory procedures. Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the equipment, materials and technology appropriate to the course content and in accordance with current practices.

Student will learn a basic understanding of agriculture with focuses on plants, animals, and natural resources. Students will also learn about our food system and the safety procedures in agriculture systems.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Course Structure

The length of this course is one semester. It may be offered for two semesters when appropriate. When offered for one semester, it is recommended that it be at the exploratory level and more in-depth when offered for two semesters.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the course structure:

| Course Number | Course Title | Teacher Certification | Length |
|---------------|-----------------------------|------------------------------|----------|
| 8100120 | Introduction to Agriscience | AGRICULTUR 1 @2 EXP AG @4 | Semester |

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

Standards

After successfully completing this course, the student will be able to perform the following:

- 01.0 Identify the importance of agriscience.
- 02.0 Identify and practice agriculture safety skills.
- 03.0 Describe the importance of plants and animals in agriculture.
- 04.0 Use selected techniques to produce finished products from agricultural materials.
- 05.0 Describe leadership and communication skills.
- 06.0 Integrate the use of science, mathematics, reading, geography, history, writing, and communication in agriscience and technology.

**Florida Department of Education
Student Performance Standards**

Course Title: Introduction to Agriscience
Course Number: 8100120
Course Length: Semester

Course Description:

This course is the first course in a sequence of middle school agriculture study. This course is designed to develop competencies in the areas of agricultural literacy, importance of agriculture, the role of science, math, reading, writing, geography, history, and technology in agriculture, plants and animals, and sources of consumer goods from agriculture. Content of this course is focused on the introduction to the food system. During the semester/ year students will learn about plants, animals, food systems, and natural resources.

| CTE Standards and Benchmarks | |
|-------------------------------------|--|
| 01.0 | Identify the importance of agriscience – the student will be able to: |
| 01.01 | Define agriscience and explain its diversity and scope. |
| 01.02 | Describe the importance of agriculture on a world, national, state and community scale. |
| 01.03 | Describe the importance of agriculture in each individual's life. |
| 01.04 | Collect and discuss information on current agricultural events. |
| 01.05 | Trace the evolution of agriscience from its beginnings to current applications. |
| 01.06 | Identify the major agricultural production areas of the United States and of Florida and the major commodities produced. |
| 01.07 | Describe the diversity of career opportunities in agriculture and its related fields.. |
| 01.08 | Describe the relationship between natural resources and agriculture. |
| 01.09 | Describe technology used in agricultural production, processing, and marketing of agricultural products. |
| 02.0 | Identify and practice agriculture safety skills- the student will be able to: |
| 02.01 | Identify procedures for safely using equipment |
| 02.02 | Identify and use proper personal protective equipment. |

| | |
|-------|---|
| 02.03 | Describe proper procedures for safety in agriculture classroom/lab/farm |
| 03.0 | Describe the importance of plants and animals in agriculture – the student will be able to: |
| 03.01 | Identify plants important to agriculture. |
| 03.02 | Identify animals important to agriculture. |
| 03.03 | Demonstrate the proper handling and ethical care of animals. |
| 03.04 | Describe animal rights and animal welfare. |
| 03.05 | Compare organic farming and conventional farming. |
| 03.06 | Identify conditions necessary for agricultural production. |
| 03.07 | Evaluate proper health and nutrition for livestock animals. |
| 03.08 | Compare companion animals and livestock animals |
| 03.09 | Identify the agricultural source of consumer products. |
| 03.10 | Trace the development of an agricultural product from the producer to the consumer. |
| 04.0 | Use selected techniques to produce finished products from agricultural materials – the student will be able to: |
| 04.01 | Complete a project safely using the appropriate agricultural tools, machinery or equipment. |
| 04.02 | Prepare and process an agricultural product. |
| 04.03 | Propagate horticulture plants. |
| 05.0 | Describe leadership and communication skills – the student will be able to: |
| 05.01 | Describe the aims and purposes of the FFA organization. |
| 05.02 | Identify opportunities available to FFA members. |
| 05.03 | Define leadership and different leadership styles. |
| 05.04 | Define communication and identify methods of communication |
| 05.05 | Prepare and present and extemporaneous speech. |
| 06.0 | Integrate the use of science, mathematics, reading, geography, history, writing, and communication in agriscience and technology – the student will be able to: |

| | |
|-------|---|
| 06.01 | Apply basic mathematics operations to solve agricultural problems. |
| 06.02 | Correctly use measuring devices and utilize measurements to solve agricultural problems. |
| 06.03 | Prepare written and oral materials using correct English grammar. |
| 06.04 | Identify the main idea in oral presentations and written materials. |
| 06.05 | Locates, organizes, and interprets information from a variety of agricultural sources. |
| 06.06 | Integrate the use of science, mathematics, reading, geography, history, writing, and communication in agriscience and technology – the student will be able to: |
| 06.07 | Apply basic mathematics operations to solve agricultural problems. |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Extended Student Supervision

Because of the production and marketing cycle of the agriculture industry, this program requires individual instruction and supervision of students for the entire period beyond the 180-day school year.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

National FFA Organization (FFA) is the intercurricular career and technical student organization(s) providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Florida Department of Education
Curriculum Framework

Course Title: Exploration of Agriscience
Course Type: Orientation/Exploratory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Middle School

| | |
|-----------------------|--|
| Course Number | 8100210 |
| CIP Number | 01019920EX |
| Grade Level | 6-8 |
| Standard Length | Semester |
| Teacher Certification | Refer to the <u>Course Structure</u> section. |
| CTSO | FFA |

Purpose

The purpose of this course is to assist students in making informed decisions regarding their future academic and occupational goals and to provide information regarding careers in the Agriculture, Food and Natural Resource career cluster. The content includes but is not limited to agricultural literacy, importance of agriculture, the role of science, math, reading, writing, geography, history, and technology in agriculture, plants and animals, and sources of consumer goods from agriculture. Reinforcement of academic skills occurs through classroom instruction and applied laboratory procedures. Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the equipment, materials and technology appropriate to the course content and in accordance with current practices.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Course Structure

The length of this course is one semester. It may be offered for two semesters when appropriate. When offered for one semester, it is recommended that it be at the exploratory level and more in-depth when offered for two semesters.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the course structure:

| Course Number | Course Title | Teacher Certification | Length |
|---------------|----------------------------|------------------------------|----------|
| 8100210 | Exploration of Agriscience | AGRICULTUR 1 @2 EXP AG @4 | Semester |

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

Standards

After successfully completing this course, the student will be able to perform the following:

- 01.0 Explain the evolution of agriculture.
- 02.0 Apply knowledge and skills in plant sciences.
- 03.0 Apply knowledge and skills in Forestry.
- 04.0 Apply knowledge and skills in animal sciences.
- 05.0 Demonstrate knowledge and skills in food science.
- 06.0 Apply knowledge and skills in biotechnology.
- 07.0 Apply knowledge and skills in processing and marketing.
- 08.0 Apply knowledge and skills in natural resources.
- 09.0 Apply leadership and communication skills.
- 10.0 Integrate the use of science, mathematics, reading, geography, history, writing, and communication in agriscience and technology.

**Florida Department of Education
Student Performance Standards**

Course Title: Exploration of Agriscience
Course Number: 8100210
Course Length: Semester

Course Description:

This course is designed for students that have already covered the basic introduction to agriculture. This course is designed to provide instruction that explores the tasks, training, education and physical requirements of a broad range of agriscience and natural resources careers develop competencies in the areas of agricultural literacy, importance of agriculture, the role of science, math, reading, writing, geography, history, and technology in agriculture, plants and animals, and sources of consumer goods from agriculture. During the semester/ year student will take a more in depth look into plants, animals, natural resources, and food science as they learn more about our food system.

| CTE Standards and Benchmarks | |
|-------------------------------------|---|
| 01.0 | Explain the evolution of agriculture- the student will be able to: |
| 01.01 | Define agriculture. |
| 01.02 | Identify and research careers within a specific area of agriscience. |
| 01.03 | Explain how commodities have diversified in Florida. |
| 02.0 | Apply knowledge and skills in plant sciences – the student will be able to: |
| 02.01 | Produce an agricultural plant. |
| 02.02 | Discuss the technology involved in the development of improved crops. |
| 02.03 | Identify agribusinesses that provide supplies and services to plant science industries in the state.. |
| 02.04 | Identify the recommended uses and safety precautions from a pesticide label. |
| 02.05 | Discuss basic landscape design. |
| 02.06 | Identify pests, pathogens, parasites, and predators of horticultural and agronomic crops. |
| 02.07 | Describe the major components of soil. |
| 02.08 | Demonstrate how to read a fertilizer label |

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|-------|---|
| 02.09 | Describe various forms of fertilizer and proper application method. |
| 03.0 | Apply knowledge and skills in Forestry- the student will be able to: |
| 03.01 | Identify the major forest regions of the United States and Florida. |
| 03.02 | Describe the importance of forests and forest products. |
| 03.03 | Describe how trees grow, reproduce, and components of forest health. |
| 03.04 | Describe tools and techniques common to the forest industry. |
| 03.05 | Identify pests, pathogens, parasites, and predators of forests. |
| 04.0 | Apply knowledge and skills in animal sciences – the student will be able to: |
| 04.01 | Describe the differences between animal welfare and animal rights. |
| 04.02 | Discuss the technology involved in the development of improved animal products. |
| 04.03 | Identify the breeds of livestock important to agriculture. |
| 04.04 | Identify agribusinesses that provide supplies and services to animal science industries in the state. |
| 04.05 | Describe the uses of livestock and their products. |
| 05.0 | Demonstrate knowledge and skills in food science – the student will be able to: |
| 05.01 | Demonstrate the proper handling and storage of food products from farm to plate. |
| 05.02 | Describe and demonstrate at least one method of food preservation. |
| 05.03 | Conduct a food taste test. |
| 05.04 | Produce and market a food product. |
| 05.05 | Read, interpret, and develop a food label. |
| 05.06 | Describe the components of a balance diet. |
| 05.07 | Identify and compare USDA standards and grades for agricultural products. |
| 06.0 | Apply knowledge and skills in biotechnology – the student will be able to: |
| 06.01 | Define biotechnology. |

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|-------|--|
| 06.02 | Discuss current and future uses of genetic engineering. |
| 06.03 | Identify issues associated with biotechnology. |
| 06.04 | Explain the history of genetic engineering and biotechnology in agriculture. |
| 06.05 | Apply knowledge and skills in biotechnology – the student will be able to: |
| 07.0 | Apply knowledge and skills in agricultural processing and marketing – the student will be able to: |
| 07.01 | Identify processing and packaging techniques used in agriculture. |
| 07.02 | Discuss the difference in marketing strategies between perishable and nonperishable commodities. |
| 07.03 | Describe how processing, packaging, and marketing affects the price of an item. |
| 07.04 | Recognize misleading advertising. |
| 07.05 | Describe how competition benefits the consumer. |
| 08.0 | Apply knowledge and skills in natural resources – the student will be able to: |
| 08.01 | Identify methods or practices of the conservation natural resources. |
| 08.02 | Demonstrate a method or practice of conservation. |
| 08.03 | Identify major ecosystems in Florida. |
| 08.04 | Discuss the importance of the ecosystems to agriculture, society and each other. |
| 08.05 | Define Best Management Practices (BMPs) and explain their benefits to agriculture. |
| 09.0 | Apply leadership and communication skills – the student will be able to: |
| 09.01 | Discuss the establishment and history of the FFA organization. |
| 09.02 | Identify the characteristics and responsibilities of organizational leaders. |
| 09.03 | Identify parliamentary procedure skills during a business meeting. |
| 09.04 | Demonstrate effective communication skills through delivery of a speech or conducting a demonstration. |
| 09.05 | Identify communication skills necessary for effective leadership. |
| 09.06 | Identify state and community organizations associated with agricultural promotion. |

| | |
|-------|---|
| 10.0 | Integrate the use of science, mathematics, reading, geography, history, writing, and communication in agriscience and technology – the student will be able to: |
| 10.01 | Apply basic mathematics operations to solve agricultural problems. |
| 10.02 | Correctly use measuring devices and utilize measurements to solve agricultural problems. |
| 10.03 | Apply the scientific method to solve an agricultural problem. |
| 10.04 | Prepare written and/or oral materials using correct English grammar. |
| 10.05 | Identify the main idea in oral presentations and/or written materials. |
| 10.06 | Locates, organizes, and interprets information from a variety of agricultural sources. |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Extended Student Supervision

Because of the production and marketing cycle of the agriculture industry, this program requires individual instruction and supervision of students for the entire period beyond the 180-day school year.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

National FFA Organization (FFA) is the intercurricular career and technical student organization(s) providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Florida Department of Education
Curriculum Framework

Course Title: Orientation to Agriscience
Course Type: Orientation/Exploratory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Middle School

| | |
|-----------------------|--|
| Course Number | 8100310 |
| CIP Number | 01019910OR |
| Grade Level | 6-8 |
| Standard Length | Semester |
| Teacher Certification | Refer to the <u>Course Structure</u> section. |
| CTSO | FFA |

Purpose

This course provides an overview of agriculture, and will help students to be educated about their food supply. The content includes but is not limited to agricultural literacy, importance of agriculture, the role of science, math, reading, writing, geography, history, and technology in agriculture, plants and animals, and sources of consumer goods from agriculture. Reinforcement of academic skills occurs through classroom instruction and applied laboratory procedures. Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the equipment, materials and technology appropriate to the course content and in accordance with current practices.

Student will learn a basic understanding of agriculture with focuses on plants, animals, and natural resources. Students will also learn about our food system and the safety procedures in agriculture systems.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Course Structure

The length of this course is one semester. It may be offered for two semesters when appropriate. When offered for one semester, it is recommended that it be at the exploratory level and more in-depth when offered for two semesters.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the course structure:

| Course Number | Course Title | Teacher Certification | Length |
|---------------|----------------------------|------------------------------|----------|
| 8100310 | Orientation to Agriscience | AGRICULTUR 1 @2 EXP AG @4 | Semester |

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

Standards

After successfully completing this course, the student will be able to perform the following:

- 01.0 Demonstrate knowledge and skills in agriscience research.
- 02.0 Demonstrate knowledge and skills in the importance of agriculture.
- 03.0 Demonstrate knowledge and skills in agriscience laboratories and workshops.
- 04.0 Demonstrate knowledge and skills plant sciences.
- 05.0 Demonstrate knowledge and skills in animal sciences.
- 06.0 Demonstrate knowledge and skills in food science.
- 07.0 Demonstrate product knowledge and skills in agricultural processing and marketing.
- 08.0 Demonstrate knowledge and skills in natural resources.
- 09.0 Demonstrate leadership and communication skills.
- 10.0 Integrate the use of science, mathematics, reading, geography, history, writing, and communication in agriscience and technology.

**Florida Department of Education
Student Performance Standards**

Course Title: Orientation to Agriscience
Course Number: 8100310
Course Length: Semester

Course Description:

This course is designed to provide an understanding of the agricultural food system, environmental resources, and strategies used to produce and market agricultural products, and an exploration of research through the use of the scientific method. Throughout the semester/year student will take a closer look at agriculture and learn about the research and development of our food supply.

| CTE Standards and Benchmarks | |
|-------------------------------------|---|
| 01.0 | Demonstrate knowledge and skills in agriscience research – the student will be able to: |
| 01.01 | Define agriscience. |
| 01.02 | Describe products of agriscience. |
| 01.03 | Define the scope of research in agriscience. |
| 01.04 | Discuss the impact of research on agriculture on consumer opinion. |
| 01.05 | Identify the steps of the scientific method. |
| 01.06 | Apply the scientific method to solve an agricultural problem. |
| 02.0 | Demonstrate knowledge and skills in the importance of agriculture – the student will be able to: |
| 02.01 | Describe the historical evolution of agriculture and its impact on civilization. |
| 02.02 | Discuss the scope of agriculture and its impact on daily life. |
| 02.03 | Identify specific areas of commodity production in the state, nation and world. |
| 03.0 | Demonstrate knowledge and skills in agriscience laboratories and workshops – the student will be able to: |
| 03.01 | Identify tools, machines and equipment used in agriculture. |
| 03.02 | Demonstrates proper laboratory/ workshop safety techniques. |

| | |
|-------|--|
| 03.03 | Complete a project demonstrating the safe use of agricultural tools, machinery or equipment. |
| 03.04 | Discuss the impact of agricultural mechanization and engineering on society. |
| 03.05 | Conduct an experiment using proper laboratory techniques. |
| 04.0 | Demonstrate knowledge and skills in plant sciences – the student will be able to: |
| 04.01 | Distinguish between horticulture, forestry, and agronomic. |
| 04.02 | Propagate and grow an agricultural plant. |
| 04.03 | Identify supplies and services industries related to plant science. |
| 04.04 | Develop a specimen collection of local plant materials. |
| 04.05 | Demonstrate proper planting techniques. |
| 04.06 | Discuss organic agriculture and conventional agriculture as it relates to plants |
| 05.0 | Demonstrate knowledge and skills in animal sciences – the student will be able to: |
| 05.01 | Distinguish between food, service and companion animals. |
| 05.02 | Identify breeds of food, service and companion animals. |
| 05.03 | Identify supplies and services industries related to animal science. |
| 05.04 | Identify the needs of an animal and describe and describe proper care for that animal. |
| 05.05 | Identify consumer foods and products derived from animals. |
| 05.06 | Discuss organic and conventional agriculture as it relates to livestock production. |
| 06.0 | Demonstrate knowledge and skills in food science – the student will be able to: |
| 06.01 | Describe the proper handling techniques and storage of food products from farm to plate. |
| 06.02 | List and explain methods of food preservation. |
| 06.03 | Conduct a food taste test. |
| 06.04 | Develop a production and marketing plan for a food product. |
| 06.05 | Read and interpret a food label. |

| | |
|-------|--|
| 07.0 | Demonstrate product knowledge and skills in agricultural processing and marketing – the student will be able to: |
| 07.01 | Define agricultural product processing and marketing. |
| 07.02 | Describe the processing and marketing of an agriculture product from farm to consumer. |
| 07.03 | Prepare, process, and market an agricultural product. |
| 08.0 | Demonstrate knowledge and skills in natural resources – the student will be able to: |
| 08.01 | Define and identify renewable and nonrenewable natural resources. |
| 08.02 | Describe agricultural management practices that conserve natural resources. |
| 08.03 | Describe effects of pollution on the environment. |
| 08.04 | Demonstrate how to recycle or conserve a natural resource. |
| 09.0 | Demonstrate leadership and communication skills – the student will be able to: |
| 09.01 | Describe the aims and purposes of the FFA organization. |
| 09.02 | Identify opportunities available to FFA members. |
| 09.03 | Identify characteristics of a good leader. |
| 09.04 | Participate in a cooperative leadership development activity or FFA Career Development Event. |
| 09.05 | Identify the importance of effective communication skills. |
| 09.06 | Demonstrate effective communication skills. |
| 10.0 | Integrate the use of science, mathematics, reading, geography, history, writing and communication in agriscience and technology – the student will be able to: |
| 10.01 | Apply basic mathematic operations to solve agricultural problems. |
| 10.02 | Correctly use measuring instruments and utilize measurements to solve agricultural problems. |
| 10.03 | Prepare written and oral materials using correct English grammar. |
| 10.04 | Identify the main idea in oral presentations and written materials. |
| 10.05 | Locates, organizes and interprets information from a variety of agricultural sources. |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Extended Student Supervision

Because of the production and marketing cycle of the agriculture industry, this program requires individual instruction and supervision of students for the entire period beyond the 180-day school year.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

National FFA Organization (FFA) is the intercurricular career and technical student organization(s) providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Florida Department of Education
Curriculum Framework

Course Title: Advanced Concepts of Agriscience
Course Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

| | |
|-----------------------|---|
| Course Number | 8100330 |
| CIP Number | 0101999902 |
| Grade Level | 11-12 |
| Standard Length | 1 credit |
| Teacher Certification | Refer to the Course Structure section. |
| CTSO | FFA |

Purpose

The purpose of this course is to provide students who have completed or are currently completing an OCP (occupational completion point) in an agricultural program, a capstone experience in agriscience education. This course is designed to enhance competencies in the areas of agricultural science and research; biological and physical science; environmental principles; and principles of leadership. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Course Structure

This program is a planned sequence of instruction consisting of one occupational completion point.

To teach the course listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the secondary course structure:

| OCP | Course | Course Title | Teacher Certification | Length | SOC Code | Level | Graduation |
|-----|--------|--------------|-----------------------|--------|----------|-------|------------|
|-----|--------|--------------|-----------------------|--------|----------|-------|------------|

| Number | | | | | | Requirement | |
|--------|---------|----------------------------------|-----------------|----------|--|-------------|--|
| A | 8100330 | Advanced Concepts of Agriscience | AGRICULTUR 1 @2 | 1 credit | | 2 | |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Academic Alignment Tables

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

| Courses | Anatomy/ Physiology Honors | Astronomy Solar/Galactic Honors | Biology 1 | Chemistry 1 | Earth-Space Science | Environmental Science | Genetics | Integrated Science | Marine Science 1 Honors | Physical Science | Physics 1 |
|----------------------------------|----------------------------|---------------------------------|-----------|-------------|---------------------|-----------------------|----------|--------------------|-------------------------|------------------|-----------|
| Advanced Concepts of Agriscience | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** |

** Alignment pending review

Alignment attempted, but no correlation to academic course

| Courses | Algebra 1 | Algebra 2 | Geometry | English 1 | English 2 | English 3 | English 4 |
|----------------------------------|-----------|-----------|----------|-----------|-----------|-----------|-----------|
| Advanced Concepts of Agriscience | ** | ** | ** | ** | ** | ** | ** |

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. The FS for Mathematical Practices are designed for grades K-12 and describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education.

Instructors must incorporate the Florida Standards for Technical Subjects and Mathematical Practices throughout instruction of this CTE program.

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Conduct a research project in agriculture using the scientific method, interpret research information, and prepare and present a research project.
- 02.0 Apply enhanced leadership and professional career skills.
- 03.0 Illustrate agricultural applications of physical science concepts and principles.

Optional Standards:

- 04.0 Investigate the concepts, principles, and theories associated with the classification, growth, function, and reproduction of plants and soils.
- 05.0 Investigate concepts associated with animal taxonomy, life at the cellular level, organ systems, genetics, ecology, and related current issues to understand animal life and animal science as it pertains to agriculture.
- 06.0 Investigate how chemistry and physics principles are applied to the composition of foods, food nutrition, and microbiology as it is associated with the food science segment of agriculture.
- 07.0 Apply enhanced agricultural communication and/or agricultural sales skills.

**Florida Department of Education
Student Performance Standards**

Course Title: **Advanced Concepts of Agriscience**
Course Number: **8100330**
Course Credit: **1**

Course Description:

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSSS-Sci.

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|---|----------------|------------------|
| 01.0 Conduct a research project in agriculture using the scientific method, interpret research information, and prepare and present a research project–The student will be able to: | | |
| 01.01 Formulate hypotheses referencing prior research and knowledge. | | |
| 01.02 Conduct controlled experiments or simulations to test hypotheses. | | |
| 01.03 Collect, organize and analyze data accurately and precisely. | | |
| 01.04 Design procedures to test the selected hypotheses. | | |
| 01.05 Report, display and defend the results of investigations to audiences that may include professionals and technical experts. | | |
| 01.06 Estimate and suggest ways to reduce the degree of risk involved in activities in agriculture and related sciences. | | |
| 02.0 Apply enhanced leadership and professional career skills–The student will be able to: | | |
| 02.01 Identify and investigate a current agricultural issue. | | |
| 02.02 Evaluate and explain AFNR issues and their impacts to audiences with limited AFNR knowledge. | | |
| 02.03 Identify the opportunities for enhanced leadership development available through the National FFA Organization and/or professional organizations. | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|--|---------|-----------|
| 02.04 Enhance written and oral communications through developing resumes and interviews. | | |
| 03.0 Illustrate agricultural applications of physical science concepts and principles–The student will be able to: | | |
| 03.01 Compare physical, ecological and behavioral factors that influence interactions and interdependence of organisms. | | |
| 03.02 Evaluate Sustainability policies and plans and prepare summary of potential improvements for AFNR businesses or organizations. | | |
| 03.03 Analyze the properties of materials (e.g., mass, boiling point, melting point, hardness) in relation to their physical and/or chemical structures. | | |
| 03.04 Analyze factors that influence the relative motion of an object (e.g., friction, wind shear, cross currents, potential differences). | | |
| 03.05 Analyze reactions (e.g., burning of fuel, decomposition of waste) in natural and man-made energy systems. | | |
| 03.06 Describe the need for organization, supervision, rules, policies and procedures. | | |
| Optional Standards: Each program offering this course will provide instruction in one or more of the following standards. Selection of standard(s) will be based on the agriscience education program the student has completed or is completing. | | |
| 04.0 Investigate the concepts, principles, and theories associated with the classification, growth, function, and reproduction of plant and soils--The student will be able to: | | |
| 04.01 Describe biotechnology and genetic engineering. | | |
| 04.02 Discuss the benefits and risks of biotechnology and genetic engineering. | | |
| 04.03 Describe the functions of water in plant growth. | | |
| 04.04 Identify major sources of water pollution and possible measures for its control. | | |
| 04.05 Contrast the biochemistry and functions of plant cell membranes and cell walls. | | |
| 04.06 Describe and give functions for common plant cell types. | | |
| 04.07 Identify cell types and functions associated with the vascular, dermal and ground tissue systems in woody and herbaceous plant parts. | | |
| 04.08 Compare and contrast periderm and epidermis and xylem and phloem. | | |
| 04.09 Explain how differential gene expression is what determines which proteins are made, and how the proteins decide the characteristics and functions of a particular cell. | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|--|---------|-----------|
| 04.10 Describe methods of producing transgenic plants and ways in which they are used. | | |
| 05.0 Investigate concepts associated with animal taxonomy, life at the cellular level, organ systems, genetics, ecology, and related current issues to understand animal life and animal science as it pertains to agriculture--The student will be able to: | | |
| 05.01 Identify the major features of chordates, identify the highlights of vertebrate evolution (development of jaws, cartilage to bone, and water to land), and identify the distinguishing characters of fish, birds, and mammals. | | |
| 05.02 Describe the biochemistry and functions of animal cell membranes. In doing so, describe the fluid mosaic model of the membrane and the role of the cell membrane proteins in transporting materials in and out of cells. | | |
| 05.03 Using examples relevant to animal science, track the events involved in expression of individual genes and compartmentalization of the resulting proteins. | | |
| 05.04 Discuss four basic tissue types: epithelial, connective, muscle, and nervous. | | |
| 05.05 Describe the chemical process in the formation of bones and muscles and the process of calcification and its impact on animal growth. | | |
| 05.06 Describe homeostasis and how it is controlled. | | |
| 05.07 Explain the flow of genetic information, and identify the central dogma: DNA transcription-mRNA-translation-protein. | | |
| 05.08 Describe the purpose, function, and production of RNA, and explain how protein synthesis works. | | |
| 06.0 Investigate how chemistry and physics principles are applied to the composition of foods, food nutrition, and microbiology as it is associated with the food science segment of agriculture--The student will be able to: | | |
| 06.01 Describe composition and arrangement of functional groups found in biological systems. | | |
| 06.02 Discuss the chemical composition and structure of protein molecules including primary, secondary, tertiary, and quaternary structures. | | |
| 06.03 Discuss the biochemical and physiological functions of proteins, carbohydrates, lipids, vitamins and minerals. | | |
| 06.04 Explain thermodynamics and kinetics (e.g., reaction rates for affecting quality and destroying nutrients). | | |
| 06.05 Compare and contrast the chemical reactions initiated by the effect of heat, oxygen, acid, and light during processing and storage of foods. | | |
| 06.06 Identify the various food spoilage methods including microbial spoilage, chemical spoilage and their effect on food product shelf-life. | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci |
|--|---------|-----------|
| 06.07 Compare and contrast three types of chemical bonds: hydrogen, ionic and covalent bonds. | | |
| 07.0 Apply enhanced agricultural communication and/or agricultural sales skills--The student will be able to: | | |
| 07.01 Evaluate the effectiveness of a current communications or marketing campaign. | | |
| 07.02 Develop and implement a communications or marketing campaign for an agricultural product or issue. | | |
| 07.03 Apply enhanced written and oral communication skills by selecting the correct style, tone, and format appropriate for a variety of settings. | | |
| 07.04 Demonstrate characteristics of a responsible/ethical agricultural communicator. | | |
| 07.05 Select the proper communication medium and target audience for a current agricultural issue. | | |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Extended Student Supervision

Because of the production and marketing cycle of the agriculture industry, this program requires individual instruction and supervision of students for the entire period beyond the 180-day school year.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization for providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

Florida Department of Education
Curriculum Framework

Course Title: Agriculture, Food, and Natural Resources Cooperative Education OJT
Course Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Cooperative Education - OJT

| | |
|-----------------------|--|
| Course Number | 8100410 |
| CIP Number | 01019999CP |
| Grade Level | 9-12 |
| Standard Length | Multiple credits |
| Teacher Certification | Refer to the <u>Course Structure</u> section. |
| CTSO | FFA |

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Agriculture, Food and Natural Resources cluster.

Each student job placement must be related to the job preparatory program in which the student is enrolled or has completed.

The purpose of this course is to provide the on-the-job training component when the **cooperative method of instruction** is appropriate. Whenever the cooperative method is offered, the following is required for each student: a training agreement; a training plan signed by the student, teacher and employer, including instructional objectives; a list of on-the-job and in-school learning experiences; a workstation which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal; and a site supervisor with a working knowledge of the selected occupation. The workstation may be in an industry setting or in a virtual learning environment. The student **must be compensated** for work performed.

The teacher/coordinator must meet with the site supervisor a minimum of once during each grading period for the purpose of evaluating the student's progress in attaining the competencies listed in the training plan.

Agriculture, Food, and Natural Resources Cooperative Education - OJT may be taken by a student for one or more semesters. A student may earn multiple credits in this course. The specific student performance standards which the student must achieve to earn credit are specified in the Cooperative Education - OJT Training Plan.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Course Structure

To teach the course listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the secondary course structure:

| Course Number | Course Title | Teacher Certification | Length | Level | Graduation Requirement |
|---------------|--|--------------------------------|------------------|-------|------------------------|
| 8100410 | Agriculture, Food, and Natural Resources Cooperative Education OJT | AGRICULTUR 1 @2 ANY AG ED G | Multiple Credits | 2 | |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Perform designated job skills.
- 02.0 Demonstrate work ethics.

Florida Department of Education
 Student Performance Standards

Course Title: Agriculture, Food, and Natural Resources Cooperative Education - OJT
 Secondary Number: 8100410

| Standards and Benchmarks | |
|---------------------------------|--|
| 01.0 | Perform designated job skills – the student will be able to: |
| 01.01 | Perform tasks as outlined in the training plan. |
| 01.02 | Demonstrate job performance skills. |
| 01.03 | Demonstrate safety procedures on the job. |
| 01.04 | Maintain appropriate records. |
| 01.05 | Attain an acceptable level of productivity. |
| 01.06 | Demonstrate appropriate dress and grooming habits. |
| 02.0 | Demonstrate work ethics – the student will be able to: |
| 02.01 | Follow directions. |
| 02.02 | Demonstrate good human relations skills on the job. |
| 02.03 | Demonstrate good work habits. |
| 02.04 | Demonstrate acceptable business ethics. |

Additional Information

Special Notes

The **Cooperative Education Manual** is available on-line and has guidelines for students, teachers, employers, parents and other administrators and sample training agreements.

The occupational standards and benchmarks outlined in this secondary course correlate to the standards and benchmarks of the postsecondary course with the same Classification of Instructional Programs (CIP) number.

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

National FFA Organization (FFA) is the intercurricular career and technical student organization(s) providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities may need additional time (beyond the regular school year) to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students.

**Florida Department of Education
Curriculum Framework**

Program Title: Animal Science and Services
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

| | |
|----------------------------|--|
| Program Number | 8106200 |
| CIP Number | 0101030210 |
| Grade Level | 9-12 |
| Standard Length | 6 credits |
| Teacher Certification | Refer to the Program Structure section |
| CTSO | FFA |
| SOC Codes (all applicable) | 45-2093 - Farmworkers, Farm, Ranch, and Aquacultural Animals 45-1011 - First-Line Supervisors of Farming, Fishing, and Forestry Workers |

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, health, safety and environmental issues, and the use and care of animal health-care instruments, animal grooming equipment, animal restraining equipment, and laboratory equipment.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of three occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the secondary program structure:

| OCP | Course Number | Course Title | Teacher Certification | Length | SOC Code | Level | Graduation Requirement |
|-----|---------------|-------------------------------|-----------------------|----------|----------|---------|------------------------|
| A | 8106810 | Agriscience Foundations 1 | AGRICUTUR 1 @2 | 1 credit | 45-2093 | 3 | EQ |
| | 8106210 | Animal Science and Services 2 | | 1 credit | | 2 | |
| | 8106220 | Animal Science and Services 3 | | 1 credit | | 2 | |
| B | 8106230 | Animal Science and Services 4 | | 1 credit | 45-1011 | 2 | |
| | 8106240 | Animal Science and Services 5 | | 1 credit | | 2 | |
| C | 8106250 | Animal Science and Services 6 | | | 1 credit | 45-1011 | 2 |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Academic Alignment Table

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

| Courses | Anatomy/ Physiology Honors | Astronomy Solar/Galactic Honors | Biology 1 | Chemistry 1 | Earth-Space Science | Environmental Science | Genetics | Integrated Science | Marine Science 1 Honors | Physical Science | Physics 1 |
|-------------------------------|----------------------------|---------------------------------|--------------|--------------|---------------------|-----------------------|--------------|--------------------|-------------------------|------------------|--------------|
| Ag. Foundations | 29/87 33% | 18/80 23% | 55/83 66% | 11/69 16% | 36/67 54% | 30/70 42% | 20/69 29% | 49/82 60% | 25/66 38% | 38/74 51% | 12/72 16% |
| Animal Science and Services 2 | 13/87 15% | 9/80 11% | 27/83 33% | 7/69 10% | 21/67 31% | 9/70 13% | 6/69 9% | 23/82 28% | 11/66 17% | 22/74 30% | 6/72 8% |
| Animal Science and Services 3 | 25/87 29% | 23/80 29% | 8/83 10% | 22/69 32% | 2/67 3% | 22/70 31% | 26/69 38% | 4/82 5% | 24/66 36% | 3/74 4% | 22/72 31% |
| Animal Science and Services 4 | 21/87 24% | 21/80 26% | 8/83 10% | 21/69 30% | 1/67 1% | 25/70 36% | 25/69 36% | 1/82 1% | 19/66 29% | 2/74 3% | 19/72 26% |
| Animal Science and Services 5 | 2/87 2% | 2/80 3% | 3/83 4% | 1/69 1% | 1/67 1% | 3/70 7% | 2/69 3% | # | 2/66 3% | 2/74 3% | 1/72 1% |
| Animal Science and Services 6 | 13/87 15% | 9/80 11% | 27/83 33% | 7/69 10% | 21/67 31% | 9/70 13% | 6/69 9% | 23/82 28% | 11/66 17% | 22/74 30% | 6/72 8% |

** Alignment pending review

Alignment attempted, but no correlation to academic course

| Courses | Algebra 1 | Algebra 2 | Geometry | English 1 | English 2 | English 3 | English 4 |
|-------------------------------|--------------|------------|-------------|--------------|--------------|--------------|--------------|
| Agriscience Foundations 1 | 14/67 21% | 4/75 5% | 8/54 15% | 11/46 24% | 11/45 24% | 11/45 24% | 11/45 24% |
| Animal Science and Services 2 | 5/67 7% | 4/75 5% | # | ** | ** | ** | ** |
| Animal Science and Services 3 | 6/67 9% | 5/75 7% | # | ** | ** | ** | ** |
| Animal Science and Services 4 | # | 1/75 1% | # | ** | ** | ** | ** |
| Animal Science and Services 5 | 7/67 10% | 1/75 1% | # | ** | ** | ** | ** |
| Animal Science and Services 6 | 5/67 7% | 7/75 9% | # | ** | ** | ** | ** |

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. The FS for Mathematical Practices are designed for grades K-12 and describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education.

Instructors must incorporate the Florida Standards for Technical Subjects and Mathematical Practices throughout instruction of this CTE program.

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL’s need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. If so, the standards have been identified and cross walked with the corresponding CTE standard and/or benchmark.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Describe the history of agriculture and its influence on the global economy.
- 02.0 Practice agriscience safety skills and procedures.
- 03.0 Apply scientific and technological principles to agriscience issues.
- 04.0 Apply environmental principles to the agricultural industry.
- 05.0 Investigate and utilize basic scientific skills and principles in plant science.
- 06.0 Investigate and utilize basic scientific skills and principles in animal science.
- 07.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 08.0 Demonstrate agribusiness, employability and human relation skills.
- 09.0 Apply leadership and citizenship skills.
- 10.0 Describe animal science and the role of animals in society.
- 11.0 Classify animals according to hierarchical taxonomy and agricultural use.
- 12.0 Identify careers in the animal industry.
- 13.0 Describe animal and human first aid and laboratory safety.
- 14.0 Recognize normal and abnormal animal behaviors.
- 15.0 Apply principles of comparative anatomy and physiology to uses within various animal systems.
- 16.0 Evaluate the male and female reproductive systems.
- 17.0 Demonstrate safe animal handling and management techniques.
- 18.0 Analyze the communities responsibility in options for caring for unwanted /neglected livestock.
- 19.0 Evaluate the importance of the food and fiber system to understand the impact on global economy.
- 20.0 Examine the scope of career opportunities in and the importance of agriculture to the economy.
- 21.0 Apply principles of animal nutrition to ensure the proper growth, development, and reproduction and economic production of animals.
- 22.0 Evaluate animals for breeding readiness and soundness.
- 23.0 Explain the reproductive system and breeding of selected animals.
- 24.0 Prescribe and implement a prevention and treatment program for animal diseases, parasites and other disorders.
- 25.0 Demonstrate knowledge of preventive medicine and disease control.
- 26.0 Select animals for specific purposes and maximum performance based on anatomy and physiology.
- 27.0 Prepare, groom, exhibit, and market animals
- 28.0 Maintain and analyze records.
- 29.0 Provide for the biosecurity of agricultural animals and production facilities.
- 30.0 Explain the components of the American business system.
- 31.0 Investigate agricultural cooperatives structure and function.
- 32.0 Apply animal health practices.
- 33.0 Maintain equipment and facilities.
- 34.0 Operate, maintain, and repair machinery and equipment.
- 35.0 Investigate emerging technologies in Animal Science.
- 36.0 Apply scientific principles in the selection and breeding of animals.
- 37.0 Manage pasture and forage crops.

- 38.0 Discuss animal marketing techniques.
- 39.0 Apply advanced animal health practices.
- 40.0 Perform emergency first aid on animals.
- 41.0 Implement procedures to ensure that animal products are safe.
- 42.0 Identify, select, and breed food-producing animals.
- 43.0 Analyze county, state and federal agencies that support the animal industry.
- 44.0 Apply principles of comparative anatomy and physiology to uses within various animal systems.
- 45.0 Plan routine management of food-producing animals and facilities.
- 46.0 Maintain and analyze records.
- 47.0 Design animal housing, equipment and handling facilities for animal production.
- 48.0 Comply with government regulations and safety standards for facilities used in animal production.
- 49.0 Identify and interpret rules, policy, and regulations affecting the livestock industry.
- 50.0 Understand the relationship of animal production and the environment.
- 51.0 Evaluate the effects of environmental conditions on animals.
- 52.0 Identify and interpret environmental issues and regulations pertaining to animal industry.

**Florida Department of Education
Student Performance Standards**

Course Title: Agriscience Foundations 1
Course Number: 8106810
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of agricultural history and the global impact of agriculture; career opportunities; scientific and research concepts; biological and physical science principles; environmental principles; agriscience safety; principles of leadership; and agribusiness, employability, and human relations skills in agriscience. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students will interact with materials and primary sources of data or with secondary sources of data to observe and understand the natural world. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 20% of classroom time will be dedicated to laboratory experiences.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|------------------------------------|---|--------------------|
| 01.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to: | | SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2; | |
| 01.01 Evaluate and explain emerging trends and the opportunities they may create within the AFNR systems. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.01.01.02.c |
| 01.02 Assess the economic impact of an AFNR system on a local, state, national and global level. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | CS.02.02.03.b |
| 01.03 Identify significant career patterns/shifts in the history of the agricultural industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.01.01.01.a |
| 01.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.06.02.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|---|--------------------|
| 02.0 Practice agriscience safety skills and procedures--The student will be able to: | | SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7; | |
| 02.01 Identify the common causes and prevention of accidents in agriscience operations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.a |
| 02.02 Extract and utilize pertinent information from a container label and/or Safety Data Sheet (SDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | CS.03.04.03.a |
| 02.03 Identify proper disposal of hazardous waste materials and biohazards. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | ESS.04.01.02.c |
| 02.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.b |
| 03.0 Apply scientific and technological principles to agriscience issues--The student will be able to: | | SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1; | |
| 03.01 Employ scientific measurement skills. | | | |
| 03.02 Demonstrate safe and effective use of common laboratory equipment. | | | ESS.01.02.01.b |
| 03.03 Identify the parts and functions of plant and animal cells. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |
| 03.04 Describe the phases of cell reproduction. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 03.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|--------------------|
| 03.06 Interpret, analyze, and report data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | BS.02.01.01.b |
| 03.07 Investigate DNA and genetics applications in agriscience including the theory of probability. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | BS.01.01.01.a |
| 03.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.). | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | BS.03.01.03.b |
| 04.0 Apply environmental principles to the agricultural industry--The student will be able to: | | SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12 | |
| 04.01 Research how different climactic and geological activity influences agriculture. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | NRS.01.03.02.b |
| 04.02 Describe various ecosystems as they relate to the agriculture industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.03 Describe the environmental resources (soil, water, air) necessary for agriculture production. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.08.02.01.a |
| 04.04 Identify regulatory agencies that impact agricultural practices. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6 | | NRS.02.01.02.a |
| 04.05 Apply Best Management Practices that enhance the natural environment. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.06 Identify conservation practices related to natural resources. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.02.02.b |
| 05.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to: | | SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7; | |
| 05.01 Identify and describe the specializations within the plant science industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.02 Categorize plants based on specific characteristics according to industry and scientific standards. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|---|---|
| 05.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc.... | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.03.01.a PS.02.03.02.a PS.02.03.05.a |
| 05.04 Identify the nutrients required for plant growth from the periodic table and explain their functions. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.01.02.01.a |
| 05.05 Analyze information from a fertilizer label. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | PS.01.03.04.b |
| 05.06 Propagate and grow plants through sexual and/or asexual reproduction. | | | PS.03.01.03.a PS.03.01.01.b |
| 05.07 Investigate the impacts of various pests and propose solutions for their control. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.03.03.01.c |
| 05.08 Investigate the nature and properties of food, fiber, and by-products from plants. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.09 Explore career opportunities in plant science. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.05.01.01.a |
| 06.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to: | | SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19; | |
| 06.01 Explain the economic importance of animals and the products obtained from animals. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.02 Analyze commercially important livestock breeds in Florida. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |
| 06.04 Compare and contrast animal welfare issues. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | AS.02.01.01.a |
| 06.05 Investigate the nature and properties of food, fiber, and by-products from animals. | | | AS.06.03.03.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|---|--------------------|
| 06.06 Explore career opportunities in animal science. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | CS.05.01.01.a |
| 07.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to | | SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9; | |
| 07.01 Select and demonstrate proper use of hand tools in agriculture. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.04.02.a |
| 07.02 Operate service and maintain agriscience equipment, and instruments. | | | CS.03.04.03.b |
| 07.03 Manage facilities and supplies. | | | |
| 08.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to: | | | |
| 08.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE). | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 08.02 Utilize a record keeping system to collect, interpret, and analyze data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 08.03 Enhance oral communications through telephone, interview and presentation skills. | LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | CRP.04.01.02.b |
| 08.04 Enhance written communication by developing resumes and business letters. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2 | | CRP.04.02.02.b |
| 08.05 Demonstrate interpersonal (nonverbal) communication skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 08.06 Demonstrate good listening skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.04.03.01.a |
| 09.0 Apply leadership and citizenship skills--The student will be able to: | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|-----------|---------------------------------|
| 09.01 Identify and describe leadership characteristics. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.01.a |
| 09.02 Identify opportunities to apply acquired leadership skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.02.a |
| 09.03 Identify and demonstrate ways to be an active citizen. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.01.03.02.c |
| 09.04 Participate in community based learning activities. | | | CRP.01.03.01.a |
| 09.05 Demonstrate the ability to work cooperatively. | | | CRP.09.03.01.a |
| 09.06 Conduct formal and informal meetings using correct parliamentary procedure skills. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 09.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 09.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks. | | | CS.05.01.01.b CRP.10.02.02.b |
| 10.0 Discuss components of food safety and handling practices in agriculture - The student will be able to: | | | |
| 10.01 Demonstrate proper safety precautions and use of personal protective equipment. | | | FPP.01.01.01.b |
| 10.02 Evaluate the food safety responsibilities that occur along the food supply chain. | | | FPP.03.03.02.b |
| 10.03 Explain techniques and procedures for the safe handling of food products. | | | FPP.03.03.02.c |
| 10.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation). | | | FPP03.03.01.b |
| 10.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply. | | | FPP04.01.01.0b |

**Florida Department of Education
Student Performance Standards**

Course Title: Animal Science and Services 2
Course Number: 8106210
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of safety; animal behavior; animal welfare; animal control; and employability skills.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|-----------|--------------------|
| 11.0 Describe animal science and the role of animals in society – the student will be able to: | | | |
| 11.01 Describe animal science and the role of animals in society. | | | |
| 11.02 Analyze perceptions of public opinion of animal related issues. | MAFS.912.SIC.2.3 | | |
| 11.03 Identify the origin, significance, distribution and domestication of animal species. | MAFS.912.SIC.1.1 MAFS.912.SIC.1.2 | | AS.01.01.01.a |
| 11.04 Evaluate and describe characteristics of animals that developed in response to the animals’ environment and led to their domestication. | | | AS.01.01.01.b |
| 11.05 Predict adaptations of animals to production practices and environments. | | | AS.01.01.01.c |
| 11.06 Define major components of the animal industry. | | | AS.01.01.02.a |
| 11.07 Outline the development of the animal industry and the resulting products, services and careers. | | | AS.01.01.02.b |
| 11.08 Predict trends and implications of future development of the animal systems industry. | MAFS.912.S-IC.2.6 MAFS.912.S-IC.2.3 | | AS.01.01.02.c |
| 12.0 Classify animals according to hierarchical taxonomy and agricultural use – the student will be able to: | | | AS.06.01 |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|----------------|--------------------|
| 12.01 Analyze the visual characteristics of an animal or animal product and select correct classification terminology when referring to companion and production animals. | | SC.912.L.15.4 | AS.06.01.03.b |
| 12.02 Appraise and evaluate the economic value of animals for various applications in the agriculture industry. | MAFS.912.S-ID.1.2, 3, 4 MAFS.912.S-ID.2.5, 6 MAFS.912.S-ID.3.7, 8, 9 | SC.912.N.4.2 | AS.06.01.02.b |
| 13.0 Evaluate and implement the steps and requirements to pursue a career opportunity in the animal industry – the student will be able to: | | | CS.05.01 |
| 13.01 Locate and obtain information on animal-industry careers and career opportunities. | | | |
| 13.02 Examine the educational training and experiential requirements to pursue a career in the animal industry. | | | CS.05.01.02.a |
| 13.03 Examine professional organizations and commodity groups in the animal industry and supporting organizations. | | | |
| 14.0 Describe animal and human first aid and laboratory safety – the student will be able to: | | | |
| 14.01 Practice safe procedures when working with animal-related equipment and in laboratory settings. | | | |
| 14.02 Understand animal behaviors as they relate to practicing safety precautions around animal restraint. | | | |
| 14.03 Discuss the impact of unsafe procedures. | | | |
| 14.04 Define zoonosis and investigate selected zoonotic diseases. | | SC.912.L.14.6 | |
| 14.05 Discuss OSHA as it relates to the animal industry. | | | |
| 14.06 Explain how to use a first aid kit and its key components. | | | |
| 14.07 Recognize allergic reactions. | | SC.912.L.14.52 | |
| 14.08 Describe proper use of eye wash solution. | | | |
| 14.09 Understand how to control minor hemorrhage and/or trauma. | | SC.912.L.14.36 | |
| 14.10 Explain emergency procedures. | | | |
| 15.0 Recognize normal and abnormal animal behaviors – the student will be able to: | | | |
| 15.01 Distinguish between instinctive and learned behaviors. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|--|--------------------|
| 15.02 Recognize normal and abnormal behavioral characteristics of animals through observations. | | SC.912.N.1.6 | |
| 15.03 Identify behavioral problems. | | | |
| 16.0 Apply principles of comparative anatomy and physiology to uses within various animal systems – the student will be able to: | | | AS.06.02 |
| 16.01 Identify and summarize the properties, locations, functions and types of animal cells, tissues, organs and body systems. | | | AS.06.02.03.a |
| 16.02 Compare and contrast animal cells, tissues, organs, body systems types and functions among animal species. | | SC.912.L.14.19, 21, 31, 32, 33, 36, 46, 48 | AS.06.02.03.b |
| 16.03 Apply knowledge of anatomical and physiological characteristics of animals to make production and management decisions. | | | AS.06.02.03.c |
| 16.04 Correlate the functions of animal cell structures to animal growth, development, health and reproduction. | | SC.912.L.14.2 | AS.06.02.01.c |
| 17.0 Evaluate the male and female reproductive systems – the student will be able to: | | | |
| 17.01 Examine the basic functions of animal cells in animal growth and reproduction. | | | AS.06.02.02.a |
| 17.02 Analyze the processes of meiosis and mitosis in animal growth, development, health and reproduction. | | | AS.06.02.02.b |
| 17.03 Apply the processes of meiosis and mitosis to solve animal growth, development, health and reproductive problems. | | | AS.06.02.02.c |
| 18.0 Demonstrate safe animal handling and management techniques – the student will be able to: | | | AS.02.01 |
| 18.01 Devise, implement and evaluate safety procedures and plans for working with animals by species using information based on animal behavior and responses. | | SC.912.N.4.2 | AS.02.01.02.c |
| 18.02 Outline safety procedures for working with animals by species. | | | |
| 18.03 Interpret animal behaviors and execute protocols for safe handling of animals. | | | |
| 18.04 Analyze and document animal husbandry practices and their impact on animal welfare. | | | AS.02.01.03.b |
| 18.05 Design programs that assure the proper care and use of animals and prevent abuse or mistreatment. | | SC.912.N.4.1 | AS.02.01.01.b |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|--------------------------------|--------------------|
| 18.06 Implement quality-assurance programs and procedures for animal production. | | | AS.02.01.01.c |
| 19.0 Analyze the communities responsibility in options for caring for unwanted/neglected livestock – the student will be able to: | | | |
| 19.01 Differentiate between animal control agencies and humane societies. | | | |
| 19.02 Explain the laws governing animal care and use. | | SC.912.L.17.13 SC.912.N.4.2 | |
| 20.0 Evaluate the importance of the food and fiber system to understand the impact on global economy – the student will be able to: | | | |
| 20.01 Assess the agricultural impact upon the US gross national product and the total global economy. | MAFS.912.S-IC.1.1, 2 MAFS.912.S-IC.2.6 | | |
| 20.02 Investigate local, state, and national regulatory laws, industry regulations, and legislation for agricultural businesses. | | SC.912.L.17.12, 13 | |
| 20.03 Identify and describe the primary government agencies involved with agriculture. | | SC.912.L.17.13 | |
| 20.04 Research new and emerging technologies and their impact on the economy. | MAFS.912.S-IC.2.6 | | |
| 20.05 Recognize the value of the food and agribusiness industry. | MAFS.912.S-ID.3.9 | SC.912.L.17.18 | |
| 21.0 Examine the scope of career opportunities in and the importance of agriculture to the economy – the student will be able to: | | | |
| 21.01 Define and explore agriculture and agribusinesses and their role in the economy. | | | |
| 21.02 Evaluate and explore the agribusiness career opportunities in agriculture. | | | |
| 21.03 Demonstrate those qualities, attributes and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society. | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Animal Science and Services 3
Course Number: 8106220
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of animal digestive systems; animal breeding; preventive medicine and disease control; control of parasites; animal marketing; and analyzing records

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|---------------|--------------------|
| 22.0 Analyze feed rations and asses if they meet the nutritional needs of animals – the student will be able to: | | | AS.03.02 |
| 22.01 Compare and contrast common types of feedstuffs and the roles they play in the diets of animals. | | SC.912.L.18.1 | AS.03.02.01.a |
| 22.02 Determine the relative nutritional value of feedstuffs by evaluating their general quality and condition. | | | AS.03.02.01.b |
| 22.03 Select appropriate feedstuffs for animals based on factors such as economics, digestive system and nutritional needs. | | | AS.03.02.01.c |
| 22.04 Examine the importance of a balanced ration for animals based on the animal’s growth stage (e.g., maintenance, newborn, gestation, lactation, etc.). | | | AS.03.02.02.a |
| 22.05 Appraise the adequacy of feed rations using data from the analysis of feedstuffs, animal requirements and performance. | MAFS.912.F-IF.2.4 MAFS.912.N-Q.1.3 MAFS912.A-CED.1.3 | | AS.03.02.02.b |
| 22.06 Formulate animal feeds based on nutritional requirements, using feed ingredients for maximum nutrition and optimal economic production. | MAFS.912.F-LE.2.5 MAFS.912.AREI.3.6 MAFS.912.N-Q.1.1, 3 | SC.912.L.18.1 | AS.03.02.02.c |

| CTE Standards and Benchmarks | | FS-M/LA | NGSSS-Sci | National Standards |
|------------------------------|--|---------------------|-----------------------|--------------------|
| 22.07 | Examine the purpose, impact and mode of action of feed additives and growth promotants in animal production | | SC.912.L.18.1 | AS.03.02.03.a |
| 22.08 | Compare and contrast methods that utilize feed additives and growth promotants with production practices that do not, (e.g., organic versus conventional production methods). | | SC.912.L.18.1 | AS.03.02.03.b |
| 22.09 | Make and defend decisions regarding whether to use feed additives and growth promotants after researching and considering scientific evidence, production system needs and goals, and input from industry professionals. | MAFS.912.N-Q.1.1, 3 | | AS.03.02.03.c |
| 22.10 | Analyze different feed labels and apply feed label regulations. | MAFS.912.N-Q.1.3 | | |
| 23.0 | Evaluate animals for breeding readiness and soundness – the student will be able to: | | | AS.04.01 |
| 23.01 | Explain how age, size, life cycle, maturity level and health status affect the reproductive efficiency of male and female animals. | | | AS.04.01.02.a |
| 23.02 | Assess and describe factors that lead to reproductive maturity. | | | AS.04.01.02.b |
| 23.03 | Evaluate and select animals for reproductive readiness. | | | AS.04.01.02.c |
| 23.04 | Summarize the importance of efficient and economic reproduction in animals. | | SC.912.N.4.2 | AS.04.02.03.a |
| 23.05 | Evaluate reproductive problems that occur in animals. | | | AS.04.02.03.b |
| 23.06 | Treat or cull animals with reproductive problems. | | | AS.04.02.03.c |
| 23.07 | Select breeding animals based on characteristics of the reproductive organs. | | SC.912.L.15.4 | AS.04.01.01.c |
| 24.0 | Explain the reproductive system and breeding of selected animals – the student will be able to: | | | |
| 24.01 | Select and evaluate a breeding system based on the principles of genetics. | | SC.912.L.14.31, 33 | AS.04.02.01.c |
| 24.02 | Describe breeding techniques. | | SC.912.L.15.9, 14, 15 | |
| 24.03 | Analyze the care needs for breeding stock in each stage of growth. | | | AS.04.02.04.b |
| 24.04 | Describe the proper care for newborn. | | SC.912.L.14.41 | |
| 25.0 | Design programs to prevent animal diseases, parasites and other disorders and ensure animal welfare– the student will be able to: | | | AS.07.01 |
| 25.01 | Explain methods of determining animal health and disorders. | | | AS.07.01.02.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|----------------|--------------------|
| 25.02 Perform simple health-check evaluations on animals and practice basic emergency response procedures related to animals. | | | AS.07.01.02.b |
| 25.03 Identify and describe common illnesses and disorders of animals based on symptoms and problems caused by wounds, diseases, parasites and physiological disorders. | | | AS.07.01.03.b |
| 25.04 Identify and summarize characteristics of causal agents and vectors of diseases and disorders in animals. | | SC.912.L.14.6 | AS.07.01.04.a |
| 25.05 Research and analyze data to evaluate preventive measures for controlling and limiting the spread of diseases, parasites and disorders among animals. | | SC.912.L.17.17 | AS.07.01.04.b |
| 25.06 Design and implement a health maintenance and disease and disorder prevention plan for animals in their natural and/or confined environments. | | | AS.07.01.04.c |
| 25.07 Explain the clinical significance of common considerations in veterinary treatments, such as aseptic techniques. | | | AS.07.01.05.a |
| 25.08 Assess the safety and effectiveness of facilities and equipment used for surgical and nonsurgical veterinary treatments and procedures. | | | AS.07.01.05.b |
| 25.09 Identify and describe surgical and nonsurgical treatments and procedures in animal health care objectives. | | | AS.07.01.05.c |
| 26.0 Analyze biosecurity measures utilized to protect the welfare of animals on a local, state, national, and global level. – the student will be able to: | | | AS.07.02 |
| 26.01 Summarize the importance of biosecurity to the animal industry at multiple levels (e.g., local, state, national, global). | | | AS.07.02.01.a |
| 26.02 Analyze procedures at the local, state and national levels to ensure biosecurity of the animal industry. | | | AS.07.02.01.b |
| 26.03 Identify and describe zoonotic diseases including their historical significance and potential future implications. | | | AS.07.02.02.a |
| 26.04 Analyze the health risk of different zoonotic diseases to humans and identify prevention methods. | | SC.912.L.14.6 | AS.07.02.02.b |
| 26.05 Research and evaluate the effectiveness of zoonotic disease prevention methods and procedures to identify those that are best suited to ensure public safety and animal welfare. | | | AS.07.02.02.c |
| 27.0 Demonstrate knowledge of preventive medicine and disease control – the student will be able to: | | | |
| 27.01 Describe procedures for prescribed oral medications. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-------------------|--------------------|
| 27.02 Describe the process for administering medications by injection. | | | |
| 27.03 Describe the procedure for safe disposal of biologicals. | | | |
| 27.04 Discuss the term immunology and active and passive immunity. | | SC.912.L.14.6, 52 | |
| 27.05 Describe the process for fecal sample collection, slide preparation, and examination. | | | |
| 28.0 Select animals for specific purposes and maximum performance based on anatomy and physiology – the student will be able to: | | | |
| 28.01 Identify and summarize ways an animal’s health can be affected by anatomical and physiological disorders. | | | AS.06.03.01.a |
| 28.02 Compare and contrast desirable anatomical and physiological characteristics of animals within and between species. | | | AS.06.03.01.b |
| 28.03 Evaluate and select animals to maximize performance based on anatomical and physiological characteristics that affect health, growth and reproduction. | | SC.912.L.15.15 | AS.06.03.01.c |
| 28.04 Compare and contrast procedures to sustainably and efficiently develop an animal to reach its highest performance potential with respect to its anatomical and physiological characteristics. | | | AS.06.03.02.b |
| 28.05 Choose, implement and evaluate sustainable and efficient procedures (e.g., selection, housing, nutrition and management) to produce consistently high-quality animals that are well suited for their intended purposes. | | | AS.06.03.02.c |
| 28.06 Evaluate and select products from animals based on industry standards. | | | AS.03.03.03.b |
| 29.0 Prepare, groom, exhibit, and market animals – the student will be able to: | | | |
| 29.01 Groom selected animals for exhibition. | | | |
| 29.02 Train animals for show and/or exhibition. | | | |
| 29.03 Demonstrate proper techniques for exhibiting and animals. | | | |
| 29.04 Demonstrate knowledge required to train selected animals to halter. | | | |
| 29.05 Measure animal growth using a scale. | | | |
| 29.06 Identify market outlets. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|-----------|--------------------|
| 29.07 Describe methods of restraining, loading, handling, and transporting animals safely. | | | |
| 29.08 Determine market grades of animals and animal products. | | | |
| 29.09 Identify components of shipping and health certificates. | | | |
| 30.0 Maintain and analyze records – the student will be able to: | | | |
| 30.01 Maintain and analyze animal records. | MAFS.912.N-Q.1.1 | | |
| 30.02 Discuss the legal requirements of maintaining animal health records, and maintain and analyze animal health records. | MAFS.912.N-Q.1.1 | | |
| 30.03 Maintain and analyze basic business records (inventory, depreciation, receipts, and expenses) using computer applications. | MAFS.912.N-Q.1.1 MAFS912.A-CED.1.3 MAFS.912.F-IF.3.8b | | |
| 30.04 Prepare and maintain Supervised Agricultural Experience (SAE) records. | MAFS.912.N-Q.1.1 MAFS912.A-CED.1.1 | | |
| 31.0 Explain the components of the American business system – the student will be able to: | | | |
| 31.01 Describe the five basic ways American business is organized. | | | |
| 31.02 Distinguish and identify between the characteristics of each method of doing business. | | | |
| 31.03 Evaluate the advantages and disadvantages provided by each business method. | | | |
| 31.04 Evaluate how cooperative principles and practices differentiate cooperatives from other businesses. | | | |
| 32.0 Investigate agricultural cooperatives structure and function – the student will be able to: | | | |
| 32.01 Explain the definition of a cooperative. | | | |
| 32.02 Understand the history of cooperative principles and practices. | | | |
| 32.03 Describe the five areas that classify cooperative structure. | | | |
| 32.04 Distinguish and identify between the five types of cooperative structure and their functions. | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Animal Science and Services 4
Course Number: 8106230
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of nutrition; grooming, exhibiting and marketing animals; operation, maintenance and repair of equipment.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|---------------|--------------------|
| 33.0 Apply animal health practices – the student will be able to: | | | |
| 33.01 Administer prescribed oral medications. | | | |
| 33.02 Locate injection points of selected animals. | | | |
| 33.03 Sterilize instruments and supplies. | | | |
| 33.04 Interpret and follow directions on medications and animal health aids, including withdrawal periods. | | | |
| 33.05 Dip, spray, or dust animals for external parasites (under supervision). | | | |
| 33.06 Dispose of empty chemical and medical containers as prescribed. | | | |
| 33.07 Store medications and chemicals safely and securely. | | | |
| 33.08 Dispose of biomedical waste and by products (needles, scalpel blades, medicines, etc.) | | | |
| 34.0 Maintain equipment and facilities – the student will be able to: | | | |
| 34.01 Clean and disinfect pens, cages, feeders, waterers, trailers and other equipment according to Best Management Practices. | | SC.912.L.14.6 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-------------------|----------------------------------|--------------------|
| 34.02 Dispose of animal residue and waste according to Best Management Practices. | | SC.912.L.17.14 | |
| 34.03 Prepare and maintain equipment and instruments. | | | |
| 34.04 Repair and maintain pens, cages and other facilities and structures. | | | |
| 34.05 Create a clean, sanitary and healthy environment for animals. | | | |
| 35.0 Operate, maintain, and repair machinery and equipment – the student will be able to: | | | |
| 35.01 Use equipment-operator and repair manuals. | | | |
| 35.02 Operate, service, and maintain equipment. | | | |
| 35.03 Maintain records of equipment maintenance and repair. | | | |
| 35.04 Prepare equipment for storage. | | | |
| 35.05 Demonstrate safety practices in operating machinery and equipment. | | | |
| 36.0 Investigate emerging technologies in Animal Science – the student will be able to: | | | |
| 36.01 Identify new technologies in animal science. | | | |
| 36.02 Research emerging technologies and determine their impact on animal industry and society. | | SC.912.L.16.10 SC.912.L.17.17 | |
| 37.0 Apply scientific principles in the selection and breeding of animals – the student will be able to: | | | |
| 37.01 Compare and contrast the use of genetically superior animals in the production of animals and animal products. | | | AS.04.02.01.b |
| 37.02 Identify and categorize natural and artificial breeding methods (e.g., natural breeding, artificial insemination, estrous synchronization, flushing, cloning, etc.). | | | AS.04.03.01.a |
| 37.03 Select animal breeding methods based on reproductive and economic efficiency. | | | AS.04.03.01.c |
| 37.04 Examine the use of quantitative breeding values (e.g., EPDs, Performance records, pedigrees) in the selection of genetically superior breeding stock. | MAFS.912.S-IC.2.6 | | AS.04.03.04.a |
| 37.05 Compare and contrast quantitative breeding value differences between genetically superior animals and animals of average genetic value. | MAFS.912.S-IC.2.6 | | AS.04.03.04.b |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|-------------------|----------------|--------------------|
| 37.06 Select and assess animal performance based on quantitative breeding values for specific characteristics. | | | AS.04.03.04.c |
| 37.07 Identify and summarize the advantages and disadvantages of major reproductive management practices, including estrous synchronization, superovulation, flushing and embryo transfer (e.g., cost, labor, equipment, etc.). | | | AS.04.03.03.a |
| 37.08 Analyze the processes of major reproductive management practices, including estrous synchronization, superovulation, flushing and embryo transfer. | | | AS.04.03.03.b |
| 37.09 Create and evaluate plans and procedures for estrous synchronization, superovulation, flushing, embryo transfer and other reproductive management practices. | | | AS.04.03.03.c |
| 37.10 Calculate the potential economic benefits of natural versus artificial breeding methods. | | | AS.04.03.01.b |
| 37.11 Analyze the materials, methods and processes of artificial insemination. | | | AS.04.03.02.a |
| 37.12 Demonstrate artificial insemination techniques. | | | AS.04.03.02.b |
| 38.0 Manage pasture and forage crops – the student will be able to: | | | |
| 38.01 Compare pasture, forage and feed crop production and harvesting systems. | | | |
| 38.02 Assist in determining pasture and forage needs. | | | |
| 38.03 Take a forage sample and interpret results. | MAFS.912.S-IC.2.6 | SC.912.N.1.4 | |
| 38.04 Determine range and pasture quality. | | | |
| 38.05 Assist in the development of a plan for the rotation of fields, pens and pastures. | | SC.912.L.17.20 | |

**Florida Department of Education
Student Performance Standards**

Course Title: Animal Science and Services 5
Course Number: 8106240
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of nutrition; grooming, exhibiting and marketing animals; operation, maintenance and repair of equipment.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|-----------------|--------------------|
| 39.0 Discuss animal marketing techniques – the student will be able to: | | | |
| 39.01 Collect and interpret market reports and identify market outlets for companion and food-producing animals. | MAFS.912.S-ID.1.2, 3, 4 MAFS.912.S-ID.2.5, 6 MAFS.912.S-ID.3.7, 8, 9 | | |
| 39.02 Determine market grades of animal and animal products. | | | |
| 39.03 Examine the impacts of industry promotion campaigns. | MAFS.912.S-IC.2.6 | | |
| 40.0 Apply advanced animal health practices – the student will be able to: | | | |
| 40.01 Administer prescribed injections (under supervision). | | | |
| 40.02 Discuss proper disposal of deceased animals. | | SC.912.L.17.14 | |
| 40.03 Determine when euthanasia is appropriate. | | SC.912.N.4.1, 2 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|------------------------------|--------------------|
| 40.04 Discuss AVMA approved methods of euthanasia. | | SC.912.N.4.1, 2 | |
| 40.05 Discuss BMPs (Best Management Practices) associated with castration, dehorning, docking, debeaking, and/or another component of livestock management. | | SC.912.N.4.2 SC.912.N.4.1 | |
| 41.0 Perform emergency first aid on animals – the student will be able to: | | | |
| 41.01 Evaluate the health status of the animals. | | | |
| 41.02 Isolate injured animals. | | | |
| 41.03 Demonstrate how to properly cleanse wounds and apply antiseptic. | | | |
| 41.04 Immobilize fractured limbs. | | | |
| 41.05 Identify and stop external bleeding. | | SC.912.L.14.36 | |
| 41.06 Know when to seek additional medical attention for animals. | | | |
| 42.0 Implement procedures to ensure that animal products are safe – the student will be able to: | | | |
| 42.01 Research and summarize animal production practices that may pose health risks. | | | AS.02.02.02.a |
| 42.02 Analyze consumer concerns with animal production practices relative to human health. | | | AS.02.02.02.b |
| 42.03 Research and evaluate programs to assure the safety of animal products for consumption. | | | AS.02.02.02.c |
| 42.04 Identify and describe animal tracking systems used in animal systems (e.g., livestock, companion animal, exotics, etc.). | | | AS.02.02.03.a |
| 42.05 Analyze and summarize the impact of animal trace-back capabilities on producers and consumers. | | SC.912.N.4.2 | AS.02.02.03.b |
| 42.06 Evaluate the effectiveness of animal and/or premise identification programs for a given species. | | | AS.02.02.03.c |
| 43.0 Identify, select, and breed food-producing animals – the student will be able to: | | | |
| 43.01 Appraise animal conformation and desirable characteristics and breeds. | | | |
| 43.02 Justify offspring that should be culled. | | | |
| 43.03 Identify signs of parturition. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|----------------|--------------------|
| 43.04 Identify common disorders of parturition. | | | |
| 43.05 Prepare animals and facilities for parturition. | | | |
| 43.06 Assist in the delivery of newborn animals. | | | |
| 44.0 Analyze county, state and federal agencies that support the animal industry – the student will be able to: | | | |
| 44.01 Identify the agencies that support the animal industry. | | SC.912.L.17.12 | |
| 44.02 Research the technical assistance, disaster relief, grants and other programs available. | | | |
| 44.03 Inquire about career opportunities within these agencies. | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Animal Science and Services 6
Course Number: 8106250
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of nutrition; grooming, exhibiting and marketing animals; operation, maintenance and repair of equipment.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|---------------|--------------------|
| 45.0 Plan routine management of food-producing animals and facilities – the student will be able to: | | | |
| 45.01 Schedule feeding and care of animals. | | | |
| 52.02 Order supplies and animal feeds. | | | |
| 51.01 Develop training and exercise schedule for animal. | | | |
| 51.02 Develop a plan for routine maintenance of equipment and facilities. | | | |
| 51.03 Assist in the planning of a routine animal health and preventative medication program. | | | |
| 51.04 Implement and maintain sanitary conditions for animals, including young. | | SC.912.L.14.6 | |
| 51.05 Separate non-compatible animals. | | | |
| 51.06 Observe animals on a regular basis for problems or stress. | | | |
| 51.07 Develop a calendar of operations for a selected animal operation. | | | |
| 46.0 Maintain and analyze records – the student will be able to: | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---|--------------|--------------------|
| 46.01 Analyze and utilize production, performance and breeding records, using computer applications. | | | |
| 46.02 Identify major sources of credit. | | | |
| 46.03 Evaluate leasing and renting agreements. | | | |
| 46.04 Evaluate need for liability and other insurance. | | | |
| 46.05 Analyze records to determine efficiency of operation. | MAFS.912.F-IF.3.8b MAFS.912.S-ID.3.7 MAFS.912.S-ID.1.2 MAFS.912.S-IC.2.6 | | |
| 46.06 Maintain machinery, equipment and facilities inventory records. | | | |
| 46.07 Maintain breeding records. | | | |
| 46.08 Prepare an annual budget. | | | |
| 46.09 Maintain and analyze basic business records (inventory, depreciation, receipts, and expenses) using computer applications. | MAFS.912.N-Q.1.1 MAFS912.A-CED.1.3 MAFS.912.F-IF.3.8b MAFS912.F-LE.1.1(bc) | | |
| 46.10 Plan a work schedule. | | | |
| 46.11 Maintain personnel and labor records. | | | |
| 46.12 Maintain supervised agricultural experience records. | MAFS.912.N-Q.1.1 MAFS.912.A-CED.1.1 | | |
| 46.13 Discuss the legal requirements of maintaining animal health records, and maintain and analyze health records. | MAFS.912.N-Q.1.1 MAFS.912.S-IC.2.6 | | |
| 46.14 Maintain chemical-use and water-use records, etc. | | | |
| 47.0 Design animal housing, equipment and handling facilities for animal production – the student will be able to: | | | |
| 47.01 Identify facilities needed to house and produce each animal species safely and efficiently. | | SC.912.N.4.1 | AS.07.01.01.a |
| 47.02 Critique designs for an animal facility and prescribe alternative layouts and adjustments for the safe and efficient use of the facility. | | SC.912.N.4.1 | AS.07.01.01.b |
| 47.03 Design an animal facility, focusing on animal requirements, efficiency, safety and ease of handling. | | SC.912.N.4.1 | AS.07.01.01.c |
| 47.04 Identify equipment and handling facilities used in modern animal production. | | | AS.07.01.02.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|----------------|--------------------|
| 47.05 Explain how modern equipment and handling facilities enhance the safe and economic production of animals. | | | AS.07.01.02.b |
| 47.06 Select equipment and implement animal handling procedures and improvements to enhance production efficiency. | | | AS.07.01.02.c |
| 48.0 Comply with government regulations and safety standards for facilities used in animal production – the student will be able to: | | | |
| 48.01 List the general standards (e.g., environmental, zoning, construction) that must be met in facilities for animal production. | | | AS.07.02.01.a |
| 48.02 Evaluate an animal facility to determine if standards have been met. | | | AS.07.02.01.b |
| 48.03 Design a facility that meets standards for the legal, safe, ethical and efficient production of animals. | | | AS.07.02.01.c |
| 49.0 Identify and interpret rules, policy, and regulations affecting the animal industry – the student will be able to: | | | |
| 49.01 Maintain a file of current animal rules and regulations. | | | |
| 49.02 Secure professional services and information. | | | |
| 49.03 Observe EPA pesticide use regulations. | | SC.912.L.17.13 | |
| 49.04 Identify the procedures and requirements for obtaining a restricted use pesticide applicator's license. | | | |
| 49.05 Observe regulations regarding the use of medications and growth stimulants. | | | |
| 49.06 Observe state and federal regulations regarding disease testing/eradication programs and other programs. | | | |
| 49.07 Identify applicable land-use and zoning regulations. | | SC.912.L.17.12 | |
| 49.08 Identify agencies affecting natural resource utilization (e.g., DNR, DEP, EPA). | | | |
| 49.09 Identify agencies regulating employee/employer relations (e.g., OSHA). | | | |
| 49.10 Investigate opportunities to impact policy making at the local, state, and national level. | | | |
| 50.0 Understand the relationship of animal production and the environment – the student will be able to: | | | |
| 50.01 Evaluate the relationship between animal agriculture on the environment. | | SC.912.L.17.17 | AS.08.01.01.a |
| 50.02 Outline methods of balancing the effects of animal agriculture on the environment. | | SC.912.L.17.17 | AS.08.01.01.b |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|----------------|--------------------|
| 50.03 Implement BMPs (Best Management Practices) to balance the impact of animal agriculture on the environment. | | SC.912.L.17.17 | AS.08.01.01.c |
| 50.04 Determine positive effects of animal agriculture on the environment. | | SC.912.L.17.17 | |
| 51.0 Evaluate the effects of environmental conditions on animals – the student will be able to: | | | |
| 51.01 Identify optimal environmental conditions for animals. | | | AS.08.02.01.a |
| 51.02 Describe the effects of environmental conditions on animal populations and performance. | | | AS.08.02.01.b |
| 51.03 Establish and maintain favorable environmental conditions for animal growth and performance. | | | AS.08.02.01.c |
| 52.0 Identify and interpret environmental issues and regulations pertaining to animal industry – the student will be able to : | | | |
| 52.01 Determine environmental issues pertinent to your area. | | | |
| 52.02 Calculate the economic impact of environmental regulations on the industry. | | | |
| 52.03 Discuss emerging technologies and determine their effectiveness as related to environmental quality. | | SC.912.L.17.15 | |
| 52.04 Evaluate an animal facility to determine if standards have been met. | | | |
| 52.05 Design a facility that meets standards for the legal, safe, ethical and efficient production of animals. | | | |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Extended Student Supervision

Because of the production and marketing cycle of the animal industry, this program requires individual instruction and supervision of students for the entire period beyond the 180-day school year.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

Florida Department of Education
Curriculum Framework

Program Title: Agritechnology
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

| | |
|----------------------------|---|
| Program Number | 8106800 |
| CIP Number | 0101039901 |
| Grade Level | 9-12 |
| Standard Length | 3 credits |
| Teacher Certification | Refer to the <u>Program Structure</u> section. |
| CTSO | FFA |
| SOC Codes (all applicable) | 19-4011 - Agricultural and Food Science Technicians |

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to instruction in animal and plant production and processing; agriculture marketing; agricultural mechanics; employability skills; mathematics; basic science; biological sciences; communications; and human-relations skills.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of one occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the secondary program structure:

| OCP | Course Number | Course Title | Teacher Certification | Length | SOC Code | Level | Graduation Requirements |
|-----|---------------|---------------------------|-----------------------|----------|----------|-------|-------------------------|
| A | 8106810 | Agriscience Foundations 1 | AGRICULTUR 1 @2 | 1 credit | 19-4011 | 3 | EQ |
| | 8106820 | Agritechnology 1 | | 1 credit | | 2 | |
| | 8106830 | Agritechnology 2 | | 1 credit | | 2 | |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Academic Alignment Table

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

| Courses | Anatomy/ Physiology Honors | Astronomy Solar/Galactic Honors | Biology 1 | Chemistry 1 | Earth-Space Science | Environmental Science | Genetics | Integrated Science | Marine Science 1 Honors | Physical Science | Physics 1 |
|-------------------------|----------------------------|---------------------------------|--------------|--------------|---------------------|-----------------------|--------------|--------------------|-------------------------|------------------|--------------|
| Agriscience Foundations | 29/87 33% | 18/80 23% | 55/83 66% | 11/69 16% | 36/67 54% | 30/70 42% | 20/69 29% | 49/82 60% | 25/66 38% | 38/74 51% | 12/72 16% |
| Agritechnology 1 | 9/87 10% | 9/80 11% | 37/83 45% | 10/69 14% | 27/67 40% | 19/70 27% | 10/69 14% | 28/82 34% | 20/66 30% | 27/74 36% | 10/72 14% |
| Agritechnology 2 | 27/87 31% | 29/80 36% | 18/83 22% | 29/69 42% | 12/67 18% | 42/70 60% | 26/69 38% | 14/82 17% | 36/66 56% | 15/74 20% | 29/72 40% |

** Alignment pending review

Alignment attempted, but no correlation to academic course

| Courses | Algebra 1 | Algebra 2 | Geometry | English 1 | English 2 | English 3 | English 4 |
|-------------------------|--------------|------------|-------------|--------------|--------------|--------------|--------------|
| Agriscience Foundations | 14/67 21% | 4/75 5% | 8/54 15% | 11/46 24% | 11/45 24% | 11/45 24% | 11/45 24% |
| Agritechnology 1 | ** | ** | ** | ** | ** | ** | ** |
| Agritechnology 2 | ** | ** | ** | ** | ** | ** | ** |

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and

language in their respective fields. The FS for Mathematical Practices are designed for grades K-12 and describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education.

Instructors must incorporate the Florida Standards for Technical Subjects and Mathematical Practices throughout instruction of this CTE program.

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL’s need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. If so, the standards have been identified and cross walked with the corresponding CTE standard and/or benchmark.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Describe the history of agriculture and its influence on the global economy.
- 02.0 Practice agriscience safety skills and procedures.
- 03.0 Apply scientific and technological principles to agriscience issues.
- 04.0 Apply environmental principles to the agricultural industry.
- 05.0 Investigate and utilize basic scientific skills and principles in plant science.
- 06.0 Investigate and utilize basic scientific skills and principles in animal science.
- 07.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 08.0 Demonstrate agribusiness, employability and human relation skills.
- 09.0 Apply leadership and citizenship skills.
- 10.0 Discuss components of food safety and handling practices in agriculture.
- 11.0 Explore the scope of the agriscience industry.
- 12.0 Determine proper animal health and nutrition.
- 13.0 Identify components of reproduction.
- 14.0 Identify procedures in animal production.
- 15.0 Develop procedures for exhibiting animals.
- 16.0 Compare, select, and use plant production systems.
- 17.0 Investigate proper methods to fertilize plants and crops.
- 18.0 Operate, maintain, and service facilities, tools, and equipment.
- 19.0 Apply principles of agribusiness finance.
- 20.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy.
- 21.0 Examine the scope of career opportunities in and the importance of agriculture to the economy.
- 22.0 Analyze the scope of the Agriscience industry.
- 23.0 Recommend steps for proper animal health and nutrition.
- 24.0 Select, and use plant production systems.
- 25.0 Fertilize plants and crops.
- 26.0 Irrigate plants and crops.
- 27.0 Control plant pests.
- 28.0 Maintain, and service facilities, tools, and equipment.
- 29.0 Describe procedures for harvesting and marketing agricultural products.
- 30.0 Compare principles of agribusiness finance.
- 31.0 Explain the components of the American business system.
- 32.0 Investigate agricultural cooperatives structure and function.

**Florida Department of Education
Student Performance Standards**

Course Title: Agriscience Foundations 1
Course Number: 8106810
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of agricultural history and the global impact of agriculture; career opportunities; scientific and research concepts; biological and physical science principles; environmental principles; agriscience safety; principles of leadership; and agribusiness, employability, and human relations skills in agriscience. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students will interact with materials and primary sources of data or with secondary sources of data to observe and understand the natural world. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 20% of classroom time will be dedicated to laboratory experiences.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|------------------------------------|---|--------------------|
| 01.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to: | | SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2; | |
| 01.01 Evaluate and explain emerging trends and the opportunities they may create within the AFNR systems. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.01.01.02.c |
| 01.02 Assess the economic impact of an AFNR system on a local, state, national and global level. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | CS.02.02.03.b |
| 01.03 Identify significant career patterns/shifts in the history of the agricultural industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.01.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-------------------------------------|--|--------------------|
| 01.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.06.02.01.a |
| 02.0 Practice agriscience safety skills and procedures--The student will be able to: | | SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7; | |
| 02.01 Identify the common causes and prevention of accidents in agriscience operations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.a |
| 02.02 Extract and utilize pertinent information from a container label and/or Safety Data Sheet (SDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | CS.03.04.03.a |
| 02.03 Identify proper disposal of hazardous waste materials and biohazards. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | ESS.04.01.02.c |
| 02.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.b |
| 03.0 Apply scientific and technological principles to agriscience issues--The student will be able to: | | SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1; | |
| 03.01 Employ scientific measurement skills. | | | |
| 03.02 Demonstrate safe and effective use of common laboratory equipment. | | | ESS.01.02.01.b |
| 03.03 Identify the parts and functions of plant and animal cells. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |
| 03.04 Describe the phases of cell reproduction. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 03.05 Implement the scientific method and science process skills through | LAFS.910.W.2.4 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|--------------------|
| the design and completion of an agriscience research project. | LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |
| 03.06 Interpret, analyze, and report data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | BS.02.01.01.b |
| 03.07 Investigate DNA and genetics applications in agriscience including the theory of probability. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | BS.01.01.01.a |
| 03.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.). | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | BS.03.01.03.b |
| 04.0 Apply environmental principles to the agricultural industry--The student will be able to: | | SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12 | |
| 04.01 Research how different climactic and geological activity influences agriculture. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | NRS.01.03.02.b |
| 04.02 Describe various ecosystems as they relate to the agriculture industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.03 Describe the environmental resources (soil, water, air) necessary for agriculture production. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.08.02.01.a |
| 04.04 Identify regulatory agencies that impact agricultural practices. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6 | | NRS.02.01.02.a |
| 04.05 Apply Best Management Practices that enhance the natural environment. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.06 Identify conservation practices related to natural resources. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.02.02.b |
| 05.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to: | | SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7; | |
| 05.01 Identify and describe the specializations within the plant science industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|---|
| | LAFS.1112.W.2.4 | | |
| 05.02 Categorize plants based on specific characteristics according to industry and scientific standards. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.01.01.a |
| 05.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc.... | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.03.01.a PS.02.03.02.a PS.02.03.05.a |
| 05.04 Identify the nutrients required for plant growth from the periodic table and explain their functions. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.01.02.01.a |
| 05.05 Analyze information from a fertilizer label. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | PS.01.03.04.b |
| 05.06 Propagate and grow plants through sexual and/or asexual reproduction. | | | PS.03.01.03.a PS.03.01.01.b |
| 05.07 Investigate the impacts of various pests and propose solutions for their control. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.03.03.01.c |
| 05.08 Investigate the nature and properties of food, fiber, and by-products from plants. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.09 Explore career opportunities in plant science. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.05.01.01.a |
| 06.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to: | | SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19; | |
| 06.01 Explain the economic importance of animals and the products obtained from animals. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.02 Analyze commercially important livestock breeds in Florida. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |
| 06.04 Compare and contrast animal welfare issues. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.02.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|---|--------------------|
| | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 06.05 Investigate the nature and properties of food, fiber, and by-products from animals. | | | AS.06.03.03.a |
| 06.06 Explore career opportunities in animal science. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | CS.05.01.01.a |
| 07.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to | | SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9; | |
| 07.01 Select and demonstrate proper use of hand tools in agriculture. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.04.02.a |
| 07.02 Operate service and maintain agriscience equipment, and instruments. | | | CS.03.04.03.b |
| 07.03 Manage facilities and supplies. | | | |
| 08.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to: | | | |
| 08.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE). | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 08.02 Utilize a record keeping system to collect, interpret, and analyze data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 08.03 Enhance oral communications through telephone, interview and presentation skills. | LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | CRP.04.01.02.b |
| 08.04 Enhance written communication by developing resumes and business letters. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2 | | CRP.04.02.02.b |
| 08.05 Demonstrate interpersonal (nonverbal) communication skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|-----------|---------------------------------|
| 08.06 Demonstrate good listening skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.04.03.01.a |
| 09.0 Apply leadership and citizenship skills--The student will be able to: | | | |
| 09.01 Identify and describe leadership characteristics. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.01.a |
| 09.02 Identify opportunities to apply acquired leadership skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.02.a |
| 09.03 Identify and demonstrate ways to be an active citizen. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.01.03.02.c |
| 09.04 Participate in community based learning activities. | | | CRP.01.03.01.a |
| 09.05 Demonstrate the ability to work cooperatively. | | | CRP.09.03.01.a |
| 09.06 Conduct formal and informal meetings using correct parliamentary procedure skills. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 09.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 09.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks. | | | CS.05.01.01.b CRP.10.02.02.b |
| 10.0 Discuss components of food safety and handling practices in agriculture - The student will be able to: | | | |
| 10.01 Demonstrate proper safety precautions and use of personal protective equipment. | | | FPP.01.01.01.b |
| 10.02 Evaluate the food safety responsibilities that occur along the food supply chain. | | | FPP.03.03.02.b |
| 10.03 Explain techniques and procedures for the safe handling of food products. | | | FPP.03.03.02.c |
| 10.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation). | | | FPP.03.03.01.b |
| 10.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply. | | | FPP.04.01.01.0b |

**Florida Department of Education
Student Performance Standards**

Course Title: Agritechnology 1
Course Number: 8106820
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of agriscience industry careers; prevention and treatment of livestock diseases; livestock anatomy; wholesale cuts of meat; animal reproduction and identification; animal safety; animal-health certification; plant growth; plant fertilization; safe use of pesticides; maintenance of tools and equipment; record keeping; and employability skills.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|---|--------------------|
| 11.0 Explore the scope of the agriscience industry--The student will be able to: | | SC.912.N.1.1, 4, 5 SC.912.N.4.1; | |
| 11.01 Investigate career opportunities in agriscience industries. | | | CS.05.01.01.a |
| 11.02 Describe training requirements for entry and advancement in agriscience careers. | | | Cs.05.02.02.a |
| 12.0 Determine proper animal health and nutrition--The student will be able to: | | SC.912.L.14.6, 31, 52 SC.912.L.16.7 SC.912.L.17.1, 2, 6, 8, 11, 14, 15, 16, 17, 18, 20 SC.912.L.18.2, 3, 4 SC.912.N.1.1, 2, 4, 5, 6 | |
| 12.01 Demonstrate proper methods to clean and disinfect animal equipment and facilities. | | | |
| 12.02 Explain proper disposal of animal waste with regards to sanitation, economics, and environmental implications | | | AS.08.01.01.a |
| 12.03 Describe a livestock animals digestive system. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|-----------------|---|--------------------|
| 12.04 Describe nutritional requirements of animals. | | | AS.03.01.01.a |
| 13.0 Identify components of reproduction--The student will be able to: | | SC.912.L.14.31, 32, 33 SC.912.L.15.2, 5, 6 SC.912.L.16.1, 2, 10, 13 SC.912.N.3.5 | |
| 13.01 Examine livestock and poultry reproductive anatomy. | | | AS.04.01.01.b |
| 13.02 Explain the reproductive cycles of commercially important animals. | | | |
| 13.03 Compare and select appropriate breeding methods for different agricultural enterprises. | | | |
| 13.04 Describe approved care for newborn animals. | | | AS.04.02.04.a |
| 14.0 Identify procedures in animal production | | | |
| 14.01 Compare & contrast desirable characteristics of breeding and market animals. | | | AS.04.02.01.b |
| 14.02 Evaluate wholesale cuts of beef, pork, lamb, and poultry. | | | |
| 14.03 Describe methods of animal identification. | | | |
| 14.04 Describe methods of restraining, loading, handling, and transporting animals safely. | | | |
| 15.0 Develop procedures for exhibiting animals--The student will be able to: | | SC.912.L.16.10 | |
| 15.01 Demonstrate the procedures for preparing, maintaining, and handling livestock. | | | |
| 15.02 Compare and contrast appropriate livestock evaluation criteria. | | | AS.06.03.02.a |
| 15.03 Prepare appropriate registrations, shipping and health certificates required for exhibiting or marketing animals. | | | |
| 15.04 Demonstrate appropriate grooming and showmanship skills. | | | |
| 16.0 Compare, select, and use plant production systems--The student will be able to: | MAFS.912.S-IC.2 | SC.912.L.14.7, 53 SC.912.L.15.5, 6 SC.912.L.16.17 SC.912.L.17.4 SC.912.L.18.7 | |
| 16.01 Compare different plant production systems. (Seed, cutting, air layer and tissue culture). | | | |

| CTE Standards and Benchmarks | | FS-M/LA | NGSSS-Sci | National Standards |
|------------------------------|--|------------------|--|--------------------|
| 16.02 | Propagate, transplant and grow plants. | | | |
| 16.03 | Select and prepare a site and/or a seedbed for planting. | | | |
| 16.04 | Identify methods of pruning plants to achieve desired growth and to maintain health. | | | |
| 17.0 | Investigate proper methods to fertilize plants and crops--The student will be able to: | MAFS.912.N-Q.1.3 | SC.912.L.17.10, 16 SC.912.P.8.8, 11 | |
| 17.01 | Interpret information on a fertilizer label. | | | |
| 17.02 | Compare sources and forms of nutrients. | | | |
| 17.03 | Determine methods of applying fertilizer materials. | | | |
| 17.04 | Collect soil sample to determine nutrient levels. | | | PS.01.03.03.a |
| 17.05 | Test for pH and soluble salts. | | | |
| 18.0 | Operate, maintain, and service facilities, tools, and equipment--The student will be able to: | | SC.912.P.10.3, 14, 15, 16, 18 | |
| 18.01 | Use and maintain hand tools and power equipment (e.g., power saws, welders). | | | PST.02.02.02.b |
| 18.02 | Describe maintenance and service of small engines. | | | |
| 18.03 | Examine science principles as applied in selected mechanical applications (e.g. levers, pulleys, hydraulics, and internal combustion). | | | |
| 19.0 | Apply principles of agribusiness finance--The student will be able to: | MAFS.912.S-IC.2 | SC.912.N.4.2 | |
| 19.01 | Identify components of balance sheets and income statements. | | | ABS.02.01.01.a |
| 19.02 | Identify major sources of credit for agribusiness. | | | ABS.03.02.02.a |
| 19.03 | Complete a business loan application. | | | |
| 19.04 | Maintain and interpret agribusiness financial records including depreciation, inventory, and budgets. | | | |
| 20.0 | Evaluate the importance of the food and fiber system to understand the impact on global economy.—The student will be able to: | | | |
| 20.01 | Assess the agricultural impact upon the US gross national product and the total global economy. | | | CS.02.02.03.b |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 20.02 Investigate local, state, and national regulatory laws, industry regulations, and legislation for agricultural businesses. | | | |
| 20.03 Identify and describe the primary government agencies involved with agriculture. | | | |
| 20.04 Research new and emerging technologies and their impact on the economy. | | | CS.01.02.02.c |
| 20.05 Describe the value of the food and agribusiness industry. | | | |
| 21.0 Examine the scope of career opportunities in and the importance of agriculture to the economy. | | | |
| 21.01 Define and explore agriculture and agribusinesses and their role in the economy. | | | CS.02.02.03.a |
| 21.02 Evaluate and explore the agribusiness career opportunities in agriculture. | | | |
| 21.03 Compare how key organizational structures and processes affect organizational performance and the quality of products and services. | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Agritechnology 2
Course Number: 8106830
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of welding; small gasoline engine service and repair; preventative maintenance procedures; irrigation system repair; refrigeration; new and emerging technologies; financial management skills; and employability skills.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|------------------|--|--------------------|
| 22.0 Analyze the scope of the agriscience industry--The student will be able to: | | SC.912.N.1.1, 4, 5 SC.912.N.4.1 | |
| 22.01 Identify and describe the importance of professional and trade organizations. | | | |
| 22.02 Examine and interpret trade journals, and academic research in the agriscience industry. | | | |
| 22.03 Complete a job application | | | |
| 23.0 Recommend steps for proper animal health and nutrition--The student will be able to: | MAFS.912.N-Q.1.3 | SC.912.L.14.6, 31, 52 SC.912.L.16.7; SC.912.L.17.1, 2, 6, 8, 11, 14, 15, 16, 17, 18, 20 SC.912.L.18.2, 3, 4 SC.912.N.1.1, 2, 4, 5. 6 | |
| 23.01 Recognize, describe and demonstrate prevention and treatment of common animal diseases, disorders, and pests. | | | AS.07.01.03.b |
| 23.02 Read, interpret, and demonstrate correct uses of pesticides, medication, and other additives according to their labels. | | | |
| 23.03 Formulate and compute least-cost feed rations. | | | AS.03.01.02.b |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-------------------------------------|---|--------------------|
| 23.04 Select and apply growth stimulators and implants. | | | AS.03.02.03.c |
| 23.05 Determine feeding rates and methods of feeding animals. | | | |
| 24.0 Select, and use plant production systems--The student will be able to: | MAFS.912.S-IC.2 | SC.912.L.14.7, 53 SC.912.L.15.5, 6 SC.912.L.16.17 SC.912.L.17.4 SC.912.L.18.7 | |
| 24.01 List the leading local (community) varieties of commonly grown crops for commercial production. | | | |
| 24.02 Recommend varieties of local commercial plants and field crops. | | | |
| 24.03 Identify the recommended planting rate, spacing requirements and growth times for common garden crops. | | | |
| 24.04 Describe the operation of and adjustment of plant production equipment | | | |
| 25.0 Fertilize plants and crops--The student will be able to: | MAFS.912.S-IC.2 MAFS.912.N-Q.1.3 | SC.912.L.17.10, 16 SC.912.P.8.8, 11 | |
| 25.01 Develop fertilization schedules and calculate fertilizer rates for plants. | | | PS.01.03.06.c |
| 25.02 Identify common nutrient-deficiency symptoms in plants. | | | PS.01.03.01.b |
| 25.03 Calibrate fertilization equipment and fertilize plants. | | | PS.01.03.04.c |
| 26.0 Irrigate plants and crops--The student will be able to: | MAFS.912.N-Q.1.3 | SC.912.E.7.5, 6, 7, 8, 9 SC.912.L.17.10; | |
| 26.01 Recognize soil and plant conditions indicating irrigation needs and develop an irrigation schedule. | | | |
| 26.02 Compare and select irrigation equipment and methods. | | | |
| 26.03 Install, operate, maintain, and repair irrigation equipment. | | | |
| 26.04 Develop Best Management Practices for water use. | | | |
| 27.0 Control plant pests--The student will be able to: | MAFS.912.N-Q.1.3 | SC.912.L.17.6, 8, 9, 13, 17 | |
| 27.01 Compare and contrast common plant pests and their damages. | | | PS.03.03.01.a |
| 27.02 Diagram life cycles of insects, pests, and diseases. | | | PS.03.03.02.a |
| 27.03 Interpret the procedures and requirements for obtaining a | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-----------------|---------------------------|--------------------|
| restricted-use-pesticide operator's license. | | | |
| 27.04 Select, mix, and apply a no restricted chemical according to the label and local, state, federal and EPA regulations. | | | |
| 27.05 Describe biological, chemical and cultural methods of controlling plant pests. | | | PS.03.03.03.c |
| 27.06 Develop Best Management Practices for pest management. | | | |
| 28.0 Maintain, and service facilities, tools, and equipment--The student will be able to: | | SC.912.P.10.3,14,15,16,18 | |
| 28.01 Discuss basic facility maintenance, installation, or repair. (e.g., welding, electricity, plumbing, fencing, construction) | | | |
| 28.02 Safely operate, maintain, service, and repair equipment. | | | |
| 29.0 Describe procedures for harvesting and marketing agricultural products--The student will be able to | MAFS.912.S-IC.2 | SC.912.P.8.10 | |
| 29.01 Determine maturity, condition, quality, and volume of products (produced by program) to be harvested. | | | |
| 29.02 Describe procedures for harvesting products (produced by program). | | | PS.03.05.01.a |
| 29.03 Collect and interpret market reports and identify market outlets for agricultural products (produced by program). | | | |
| 29.04 Organize a marketing program for an agricultural product (produced by program or student). | | | |
| 29.05 Assess kinds and types of storage facilities for agricultural products (produced by program). | | | PS.03.05.04.b |
| 29.06 Grade, treat, pack, and/or store harvested products (produced by program). | | | PS.03.05.05.b |
| 30.0 Compare principles of agribusiness finance--The student will be able to: | | SC.912.N.4.2 | |
| 30.01 Explain the purposes and structures of contracts, leases, deeds, and insurance policies. | | | |
| 30.02 Complete a State FFA Degree or Proficiency Applications. | | | |
| 30.03 Identify tax structure of agricultural business. (ex. Property tax, intangible taxes, income taxes) | | | |
| 31.0 Explain the components of the American business system.—The student will be able to: | | | |
| 31.01 Describe the five basic ways American business is organized. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 31.02 Distinguish and identify between the characteristics of each method of doing business. | | | |
| 31.03 Evaluate the advantages and disadvantages provided by each business method. | | | |
| 31.04 Evaluate how cooperative principles and practices differentiate cooperatives from other businesses. | | | |
| 32.0 Investigate agricultural cooperatives structure and function.—The student will be able to: | | | |
| 32.01 Explain the definition of a cooperative. | | | |
| 32.02 Explain the history of cooperative principles and practices. | | | |
| 32.03 Describe the five areas that classify cooperative structure. | | | |
| 32.04 Distinguish and identify between the five types of cooperative structure and their functions. | | | |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Extended Student Supervision

Because of the production and marketing cycle of the agriculture industry, this program requires individual instruction and supervision of students for the entire period beyond the 180-day school year.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

**Florida Department of Education
Student Performance Standards**

Course Title: Agriscience Foundations 1
Course Number: 8106810
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of agricultural history and the global impact of agriculture; career opportunities; scientific and research concepts; biological and physical science principles; environmental principles; agriscience safety; principles of leadership; and agribusiness, employability, and human relations skills in agriscience. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students will interact with materials and primary sources of data or with secondary sources of data to observe and understand the natural world. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 20% of classroom time will be dedicated to laboratory experiences.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-----------------------------------|---|--------------------|
| 01.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to: | | SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2; | |
| 01.01 Evaluate and explain emerging trends and the opportunities they may create within the AFNR systems. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.01.01.02.c |
| 01.02 Assess the economic impact of an AFNR system on a local, state, | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | CS.02.02.03.b |

| CTE Standards and Benchmarks | | FS-M/LA | NGSSS-Sci | National Standards |
|------------------------------|--|-------------------------------------|---|--------------------|
| national and global level. | | | | |
| 01.03 | Examine historical and current data to identify issues impacting AFNR systems. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.01.01.01.a |
| 01.04 | Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.06.02.01.a |
| 02.0 | Practice agriscience safety skills and procedures--The student will be able to: | | SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7; | |
| 02.01 | Identify the common causes and prevention of accidents in agriscience operations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 02.02 | Extract and utilize pertinent information from a container label and/or Safety Data Sheet (SDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |
| 02.03 | Identify proper disposal of hazardous waste materials and biohazards. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 02.04 | Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.b |
| 03.0 | Apply scientific and technological principles to agriscience issues--The student will be able to: | | SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1; | |
| 03.01 | Employ scientific measurement skills. | | | |
| 03.02 | Demonstrate safe and effective use of common laboratory equipment. | | | ESS.01.02.01.b |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|--|---|--|--------------------|
| 03.03 Identify the parts and functions of plant and animal cells. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | PS.02.02.01.a |
| 03.04 Describe the phases of cell reproduction. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | PS.02.02.01.b |
| 03.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8 | | BS.01.01.01.c |
| 03.06 Interpret, analyze, and report data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | BS.02.01.01.b |
| 03.07 Investigate DNA and genetics applications in agriscience including the theory of probability. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 03.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.). | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | BS.01.01.02.a |
| 04.0 Apply environmental principles to the agricultural industry--The student will be able to: | | SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12 | |
| 04.01 Research how different climactic and geological activity influences agriculture. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | NRS.01.03.02.b |
| 04.02 Describe various ecosystems as they relate to the agriculture industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | NRS.02.02.01.a |
| 04.03 Describe the environmental resources (soil, water, air) necessary for agriculture production. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.08.02.01.a |
| 04.04 Identify regulatory agencies that impact agricultural practices. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6 | | NRS.02.01.02.a |
| 04.05 Apply Best Management Practices that enhance the natural environment. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.06 Identify conservation practices related to natural resources. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | NRS.02.02.02.c |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|---|---|
| 05.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to: | | SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L.15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7; | |
| 05.01 Identify and describe the specializations within the plant science industry. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.02 Categorize plants based on specific characteristics according to industry and scientific standards. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.01.01.a |
| 05.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc.... | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.03.01.a PS.02.03.02.a PS.02.03.05.a |
| 05.04 Identify the nutrients required for plant growth from the periodic table and explain their functions. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.05 Analyze information from a fertilizer label. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | PS.01.03.04.a |
| 05.06 Propagate and grow plants through sexual and/or asexual reproduction. | | | PS.03.01.03.a PS.03.01.01.b |
| 05.07 Investigate the impacts of various pests and propose solutions for their control. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.03.03.01.c |
| 05.08 Investigate the nature and properties of food, fiber, and by-products from plants. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.09 Explore career opportunities in plant science. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.05.01.01.a |
| 06.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to: | | SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|--------------------|
| | | SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19; | |
| 06.01 Explain the economic importance of animals and the products obtained from animals. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.02 Analyze commercially important livestock breeds in Florida. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.06.01.02.c |
| 06.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | | AS.06.01.03.a |
| 06.04 Compare and contrast animal welfare issues. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | AS.02.01.01.a |
| 06.05 Investigate the nature and properties of food, fiber, and by-products from animals. | | | AS.06.03.03.a |
| 06.06 Explore career opportunities in animal science. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | CS.05.01.01.a |
| 07.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to | | SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9; | |
| 07.01 Select and demonstrate proper use of hand tools in agriculture. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.04.02.a |
| 07.02 Operate service and maintain agriscience equipment, and instruments. | | | CS.03.04.03.b |
| 07.03 Manage facilities and supplies. | | | |
| 08.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to: | | | |
| 08.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE). | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|-----------|---------------------------------|
| 08.02 Utilize a record keeping system to collect, interpret, and analyze data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 08.03 Enhance oral communications through telephone, interview and presentation skills. | LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | CRP.04.01.02.a |
| 08.04 Enhance written communication by developing resumes and business letters. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2 | | CRP.04.02.02.b |
| 08.05 Demonstrate interpersonal (nonverbal) communication skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 08.06 Demonstrate good listening skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.04.03.01.a |
| 09.0 Apply leadership and citizenship skills--The student will be able to: | | | |
| 09.01 Identify and describe leadership characteristics. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.01.a |
| 09.02 Identify opportunities to apply acquired leadership skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.02.a |
| 09.03 Identify and demonstrate ways to be an active citizen. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.01.03.02.c |
| 09.04 Participate in community based learning activities. | | | CRP.01.03.01.a |
| 09.05 Demonstrate the ability to work cooperatively. | | | CRP.09.03.01.a |
| 09.06 Conduct formal and informal meetings using correct parliamentary procedure skills. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 09.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 09.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks. | | | CS.05.01.01.b CRP.10.02.02.a |
| 10.0 Discuss components of food safety and handling practices in agriculture - The student will be able to: | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|----------------|------------------|---------------------------|
| 10.01 Demonstrate proper safety precautions and use of personal protective equipment. | | | FPP.01.01.01.b |
| 10.02 Evaluate the food safety responsibilities that occur along the food supply chain. | | | FPP.03.03.02.b |
| 10.03 Explain techniques and procedures for the safe handling of food products. | | | FPP.03.03.02.c |
| 10.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation). | | | FPP.03.03.01.c |
| 10.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply. | | | FPP.04.02.02.c |

Florida Department of Education
Curriculum Framework

Program Title: Veterinary Assisting
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

| | |
|----------------------------|--|
| Program Number | 8115110 |
| CIP Number | 0151080810 |
| Grade Level | 9-12 |
| Standard Length | 5 credits |
| Teacher Certification | Refer to the <u>Program Structure</u> section. |
| CTSO | FFA |
| SOC Codes (all applicable) | 31-9096 - Veterinary Assistants and Laboratory Animal Caretakers 29-2056 - Veterinary Technologists and Technicians |

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to broad, transferable skills and stresses understanding and demonstration of the following elements of the veterinary assisting industry: planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety and environmental issues. The program also provides supplemental training for persons previously or currently employed as veterinary assistants.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of three occupational completion points.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the secondary program structure:

| OCP | Course Number | Course Title | Teacher Certification | Length | SOC Code | Level | Graduation Requirement |
|-----|---------------|------------------------|---------------------------------|----------|----------|-------|------------------------|
| A | 8111510 | Veterinary Assisting 1 | AGRICUTUR 1 @2 VET ASSIST 7G | 1 credit | 31-9096 | 3 | |
| | 8111540 | Veterinary Assisting 2 | | 1 credit | 31-9096 | 3 | |
| | 8111550 | Veterinary Assisting 3 | | 1 credit | 31-9096 | 3 | |
| B | 8111520 | Veterinary Assisting 4 | | 1 credit | 31-9096 | 3 | |
| C | 8111530 | Veterinary Assisting 5 | | 1 credit | 29-2056 | 3 | |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Academic Alignment Tables

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

| Courses | Anatomy/ Physiology Honors | Astronomy Solar/Galactic Honors | Biology 1 | Chemistry 1 | Earth- Space Science | Environmental Science | Genetics | Integrated Science | Marine Science 1 Honors | Physical Science | Physics 1 |
|---------------------------|----------------------------------|---------------------------------------|--------------|----------------|----------------------------|--------------------------|--------------|-----------------------|-------------------------------|---------------------|--------------|
| Veterinary Assisting 1 | 4/87 5% | 5/80 6% | 30/83 36% | 3/69 4% | 21/67 31% | 17/70 24% | 8/69 12% | 26/82 32% | 12/66 18% | 24/74 32% | 3/72 4% |
| Veterinary Assisting 2 | 37/87 43% | 3/80 4% | 32/83 39% | 1/69 1% | 21/67 31% | 4/70 6% | 5/69 7% | 25/82 30% | 2/66 3% | 22/74 32% | 3/72 4% |
| Veterinary Assisting 3 | 30/87 34% | 26/80 33% | 17/83 20% | 25/69 36% | 5/67 7% | 29/70 41% | 30/69 43% | 9/82 11% | 24/66 36% | 7/74 9% | 24/72 33% |
| Veterinary Assisting 4 | 25/87 29% | 23/80 29% | 8/83 10% | 22/69 32% | 3/67 4% | 25/70 36% | 22/69 32% | 3/82 4% | 20/66 30% | 4/74 5% | 21/72 29% |
| Veterinary Assisting 5 | 3/87 3% | 2/80 3% | 7/83 8% | 2/69 3% | 2/67 3% | 9/70 13% | 3/69 4% | 3/82 4% | 6/66 9% | 2/74 3% | 2/72 3% |

** Alignment pending review

Alignment attempted, but no correlation to academic course

| Courses | Algebra 1 | Algebra 2 | Geometry | English 1 | English 2 | English 3 | English 4 |
|---------------------------|--------------|-------------|-------------|-----------|-----------|-----------|-----------|
| Veterinary Assisting 1 | 10/67 15% | 9/75 12% | 8/54 15% | ** | ** | ** | ** |
| Veterinary Assisting 2 | 9/67 13% | 9/75 12% | 8/54 15% | ** | ** | ** | ** |

| | | | | | | | |
|------------------------|--------------|--------------|-------------|----|----|----|----|
| Veterinary Assisting 3 | 12/67 18% | 9/75 12% | 8/54 15% | ** | ** | ** | ** |
| Veterinary Assisting 4 | 3/67 4% | 2/75 3% | # | ** | ** | ** | ** |
| Veterinary Assisting 5 | 12/67 18% | 11/75 17% | 8/54 15% | ** | ** | ** | ** |

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. The FS for Mathematical Practices are designed for grades K-12 and describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education.

Instructors must incorporate the Florida Standards for Technical Subjects and Mathematical Practices throughout instruction of this CTE program.

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL’s need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Describe veterinary science and the role of animals in society.
- 02.0 Describe the socioeconomic role of veterinary sciences on the companion animal livestock industries.
- 03.0 Discuss the human-animal bond and its effects on human health.
- 04.0 Demonstrate the proper use of veterinary science terminology.
- 05.0 Identify careers in the animal industry.
- 06.0 Practice safety.
- 07.0 Recognize normal and abnormal animal behaviors.
- 08.0 Restrain and control companion and livestock animals.
- 09.0 Identify common breeds of companion animals and husbandry practices
- 10.0 Demonstrate human-relations, communications and leadership through FFA activities.
- 11.0 Demonstrate basic first aid for companion and livestock animals.
- 12.0 Demonstrate the use of tools, equipment, and instruments in the veterinary science and companion animal industry
- 13.0 Demonstrate proper techniques in taking vital signs.
- 14.0 Investigate the common breeds and husbandry practices for several species of animals
- 15.0 Identify parts and functions of various systems of common companion and livestock animals.
- 16.0 Explain the various methods of animal identification.
- 17.0 Demonstrate knowledge of animal control and animal welfare organizations.
- 18.0 Describe the problems, causes, and solutions of animal overpopulation.
- 19.0 Locate and interpret animal-related laws, in state statutes, or local ordinances
- 20.0 Identify the different digestive systems of animals and the nutritional requirements of selected species.
- 21.0 Explain the reproductive system and breeding of common companion and livestock animals.
- 22.0 Investigate the common husbandry practices and daily care of companion animals and exotic animals and fish.
- 23.0 Demonstrate knowledge of preventive medicine and disease control.
- 24.0 Demonstrate human-relations, communications, leadership and employability skills.
- 25.0 Differentiate between animal welfare and animal rights.
- 26.0 Explain the role of animals in research.
- 27.0 Maintain and analyze records.
- 28.0 Explain proper sanitation for animal facilities
- 29.0 Explain diagnostic testing and use of equipment
- 30.0 Describe internal and external parasites and control methods.
- 31.0 Groom selected companion and livestock animals.
- 32.0 Describe exotic animals and the effects of captivity on them.
- 33.0 Assess techniques used in surgical assisting and surgical preparation.
- 34.0 Explain principles of pharmacology
- 35.0 Explain proper methods of syringe and hypodermic needle use.

Florida Department of Education
Student Performance Standards

Course Title: Veterinary Assisting 1
Course Number: 8111510
Course Credit: 1

Course Description:

This course is designed to develop competencies in areas such as the history of the animal industry; applied scientific and technological concepts; safety; terminology; careers; breed identification; animal care and human relations skills.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Benchmarks that appear in italics within the framework are skills or competencies that have been taken directly from the Skills Competency Validation list. Contact the Florida Veterinary Medical Association for the most up to date skills list.

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|---|--------------------|
| 01.0 Describe veterinary science and the role of animals in society – the students will be able to: | | | |
| 01.01 Define veterinary science. | | SC.912.N.1.2 SC.912.N.2.1 SC.912.N.4.1 | |
| 01.02 Identify key components in the domestication of animals. | | SC.912.L.15.3,13 SC.912.N.4.1 | |
| 01.03 Choose current issues facing the animal industry today and describe the effect of each on society. | | SC.916.L.14.6 SC.912.L.15.13, 15 SC.912.L.16.7,10 SC.912.L.17.11,12, 13, 14, 15, 16, 17, 18, 19, 20 SC.912.N.4.1 SC.912.L.15.12,13 | |
| 02.0 Describe the socioeconomic role of veterinary sciences on the companion animal and livestock industries – the students will be able to: | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|---|---------|--|--------------------|
| 02.01 Summarize the history of the veterinary science, companion animal and livestock industry. | | SC.912.N.4.1, 2 | |
| 02.02 Discuss the role of companion animals on the veterinary science industry. | | SC.912.L.16.10 SC.912.N.4.1, 2, | |
| 02.03 Discuss the role of livestock animals on the veterinary science industry. | | SC.912.L.14.6 SC912.L.16.10 SC.912.L.17.11,12 13, 14, 15, 16, 17, 18, 19, 20, SC.912.N.4.1, 2 | |
| 03.0 Discuss the human-animal bond and its effects on human health – the students will be able to: | | | |
| 03.01 <i>Describe the human-animal bond and its influence on veterinary care.</i> | | | |
| 03.02 <i>Compare and contrast different types of human-animal bonds for companion animals, working animals and livestock.</i> | | SC.912.N.4.2 | |
| 03.03 Discuss the positive health effects on people resulting from their interaction with animals. | | SC.912.N.4.1, 2 | |
| 03.04 Discuss programs that use human-animal interaction as a therapy tool. | | SC.912.N.4.1, 2 | |
| 03.05 Describe the characteristics of animals used in the animal-facilitated therapy programs. | | SC.912.N.4.1, 2 | |
| 03.06 Describe national and local programs that use animal-facilitated therapy. | | SC.912.N.4.1, 2 | |
| 03.07 Discuss stages of grief of animal loss. | | SC.912.N.4.1, 2 | |
| 04.0 Demonstrate the proper use of veterinary science terminology – the students will be able to: | | | |
| 04.01 Define common veterinary and medical terms, including directional terminology. | | | |
| 04.02 <i>Compile a list of prefixes, suffixes, and root words for veterinary medical terminology.</i> | | | |
| 04.03 Categorize gender and species-related terminology. | | SC.912.L.15.5,6,7 | |
| 04.04 <i>List common medical and veterinary abbreviations</i> | | | |
| 05.0 Identify careers in the animal industry – the students will be able to: | | | |
| 05.01 Differentiate between entry and advanced level animal-industry careers. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|--------------|--------------------|
| 05.02 Identify professional organizations and trade journals in the animal industry. | | | |
| 05.03 Investigate career opportunities in the veterinary science, companion animal, and large animal industry; also identify degree or credential needed to prepare for those careers. | | | |
| 05.04 Using national or state credentialing agencies as a reference, distinguish between a Veterinary Assistant, Credentialed Veterinary Assistant, Veterinary Technician, Credentialed Veterinary Technician, and Veterinary Technologist. | | | |
| 05.05 Investigate requirements necessary to earn and maintain Veterinary Assisting Certification. | | | |
| 06.0 Practice safety – the students will be able to: | | | |
| 06.01 <i>Recognize and avoid potential safety hazards (physical, chemical, biological and zoonotic).</i> | | SC.912.N.1.1 | |
| 06.02 <i>Utilize proper safety precautions and procedures when working in the hospital and/or animal handling areas.</i> | | SC.912.N.1.1 | |
| 06.03 <i>Demonstrate knowledge on how to use personal protective equipment- PPE (wears gloves, goggles, face mask, ear plugs, apron, gown, cap, and shoe covers when needed)</i> | | SC.912.N.1.1 | |
| 06.04 <i>Locate and demonstrates use of an eye wash solution or station</i> | | SC.912.N.1.1 | |
| 06.05 <i>Locate first aid kit and fire extinguisher</i> | | SC.912.N.1.1 | |
| 06.06 <i>Explain OSHA (Occupational Safety and Health Act) and its regulations pertaining to a veterinary practice, including sanitation, safety of employees and the employee’s right to know of potential work place hazards through SDS (Safety Data Sheets) and the written hazard communication plan</i> | | SC.912.N.1.1 | |
| 06.07 <i>Demonstrate knowledge of OSHA regulations regarding the handling, placement and disposition of sharps and bio-hazardous material</i> | | | |
| 06.08 <i>Handle and uses disposable “sharps” containers in a safe manner</i> | | | |
| 06.09 <i>Explain correct labeling of secondary containers with appropriate safety information</i> | | SC.912.N.1.1 | |
| 06.10 Practice safety precautions around animals, list the most common causes of animal related accidents. | | | |
| 07.0 Recognize normal and abnormal animal behaviors – the students will be able to: | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|--------------|--------------------|
| 07.01 Identify instinctive and learned behaviors. | | | |
| 07.02 Differentiate between normal and abnormal behavioral characteristics of animals. | | SC.912.N.1.1 | |
| 07.03 Recognize signs of aggressive animal behaviors. | | SC.912.N.1.1 | |
| 07.04 Describe behavioral changes due to aging. | | | |
| 08.0 Restrain and control companion and livestock animals – the students will be able to: | | | |
| 08.01 <i>Discuss the proper method for placing large animals in a stall, paddock, and trailer.</i> | | | |
| 08.02 <i>Safely handle and restrain dogs, cats, and other animals for exams, procedures, and treatment to prevent undue stress or harm to either animals or humans.</i> <ul style="list-style-type: none"> • <i>Lifting positioning and restraining animals</i> • <i>Position an animal in sternal dorsal and lateral recumbency</i> • <i>restraint of a small dog on an exam table</i> • <i>restraint of a cat on an exam table</i> • <i>restraint of a large dog on and exam table, lift table, and on the floor</i> • <i>place a lead on a dog slip lead and standard leash</i> | | | |
| 08.03 <i>Demonstrate verbal and physical restraint of animals.</i> | | | |
| 08.04 <i>Demonstrate how to match appropriate level of restraint for an individual animal's level of resistance and situation.</i> | | | |
| 08.05 <i>Explain appropriate methods for placing and removing animals from kennels</i> | | | |
| 08.06 <i>Identify venipuncture sites and accepted restraint for companion and livestock animals; [ex. cephalic vein (cat & dog), jugular vein (cat & dog), femoral vein (cat), saphenous vein (dog)jugular (horse & goat), tail (cow & pig)]</i> | | | |
| 08.07 <i>Demonstrate use of muzzle on a dog using commercial, leash, and gauze muzzles of appropriate size.</i> | | | |
| 08.08 <i>Demonstrate currently accepted standards for restraint of the cat including towels, scruff technique, commercial muzzles, cat bags, leather gloves, and the squeeze cage</i> | | | |
| 08.09 <i>Explain methods of restraint for exotic and avian animals.</i> | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|----------------------|--------------------|
| 08.10 Identify the appropriate restraining methods for the following: <ul style="list-style-type: none"> • Halter, tie and lead horses and cattle • Application of twitch, nose tongs • Restrain sheep, goats and swine • Restrain poultry | | | |
| 08.11 Discuss chemical restraints of animals. | | | |
| 09.0 Identify common breeds of companion animals and husbandry practices. – the students will be able to: | | | |
| 09.01 Identify canine breeds and list breed characteristics and husbandry practices. | | SC.912.L.15.3, 4, 5, | |
| 09.02 Identify feline breeds and list breed characteristics and husbandry practices. | | SC.912.L.15.3, 4, 5, | |
| 10.0 Demonstrate human-relations, communications and leadership through FFA activities – the student will be able to: | | | |
| 10.01 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations. | | | |
| 10.02 Delineate the major events in the history of the FFA. | | | |
| 10.03 Develop, implement, and maintain work-based learning through a Supervised Agricultural Experience (SAE) program. | | | |
| 10.04 Collect, interpret, and analyze data using an organized record-keeping system | MAFS.912.S-IC.2.5 MAFS.912.S-ID.3.9 MAFS.912.S-ID.1.3 | SC.912.N.1.1 | |

**Florida Department of Education
Student Performance Standards**

Course Title: Veterinary Assisting 2
Course Number: 8111540
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas such as basic first aid; scientific and technological; tools and equipment; breed identification; and functions of systems.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Benchmarks that appear in italics within the framework are skills or competencies that have been taken directly from the Skills Competency Validation list. Contact the Florida Veterinary Medical Association for the most up to date skills list.

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|--------------------------------|--------------------|
| 11.0 Demonstrate basic first aid for companion and livestock animals – the students will be able to: | | | |
| 11.01 Recognize emergency health (physical and behavioral) status. | | SC.912.N.1.1 | |
| 11.02 Describe procedures to restrain and move injured animals. | | SC.912.N.1.1 | |
| 11.03 Demonstrate hemorrhage control. | | SC.912.L.14.35 | |
| 11.04 Dress wounds and punctures. | | SC.912.N.1.1 | |
| 11.05 Demonstrate the correct emergency procedures for shock, burns, heatstroke, and fractures. | | SC.912.N.1.1 | |
| 11.06 Demonstrate companion animal CPR. | | SC.912.N.1.1 | |
| 11.07 Recognize allergic reactions and toxicity | | | |
| 12.0 Demonstrate the use of tools, equipment, and instruments in the veterinary science and companion animal industry – the students will be able to: | | | |
| 12.01 Identify, demonstrate and maintain the proper tools, equipment, and instruments for common veterinary procedures. | | SC.912.L.14.4, SC.912.N.1.1 | |

| CTE Standards and Benchmarks | | FS-M/LA | NGSSS-Sci | National Standards |
|------------------------------|---|--------------------|-------------------------------------|--------------------|
| 12.02 | Demonstrate the ability to use an equipment or instrument manual. | | SC.912.L.14.4, SC.912.N.1.1 | |
| 13.0 | Demonstrate proper techniques in taking vital signs – the student will be able to: | | | |
| 13.01 | <i>Obtain and record the TPR (temperature, pulse, and respiratory rate) , MM (mucus membrane color), CRT(capillary refill time) with minimal discomfort to pet.</i> | MAFS.912.A-CED.1.4 | SC.912.N.1.1 | |
| 13.02 | <i>Demonstrate how to use, clean, and store thermometers.</i> | | SC.912.N.1.1 | |
| 13.03 | <i>Identify normal and abnormal range for each parameter (TPR, MM, and CRT).</i> | | SC.912.N.1.1 | |
| 14.0 | Investigate the common breeds and husbandry practices for several species of animals – the students will be able to: | | | |
| 14.01 | Identify bovine breeds and their characteristics, and husbandry practices. | | SC.912.L.14.6 | |
| 14.02 | Identify ovine breeds and their characteristics and husbandry practices. | | SC.912.L.14.6 | |
| 14.03 | Identify caprine breeds and their characteristics and husbandry practices. | | SC.912.L.14.6 | |
| 14.04 | Identify porcine breeds and their characteristics and husbandry practices. | | SC.912.L.14.6 | |
| 14.05 | Identify equine breeds and their characteristics and husbandry practices. | | SC.912.L.14.6 | |
| 14.06 | Identify poultry breeds and their characteristics and husbandry practices. | | SC.912.L.14.6 | |
| 15.0 | Identify parts and functions of various systems of common companion and livestock animals – the students will be able to: | | | |
| 15.01 | Identify internal and external anatomy of common companion and livestock animals. | | SC.912.L.14.11, 16 | |
| 15.02 | Identify parts and functions of the following systems of animals using correct terminology: | | SC.912.L.14.43,44 | |
| 15.02.1 | <i>Identify the general function of the respiratory system and the major organs</i> | | SC.912.L.14.13,14 | |
| 15.02.2 | <i>Identify the general function of the skeletal system and the major bones of the axial and appendicular skeleton</i> | | SC.912.L.14.16,17, 18,19,20 | |
| 15.02.3 | <i>Identify the general function of the muscular system and major groups of muscles</i> | | SC.912.L.14.45,46 SC.912.L.18.11 | |

| CTE Standards and Benchmarks | | FS-M/LA | NGSSS-Sci | National Standards |
|------------------------------|--|---------|--|--------------------|
| 15.02.4 | <i>Identify the general function of the digestive system and the major organs</i> | | SC.912.L.14.34,35,36,37,38,39 | |
| 15.02.5 | <i>Identify the general function of the cardiovascular system and the major organs</i> | | SC.912.L.14.43,44 | |
| 15.02.6 | <i>Identify the general function of the respiratory system and the major organs</i> | | SC.912.L.14.43,44 | |
| 15.02.7 | <i>Identify the general function of the endocrine and the major organs</i> | | SC.912.L.14.29,31,32 | |
| 15.02.8 | <i>Identify the general function of the urinary system and the major organs</i> | | SC.912.L.14.47,48 | |
| 15.02.9 | <i>Identify the general function of the reproductive system and both male and female organs</i> | | SC.912.L.14.33 SC.912.L.15.12,13,15 SC.912.L.16.13 | |
| 15.02.10 | <i>Identify the general function of the nervous system and the major organs</i> | | SC.912.L.14.21,22,24,25,26,27,28,49,50 | |
| 15.02.11 | <i>Identify the general function of the integumentary system and the major organs</i> | | SC.912.L.14.11,51 | |
| 15.02.12 | <i>Explain the differences in the teeth and eating habits for omnivores, carnivores and herbivores</i> | | SC.912.L.14.45,46 SC.912.N.1.1 | |
| 16.0 | Explain the various methods of animal identification – the student will be able to: | | | |
| 16.01 | <i>Explain types of identification tags and their use.</i> | | SC.912.L.17.13 | |
| 16.02 | <i>Explain the use of microchips for animal identification.</i> | | | |
| 16.03 | <i>Explain types of tattoos for animals and the use in both companion and production animals.</i> | | SC.912.L.17.13 | |
| 16.04 | <i>Explain the types of ear tags and their use in production animals.</i> | | SC.912.L.17.13 | |
| 16.05 | <i>Explain types of ear notching and use for identification.</i> | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Veterinary Assisting 3
Course Number: 8111550
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas animal digestive systems; animal breeding; animal control; animal overpopulation; animal related laws; and breeds.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Benchmarks that appear in italics within the framework are skills or competencies that have been taken directly from the Skills Competency Validation list. Contact the Florida Veterinary Medical Association for the most up to date skills list.

| CTE Standards and Benchmarks | | FS-M/LA | NGSSS-Sci | National Standards |
|------------------------------|--|-------------------|---|--------------------|
| 17.0 | Demonstrate knowledge of animal control and animal welfare organizations – the students will be able to: | | | |
| 17.01 | Differentiate between animal control agencies and animal welfare organizations. | | SC.912.L.17.13 SC.912.N.1.4 SC.912.N.2.2 | |
| 17.02 | Describe the responsibilities and goals of animal control agencies and animal welfare organizations | | SC.912.L.17.13 SC.912.N.1.4 SC.912.N.2.2 | |
| 17.03 | Identify and locate local animal control agencies and animal welfare organizations. | | SC.912.L.17.13 SC.912.N.1.4 SC.912.N.2.2 | |
| 18.0 | Describe the problems, causes, and solutions of animal overpopulation – the students will be able to: | | | |
| 18.01 | Explain the cause and effect of overpopulation in animals. | MAFS.912.S-ID.3.9 | SC.912.L.17.1,5,6, 8,11,13 SC.912.N.4.1,2 | |
| 18.02 | Define euthanasia and describe its role in animal overpopulation. | | SC.912.L.17.13 | |
| 18.03 | Explain the pet owners’ and societies’ responsibilities concerning | | SC.912.N.4.1,2 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|--|--------------------|
| animal overpopulation. | | SC.912.L.17.13 | |
| 18.04 Discuss the medical benefits of spaying and neutering. | | SC.912.L.17.13 | |
| 19.0 Locate and interpret animal-related laws, in state statutes, or local ordinances – the students will be able to: | | | |
| 19.01 Describe local animal control laws. | | SC.912.L.17.13 SC.912.N.4.1,2 | |
| 19.02 Describe permitting requirements for exotic and wildlife animals. | | SC.912.L.17.13 SC.912.N.4.1,2 | |
| 19.03 Demonstrate knowledge of local and state animal regulations. | | SC.912.L.17.13 SC.912.N.4.1,2 | |
| 19.04 Determine the legal limitations of duties of an employee in the animal services industry. | | SC.912.L.17.13 SC.912.N.4.1,2 | |
| 19.05 Identify when an Animal Health Certificate is required. | | SC.912.L.17.13 SC.912.N.4.1,2 | |
| 19.06 Explain the laws governing the sale of animals and the disposal of animals. | | SC.912.L.17.13 SC.912.N.4.1,2 | |
| 19.07 <i>List the legal options for euthanasia.</i> | | SC.912.N.4.1,2 | |
| 19.08 <i>List the legal options for disposal of the pet's body.</i> | | SC.912.L.17.13 SC.912.N.4.1,2 | |
| 20.0 Identify the different digestive systems of animals and the nutritional requirements of selected species – the students will be able to: | | | |
| 20.01 Differentiate between ruminants and non-ruminants (monogastric and hind gut fermentors). | | SC.912.L.14.45,46 SC.912.L.18.2,3,4, 11 SC.912.N.1.1 | |
| 20.02 Differentiate the teeth and eating habits of omnivores, carnivores, and herbivores. | | SC.912.L.14.45,46 SC.912.N.1.1 | |
| 20.03 Describe the basic nutritional requirements of selected species. | | SC.912.L.18.2,3,4 | |
| 20.04 Analyze different feed labels and identify feed ingredients. | MAFS.912.A-CED.1.4 MAFS.912.N-Q.1.1, 3 MAFS.912.N-VM.3.6,7,8 | | |
| 20.05 <i>Explain the appropriate storage for dry and canned dog or cat food.</i> | | | |
| 20.06 <i>Explain nutritional needs based on life stage and size of animal and choose appropriate food and amount for specific animals for general care.</i> | | | |
| 20.07 <i>Explain potential problems with feeding therapeutic foods incorrectly or to the wrong patient.</i> | | SC.912.N.1.1 | |

| CTE Standards and Benchmarks | | FS-M/LA | NGSSS-Sci | National Standards |
|------------------------------|--|---------|-------------------------------------|--------------------|
| 21.0 | Explain the reproductive system and breeding of common companion and livestock animals – the students will be able to: | | | |
| 21.01 | Explain the male and female reproductive systems of common companion and livestock animals. | | SC.912.L.14.33 SC.912.L.16.13 | |
| 21.02 | Determine sex of animals. | | SC.912.L.14.33 SC.912.L.16.13 | |
| 21.03 | Determine appropriate age or weight for breeding. | | SC.912.L.14.33 SC.912.L.16.13 | |
| 21.04 | Identify gestation length. | | SC.912.L.14.33 SC.912.L.16.13 | |
| 21.05 | Describe estrous cycle. | | SC.912.L.14.33 SC.912.L.16.13 | |
| 21.06 | Describe breeding techniques (ex. Natural, artificial insemination etc....) | | SC.912.L.14.33 SC.912.L.15.9 | |
| 21.07 | Identify selection criteria of males and females for reproduction. | | SC.912.L.15.9,15 SC.912.L.16.1,2 | |
| 21.08 | Describe care of breeding stock. | | | |
| 22.0 | Investigate the common husbandry practices and daily care of companion animals and exotic animals and fish – the students will be able to: | | | |
| 22.01 | Describe breeds, characteristics and husbandry and care of guinea pigs. | | | |
| 22.02 | Describe breeds, characteristics and husbandry and care of chinchillas and degus. | | | |
| 22.03 | Describe breeds, characteristics and husbandry and care of ferrets. | | | |
| 22.04 | Describe breeds, characteristics and husbandry and care of amphibians. | | | |
| 22.05 | Describe breeds, characteristics and husbandry and care of reptiles. | | | |
| 22.06 | Describe breeds, characteristics and husbandry and care of birds. | | | |
| 22.07 | Describe breeds, characteristics and husbandry and care of fish. | | | |
| 22.08 | Describe breeds, characteristics and husbandry and care of avian species. | | SC.912.L.15.4, 5, 6 | |
| 22.09 | Describe breeds, characteristics and husbandry and care of reptile species. | | SC.912.L.15.4, 5, 6 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|---------------------|--------------------|
| 22.10 Describe breeds, characteristics and husbandry and care of fish. | | SC.912.L.15.4, 5, 6 | |
| 22.11 Describe breeds, characteristics and husbandry and care of rabbits. | | | |
| 22.12 Describe breeds, characteristics and husbandry and care of rodents. | | | |
| 23.0 Demonstrate knowledge of preventive medicine and disease control- the students will be able to: | | | |
| 23.01 Describe the importance of preventive medicine for animal health. | | | |
| 23.02 Differentiate between healthy and sick animals. | | | |
| 23.03 Describe common infectious and noninfectious diseases of animals to include bacterial, viral, fungal, prion and zoonotic. | | | |
| 23.04 Describe vaccinations available for disease prevention and vaccination procedures. | | | |
| 23.05 Describe isolation or quarantine procedures for new or sick animals. <ul style="list-style-type: none"> • Describe methods of preventive medicine and quarantine for disease control in a kennel, cattery, paddock, rabbitry, and zoo. | | | |
| 23.06 Discuss the terms immunology and active and passive immunity as it applies to disease and vaccination. | | | |
| 23.07 Describe concepts for periodic health check-up. | | | |
| 23.08 <i>List and discuss common zoonotic diseases.</i> | | | |
| 24.0 Demonstrate human-relations, communications, leadership and employability skills – the students will be able to: | | | |
| 24.01 Follow oral and written directions with understanding; ask questions that clarify directions, as needed. | | | |
| 24.02 Communicate effectively in verbal, written, and nonverbal modes; demonstrate effective telephone skills. | | | |
| 24.03 Conduct small, informal, formal, and group meetings using basic parliamentary procedure. | | | |
| 24.04 Identify the opportunities for leadership development available through an appropriate student and/or professional organization. | | | |
| 24.05 Demonstrate acceptable employee hygiene habits. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 24.06 Complete pertinent forms for employment, such as a resume, a job application, a W-4 form. | | | |
| 24.07 Demonstrate job interview techniques. | | | |
| 24.08 <i>Student avoids misrepresentation, slander, violating client confidentiality, substandard patient care, substance abuse, or animal abuse/neglect.</i> | | | |
| 24.09 <i>Explain the veterinarian-client-patient relationships</i> | | | |
| 24.10 <i>Explain the importance of keeping their credentials current with continuing education credits</i> | | | |
| 24.11 <i>Conforms to safety and professional dress code by dressing in well- fitting scrubs or uniforms, closed- toed shoes, avoids excessive or loose jewelry, or excessive and visible body-piercings or tattoos, avoids long or fake nails, and keeps hair short or tied back.</i> | | | |
| 24.12 <i>Actively observe his/her working environment and animals, promptly reporting observations and concerns to the veterinary technician or veterinarian as needed.</i> | | | |
| 24.13 <i>Demonstrate initiative to complete tasks.</i> | | | |
| 24.14 <i>Accurately follow both oral and written instructions.</i> | | | |
| 24.15 <i>Discuss ways to resolve complaints or conflicts with either pet owners/clients or co-workers in a professional manner.</i> | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Veterinary Assisting 4
Course Number: 8111520
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of animal welfare and rights; research; record keeping; disease and parasites.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Benchmarks that appear in italics within the framework are skills or competencies that have been taken directly from the Skills Competency Validation list. Contact the Florida Veterinary Medical Association for the most up to date skills list.

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|--|--------------------|
| 25.0 Differentiate between animal welfare and animal rights – the students will be able to: | | | |
| 25.01 Define animal welfare and animal rights. | | SC.912.L.17.13 SC.912.N.4.1 | |
| 25.02 Compare and contrast between animal welfare and animal rights. | | SC.912.L.17.13 SC.912.N.4.1 SC.912.N.1.1 | |
| 25.03 Identify animal welfare and animal rights advocate groups. | | SC.912.L.17.13 SC.912.N.4.1 SC.912.N.1.4 | |
| 25.04 Debate current events concerning animal welfare and animal rights. | | SC.912.L.17.13 SC.912.N.4.1 SC.912.N.1.1,4 | |
| 25.05 Describe animal cruelty and the consequences of cruel treatment of animals. | | SC.912.L.17.13 SC.912.N.4.1 | |
| 26.0 Explain the role of animals in research – the students will be able to: | | | |
| 26.01 Describe the history of the role of animals in research. | | SC.912.L.16.10; SC.912.N.4.1 | |
| 26.02 Discuss medical advances made possible through the use of | | SC.912.L.16.10; SC.912.N.4.1,2 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|-----------------------------------|--------------------|
| animals in research. | | | |
| 26.03 Define USDA and explain its roles in using animals for research. | | SC.912.L.16.10; SC.912.N.4.1,2 | |
| 26.04 Describe the role of the Institutional Animal Care and Use Committee (IACUC) with regard to animal research facilities. | | SC.912.L.16.10; SC.912.N.4.1 | |
| 26.05 Explain the controversy over using animals in research. | | SC.912.L.16.10; SC.912.N.4.1,2 | |
| 26.06 Identify organizations that are in favor of and those that are against the use of animals in research. | | SC.912.L.16.10; SC.912.N.4.1 | |
| 26.07 Develop a personal position on the use of animals in research and support that position. | | SC.912.L.16.10; SC.912.N.4.1,2 | |
| 26.08 Explain how biotechnology has affected animal research. | | SC.912.L.16.10; SC.912.N.4.1,2 | |
| 26.09 Debate the use of cloning for research purposes. | | SC.912.L.16.10; SC.912.N.4.1,2 | |
| 27.0 Maintain and analyze records – the students will be able to: | | | |
| 27.01 Discuss the legal requirements of maintaining animal health records, and maintain and analyze animal health records. | | SC.912.N.1.1 | |
| 27.02 Maintain and analyze basic business records (inventory, depreciation, receipts, expenses), using computer applications. | MAFS.912.S-ID.3.9 MAFS.912.S-IC.2.6 MAFS.912.F-IF.3.8(B) MAFS.912.F-LE.1.1(B,C) | | |
| 27.03 <i>Explain the process of scheduling appointments.</i> | | | |
| 27.04 <i>Demonstrate admissions and discharges for boarders or non-medical cases.</i> | | | |
| 27.05 <i>Demonstrate filing and retrieving of records from both numerical and alphabetical filing systems.</i> | | | |
| 27.06 <i>Demonstrate computer and keyboarding skills.</i> | | | |
| 27.07 <i>Demonstrate data collection from organized records.</i> | | | |
| 27.08 <i>Discuss legal requirements of veterinary medical records to include:: (1)establish veterinarian-client-patient relationship, (2)contain owner and patient information, (3)contain patient history, and (4) contain contemporaneously written medical procedures</i> | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| <p>27.09 Describe the duties of an office or hospital staff member as outlined by NAVTA which includes:</p> <ul style="list-style-type: none"> • <i>Greet pet owner/client, identifies his/herself by name and as veterinary assistant in a professional manner</i> • <i>Obtain or confirm pet owner/client and pet information including pet owner/client's name, address and phone numbers; pet's name, species, breed, color, sex and neutered/not neutered, and age or birth date</i> • <i>Discuss process for recording new information and/or confirms existing information on medical record using appropriate medical terminology and concise notations. Include current date and reason for appointment.</i> • <i>Obtain and record the pet's vital signs (TPR, MM, & CRT) and weight with minimal restraint to the pet.</i> • <i>Leave the exam room courteously indicating the veterinarian will be right in.</i> | | | |
| <p>27.10 Explain the importance of client/patient confidentiality.</p> | | | |
| <p>28.0 Explain proper sanitation for animal facilities– the students will be able to:</p> | | | |
| <p>28.01 Demonstrate proper sanitation techniques for an examination room, hospital facilities, surgical suites, kennel, cattery, paddock, rabbit hutch, and zoo.</p> | | | |
| <p><i>28.01.01 Keep assigned work areas clean and organized</i></p> | | | |
| <p><i>28.01.02 Explain sanitary procedures including physical cleaning, disinfecting, and sterilizing</i></p> | | | |
| <p><i>28.01.03 Demonstrate proper cleaning protocols for kennels, runs, and enclosures including cleaning and disinfecting all sides of the kennel (floor, ceiling, walls, & door) and all items in the kennel (bowls, blankets, toys, etc.)</i></p> | | | |
| <p><i>28.01.04 List precautions to take when mixing or using multiple cleaning and disinfecting agents i.e. NEVER mix bleach with ammonia containing cleaners or disinfectants</i></p> | | | |
| <p><i>28.01.05 Change bedding materials in a timely and efficient manner.</i></p> | | | |
| <p><i>28.01.06 Demonstrate of the proper disposal of bedding and waste materials.</i></p> | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|--------------------------------|--------------------|
| 28.01.07 <i>Notify supervisor of needed repair or maintenance on cages, kennels, or stalls</i> | | | |
| 29.0 Explain diagnostic testing and use of equipment – the students will be able to: | | | |
| 29.01 <i>Explain the proper placement of a slide in the microscope and focus on 100X and 400X magnification</i> | | SC.912.L.14.4, SC.912.N.1.1 | |
| 29.02 <i>Explain appropriate materials for cleaning the microscope</i> | | SC.912.L.14.4, SC.912.N.1.1 | |
| 29.03 <i>Demonstrate the centrifugation of a sample</i> | | SC.912.N.1.1 | |
| 29.04 <i>Explain the purpose of the blood analyzer machine.</i> | | SC.912.N.1.1 | |
| 29.05 Explain a urinalysis including: | | | |
| 29.05.01 <i>List methods for urine collection commonly used in the veterinary practice</i> | | | |
| 29.05.02 <i>Collect a free-caught urine sample using proper techniques for dogs</i> | | | |
| 29.05.03 <i>Identify time and storage parameters for urine samples</i> | | | |
| 29.05.04 <i>List precautions and safety factors in handling urine samples including personal protection equipment</i> | | | |
| 29.06 Explain fecal test including: | | | |
| 29.06.01 <i>Explain methods of collecting fecal samples.</i> | | | |
| 29.06.02 <i>Identify time and storage parameters for fecal samples.</i> | | | |
| 29.06.03 <i>Identify appropriate volume of feces for each method of testing.</i> | | | |
| 29.06.04 <i>Demonstrate the correct technique for handling and preparing the fecal samples for analysis by flotation, sedimentation, and direct smear.</i> | | | |
| 29.06.05 <i>Explain appropriate method of placing sample on microscope slide or cover slip.</i> | | SC.912.L.14.4 | |
| 29.06.06 <i>List precautions and safety factors in handling fecal samples including personal protection equipment.</i> | | | |
| 29.07 Examine radiology, electrocardiogram and ultrasound imaging techniques and safety. | | SC.912.L.14.37 | |
| 29.07.01 <i>Discuss restrictions from radiation exposure for pregnant women and minors.</i> | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|----------------|--------------------|
| 29.07.02 Explain what a dosimeter badge does and who wears it and when. | | | |
| 29.07.03 Describe the area of exposure in the radiology room including direct beam and scatter radiation. | | | |
| 29.07.04 Explain the correct use of personal protection equipment including lead-shielded gowns, lead gloves, lead thyroid shield, lead glasses, and other lead protective wear. | | | |
| 29.07.05 Explain methods of restraint for positioning for radiographs including chemical restraint. | | | |
| 29.07.06 Explain the proper handling of radiographic film including safe light use. | | | |
| 29.07.07 Demonstrate the appropriate labeling of a radiograph including date, patient name, view or side of patient, machine settings, and film developing | | | |
| 29.07.08 Maintain radiograph log and filing of films. | | | |
| 29.07.09 Explain how digital radiography differs from film. | | | |
| 29.08 Describe the process for handling a suspected rabies patient, and the process for other deceased animals. | | | |
| 29.08.01 List the common species which may transmit rabies to humans. | | SC.912.L.14.6 | |
| 29.08.02 Explain the methods of transmission of rabies to animals and humans. | | SC.912.L.14.6 | |
| 29.08.03 List the symptoms associated with rabies. | | | |
| 29.08.04 Explain the proper safety measures to follow when handling an animal suspected of having rabies. | | SC.912.L.17.13 | |
| 29.08.05 Explain the procedure for euthanasia suitable as an explanation for a pet owner. | | | |
| 29.08.06 Discuss the grief process that an owner may experience on the loss of the pet. | | | |
| 29.08.07 Discuss the importance of presenting the body of the pet in a respectful and empathetic way. | | | |
| 30.0 Describe internal and external parasites and control methods – the students will be able to: | | | |
| 30.01 Set up fecal flotations or centrifuged fecal samples | | | |
| 30.02 Identify ectoparasites fleas, ticks, lice, and mites and explain the life cycle and treatment and prevention methods | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|----------------|------------------|---------------------------|
| <i>30.03 Identify ova of endoparasites roundworms, hookworms, whipworms, strongyles and explain the life cycle and treatment and prevention methods</i> | | | |
| <i>30.04 Identify adult endoparasites roundworms, hookworms, whipworms, strongyles and heartworms</i> | | | |
| <i>30.05 Identify giardia and coccidia in fecal samples</i> | | | |
| <i>30.06 Identify tapeworm segments in fecal sample or on pet</i> | | | |

Florida Department of Education
Student Performance Standards

Course Title: Veterinary Assisting 5
Course Number: 8111530
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of grooming, effects of captivity of exotics; genetics and biotechnology in reproduction; diagnostic and therapeutic testing; surgical preparation; and pharmacology.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
NGSSS-Sci = Next Generation Sunshine State Standards for Science

Benchmarks that appear in italics within the framework are skills or competencies that have been taken directly from the Skills Competency Validation list. Contact the Florida Veterinary Medical Association for the most up to date skills list.

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 31.0 Groom selected companion and livestock animals – the students will be able to: | | | |
| 31.01 <i>Discuss using a variety of brushes, combs, flea combs, mat splitters, undercoat rakes, etc. to groom animal hair/fur as needed for both cosmetic and therapeutic reasons.</i> | | | |
| 31.02 <i>Explain using clippers to cut animal hair/fur as needed for both cosmetic and therapeutic reasons.</i> | | | |
| 31.03 <i>Explain the necessity of following written and oral instructions and all label directions regarding shampoos for bathing and therapeutic or flea rinses (dips).</i> | | | |
| 31.04 <i>List precautions in bathing and dipping including avoiding soap or chemicals in the eyes, lathering the entire body, timing the shampoo application according to directions, and towel or blow drying.</i> | | | |
| 31.05 <i>Identify the area of blood and nerve supply of the nail in the dog and cat and common pets such as rabbits and ferrets.</i> | | | |
| 31.06 <i>Identify appropriate instrument or nail trimmer for small and large dogs and cats.</i> | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|--|--------------------|
| 31.07 <i>Demonstrate comfortable handling of paw or limb during nail trim for dog and cat.</i> | | | |
| 31.08 <i>Explain methods for hemostasis if nail is accidentally trimmed too short.</i> | | SC.912.L.14.35 | |
| 31.09 <i>Notify supervisor of abnormalities including in-grown nails and abnormal growth or shape.</i> | | | |
| 31.10 Describe the steps in expressing anal sacs using the external method. | | | |
| 31.11 Discuss proper hoof care and hoof trimming needs. | | | |
| 32.0 Describe exotic animals and the effects of captivity on them – the students will be able to: | | | |
| 32.01 Define exotic animal, zoo animal, invasive and native animals. | | SC.912.L.17.8 | |
| 32.02 Identify exotic animals native and invasive to Florida. | | SC.912.L.17.8 | |
| 32.03 Explain the effects of urban sprawl on the wildlife population. | | SC.912.L.14.6 SC.912.L.17.11,12,13,18,19,20 | |
| 32.04 Describe the roles of the Florida Fish and Wildlife Conservation Commission in wildlife management. | | SC.912.L.17.11,12,13 | |
| 32.05 Explain state, national, and international laws affecting the purchase and transport of exotic animals. | | SC.912.L.17.13 | |
| 33.0 Assess techniques used in surgical assisting and surgical preparation – the students will be able to: | | | |
| <p>33.01 <i>Prepare and sterilize surgical equipment and supplies.</i></p> <ul style="list-style-type: none"> • <i>Explain standard procedure for cleaning and lubricating all stainless steel instruments.</i> • <i>Explain appropriate use of ultrasonic instrument cleaning and proper solutions.</i> • <i>Explain cold sterilization trays and appropriate solutions.</i> • <i>Demonstrate assembly and wrapping of surgical packs for sterilization.</i> • <i>Demonstrate folding and wrapping a surgical gown for sterilization.</i> • <i>Explain proper procedure for sterilizations methods including the autoclave and gas sterilization (ethylene oxide) including safety precautions with each.</i> | | SC.912.N.1.1 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|---|---|---------------------|--------------------|
| <p>33.02 Describe components of surgical assisting.</p> <ul style="list-style-type: none"> • Explain aseptic protocol for maintaining sterility of the surgical field • Demonstrate what can and cannot be touched when assisting in a surgical environment. • Demonstrate how suture material might be removed from its outer packaging and passed to the surgeon while maintaining sterility | | | |
| <p>33.03 Summarize procedures necessary of patient preparation.</p> <ul style="list-style-type: none"> • Explain reason for pre-surgical fasting and appropriate time interval. • List methods to identify animal for surgery and confirm identity. • Demonstrate dorsal and sternal recumbancy positioning and securing animal in each on the surgery table under anesthesia as instructed by the veterinary technician or veterinarian. • Demonstrate clipping or shaving surgical field as instructed by the veterinary technician or veterinarian. • Demonstrate cleaning and disinfecting the surgical field using currently accepted standards for aseptic technique and surgical scrub. | | | |
| <p>33.04 Identify proper post-surgical care techniques.</p> <ul style="list-style-type: none"> • List parameters to monitor during recovery and signs of distress in the recovery period. • Explain the swallow reflex and the appropriate time and method for endotracheal tube removal. • Explain appropriate transfer of animal from surgery to recovery kennel, positioning in kennel, and precautions in kennel. • Confirm “No food or water” or similar instructions on recovery kennel. | <p>MAFS.912.S-IC.1.2 MAFS.912.N-Q.1.2</p> | <p>SC.912.N.1.1</p> | |
| <p>34.0 Explain principles of pharmacology – the students will be able to:</p> | | | |
| <p>34.01 Identify forms of medication including tablet, capsule, liquid, powder, granules, topical creams, liquids, and gels.</p> | | | |
| <p>34.02 Explain the application of topical flea medication.</p> | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|--|--------------------|--------------|--------------------|
| 34.03 <i>Demonstrate the reconstitution of vaccine using appropriate diluents and amounts of diluents.</i> | MAFS.912.N-Q.1.2,3 | | |
| 34.04 <i>Demonstrate administration oral medications on companion and livestock animals.</i> | | | |
| 34.05 <i>List the components that must be present on a prescription label.</i> | | | |
| 34.06 <i>Observe and understand controlled substances logs and security</i> | | SC.912.N.1.1 | |
| 34.07 <i>Inventory pharmacy supplies and notify supervisor of low supplies</i> | | | |
| 34.08 <i>Identify expiration date on labels and notify supervisor of expired drugs</i> | | | |
| 34.09 <i>Maintain clean shelves and storage areas for pharmaceuticals</i> | | | |
| 34.10 Describe the process for administering medications by injection, oral, nasal and topical. | | | |
| 34.11 Describe the procedure for safe disposal of medications. | | | |
| 34.12 Determine methods to observe animals for medicine side effects or allergies. | | SC.912.N.1.1 | |
| 35.0 Explain proper methods of syringe and hypodermic needle use – the student will be able to: | | | |
| 35.01 <i>Identify and give the correct alignment from smallest to largest of hypodermic needles including but not limited to; 12 g, 18g, 20 g, 22 g and 25 g.</i> | | | |
| 35.02 <i>Identify and align from smallest to largest commonly used syringes including but not limited to 3cc, 6cc, 12cc, 20cc, 35cc, 60cc and 1cc tuberculin or insulin syringe.</i> | | | |
| 35.03 <i>Demonstrate the ability to read the precise volume of medication in a syringe and to fill a syringe with medication to a specified volume when requested.</i> | MAFS.912.N-Q.1.3 | | |
| 35.04 <i>Describe appropriate SQ, IM, and IV injection sites.</i> | | | |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Benchmarks that appear in italics within the framework are skills or competencies that have been taken directly from the Skills Competency Validation list. Contact the Florida Veterinary Medical Association for the most up to date skills list.

The occupational standards and benchmarks outlined in this secondary program correlate to the standards and benchmarks of the postsecondary program with the same Classification of Instructional Programs (CIP) number.

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Extended Student Supervision

Because of the production and marketing cycle of the animal industry, this program requires individual instruction and supervision of students for the entire period beyond the 180-day school year.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization for providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access.

Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

**Florida Department of Education
Curriculum Framework**

Program Title: Agricultural Sales and Services
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

| | |
|----------------------------|---|
| Program Number | 8116000 |
| CIP Number | 0101010500 |
| Grade Level | 9-12 |
| Standard Length | 3 credits |
| Teacher Certification | Refer to the Program Structure section |
| CTSO | FFA |
| SOC Codes (all applicable) | 41-4011 - Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products |

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of one occupational completion point. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course. The following table illustrates the secondary program structure:

| OCP | Course Number | Course Title | Teacher Certification | Length | SOC Code | Level | Graduation Requirement |
|-----|---------------|-----------------------------------|-----------------------|----------|----------|-------|------------------------|
| A | 8106810 | Agriscience Foundations 1 | AGRICUTUR 1 @2 | 1 credit | 41-4011 | 3 | EQ |
| | 8116010 | Agricultural Sales and Services 2 | | 1 credit | | 3 | EC |
| | 8116020 | Agricultural Sales and Services 3 | | 1 credit | | 3 | PA |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Academic Alignment Tables

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

| Courses | Anatomy/ Physiology Honors | Astronomy Solar/Galactic Honors | Biology 1 | Chemistry 1 | Earth-Space Science | Environmental Science | Genetics | Integrated Science | Marine Science 1 Honors | Physical Science | Physics 1 |
|-----------------------------------|----------------------------|---------------------------------|--------------|--------------|---------------------|-----------------------|--------------|--------------------|-------------------------|------------------|--------------|
| Ag. Foundations | 29/87 33% | 18/80 23% | 55/83 66% | 11/69 16% | 36/67 54% | 30/70 42% | 20/69 29% | 49/82 60% | 25/66 38% | 38/74 51% | 12/72 16% |
| Agricultural Sales and Services 2 | # | # | 21/83 25% | # | 21/67 31% | # | # | 21/82 26% | # | 21/74 28% | # |
| Agricultural Sales and Services 3 | 22/87 25% | 22/80 28% | # | 22/69 32% | # | 22/70 31% | 22/69 32% | # | 22/66 33% | # | 22/72 31% |

** Alignment pending review

Alignment attempted, but no correlation to academic course

| Courses | Algebra 1 | Algebra 2 | Geometry | English 1 | English 2 | English 3 | English 4 |
|-----------------------------------|--------------|------------|-------------|--------------|--------------|--------------|--------------|
| Ag. Foundations | 14/67 21% | 4/75 5% | 8/54 15% | 11/46 24% | 11/45 24% | 11/45 24% | 11/45 24% |
| Agricultural Sales and Services 2 | ** | ** | ** | 8/46 17% | 8/45 18% | 6/45 13% | 6/45 13% |
| Agricultural Sales and Services 3 | ** | ** | ** | 11/46 24% | 11/45 24% | 11/45 24% | 11/45 24% |

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. The FS for Mathematical Practices are designed for grades K-12 and describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education.

Instructors must incorporate the Florida Standards for Technical Subjects and Mathematical Practices throughout instruction of this CTE program.

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL’s need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. If so, the standards have been identified and cross walked with the corresponding CTE standard and/or benchmark.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Describe the history of agriculture and its influence on the global economy.
- 02.0 Practice agriscience safety skills and procedures.
- 03.0 Apply scientific and technological principles to agriscience issues.
- 04.0 Apply environmental principles to the agricultural industry.
- 05.0 Investigate and utilize basic scientific skills and principles in plant science.
- 06.0 Investigate and utilize basic scientific skills and principles in animal science.
- 07.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 08.0 Demonstrate agribusiness, employability and human relation skills.
- 09.0 Apply leadership and citizenship skills.
- 10.0 Discuss components of food safety and handling practices in agriculture
- 11.0 Explain the components of the American business system
- 12.0 Describe the basic concepts of agribusiness
- 13.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy.
- 14.0 Students examine the scope of career opportunities in and the importance of agriculture to the economy.
- 15.0 Perform accounting activities
- 16.0 Conduct appropriate market and marketing research
- 17.0 Develop a marketing plan
- 18.0 Use accounting fundamentals to accomplish dependable bookkeeping and fiscal management
- 19.0 Develop specific tactics to market AFNR products and services
- 20.0 Observe local, state, and federal rules and regulations
- 21.0 Develop financial literacy skills
- 22.0 Explain the components of the American business system.
- 23.0 Investigate agricultural cooperatives structure and function.
- 24.0 Demonstrate knowledge of the general principles of agribusiness.
- 25.0 Perform agricultural business activities.
- 26.0 Summarize methods of selling agricultural products and services.
- 27.0 Merchandise products and services to achieve specific marketing goals.
- 28.0 Perform promotional activities.
- 29.0 Demonstrate employability skills.
- 30.0 Demonstrate acceptable customer-relations skills.
- 31.0 Model effective sales principles and techniques.
- 32.0 Develop strategies for marketing plan implementation

**Florida Department of Education
Student Performance Standards**

Course Title: Agriscience Foundations 1
Course Number: 8106810
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of agricultural history and the global impact of agriculture; career opportunities; scientific and research concepts; biological and physical science principles; environmental principles; agriscience safety; principles of leadership; and agribusiness, employability, and human relations skills in agriscience. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students will interact with materials and primary sources of data or with secondary sources of data to observe and understand the natural world. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 20% of classroom time will be dedicated to laboratory experiences.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|------------------------------------|---|--------------------|
| 01.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to: | | SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2; | |
| 01.01 Evaluate and explain emerging trends and the opportunities they may create within the AFNR systems. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.01.01.02.c |
| 01.02 Assess the economic impact of an AFNR system on a local, state, national and global level. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | CS.02.02.03.b |
| 01.03 Identify significant career patterns/shifts in the history of the agricultural industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.01.01.01.a |
| 01.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.06.02.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|---|--------------------|
| 02.0 Practice agriscience safety skills and procedures--The student will be able to: | | SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7; | |
| 02.01 Identify the common causes and prevention of accidents in agriscience operations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.a |
| 02.02 Extract and utilize pertinent information from a container label and/or Safety Data Sheet (SDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | CS.03.04.03.a |
| 02.03 Identify proper disposal of hazardous waste materials and biohazards. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | ESS.04.01.02.c |
| 02.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.b |
| 03.0 Apply scientific and technological principles to agriscience issues--The student will be able to: | | SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1; | |
| 03.01 Employ scientific measurement skills. | | | |
| 03.02 Demonstrate safe and effective use of common laboratory equipment. | | | ESS.01.02.01.b |
| 03.03 Identify the parts and functions of plant and animal cells. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |
| 03.04 Describe the phases of cell reproduction. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 03.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|--------------------|
| 03.06 Interpret, analyze, and report data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | BS.02.01.01.b |
| 03.07 Investigate DNA and genetics applications in agriscience including the theory of probability. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | BS.01.01.01.a |
| 03.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.). | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | BS.03.01.03.b |
| 04.0 Apply environmental principles to the agricultural industry--The student will be able to: | | SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12 | |
| 04.01 Research how different climactic and geological activity influences agriculture. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | NRS.01.03.02.b |
| 04.02 Describe various ecosystems as they relate to the agriculture industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.03 Describe the environmental resources (soil, water, air) necessary for agriculture production. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.08.02.01.a |
| 04.04 Identify regulatory agencies that impact agricultural practices. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6 | | NRS.02.01.02.a |
| 04.05 Apply Best Management Practices that enhance the natural environment. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.06 Identify conservation practices related to natural resources. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.02.02.b |
| 05.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to: | | SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7; | |
| 05.01 Identify and describe the specializations within the plant science industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.02 Categorize plants based on specific characteristics according to industry and scientific standards. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|---|---|
| 05.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc.... | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.03.01.a PS.02.03.02.a PS.02.03.05.a |
| 05.04 Identify the nutrients required for plant growth from the periodic table and explain their functions. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.01.02.01.a |
| 05.05 Analyze information from a fertilizer label. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | PS.01.03.04.b |
| 05.06 Propagate and grow plants through sexual and/or asexual reproduction. | | | PS.03.01.03.a PS.03.01.01.b |
| 05.07 Investigate the impacts of various pests and propose solutions for their control. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.03.03.01.c |
| 05.08 Investigate the nature and properties of food, fiber, and by-products from plants. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.09 Explore career opportunities in plant science. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.05.01.01.a |
| 06.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to: | | SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19; | |
| 06.01 Explain the economic importance of animals and the products obtained from animals. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.02 Analyze commercially important livestock breeds in Florida. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |
| 06.04 Compare and contrast animal welfare issues. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | AS.02.01.01.a |
| 06.05 Investigate the nature and properties of food, fiber, and by-products from animals. | | | AS.06.03.03.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|---|--------------------|
| 06.06 Explore career opportunities in animal science. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | CS.05.01.01.a |
| 07.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to | | SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9; | |
| 07.01 Select and demonstrate proper use of hand tools in agriculture. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.04.02.a |
| 07.02 Operate service and maintain agriscience equipment, and instruments. | | | CS.03.04.03.b |
| 07.03 Manage facilities and supplies. | | | |
| 08.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to: | | | |
| 08.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE). | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 08.02 Utilize a record keeping system to collect, interpret, and analyze data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 08.03 Enhance oral communications through telephone, interview and presentation skills. | LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | CRP.04.01.02.b |
| 08.04 Enhance written communication by developing resumes and business letters. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2 | | CRP.04.02.02.b |
| 08.05 Demonstrate interpersonal (nonverbal) communication skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 08.06 Demonstrate good listening skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.04.03.01.a |
| 09.0 Apply leadership and citizenship skills--The student will be able to: | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|-----------|---------------------------------|
| 09.01 Identify and describe leadership characteristics. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.01.a |
| 09.02 Identify opportunities to apply acquired leadership skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.02.a |
| 09.03 Identify and demonstrate ways to be an active citizen. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.01.03.02.c |
| 09.04 Participate in community based learning activities. | | | CRP.01.03.01.a |
| 09.05 Demonstrate the ability to work cooperatively. | | | CRP.09.03.01.a |
| 09.06 Conduct formal and informal meetings using correct parliamentary procedure skills. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 09.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 09.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks. | | | CS.05.01.01.b CRP.10.02.02.b |
| 10.0 Discuss components of food safety and handling practices in agriculture - The student will be able to: | | | |
| 10.01 Demonstrate proper safety precautions and use of personal protective equipment. | | | FPP.01.01.01.b |
| 10.02 Evaluate the food safety responsibilities that occur along the food supply chain. | | | FPP.03.03.02.b |
| 10.03 Explain techniques and procedures for the safe handling of food products. | | | FPP.03.03.02.c |
| 10.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation). | | | FPP03.03.01.b |
| 10.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply. | | | FPP04.01.01.0b |

**Florida Department of Education
Student Performance Standards**

Course Title: Agricultural Sales and Services 2
Course Number: 8116010
Course Credit: 1

Course Description:

This course is designed to develop competencies in the basic concepts of agribusiness; the operation and maintenance of equipment and maintenance of facilities; handling merchandise; demonstration of positive customer-relations and employability skills.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci & Soc. Studies | National Standards |
|---|-------------------------------------|--------------------------|--------------------|
| 11.0 Explain the components of the American business system – the student will be able to: | | | |
| 11.01 Compare different forms of business organizations. | LAFS.910.SL.1.1 LAFS.1112.SL1.1 | SS.912.E.1.5 | |
| 11.02 Distinguish and identify between the characteristics of each type of market structures (monopoly, oligopoly, monopolistic competition, pure competition). | LAFS.910.SL.1.1 LAFS.1112.SL1.1 | SS.912.E.1.6 | |
| 11.03 Research the factors that contribute to the four phases of the business cycle (peak, contraction – unemployment, trough, expansion – inflation). | LAFS.910.W.3.8 LAFS.1112.W.3.8 | SS.912.E.1.12 | |
| 12.0 Describe the basic concepts of agribusiness – the student will be able to: | | | |
| 12.01 Explain the following concepts: <ul style="list-style-type: none"> • business cycle • profit/loss • competition • supply/ demand • quantity supplied – graphically illustrate situations that would cause change • quantity demanded – graphically illustrate situations that would | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | SS.912.E1.4 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci & Soc. Studies | National Standards |
|--|--|--------------------------------|--------------------|
| cause change <ul style="list-style-type: none"> equilibrium price | | | |
| 12.02 Identify and discuss ethical issues in agribusiness. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 12.03 Identify the different roles in agriculture sales careers. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 13.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy – the student will be able to: | | | |
| 13.01 Assess the agricultural impact upon the on US gross national product and the total global economy. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 13.02 Discuss the impact global trade has US agribusiness industries, including barriers and regulations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | SS.912.E.3.3 | |
| 13.03 Identify and describe the primary government agencies involved with agriculture. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 13.04 Research new and emerging technologies and their impact on the economy. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 13.05 Recognize the value of the food and agribusiness industry. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 14.0 Students examine the scope of career opportunities in and the importance of agriculture to the economy – the student will be able to: | | | |
| 14.01 Explore agriculture and agribusinesses and their role in the economy. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 14.02 Evaluate the agribusiness career opportunities in agriculture. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | SS.912.FL.1.1 | |
| 14.03 Calculate the total educational cost of an agricultural career. | LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 MAFS.912.N-Q.1.3 | SS.912.FL.1.2 | |
| 14.04 Compare how key organizational structures and processes affect organizational performance and the quality of products and services. | LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 14.05 Demonstrate those qualities, attributes and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 14.06 Analyze how changes in the market and changes in product quality can affect wages, and employment status. | | SS.912.FL.1.4 SS.912.FL.1.5 | |
| 14.07 Construct a one year budget plan for a specific career path including expenses and construction of a credit plan for purchasing | LAFS.910.W.2.4 LAFS.1112.W.2.4 | SS.912.FL.1.3 SS.912.E.1.16 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci & Soc. Studies | National Standards |
|---|--|--|--------------------|
| a major item. | LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 MAFS.912.N-Q.1.1 MAFS.912.N-Q.1.2 MAFS.912.N-Q.1.3 | | |
| 15.0 Perform accounting activities – the student will be able to: | | | |
| 15.01 Interpret financial statements. | MAFS.912.S-IC.2.6 MAFS.912.S-MD.2.5 MAFS.912.S-MD.2.6 | | |
| 15.02 Create and interpret a budget for one year. | | | |
| 15.03 Establish a plan to pay off debt. | | SS.912.FL.3.1 SS.912.FL.4.2 | |
| 15.04 Explain cash management strategies including debit accounts, checking accounts, and savings accounts. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | SS.912.FL.4.2 | |
| 15.05 Analyze credit scores and reports and there uses. | MAFS.912.S-IC.2.6 | SS.912.FL.4.2 SS.912.FL.4.5 SS.912.FL.4.6 SS.912.FL.4.7 SS.912.FL.4.13 | |
| 15.06 Complete a profit and loss statement. | | | |
| 15.07 Calculate the finance charges and total amount due on a credit card bill; include any fees that could be included. | MAFS.912.A-REI.2.3 | SS.912.FL.4.1 SS.912.FL.4.2 | |
| 15.08 Examine inflation, its effects on interest, value of goods & services, and employment. | | SS.912.FL.3.2 SS.912.FL.3.3 | |
| 15.09 Analyze consequences for not repaying a loan, or having missing/late payments on loans or credit cards. | | SS.912.FL.4.7 SS.912.FL.4.8 | |
| 15.10 Compare different tax models at the federal, state, and local level. | | SS.912.FL.5.1 | |
| 15.11 Explain regulations or laws that are put in place to regulate financial institutions and protect business or consumers. | | SS.912.FL.3.5 SS.912.FL.4.12 SS.912.FL.5.12 | |
| 16.0 Conduct appropriate market and marketing research – the student will be able to: | | | |
| 16.01 Investigate the meaning and methods of marketing in AFNR as related to agricultural commodities, products and services and to agricultural goods in domestic and international markets. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 | SS.912.E.1.8 | ABS.06.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci & Soc. Studies | National Standards |
|---|---|-------------------------------------|---------------------------|
| 16.02 Apply benefit/cost analysis to marketing in AFNR businesses. | | | ABS.06.01.01.b |
| 16.03 Implement and evaluate marketing strategies with agricultural commodities, products and services. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 | | ABS.06.01.01.c |
| 16.04 Describe functions in agricultural marketing. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | ABS.06.01.02.a |
| 16.05 Assess the presence of marketing infrastructure for agricultural commodities. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 | | ABS.06.01.02.b |
| 16.06 Evaluate alternative marketing strategies, such as valueadding, branding and niche marketing, and propose and implement appropriate modifications to achieve AFNR business goals. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 | SS.912.FL.2.1 | ABS.06.01.02.c |
| 16.07 Use data to compare historical rates of return on investments with investment claims to make informed decisions and identify potential fraud. | LAFS.910.RI.1.2 LAFS.1112.RI.1.2 MAFS.912.S-MD.2.5 MAFS.912.S-MD.2.6 MAFS.912.S-MD.2.7 MAFS.912.S-IC.2.6 | SS.912.F.4.14 | |
| 16.08 Explain how buyer and sellers actions can determine the rate of return on an investment. | | SS.912.FL.5.3 | |
| 16.09 Prepare a flowchart that shows production processes, including the resources and capital needed for each step and graphically explain how to determine prices and output though marginal cost analysis. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.1.2 LAFS.1112.W.1.2 LAFS.910.W.2.6 LAFS.1112.W.2.6 | SS.912.E.1.7 | |
| 17.0 Develop a marketing plan – the student will be able to: | | | |
| 17.01 Identify the purpose, components and developmental processes of marketing plans. | LAFS.910.W.1.2 LAFS.1112.W.1.2 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | ABS.06.02.01.a |
| 17.02 Perform a marketing analysis, including evaluation of the competitors, customers, international and domestic policy environment, regulations and rules, standards and AFNR business resources. | LAFS.910.W.1.2 LAFS.1112.W.1.2 LAFS.910.W.2.4 LAFS.1112.W.2.4 | SS.912.FL.2.2 | ABS.06.02.01.b |
| 17.03 Establish marketing plan goals/objectives, including monitoring, measuring and analyzing goal achievement. | LAFS.910.W.1.2 LAFS.1112.W.1.2 | | ABS.06.02.01.c |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci & Soc. Studies | National Standards |
|--|--|--------------------------------|--------------------|
| | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 18.0 Use accounting fundamentals to accomplish dependable bookkeeping and fiscal management – the student will be able to: | | | |
| 18.01 Identify financial concepts associated with production and profit and compare various economic systems (traditional, market, command, mixed) in how they answer the questions 1) what to produce, 2) how to produce, 3) for whom to produce. | LAFS.910.SL.1.1 LAFS.1112.SL1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 | SS.912.E.1.3 | ABS.04.01.02.a |
| 18.02 Evaluate characteristics of lines of credit, loan terms and alternatives in sources of capital such as savings and investment services. | LAFS.910.RI.3.8 LAFS.1112.RI.3.8 | SS.912.FL.4.3 SS.912.FL.4.4 | ABS.04.01.02.c |
| 18.03 Determine the tax structure applicable to different agribusinesses. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | SS.912.FL.1.6 | |
| 18.04 Name and explain the impact of external economic factors on an AFNR business such as inflation. | LAFS.910.SL.1.1 LAFS.1112.SL1.1 | SS.912.E.2.7 | ABS.05.01.02.a |
| 18.05 Predict the consequences of delayed payment of expenses, prepayment of expenses and delayed receipts on a financial statement. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 MAFS.912.S-MD.2.5 | SS.912.FL.4.5 | ABS.05.01.02.c |
| 19.0 Develop specific tactics to market AFNR products and services – the student will be able to: | | | |
| 19.01 Explain the meaning and use of the four Ps (product, price, place, and promotion) in marketing. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | SS.912.FL.2.3 SS.912.FL.2.4 | ABS.06.04.01.a |
| 19.02 Develop advertising campaigns that promote products and services. | LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.SL.2.5 LAFS.1112.SL.2.5 | SS.912.FL.2.5 SS.912.FL.4.2 | ABS.06.04.01.b |
| 19.03 Implement sales goals and incentive programs, and identify pricing strategies used by competitors. | LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.2.4 LAFS.1112.W.2.4 | SS.912.FL.2.5 SS.912.FL.4.2 | ABS.06.04.01.c |
| 20.0 Observe local, state, and federal rules and regulations – the student will be able to: | | | |
| 20.01 List agencies responsible for inspecting and regulating operation or product. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | SS.912.FL.2.7 | |
| 20.02 List reasons for the necessity of inspections, certification and regulations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | SS.912.FL.2.7 | |
| 20.03 Diagram and explain the problems that occur when government institutes wage and price controls, and explain the rational for these controls | LAFS.910.SL.2.5 LAFS.1112.SL.2.5 LAFS.910.W.2.4 LAFS.1112.W.2.4 | SS.912.E.2.4 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci & Soc. Studies | National Standards |
|---|--|---|--------------------|
| | MAFS.912.N-Q.1.2 MAFS.912.F-IF.3.7 | | |
| 20.04 Identify the sources of technical assistance available from private and government. (Ex. Extension, FDACS, FDA, IFAS) | LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 21.0 Develop financial literacy skills – the student will be able to: | | | |
| 21.01 Analyze types of loans, including the importance of down payments, and collateral on securing funding sources. | | SS.912.FL.4.11 | |
| 21.02 Calculate the effects on the monthly payment in the change of interest rate based on an adjustable rate mortgage. | MAFS.912.F-LE.2.5 MAFS.912.F-LE.1.3 MAFS.912.S-ID.1.4 MAFS.912.N-Q.1.3 MAFS.912.A-SSE.1.1 | | |
| 21.03 Analyze diversification in investments. | | SS.912.FL.5.4 SS.912.FL.5.5 SS.912.FL.5.6 | |
| 21.04 Explain the risk benefit in investment areas. | | SS.912.FL.5.6 SS.912.FL.5.7 SS.912.FL.5.9 SS.912.FL.5.10 | |
| 21.05 Analyze stock with a set amount of money, and follow the process through gains, losses, and selling. | | SS.912.FL.3.4 SS.912.FL.5.8 SS.912.FL.6.1 | |
| 21.06 Compare and contrast income from purchase of common stock, preferred stock, and bonds. | | SS.912.FL.5.5 SS.912.FL.6.1 | |
| 21.07 Given current exchange rates be able to convert from one form of currency to another. | MAFS.912.A-REI.2.3 MAFS.912.N-Q.1.2 MAFS.912.N-Q.1.3 | SS.912.FL.5.8 | |
| 21.08 Compare different insurance options and fees. | | SS.912.FL.6.2 SS.912.FL.6.3 SS.912.FL.6.6 SS.912.FL.6.7 | |
| 21.09 Compare and contrast the role of insurance as a device to mitigate risk and calculate expenses of various options. | | SS.912.FL.6.2 SS.912.FL.6.3 SS.912.FL.6.7 | |
| 21.10 Collect, organize, and interpret data to determine an effective retirement savings plan to meet personal financial goals. | MAFS.912.A-SSE.1.1 MAFS.912.F-LE.1.1 MAFS.912.F-LE.1.2 MAFS.912.F-LE.1.3 MAFS.912.F-LE.1.4 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci & Soc. Studies | National Standards |
|---|--|---------------------------------|--------------------|
| | MAFS.912.F-LE.2.5 MAFS.912.S-IC.2.6 | | |
| 21.11 Discuss when bankruptcy should be used as an action and the repercussions involved with filing. | | SS.912.FL.4.10 | |
| 21.12 Determine how identity theft can occur and what assistance is in place for victims. | | SS.912.FL.6.9 SS.912.FL.6.10 | |

**Florida Department of Education
Student Performance Standards**

Course Title: Agricultural Sales and Services 3
Course Number: 8116020
Course Credit: 1

Course Description:

This course is designed to develop competencies in the general principles of agribusiness; performing agricultural business activities; merchandising and selling agricultural products and services; performing promotional activities and local, state, and federal rules and regulations.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA and NGSS- Sci

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|-------------------------------------|-----------|--------------------|
| 22.0 Explain the components of the American business system – the student will be able to: | | | |
| 22.01 Describe the five basic ways American business is organized. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 22.02 Distinguish and identify between the characteristics of each method of doing business. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 22.03 Evaluate the advantages and disadvantages provided by each business method. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 22.04 Evaluate how cooperative principles and practices differentiate cooperatives from other businesses. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 23.0 Investigate agricultural cooperatives structure and function – the student will be able to: | | | |
| 23.01 Explain the definition of a cooperative. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |
| 23.02 Understand the history of cooperative principles and practices. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 23.03 Describe the five areas that classify cooperative structure. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 23.04 Distinguish and identify between the five types of cooperative structure and their functions. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|-------------------------------|--------------------|
| 23.05 Explain the single-tax principle and how it works for cooperatives and differentiate between direct and indirect taxes and describe the progressivity of taxes. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | SS.912.FL.1.7 SS.912.E.2.8 | |
| 24.0 Demonstrate knowledge of the general principles of agribusiness – the student will be able to: | | | |
| 24.01 Explain the different types of record-keeping systems used in agribusiness. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 24.02 Explain and differentiate variable and fixed costs. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 24.03 Identify the various types and sources of credit. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 24.04 Compose a formula to determine the value of your product or service. | | | |
| 24.05 Describe the decision-making process involved in purchasing capital and sales products. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 25.0 Perform agricultural business activities – the student will be able to: | | | |
| 25.01 Prepare for a customer call or visit. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |
| 25.02 Create a customer profile or database. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 25.03 Determine margins and discounts for pricing agricultural supplies and products (e.g., cash, bulk, quantity, early season, etc.). | | | |
| 25.04 Convey updates on prices of products. | LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 25.05 Use a computer, tablets, and smart phones to conduct daily business communications and transactions. | LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 26.0 Summarize methods of selling agricultural products and services – the student will be able to: | | | |
| 26.01 Analyze marketing and pricing alternatives. | LAFS.910.RI.2.6 LAFS.1112.RI.2.6 LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 26.02 Differentiate marketing, pricing, value, and grading standards for different agricultural products. | LAFS.910.RI.2.6 LAFS.1112.RI.2.6 LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 26.03 Promote agricultural products. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|-----------|--------------------|
| 26.04 Explain the purpose, benefit, and quality of the products sold. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 26.05 Determine customer needs and wants. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 26.06 Recommend products and services that meet the customer's needs or wants. | LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 26.07 Demonstrate effective sales principles and techniques. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 26.08 Process customer orders by various means, including electronic communications. | | | |
| 26.09 Follow up to ensure the quality assurance and customer satisfaction. | | | |
| 26.10 Provide technical assistance to customers. | | | |
| 26.11 Respond to customer complaints. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | |
| 27.0 Merchandise products and services to achieve specific marketing goals – the student will be able to: | | | |
| 27.01 Identify, explain and organize components of the sales process. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | ABS.06.05.01.a |
| 27.02 Develop effective customer relationships using approaches that are consistent and comprehensive. | | | ABS.06.05.01.b |
| 27.03 Monitor marketing approaches to determine effectiveness in goal achievement, and make needed changes in such approaches. | LAFS.910.W.2.5 LAFS.1112.W.2.5 | | ABS.06.05.01.c |
| 27.04 Develop strategies to gain new customers. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | ABS.06.05.02.a |
| 27.05 Devise sales practices to achieve goals effectively and efficiently. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | ABS.06.05.05.b |
| 27.06 Prepare and make sales presentations. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | ABS.06.05.02.c |
| 27.07 Identify and maintain needed sales records. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | ABS.06.05.03.a |
| 27.08 Use strategies to follow up sales to provide post-sales service. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | ABS.06.05.03.b |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---|-----------|--------------------|
| 27.09 Intercept, interpret and process customer complaints, needs and problems with products and services. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | ABS.06.05.03.c |
| 28.0 Perform promotional activities – the student will be able to: | | | |
| 28.01 Identify potential customers. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 28.02 Collect and analyze market information. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 28.03 Develop a plan for advertising an agricultural product or service. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 28.04 Identify appropriate trade shows and demonstrations. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 28.05 Make an oral presentation in a promotional meeting, utilizing visual aids. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 LAFS.910.SL.2.5 LAFS.1112.SL.2.5 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 29.0 Demonstrate employability skills – the student will be able to: | | | |
| 29.01 Conduct a job search and identify advanced-training opportunities and requirements. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 29.02 Compile the components of an employer’s investment. (Ex. products, employees, equipment) | | | |
| 29.03 Secure information about a job, including employee benefits, career advancement, job satisfaction, employee benefits, etc. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 29.04 Prepare a resume. | LAFS.910.W.1.2 LAFS.1112.W.1.2 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 29.05 Demonstrate ethical and responsible practices. | | | |
| 29.06 Evaluate the importance of pride in the quality of workmanship. | | | |
| 29.07 Describe the advantages of a good driving record and the ramifications of a poor driving record on employability opportunities. | LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |
| 29.08 Reinforce the importance of confidentiality in various workplace | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---|--------------|--------------------|
| situations. (Ex. product launch, customer information, personal social media use, non-disclosure agreements) | | | |
| 29.09 Demonstrate appropriate responses to performance evaluations from the employer, the supervisor, and other persons in the workplace. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 29.10 Identify usual employee benefits and wages in AFNR businesses. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 | SS.912.E.1.9 | ABS.02.04.02.a |
| 30.0 Demonstrate acceptable customer-relations skills – the student will be able to: | | | |
| 30.01 Explain the purpose of a customer file system. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 30.02 Evaluate the importance of self-control in customer-relations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 30.03 Identify and demonstrate appropriate responses to criticism and praise. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 30.04 Explain the effects of positive human relations on success in business. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 30.05 Demonstrate respect for the customer's desires and property. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 30.06 Practice effective telephone and e-mail skills to enhance customer relations. | LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | |
| 31.0 Model effective sales principles and techniques – the student will be able to: | | | |
| 31.01 Describe the process of creating an opening. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 31.02 Prepare strategies for handling objections. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 31.03 Compare different methods for highlighting selling points. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.SL.2.4 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---|-----------|--------------------|
| | LAFS.1112.SL.2.4 LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 31.04 Create versions of closing strategies. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 32.0 Develop strategies for marketing plan implementation – the student will be able to: | | | |
| 32.01 Identify and use strategies frequently employed in marketing programs, including those used in niche markets. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | ABS.06.03.01.a |
| 32.02 Determine marketing strategies that are most likely to be effective in an AFNR business. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | ABS.06.03.01.b |
| 32.03 Revise marketing strategies based on monitoring and measurement information for target customer base. | LAFS.910.W.2.5 LAFS.1112.W.2.5 | | ABS.06.03.01.c |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If

needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

**Florida Department of Education
Curriculum Framework**

Program Title: Agricultural Communications
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

| | |
|----------------------------|--|
| Program Number | 8117000 |
| CIP Number | 0101080200 |
| Grade Level | 9-12 |
| Standard Length | 3 credits |
| Teacher Certification | Refer to the Program Structure Section |
| CTSO | FFA |
| SOC Codes (all applicable) | 27-3099 - Media and Communication Workers, All Other |

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to instruction in instruction in animal and plant production and processing; agriculture marketing and communications; employability skills; mathematics; basic science; biological sciences; and human-relations skills.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of one occupational completion point. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

| OCP | Course | Course Title | Teacher Certification | Length | SOC Code | Level | Graduation |
|-----|--------|--------------|-----------------------|--------|----------|-------|------------|
|-----|--------|--------------|-----------------------|--------|----------|-------|------------|

| Number | | | Requirement | | | | |
|--------|---------|-------------------------------|----------------|----------|---------|---|----|
| A | 8106810 | Agriscience Foundations1 | AGRICUTUR 1 @2 | 1 credit | 27-3099 | 3 | EQ |
| | 8117010 | Agricultural Communications 2 | | 1 credit | | 3 | PA |
| | 8117020 | Agricultural Communications 3 | | 1 credit | | 3 | PA |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Academic Alignment Tables

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

| Courses | Anatomy/ Physiology Honors | Astronomy Solar/Galactic Honors | Biology 1 | Chemistry 1 | Earth- Space Science | Environmental Science | Genetics | Integrated Science | Marine Science 1 Honors | Physical Science | Physics 1 |
|--------------------------------------|----------------------------------|---------------------------------------|--------------|----------------|----------------------------|--------------------------|--------------|-----------------------|-------------------------------|---------------------|--------------|
| Agriscience Foundations1 | 29/87 33% | 18/80 23% | 55/83 66% | 11/69 16% | 36/67 54% | 30/70 42% | 20/69 29% | 49/82 60% | 25/66 38% | 38/74 51% | 12/72 16% |
| Agricultural Communicati ons 2 | # | 2/80 3% | 25/83 30% | 2/69 3% | 26/67 39% | 2/70 3% | # | 25/82 30% | 2/66 3% | 26/74 35% | 1/72 1% |
| Agricultural Communicati ons 3 | 25/87 29% | 25/80 31% | 2/83 2% | 27/69 39% | 2/67 3% | 26/70 37% | 25/69 36% | 2/82 2% | 20/66 30% | 2/74 3% | 25/72 35% |

** Alignment pending review

Alignment attempted, but no correlation to academic course

| Courses | Algebra 1 | Algebra 2 | Geometry | English 1 | English 2 | English 3 | English 4 |
|-------------------------------------|--------------|------------|-------------|--------------|--------------|--------------|--------------|
| Agriscience Foundations 1 | 14/67 21% | 4/75 5% | 8/54 15% | 11/46 24% | 11/45 24% | 11/45 24% | 11/45 24% |
| Agricultural Communications 2 | ** | ** | ** | 10/46 22% | 10/45 22% | 11/45 24% | 11/45 24% |
| Agricultural Communications 3 | ** | ** | ** | 12/46 26% | 12/45 26% | 13/45 28% | 13/45 28% |

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. The FS for Mathematical Practices are designed for grades K-12 and describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education.

Instructors must incorporate the Florida Standards for Technical Subjects and Mathematical Practices throughout instruction of this CTE program.

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL’s need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. If so, the standards have been identified and cross walked with the corresponding CTE standard and/or benchmark.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Describe the history of agriculture and its influence on the global economy.
- 02.0 Practice agriscience safety skills and procedures.
- 03.0 Apply scientific and technological principles to agriscience issues.
- 04.0 Apply environmental principles to the agricultural industry.
- 05.0 Investigate and utilize basic scientific skills and principles in plant science.
- 06.0 Investigate and utilize basic scientific skills and principles in animal science.
- 07.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 08.0 Demonstrate agribusiness, employability and human relation skills.
- 09.0 Apply leadership and citizenship skills.
- 10.0 Discuss components of food safety and handling practices in agriculture
- 11.0 Investigate the communications sector of the agricultural industry.
- 12.0 Identify the forms of communication.
- 13.0 Develop communication messages.
- 14.0 Demonstrate oral communications skills.
- 15.0 Conduct interviews.
- 16.0 Utilize printed agricultural media.
- 17.0 Utilize photography and graphics.
- 18.0 Develop, design and edit publications and documents.
- 19.0 Develop audio and video media.
- 20.0 Investigate ethical and professional issues in agricultural communications.
- 21.0 Demonstrate leadership, employability, and human relations skills.
- 22.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy.
- 23.0 Students examine the scope of career opportunities in and the importance of agriculture to the economy.
- 24.0 Explore the communications sector of the agricultural industry.
- 25.0 Create communication messages.
- 26.0 Demonstrate oral communications skills.
- 27.0 Generate printed agricultural media.
- 28.0 Modify photography and graphics.
- 29.0 Create, design and edit publications and documents.
- 30.0 Create or analyze audio and video media
- 31.0 Investigate ethical and professional issues in agricultural communications.
- 32.0 Demonstrate leadership, employability, and human relations skills.
- 33.0 Use online social media.
- 34.0 Create an agricultural communications campaign.
- 35.0 Explain the components of the American business system.
- 36.0 Investigate agricultural cooperatives structure and function.

**Florida Department of Education
Student Performance Standards**

Course Title: Agriscience Foundations 1
Course Number: 8106810
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of agricultural history and the global impact of agriculture; career opportunities; scientific and research concepts; biological and physical science principles; environmental principles; agriscience safety; principles of leadership; and agribusiness, employability, and human relations skills in agriscience. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students will interact with materials and primary sources of data or with secondary sources of data to observe and understand the natural world. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 20% of classroom time will be dedicated to laboratory experiences.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|------------------------------------|---|--------------------|
| 01.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to: | | SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2; | |
| 01.01 Evaluate and explain emerging trends and the opportunities they may create within the AFNR systems. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.01.01.02.c |
| 01.02 Assess the economic impact of an AFNR system on a local, state, national and global level. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | CS.02.02.03.b |
| 01.03 Identify significant career patterns/shifts in the history of the agricultural industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.01.01.01.a |
| 01.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.06.02.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|--|--------------------|
| 02.0 Practice agriscience safety skills and procedures--The student will be able to: | | SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7; | |
| 02.01 Identify the common causes and prevention of accidents in agriscience operations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.a |
| 02.02 Extract and utilize pertinent information from a container label and/or Safety Data Sheet (SDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | CS.03.04.03.a |
| 02.03 Identify proper disposal of hazardous waste materials and biohazards. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | ESS.04.01.02.c |
| 02.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.b |
| 03.0 Apply scientific and technological principles to agriscience issues--The student will be able to: | | SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1; | |
| 03.01 Employ scientific measurement skills. | | | |
| 03.02 Demonstrate safe and effective use of common laboratory equipment. | | | ESS.01.02.01.b |
| 03.03 Identify the parts and functions of plant and animal cells. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |
| 03.04 Describe the phases of cell reproduction. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 03.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|--------------------|
| 03.06 Interpret, analyze, and report data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | BS.02.01.01.b |
| 03.07 Investigate DNA and genetics applications in agriscience including the theory of probability. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | BS.01.01.01.a |
| 03.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.). | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | BS.03.01.03.b |
| 04.0 Apply environmental principles to the agricultural industry--The student will be able to: | | SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12 | |
| 04.01 Research how different climactic and geological activity influences agriculture. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | NRS.01.03.02.b |
| 04.02 Describe various ecosystems as they relate to the agriculture industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.03 Describe the environmental resources (soil, water, air) necessary for agriculture production. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.08.02.01.a |
| 04.04 Identify regulatory agencies that impact agricultural practices. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6 | | NRS.02.01.02.a |
| 04.05 Apply Best Management Practices that enhance the natural environment. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.06 Identify conservation practices related to natural resources. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.02.02.b |
| 05.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to: | | SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7; | |
| 05.01 Identify and describe the specializations within the plant science industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.02 Categorize plants based on specific characteristics according to industry and scientific standards. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|---|---|
| 05.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc.... | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.03.01.a PS.02.03.02.a PS.02.03.05.a |
| 05.04 Identify the nutrients required for plant growth from the periodic table and explain their functions. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.01.02.01.a |
| 05.05 Analyze information from a fertilizer label. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | PS.01.03.04.b |
| 05.06 Propagate and grow plants through sexual and/or asexual reproduction. | | | PS.03.01.03.a PS.03.01.01.b |
| 05.07 Investigate the impacts of various pests and propose solutions for their control. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.03.03.01.c |
| 05.08 Investigate the nature and properties of food, fiber, and by-products from plants. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.09 Explore career opportunities in plant science. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.05.01.01.a |
| 06.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to: | | SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19; | |
| 06.01 Explain the economic importance of animals and the products obtained from animals. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.02 Analyze commercially important livestock breeds in Florida. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |
| 06.04 Compare and contrast animal welfare issues. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | AS.02.01.01.a |
| 06.05 Investigate the nature and properties of food, fiber, and by-products from animals. | | | AS.06.03.03.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|---|--------------------|
| 06.06 Explore career opportunities in animal science. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | CS.05.01.01.a |
| 07.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to | | SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9; | |
| 07.01 Select and demonstrate proper use of hand tools in agriculture. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.04.02.a |
| 07.02 Operate service and maintain agriscience equipment, and instruments. | | | CS.03.04.03.b |
| 07.03 Manage facilities and supplies. | | | |
| 08.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to: | | | |
| 08.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE). | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 08.02 Utilize a record keeping system to collect, interpret, and analyze data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 08.03 Enhance oral communications through telephone, interview and presentation skills. | LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | CRP.04.01.02.b |
| 08.04 Enhance written communication by developing resumes and business letters. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2 | | CRP.04.02.02.b |
| 08.05 Demonstrate interpersonal (nonverbal) communication skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 08.06 Demonstrate good listening skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.04.03.01.a |
| 09.0 Apply leadership and citizenship skills--The student will be able to: | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|-----------|---------------------------------|
| 09.01 Identify and describe leadership characteristics. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.01.a |
| 09.02 Identify opportunities to apply acquired leadership skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.02.a |
| 09.03 Identify and demonstrate ways to be an active citizen. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.01.03.02.c |
| 09.04 Participate in community based learning activities. | | | CRP.01.03.01.a |
| 09.05 Demonstrate the ability to work cooperatively. | | | CRP.09.03.01.a |
| 09.06 Conduct formal and informal meetings using correct parliamentary procedure skills. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 09.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 09.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks. | | | CS.05.01.01.b CRP.10.02.02.b |
| 10.0 Discuss components of food safety and handling practices in agriculture - The student will be able to: | | | |
| 10.01 Demonstrate proper safety precautions and use of personal protective equipment. | | | FPP.01.01.01.b |
| 10.02 Evaluate the food safety responsibilities that occur along the food supply chain. | | | FPP.03.03.02.b |
| 10.03 Explain techniques and procedures for the safe handling of food products. | | | FPP.03.03.02.c |
| 10.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation). | | | FPP03.03.01.b |
| 10.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply. | | | FPP04.01.01.0b |

**Florida Department of Education
Student Performance Standards**

Course Title: Agricultural Communications 2
Course Number: 8117010
Course Credit: 1

Course Description:

This course is designed to develop competencies in the communications sector of the agricultural industry including instruction in developing and editing materials for printed media and media broadcast, utilizing photography and graphics, the importance of the internet in communications, writing technical papers and media scripts and ethical and professional issues in the industry.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-------------------------------------|--------------|--------------------|
| 11.0 Investigate the communications sector of the agricultural industry – the student will be able to: | | | |
| 11.01 Describe the importance of and how communication is used in American agriculture and society. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |
| 11.02 Discuss career opportunities in agricultural communications including the educational requirements. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 11.03 Identify professional organizations related to agricultural communications. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |
| 12.0 Identify the forms of communication – the student will be able to: | | | |
| 12.01 Explain the different types of communication: verbal, non-verbal, written and visual. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | SC.912.N.1.4 | |
| 12.02 Compare the various forms of communication technologies: print, video, online media, visual arts and social media. | LAFS.910.SL.1.2 LAFS.1112.SL.1.2 | SC.912.N.1.5 | |
| 12.03 Identify communication barriers and determine methods of overcoming these barriers. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 13.0 Develop communication messages – the student will be able to: | | | |
| 13.01 Conduct an audience analysis. | LAFS.910.W.2.5 LAFS.1112.W.2.5 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|------------------|---------------------------|
| 13.02 Research information for message development. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |
| 13.03 Analyze credibility of research and sources. | LAFS.910.SL.1.2 LAFS.1112.SL.1.2 | SC.912.N.1.4 | |
| 13.04 Utilize elements of informative and persuasive messages. | LAFS.910.W.1.1 LAFS.910.W.1.2 LAFS.1112.W.1.1 LAFS.1112.W.1.2 | | |
| 13.05 Compare and contrast media channels. | LAFS.910.SL.1.2 LAFS.1112.SL.1.2 | | |
| 13.06 Identify agricultural messages in the media. | LAFS.910.SL.1.2 LAFS.1112.SL.1.2 | | |
| 13.07 Create informative and persuasive messages using various communication methods. | LAFS.910.W.1.1 LAFS.910.W.1.2 LAFS.1112.W.1.1 LAFS.1112.W.1.2 | | |
| 14.0 Demonstrate oral communications skills – the student will be able to: | | | |
| 14.01 Determine types of speeches: informative, persuasive. | LAFS.910.W.1.1 LAFS.910.W.1.2 LAFS.1112.W.1.1 LAFS.1112.W.1.2 | | |
| 14.02 Identify the importance of public speaking skills in career development. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 14.03 Explain the characteristics of an effective public speaker. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 14.04 Explain the steps necessary to prepare a speech. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 14.05 Present a prepared speech. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 14.06 Present an extemporaneous speech. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 14.07 Create visual aids for presentations. | LAFS.910.SL.2.5 LAFS.1112.SL.2.5 | | |
| 15.0 Conduct interviews – the student will be able to: | | | |
| 15.01 Research information for an interview (including company or organization information and information about the interviewee to build report). | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 15.02 Identify the types of interview questions. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|-------------------------------------|-----------|--------------------|
| 15.03 Write interview questions. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 15.04 Conduct an interview. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 15.05 Conduct follow-up procedures. | | | |
| 16.0 Prepare written agricultural media – the student will be able to: | | | |
| 16.01 Explain the evolution and relevance of printed media in the agricultural industry. Describe the components of various styles in written articles. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 16.02 Identify and list the criteria for newsworthiness of a news story. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |
| 16.03 Explain the structure of the inverted pyramid. | LAFS.910.RI.1.3 LAFS.1112.RI.1.3 | | |
| 16.04 List the five Ws and the H: who, what, when, where, why and how. | LAFS.910.W.1.2 LAFS.1112.W.1.2 | | |
| 16.05 Compose a news story and news release on an agricultural topic. | LAFS.910.W.1.2 LAFS.1112.W.1.2 | | |
| 16.06 Compose a news release on an agricultural topic. | | | |
| 16.07 Use the <i>Associated Press Stylebook and Libel Manual</i> to edit articles. | LAFS.910.W.2.5 LAFS.1112.W.2.5 | | |
| 16.08 Define the components of an editorial. | LAFS.910.W.1.2 LAFS.1112.W.1.2 | | |
| 17.0 Utilize photography and graphics – the student will be able to: | | | |
| 17.01 Identify types of photographs and graphics. | | | |
| 17.02 Describe the importance of photographs and graphics to agriculture communications. | | | |
| 17.03 Identify key terms in digital photography and phot editing. | | | |
| 17.04 Compose a quality photograph. | | | |
| 17.05 Demonstrate the use of technology, software, and hardware used in photography and graphic design. | | | |
| 17.06 Explain the difference among digital file formats. . | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|-----------|--------------------|
| 18.0 Develop, design and edit publications and documents – the student will be able to: | | | |
| 18.01 Identify key terms in publication and document design. | LAFS.910.L.3.6 LAFS.1112.L.36 | | |
| 18.02 Explain and apply the components of the publication and document development process. | LAFS.910.W.2.5 LAFS.1112.W.2.5 | | |
| 18.03 Identify common mistakes in publication and document design. | LAFS.910.W.2.5 LAFS.1112.W.2.5 | | |
| 18.04 Use the appropriate software to design a publication and document. | LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 19.0 Develop audio and video media – the student will be able to: | | | |
| 19.01 Explain and implement the electronic media production process. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 19.02 Write video and audio scripts. | LA.FS.910.L.1.1 LA.FS.1112.L.1.1 | | |
| 19.03 Describe the importance of grammar and punctuation in writing scripts. | LAFS.910.W.2.5 LAFS.910.W.2.6 LAFS.1112.W.2.5 LAFS.1112.W.2.6 | | |
| 19.04 Draw a video storyboard. | LAFS.910.W.2.5 LAFS.910.W.2.6 LAFS.1112.W.2.5 LAFS.1112.W.2.6 | | |
| 19.05 Write a video shot outline. | LAFS.910.SL.2.5 LAFS.1112.SL.2.5 | | |
| 19.06 Identify a proper video shot sequence (long shot, medium shot, close-up). | LAFS.910.SL.2.5 LAFS.1112.SL.2.5 | | |
| 19.07 Create a promotional video. | LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | |
| 19.08 Demonstrate proper tone and voice inflection for radio and video. | LAFS.910.SL.2.5 LAFS.1112.SL.2.5 | | |
| 19.09 Produce a video message with no narration. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 20.0 Investigate ethical and professional issues in agricultural communications – the student will be able to: | | | |
| 20.01 Demonstrate characteristics of responsible/ethical media professionals: public relations professional, reporter and editor. | LAFS.910.SL.1.3 LAFS.1112.SL.1.3 | | |
| 20.02 Adhere to all media deadlines. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|-----------|--------------------|
| 20.03 Describe plagiarism, libel, slander, copyright and intellectual property. | LAFS.910.SL.1.3 LAFS.1112.SL.1.3 LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |
| 21.0 Demonstrate leadership, employability, and human relations skills – the student will be able to: | | | |
| 21.01 Conduct a job search for a career in agricultural communications. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 21.02 Develop a resume and an application letter. Identify documents that may be required when applying for a job in the agricultural communication field. | LAFS.910.W.1.2 LAFS.1112.W.1.2 | | |
| 21.03 Identify and demonstrate proper human relation skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 21.04 Complete a job application form. | LAFS.910.W.1.2 LAFS.1112.W.1.2 | | |
| 21.05 Write a proper thank you letter. | LAFS.910.W.1.2 LAFS.1112.W.1.2 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 21.06 Identify proper workplace and interview attire. | | | |
| 21.07 Create business letters. | LAFS.910.W.1.2 LAFS.1112.W.1.2 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 21.08 Create electronic correspondence. | LAFS.910.W.1.2 LAFS.1112.W.1.2 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 22.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy – the student will be able to: | | | |
| 22.01 Assess the agricultural impact upon the US gross national product and the total global economy. | | | |
| 22.02 Investigate local, state, and national regulatory laws, industry regulations, and legislation for agricultural businesses. | | | |
| 22.03 Identify and describe the primary government agencies involved with agriculture. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |
| 22.04 Research new and emerging technologies and their impact on the economy. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 22.05 Recognize the value of the food and agribusiness industry. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|-------------------------------------|-----------|--------------------|
| 23.0 Students examine the scope of career opportunities in and the importance of agriculture to the economy – the student will be able to: | | | |
| 23.01 Define and explore agriculture and agribusinesses and their role in the economy. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |
| 23.02 Evaluate and explore the agribusiness career opportunities in agriculture. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 23.03 Compare how key organizational structures and processes affect organizational performance and the quality of products and services. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 23.04 Demonstrate those qualities, attributes and skills necessary to succeed in, or further prepare for, a chosen career while effectively contributing to society | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Agricultural Communications 3
Course Number: 8117020
Course Credit: 1

Course Description:

This course is designed to develop competencies in the communications sector of the agricultural industry including instruction in developing and editing materials for printed media and media broadcast, utilizing photography and graphics, the importance of the internet in communications, writing technical papers and media scripts, ethical and professional issues in the industry, and advertising and marketing.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-------------------------------------|------------------|---------------------------|
| 24.0 Explore the communications sector of the agricultural industry – the student will be able to: | | | |
| 24.01 Identify influential, historical and current issues in the agricultural industry that necessitates agricultural communication. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 24.02 Objectively debate agricultural issues. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 25.0 Create communication messages – the student will be able to: | | | |
| 25.01 Define what persuasion is and explain how it can be used to influence others. | LAFS.910.W.1.1 LAFS.1112.W.1.1 | SC.912.N.1.1, 4 | |
| 25.02 Describe and provide an example of how persuasion is used in the media. | LAFS.910.W.1.1 LAFS.1112.W.1.1 | SC.912.N.1.1, 4 | |
| 25.03 Create persuasive media. | LAFS.910.W.1.1 LAFS.1112.W.1.1 | | |
| 25.04 Identify different types of communication research methods. | | | |
| 26.0 Demonstrate oral communications skills – the student will be able to: | | | |
| 26.01 Identify various forms of visual aids for an oral presentation. | LAFS.910.SL.2.5 LAFS1112.SL.2.5 | | |
| 26.02 Present a speech using visual aids and non-verbal cues. | LAFS.910.SL.2.5 LAFS1112.SL.2.5 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|--------------|--------------------|
| 26.03 Evaluate a speech. | LAFS.910.SL.1.3 LAFS.1112.SL.1.3 | | |
| 27.0 Generate printed agricultural media – the student will be able to: | | | |
| 27.01 Develop a media kit consisting of a backgrounder, fact sheet, news release and other media. | LAFS910.W.2.4 LAFS910.W.2.6 LAFS1112.W.2.4 LAFS1112.W.2.6 | | |
| 27.02 Compose an advance story, feature story, follow-up story, cover story and news release on an agricultural topic. | LAFS.910.W.1.2 LAFS.910.W.1.2 | SC.912.N.1.1 | |
| 28.0 Modify photography and graphics – the student will be able to: | | | |
| 28.01 Crop and edit photographs and graphics to enhance an article or news release. | LAFS.910.SL.2.5 LAFS.1112.SL.2.5 | | |
| 28.02 Write effective captions/cutlines for photographs and graphics. | LAFS.910.SL.2.5 LAFS.1112.SL.2.5 | | |
| 29.0 Create, design and edit publications and documents – the student will be able to: | | | |
| 29.01 Create a magazine layout, brochure, poster, newsletter, and/or display for an agriculture product or event. | LAFS910.W.2.4 LAFS910.W.2.6 LAFS1112.W.2.4 LAFS1112.W.2.6 | | |
| 30.0 Create or analyze audio and video media – the student will be able to: | | | |
| 30.01 Create or analyze an informational video. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 LAFS.910.SL.2.5 LAFS.1112.SL.2.5 | | |
| 30.02 Create or analyze a persuasive video. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 LAFS.910.SL.2.5 LAFS.1112.SL.2.5 | | |
| 30.03 Create or analyze an audio program or podcast. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 LAFS.910.SL.2.5 LAFS.1112.SL.2.5 | | |
| 31.0 Investigate ethical and professional issues in agricultural communications – the student will be able to: | | | |
| 31.01 Define key terms related to ethics and professionalism and discuss their relationship to agriculture. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|-----------|--------------------|
| 31.02 Describe the importance of confidentiality in agricultural communications. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 31.03 Respond appropriately to opposing views in a professional manner. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 31.04 Identify concepts of risk communication and crisis communication. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |
| 32.0 Demonstrate leadership, employability, and human relations skills – the student will be able to: | | | |
| 32.01 Demonstrate competence in job interview techniques | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 32.02 Identify or demonstrate appropriate responses to criticism. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 32.03 Answer interview questions competently. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 32.04 Participate in mock interviews. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 32.05 Analyze one's own online presence. | LAFS.910.SL.1.3 LAFS.1112.SL.1.3 | | |
| 33.0 Use online and social media – the student will be able to: | | | |
| 33.01 Compare and contrast the methods of delivering a message through different types of online and social media. | LAFS.910.RI.3.7 LAFS.1112.RI.3.7 | | |
| 33.02 Analyze online and social media for credibility and relevance. | LAFS.910.RI.3.8 LAFS.1112.RI.3.8 | | |
| 33.03 Research the agricultural industry's use of online and social media. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | |
| 33.04 Compose a professional e-mail. | LAFS.910.W.1.2 LAFS.1112.W.1.2 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 33.05 Demonstrate an understanding of web design software and language. | LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 33.06 Create or analyze an agricultural website. | LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 33.07 Use proper composition principles to capture images with mobile technology. | | | |
| 33.08 Access data or information utilizing a mobile app. | | | |
| 34.0 Create an agricultural communications campaign – the student will be able | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|-----------|--------------------|
| to: | | | |
| 34.01 Define key terms in communications campaign development. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 34.02 Identify and perform the various professional roles in a communications campaign. | LAFS.910.W.2.5 LAFS.1112.W.2.5 | | |
| 34.03 Identify the strengths and weaknesses of various media for use in communication campaigns. | LAFS.910.W.2.5 LAFS.1112.W.2.5 | | |
| 34.04 Develop a communications campaign. | LAFS.910.W.1.2 LAFS.1112.W.1.2 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 34.05 Develop a research report for the agricultural industry using an industry standard format. | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 35.0 Explain the components of the American business system – the student will be able to: | | | |
| 35.01 Describe the five basic ways American business is organized. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 35.02 Distinguish and identify between the characteristics of each method of doing business. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 35.03 Evaluate the advantages and disadvantages provided by each business method. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 35.04 Evaluate how cooperative principles and practices differentiate cooperatives from other businesses. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 36.0 Investigate agricultural cooperatives structure and function – the student will be able to: | | | |
| 36.01 Explain the definition of a cooperative. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |
| 36.02 Understand the history of cooperative principles and practices. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 36.03 Describe the five areas that classify cooperative structure. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 36.04 Distinguish and identify between the five types of cooperative structure and their functions. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 36.05 Demonstrate the need for internal and external communications in a cooperative. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization for providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly

indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

**Florida Department of Education
Curriculum Framework**

Program Title: Forestry
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

| | |
|----------------------------|--|
| Program Number | 8118300 |
| CIP Number | 0103050101 |
| Grade Level | 9-12 |
| Standard Length | 4 credits |
| Teacher Certification | Refer to the <u>Program Structure</u> section |
| CTSO | FFA |
| SOC Codes (all applicable) | 45-4011 - Forest and Conservation Workers 19-4093 - Forest and Conservation Technicians |

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the forestry industry within the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of two occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the secondary program structure:

| OCP | Course Number | Course Title | Teacher Certification | Length | SOC Code | Level | Graduation Requirement |
|-----|---------------|----------------------------------|-----------------------|----------|----------|-------|------------------------|
| A | 8106810 | Agriscience Foundations 1 | AGRICULTUR 1 @2 | 1 credit | 45-4011 | 3 | EQ |
| | 8118310 | Forestry and Natural Resources 2 | | 1 credit | | 2 | |
| | 8118320 | Forestry and Natural Resources 3 | | 1 credit | | 2 | |
| B | 8118330 | Forestry 4 | | 1 credit | 19-4093 | 2 | |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Academic Alignment Tables

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

| Courses | Anatomy/ Physiology Honors | Astronomy Solar/Galactic Honors | Biology 1 | Chemistry 1 | Earth- Space Science | Environmental Science | Genetics | Integrated Science | Marine Science 1 Honors | Physical Science | Physics 1 |
|--|----------------------------------|---------------------------------------|--------------|----------------|----------------------------|--------------------------|--------------|-----------------------|-------------------------------|---------------------|--------------|
| Ag. Foundations | 29/87 33% | 18/80 23% | 55/83 66% | 11/69 16% | 36/67 54% | 30/70 42% | 20/69 29% | 49/82 60% | 25/66 38% | 38/74 51% | 12/72 16% |
| Forestry and Natural Resources 2 | 1/87 1% | 5/80 6% | 29/83 35% | 8/69 12% | 23/67 34% | 13/70 19% | 3/69 4% | 28/82 34% | 9/66 14% | 29/74 39% | 3/72 4% |
| Forestry and Natural Resources 3 | 20/87 23% | 25/80 31% | 12/83 14% | 25/69 36% | 9/67 13% | 34/70 49% | 22/69 32% | 8/82 10% | 27/66 41% | 9/74 12% | 23/72 32% |
| Forestry 4 | 19/87 22% | 21/80 26% | 2/83 2% | 20/69 29% | 2/67 3% | 24/70 34% | 19/69 28% | 1/82 1% | 19/66 29% | 2/74 3% | 20/72 28% |

** Alignment pending review

Alignment attempted, but no correlation to academic course

| Courses | Algebra 1 | Algebra 2 | Geometry | English 1 | English 2 | English 3 | English 4 |
|--|--------------|------------|-------------|-----------|-----------|-----------|-----------|
| Agriscience Foundations 1 | 14/67 21% | 4/75 5% | 8/54 15% | ** | ** | ** | ** |
| Forestry and Natural Resources 2 | 5/67 7% | 5/75 7% | 3/54 5% | ** | ** | ** | ** |

| | | | | | | | |
|----------------------------------|------------|------------|------------|----|----|----|----|
| Forestry and Natural Resources 3 | 5/67 7% | 4/75 6% | 3/54 5% | ** | ** | ** | ** |
| Forestry 4 | # | # | # | ** | ** | ** | ** |

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. The FS for Mathematical Practices are designed for grades K-12 and describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education.

Instructors must incorporate the Florida Standards for Technical Subjects and Mathematical Practices throughout instruction of this CTE program.

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL’s need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. If so, the standards have been identified and cross walked with the corresponding CTE standard and/or benchmark.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Describe the history of agriculture and its influence on the global economy.
- 02.0 Practice agriscience safety skills and procedures.
- 03.0 Apply scientific and technological principles to agriscience issues.
- 04.0 Apply environmental principles to the agricultural industry.
- 05.0 Investigate and utilize basic scientific skills and principles in plant science.
- 06.0 Investigate and utilize basic scientific skills and principles in animal science.
- 07.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 08.0 Demonstrate agribusiness, employability and human relation skills.
- 09.0 Apply leadership and citizenship skills.
- 10.0 Describe the forestry and natural resources industry.
- 11.0 Practice forestry and natural resources safety.
- 12.0 Operate, maintain, and repair machinery, equipment, and facilities.
- 13.0 Monitor water resources.
- 14.0 Collect and test soil samples.
- 15.0 Apply multi-use principles to forests and other lands.
- 16.0 Perform basic surveying operations.
- 17.0 Read and interpret aerial photographs and maps
- 18.0 Analyze and interpret soil survey data.
- 19.0 Perform basic nursery operation activities.
- 20.0 Apply basic financial management skills.
- 21.0 Demonstrate leadership and employability skills.
- 22.0 Monitor air quality.
- 23.0 Describe timber marketing procedures and techniques.
- 24.0 Measure trees and forest volume.
- 25.0 Perform preventive maintenance, checks, and services for forestry equipment.
- 26.0 Apply forestry and natural resources safety.
- 27.0 Operate, maintain, and repair machinery, equipment, and facilities according to forestry industry standards.
- 28.0 Identify the major ecosystems in Florida.
- 29.0 Perform monitoring of water resources.
- 30.0 Assist in controlling and using fire in forests and other lands.
- 31.0 Assist in managing forest pests.
- 32.0 Identify applicable local, state, and federal rules and regulations and assistance programs.
- 33.0 Apply multi-use principles to forest and other lands.
- 34.0 Use aerial photographs and maps.
- 35.0 Collect and test water samples.
- 36.0 Interpret soil survey data.
- 37.0 Apply the principles of Best Management Practices (BMP).

- 38.0 Identify technological advances in the industry.
- 39.0 Identify wildlife population management practices.
- 40.0 Identify multi-use principles for forest and other lands.
- 41.0 Apply basic financial management skills.
- 42.0 Demonstrate leadership and management skills.
- 43.0 Apply the principles of basic nursery operations.
- 44.0 Assist in managing the urban forest.
- 45.0 Apply business management skills and identify appropriate legal documents.
- 46.0 Explain the basic silvicultural systems used in forest management.
- 47.0 Prescribe burning for forest management.

**Florida Department of Education
Student Performance Standards**

Course Title: Agriscience Foundations 1
Course Number: 8106810
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of agricultural history and the global impact of agriculture; career opportunities; scientific and research concepts; biological and physical science principles; environmental principles; agriscience safety; principles of leadership; and agribusiness, employability, and human relations skills in agriscience. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students will interact with materials and primary sources of data or with secondary sources of data to observe and understand the natural world. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 20% of classroom time will be dedicated to laboratory experiences.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|------------------------------------|---|--------------------|
| 01.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to: | | SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2; | |
| 01.01 Evaluate and explain emerging trends and the opportunities they may create within the AFNR systems. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.01.01.02.c |
| 01.02 Assess the economic impact of an AFNR system on a local, state, national and global level. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | CS.02.02.03.b |
| 01.03 Identify significant career patterns/shifts in the history of the agricultural industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.01.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-------------------------------------|--|--------------------|
| 01.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.06.02.01.a |
| 02.0 Practice agriscience safety skills and procedures--The student will be able to: | | SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7; | |
| 02.01 Identify the common causes and prevention of accidents in agriscience operations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.a |
| 02.02 Extract and utilize pertinent information from a container label and/or Safety Data Sheet (SDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | CS.03.04.03.a |
| 02.03 Identify proper disposal of hazardous waste materials and biohazards. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | ESS.04.01.02.c |
| 02.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.b |
| 03.0 Apply scientific and technological principles to agriscience issues--The student will be able to: | | SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1; | |
| 03.01 Employ scientific measurement skills. | | | |
| 03.02 Demonstrate safe and effective use of common laboratory equipment. | | | ESS.01.02.01.b |
| 03.03 Identify the parts and functions of plant and animal cells. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |
| 03.04 Describe the phases of cell reproduction. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 03.05 Implement the scientific method and science process skills through | LAFS.910.W.2.4 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|--------------------|
| the design and completion of an agriscience research project. | LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |
| 03.06 Interpret, analyze, and report data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | BS.02.01.01.b |
| 03.07 Investigate DNA and genetics applications in agriscience including the theory of probability. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | BS.01.01.01.a |
| 03.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.). | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | BS.03.01.03.b |
| 04.0 Apply environmental principles to the agricultural industry--The student will be able to: | | SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12 | |
| 04.01 Research how different climactic and geological activity influences agriculture. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | NRS.01.03.02.b |
| 04.02 Describe various ecosystems as they relate to the agriculture industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.03 Describe the environmental resources (soil, water, air) necessary for agriculture production. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.08.02.01.a |
| 04.04 Identify regulatory agencies that impact agricultural practices. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6 | | NRS.02.01.02.a |
| 04.05 Apply Best Management Practices that enhance the natural environment. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.06 Identify conservation practices related to natural resources. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.02.02.b |
| 05.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to: | | SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7; | |
| 05.01 Identify and describe the specializations within the plant science industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|---|
| | LAFS.1112.W.2.4 | | |
| 05.02 Categorize plants based on specific characteristics according to industry and scientific standards. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.01.01.a |
| 05.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc.... | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.03.01.a PS.02.03.02.a PS.02.03.05.a |
| 05.04 Identify the nutrients required for plant growth from the periodic table and explain their functions. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.01.02.01.a |
| 05.05 Analyze information from a fertilizer label. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | PS.01.03.04.b |
| 05.06 Propagate and grow plants through sexual and/or asexual reproduction. | | | PS.03.01.03.a PS.03.01.01.b |
| 05.07 Investigate the impacts of various pests and propose solutions for their control. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.03.03.01.c |
| 05.08 Investigate the nature and properties of food, fiber, and by-products from plants. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.09 Explore career opportunities in plant science. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.05.01.01.a |
| 06.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to: | | SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19; | |
| 06.01 Explain the economic importance of animals and the products obtained from animals. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.02 Analyze commercially important livestock breeds in Florida. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |
| 06.04 Compare and contrast animal welfare issues. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.02.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|---|--------------------|
| | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 06.05 Investigate the nature and properties of food, fiber, and by-products from animals. | | | AS.06.03.03.a |
| 06.06 Explore career opportunities in animal science. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | CS.05.01.01.a |
| 07.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to | | SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9; | |
| 07.01 Select and demonstrate proper use of hand tools in agriculture. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.04.02.a |
| 07.02 Operate service and maintain agriscience equipment, and instruments. | | | CS.03.04.03.b |
| 07.03 Manage facilities and supplies. | | | |
| 08.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to: | | | |
| 08.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE). | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 08.02 Utilize a record keeping system to collect, interpret, and analyze data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 08.03 Enhance oral communications through telephone, interview and presentation skills. | LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | CRP.04.01.02.b |
| 08.04 Enhance written communication by developing resumes and business letters. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2 | | CRP.04.02.02.b |
| 08.05 Demonstrate interpersonal (nonverbal) communication skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|-----------|---------------------------------|
| 08.06 Demonstrate good listening skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.04.03.01.a |
| 09.0 Apply leadership and citizenship skills--The student will be able to: | | | |
| 09.01 Identify and describe leadership characteristics. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.01.a |
| 09.02 Identify opportunities to apply acquired leadership skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.02.a |
| 09.03 Identify and demonstrate ways to be an active citizen. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.01.03.02.c |
| 09.04 Participate in community based learning activities. | | | CRP.01.03.01.a |
| 09.05 Demonstrate the ability to work cooperatively. | | | CRP.09.03.01.a |
| 09.06 Conduct formal and informal meetings using correct parliamentary procedure skills. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 09.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 09.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks. | | | CS.05.01.01.b CRP.10.02.02.b |
| 10.0 Discuss components of food safety and handling practices in agriculture - The student will be able to: | | | |
| 10.01 Demonstrate proper safety precautions and use of personal protective equipment. | | | FPP.01.01.01.b |
| 10.02 Evaluate the food safety responsibilities that occur along the food supply chain. | | | FPP.03.03.02.b |
| 10.03 Explain techniques and procedures for the safe handling of food products. | | | FPP.03.03.02.c |
| 10.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation). | | | FPP03.03.01.b |
| 10.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply. | | | FPP04.01.01.0b |

**Florida Department of Education
Student Performance Standards**

Course Title: Forestry and Natural Resources 2
Course Number: 8118310
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of career opportunities; safety; operation, maintenance and repair of machinery, equipment and facilities; soil testing, surveying; water resources; and financial management skills.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|----------------|--|---------------------------|
| 11.0 Describe the forestry and natural resources industry--The student will be able to: | | | |
| 11.01 Identify career and educational opportunities in the forestry and natural resources industries. | | SC.912.L.17.17, 20 | |
| 11.02 Describe the importance of forestry and natural resources. | | SC.912.L.17.17,19, 20, SC.912.N.1.5 | |
| 11.03 Identify professional and interest organizations and trade journals in the forestry and natural resources industries. | | SC.912.N.1.1,1.4, | |
| 12.0 Practice forestry and natural resources safety--The student will be able to: | | | |
| 12.01 Identify and eliminate hazards of the workplace. | | SC.912.N.1.1, SC.912.E.6.6 | |
| 12.02 Observe color-coded warnings in work areas and on equipment and machinery. | | SC.912.N.1.1, SC.912.E.6.6 | |
| 12.03 Demonstrate safety procedures and workplace "housekeeping" practices. | | SC.912.N.1.1, SC.912.E.6.6 | |
| 12.04 Identify safe and effective fire extinguishing techniques. | | SC.912.N.1.1, SC.912.E.6.6 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|-------------------------------------|--------------------|
| 12.05 Apply minor first aid treatment and identify emergency procedures. | | SC.912.N.1.1, SC.912.E.6.6 | |
| 12.06 Safely handle and store flammable and nonrestricted chemicals. | | SC.912.N.1.1, SC.912.E.6.6 | |
| 12.07 Select personal safety equipment and appropriate clothing. | | SC.912.N.1.1, SC.912.E.6.6 | |
| 12.08 Operate machinery and equipment according to the safety recommendations of the manufacturers. | | SC.912.N.1.1, SC.912.E.6.6 | |
| 13.0 Operate, maintain, and repair machinery, equipment, and facilities--The student will be able to: | | | |
| 13.01 Use the equipment operator parts, and repair manuals. | | SC.912.N.1.1, SC.912.E.6.6 | |
| 13.02 Service and maintain small gasoline engines. | MAFS.912.A.REI.4.11 MAFS.912.A-APR.4.6 | | |
| 13.03 Operate, service, and maintain tractors and equipment. | MAFS.912.A.REI.4.11 MAFS.912.A-APR.4.6 | | |
| 13.04 Dispose of waste products according to required procedures. | | SC.912.L.17.14,17, | |
| 13.05 Use shop and lab instruments and equipment. | | SC.912.N.1.1 | |
| 13.06 Perform minor welding repairs using arc and oxy-acetylene equipment. | MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9 | SC.912.N.1.1,4.2 | |
| 14.0 Monitor water resources--The student will be able to: | | | |
| 14.01 Identify important physical and chemical properties of water. | MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9 | SC.912.L.17.16, SC.912.L.18.12 | |
| 14.02 Identify present and potential sources of water pollution. | | SC.912.L.17.16, SC.912.L.18.12 | |
| 15.0 Collect and test soil samples--The student will be able to: | | | |
| 15.01 Identify important physical and chemical properties of soil. | MAFS.912.F-IF.2.4 | SC.912.P.8.2,11 | |
| 15.02 Collect soil samples representative of an area, complete soil data forms, and submit them for laboratory analysis. | MAFS.912.F-IF.3.9 | SC.912.P.8.2, SC.912.N.1.1 | |
| 15.03 Test soil for acidity or alkalinity and recommend proper soil additives to correct the pH level. | MAFS.912.F-IF.2.4 | SC.912.P.8.2,11 | |
| 15.04 Determine the appropriate conservation management practices for planting a particular area. | MAFS.912.G-MG.1.1 | SC.912.L.17.11,19, SC.912.P.8.11 | |
| 15.05 Determine land classes according to soil classification standards. | MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9 | SC.912.L.17.19, SC.912.P.8.2 | |
| 16.0 Apply multi-use principles to forests and other lands--The student will be able to: | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|--|--------------------|
| 16.01 Identify the types of land ownership. | | SC.912.L.17.13,16,17, SC.912.N.4.2 | |
| 17.0 Perform basic surveying operations and map reading operations--The student will be able to: | | | |
| 17.01 Using linear measurements, calculate the area of a tract of land. | MAFS.912.G-MG.1.1 MAFS.912.G-GPE.2.7 | | |
| 17.02 Interpret legal land descriptions. | MAFS.912.S-ID.3.7 | | |
| 17.03 Locate a land area, using a legal land description. | MAFS.912.G-GPE.2.7 MAFS.912.S-ID.3.7 | | |
| 17.04 Review and interpret aerial maps/photos. | | | |
| 17.05 Explain topographic map symbols and legends. | | | |
| 17.06 Interpret topographic map. | | | |
| 17.07 Measure acreage on maps. | | | |
| 18.0 Read and interpret aerial photographs and maps--The student will be able to: | | | |
| 18.01 Interpret the terms, symbols, and scales used on soil and topographic maps. | MAFS.912.S-ID.3.7 | | |
| 19.0 Analyze and interpret soil survey data--The student will be able to: | | | |
| 19.01 Locate a designated site in the soil survey. | MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9 | | |
| 19.02 Analyze and interpret soil survey data. | MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9 | SC.912.N.1.1,6 | |
| 20.0 Perform basic nursery operation activities--The student will be able to: | | | |
| 20.01 Identify methods of propagation. | | SC.912.L.14.7, SC.912.L.16.17, SC.912.L.18.7 SC.912.P.12.12 | |
| 20.02 Perform basic nursery operation activities, such as pruning, trimming, and fertilizing. | MAFS.912.G-GPE.2.7 | S SC.912.L.16.17, SC.912.L.14.7 SC.912.L.18.7 | |
| 20.03 Maintain plants. | | SC.912.L.14.7 SC.912.L.18.7 | |
| 21.0 Apply basic financial management skills--The student will be able to: | | | |
| 21.01 Complete basic financial records. | MAFS.912.A-SSE.1.1 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|---|--------------------|
| 21.02 Demonstrate the use of banking procedures. | MAFS.912.A-SSE.1.1 | | |
| 22.0 Demonstrate leadership and employability skills--The student will be able to: | | | |
| 22.01 Identify documents that may be required for a job application. | | | |
| 22.02 Complete a job application form. | | | |
| 22.03 Demonstrate competencies in job-interview techniques. | | | |
| 23.0 Monitor air quality--The student will be able to: | | | |
| 23.01 Identify important physical and chemical properties of air. | | SC.912.P.8.2 | |
| 23.02 Identify present and potential sources of air pollution. | | SC.912.L.17.15,16 SC.912.N.4.2, SC.912.E.6.6, SC.912.P.8.2 | |
| 23.03 Analyze and interpret lab results. | | SC.912.L.17.16 SC.912.N.4.2, SC.912.E.6.6, | |
| 24.0 Describe timber marketing procedures and techniques--The student will be able to: | | | |
| 24.01 Identify the products made from trees and other natural resources and their value. | | SC.912.L.17.11,19 | |
| 24.02 Select and mark trees to be removed in timber stand improvement. | | | |
| 24.03 Conduct a simple cruise. | MAFS.912.A-SSE.1.1 | | |
| 24.04 Calculate the volume and value of timber. | MAFS.912.A-SSE.1.1 MAFS.912.G-GMD.1.3 | | |
| 24.05 Identify the components of timber sales contracts. | | | |
| 24.06 Identify the methods of harvesting and erosion prevention. | | SC.912.L.17.12 | |
| 24.07 Identify and describe the use of tree measuring tools and instruments, such as dendrometers, hypsometers, increment borers, prisms, volume tables, and logger's tape. | | | |
| 25.0 Perform preventive maintenance, checks, and services for forestry equipment--The student will be able to: | | | |
| 25.01 Perform daily operator maintenance checks for equipment. | | SC.912.N.1.1 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|--------------|--------------------|
| 25.02 Determine the preventive maintenance procedures, using the equipment operator manuals. | MAFS.912.A-REI.4.1 MAFS.912.A-APR.4.6 | SC.912.N.1.1 | |
| 25.03 Perform scheduled preventive maintenance procedures. | | SC.912.N.1.1 | |
| 25.04 Interpret and perform operator's troubleshooting procedures as described in the operator's manual. | MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9 | SC.912.N.1.1 | |
| 25.05 Keep records of the maintenance and servicing of equipment. | MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9 | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Forestry and Natural Resources 3
Course Number: 8118320
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of safety; operation, maintenance, and repair of machinery, equipment and facilities; ecosystems; water resources; wildlife populations; fire use and control; pest management; analyzing and interpreting data.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|--------------------------------|---------------------------|
| 26.0 Apply forestry and natural resources safety--The student will be able to: | | | |
| 26.01 Comply with Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) safety rules and regulations. | MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9 | SC.912.N.1.1, SC.912.E.6.6 | |
| 26.02 Describe Florida's "Right-to-Know" law (as recorded in the Florida Statutes, Chapter 442). | | | |
| 27.0 Operate, maintain, and repair machinery, equipment, and facilities according to forestry industry standards.--The student will be able to: | | | |
| 27.01 Prepare equipment for storage. | | SC.912.N.1.1 | |
| 27.02 Maintain and repair facilities. | | SC.912.N.1.1 | |
| 28.0 Identify the major ecosystems in Florida--The student will be able to: | | | |
| 28.01 Define "ecosystem" and identify the major ecosystems in Florida. | | SC.912.E.7.4, SC.912.N.1.1 | |
| 28.02 Identify common plant and animal species of the major ecosystems. | | SC.912.E.7.4, SC.912.L.17.4 | |
| 28.03 Identify environmental factors affecting each ecosystem in Florida. | MAFS.912.F-IF.2.4 | SC.912.E.7.4, | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|--|--|--------------------|
| | MAFS.912.F-IF.3.9 | SC.912.N.1.1 SC.912.L.17.4,16,17 | |
| 28.04 Identify habitats of the most threatened and endangered plant and animal species in Florida. | MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9 | SC.912.E.7.4, SC.912.N.1.1, SC.912.L.17.4,17 | |
| 28.05 Identify the hydrologic cycle of and the major uses for water. | | SC.912.E.7.1,8 SC.912.E.17.10 | |
| 29.0 Perform monitoring of water resources--The student will be able to: | | | |
| 29.01 Determine stream flow. | MAFS.912.A-CED.1.4 MAFS.912.G-GMD.1.3 | SC.912.E.7.8, SC.912.P.12.2 | |
| 29.02 Monitor water levels of rivers, streams, ponds, and lakes. | MAFS.912.G-MG.1.1 MAFS.912.G-GPE.2.7 | | |
| 29.03 Identify and monitor erosion hazards and environmental quality. | | SC.912.L.17.16, SC.912.N.1.1 | |
| 30.0 Assist in controlling and using fire in forests and other lands--The student will be able to: | | | |
| 30.01 Identify the major causes of wildfire. | | SC.912.N.1.1 | |
| 30.02 Assist in determining fire danger in forests and other lands. | MAFS.912.G-MG.1.1 MAFS.912.G-GPE.2.7 | SC.912.E.7.5 | |
| 30.03 Describe personal safety procedures for wildland fire fighters. | | | |
| 30.04 Identify and describe the use of basic tools for wildland firefighting. | | SC.912.N.1.1 | |
| 30.05 Explain the uses of prescribed burning in forestry, natural resources, and wildlife management. | | SC.912.E.7.5 | |
| 30.06 Identify the different types of burning assistance that are available through agencies or vendors. | | SC.912.N.1.1 | |
| 31.0 Assist in managing forest pests--The student will be able to: | | | |
| 31.01 Identify common forest pests, insects, and diseases. | | SC.912.N.1.1, SC.912.L.17.6 | |
| 31.02 Assist with common forest pest control. | MAFS.912.G-GMD.1.3 | SC.912.L.17.6 | |
| 31.03 Assist with chemical, mechanical, and other controls of undesirable species. | | SC.912.L.17.8 | |
| 32.0 Identify applicable local, state, and federal rules and regulations and assistance programs--The student will be able to: | | | |
| 32.01 Locate applicable portions of comprehensive plans. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|--|---|--|--------------------|
| 32.02 Identify agencies affecting land and wildlife utilization. | | SC.912.L.17.13, | |
| 32.03 Identify agencies regulating employee/employer relations (e.g., the Occupational Safety and Health Administration [OSHA]). | | SC.912.N.1.1 | |
| 32.04 Identify public- and private-assistance programs for private-land owners. | | SC.912.L.17.13 | |
| 32.05 Describe applicable local, state, and federal rules and regulations. | | SC.912.L.17.13 | |
| 33.0 Apply multi-use principles to forests and other lands--The student will be able to: | | | |
| 33.01 Assist in preparing a multi-use plan for forests and other lands. | | SC.912.L17.13,17 | |
| 34.0 Use aerial photographs and maps--The student will be able to: | | | |
| 34.01 Use maps and aerial photographs for determining acreage. | MAFS.912.G-MG.1.1 MAFS.912.G-GPE.2.7 | SC.912.L.17.13 | |
| 34.02 Use aerial photographs to identify major timber types and land features. | | SC.912.L.17.13 | |
| 35.0 Collect and test water samples--The student will be able to: | | | |
| 35.01 Collect, store, and label water samples. | | SC.912.N.1.1,4, SC.912.P.8.11 | |
| 36.0 Interpret soil survey data--The student will be able to: | | | |
| 36.01 Apply soil survey information to silvicultural practices and environmental management. | MAFS.912.F-IF.2.4 MAFS.912.F-IF.3.9 | SC.912.N.1.1,6 | |
| 37.0 Apply the principles of Best Management Practices (BMP)--The student will be able to: | | | |
| 37.01 Define the terms used in Best Management Practices (BMP). | | SC.912.L.18.12 | |
| 37.02 Determine erosion and slope coefficients, using the BMP manual. | MAFS.912.S.ID.3.7 | SC.912.L.18.12 | |
| 37.03 Solve problems in land use, applying the principles found in the BMP manual. | MAFS.912.G-MG.1.1 | SC.912.L.18.12 SC.912.N.1.1 SC.912.N.4.2 | |
| 38.0 Identify technological advances in the industry--The student will be able to: | | | |
| 38.01 Identify satellite surveying operations and laser systems. | | SC.912.N.1.1 | |
| 38.02 Identify satellite thermal infrared imagery. | | SC.912.N.1.1 | |
| 38.03 Identify computer mapping systems and geographic information | | SC.912.N.1.1 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--------------------|---|--------------------|
| systems. | | | |
| 38.04 Use electronic communication devices. | | SC.912.N.1.1 | |
| 38.05 Employ technological tools to expedite workflow including word processing, databases, reports, spreadsheets, multimedia presentations, electronic calendar, contacts, email, and internet applications. | | SC.912.N.1.1 | |
| 38.06 Employ computer operations applications to access, create, manage, integrate, and store information. | | SC.912.N.1.1 | |
| 38.07 Employ collaborative/groupware applications to facilitate group work. | | SC.912.N.1.1 | |
| 39.0 Identify wildlife population management practices--The student will be able to: | | | |
| 39.01 Identify appropriate management practices for a wildlife habitat. | | SC.912.L.15.13 SC.912.L.17.5,13,17 | |
| 39.02 Identify species of Florida's common wildlife (land and aquatic) and classify them as game, non-game, endangered, or threatened. | | SC.912.N.1, SC.912.L.15.4,6,13, SC.912.L.17.5, 6,13,17 | |
| 40.0 Identify multi-use principles for forest and other lands--The student will be able to: | | | |
| 40.01 Identify the different types of leases and their necessary components. | | SC.912.N.1.1 SC.912.N.4.1, SC.912.L.17.12 | |
| 41.0 Apply basic financial management skills--The student will be able to: | | | |
| 41.01 Calculate interest on loans. | MAFS.912.A-SSE.2.3 | | |
| 41.02 Complete selected income tax return forms. | | | |
| 42.0 Demonstrate leadership and management skills--The student will be able to: | | | |
| 42.01 Demonstrate knowledge of how to make job changes appropriately. | | | |
| 42.02 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks. | | | |
| 42.03 Describe the importance of a drug free workplace and the industry policies regarding drug use. | | | |
| 42.04 Demonstrate appropriate responses to performance evaluations from an employer, a supervisor, or other persons in the workplace. | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Forestry 4
Course Number: 8118330
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of urban forest; timber marketing; business management skills; measuring trees and forest volume; silvicultural systems; prescribed burning; preventative maintenance.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|---|--------------------|
| 43.0 Apply the principles of basic nursery operations--The student will be able to: | | | |
| 43.01 Select the method of, and assist in, site preparation. | | | |
| 43.02 Care for seedlings from the nursery to planting. | | | |
| 43.03 Plant tree seedlings, using a hand or mechanical planter. | | | |
| 43.04 Explain the requirements for reforestation. | | | |
| 44.0 Assist in managing the urban forest--The student will be able to: | | SC.912.L.17.12, 13 SC.912.N.1.1 SC.912.N.4.1, 2 | |
| 44.01 Assist in selecting, planting, and transplanting trees in the urban landscape. | | | |
| 44.02 Demonstrate proper tree pruning, trimming, and fertilization techniques. | | | |
| 44.03 Describe the procedure for an urban tree inventory. | | | |
| 44.04 Develop a vegetative plan for improving wildlife habitat in urban areas. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|---|--------------------|
| 44.05 Develop a plan for the basic maintenance of tree health. | | | |
| 45.0 Apply business management skills and identify appropriate legal documents--The student will be able to: | | SC.912.L.17.13, 16, 17 SC.912.N.4.2 | |
| 45.01 Identify business liability and the use of liability insurance. | | | |
| 45.02 Identify eligibility requirements for greenbelt, bluebelt, and homestead tax exemptions. | | | |
| 45.03 Identify the characteristics of legal documents (such as contracts, deeds, and leases). | | | |
| 46.0 Explain the basic silvicultural systems used in forest management--The student will be able to: | | SC.912.L.17.11, 13, 16, 17, 19 SC.912.N.4.1, 2 | |
| 46.01 Identify basic silvicultural systems. | | | |
| 46.02 Conduct a site evaluation. | | | |
| 46.03 Select tree species according to the site evaluation. | | | |
| 46.04 Explain the requirements for tree growth for effective forest management. | | | |
| 46.05 Determine site quality and growth rate for a timber stand. | | | |
| 46.06 Prepare a basic forest management plan, including cost and profit analyses. | | | |
| 47.0 Prescribe burning for forest management--The student will be able to: | | SC.912.E.7.5 | |
| 47.01 Develop a plan for a prescribed burning, including authorizations, maps, and descriptions of desirable burning conditions and fire lines. | | | |
| 47.02 Describe the requirements for obtaining different types of burning authorization and the applicable restrictions. | | | |
| 47.03 Prepare a sample prescribed burning authorization request using the phone or website. | | | |
| 47.04 Explain the effects of fuel characteristics and weather factors on fire behavior. | | | |
| 47.05 Identify the precautions to be followed in using fire as a management tool. | | | |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students will interact with materials and primary sources of data or with secondary sources of data to observe and understand the natural world. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 20% of classroom time will be dedicated to laboratory experiences

Extended Student Supervision

Because of the production and marketing cycle of the agriculture industry, this program requires individual instruction and supervision of students for the entire period beyond the 180-day school year.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

**Florida Department of Education
Curriculum Framework**

Program Title: Horticulture Science and Services
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

| | |
|----------------------------|---|
| Program Number | 8121600 |
| CIP Number | 0101060610 |
| Grade Level | 9-12 |
| Standard Length | 6 credits |
| Teacher Certification | Refer to the Program Structure section |
| CTSO | FFA |
| SOC Codes (all applicable) | 19-1013 - Soil and Plant Scientist 37-1012 - First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers |

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety and environmental issues.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of two occupational completion points. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

This program is a planned sequence of instruction consisting of a core and two completion points.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the secondary program structure:

| OCP | Course Number | Course Title | Teacher Certification | Length | SOC Code | Level | Graduation Requirement |
|-----|---------------|-------------------------------------|-----------------------|----------|----------|-------|------------------------|
| A | 8106810 | Agriscience Foundations 1 | AGRICUTUR 1 @2 | 1 credit | 37-1012 | 3 | EQ |
| | 8121510 | Introductory Horticulture 2 | | 1 credit | | 3 | PA |
| | 8121520 | Horticulture Science 3 | | 1 credit | | 3 | PA |
| B | 8121610 | Horticulture Science and Services 4 | AGRICUTUR 1 @2 | 1 credit | 19-1013 | 2 | |
| | 8121620 | Horticulture Science and Services 5 | | 1 credit | | 2 | |
| | 8121630 | Horticulture Science and Services 6 | HORTICULT #7 | 1 credit | | 2 | |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Academic Alignment Table

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

| Courses | Anatomy/ Physiology Honors | Astronomy Solar/Galactic Honors | Biology 1 | Chemistry 1 | Earth-Space Science | Environmental Science | Genetics | Integrated Science | Marine Science 1 Honors | Physical Science | Physics 1 |
|-------------------------------------|----------------------------|---------------------------------|--------------|--------------|---------------------|-----------------------|--------------|--------------------|-------------------------|------------------|--------------|
| Agriscience Foundations 1 | 29/87 33% | 18/80 23% | 55/83 66% | 11/69 16% | 36/67 54% | 30/70 42% | 20/69 29% | 49/82 60% | 25/66 38% | 38/74 51% | 12/72 16% |
| Introductory Horticulture 2 | 4/87 5% | 5/80 6% | 39/83 47% | 6/69 7% | 24/67 39% | 9/70 13% | 7/69 10% | 38/82 46% | 7/66 11% | 28/74 38% | 4/72 6% |
| Horticulture Science 3 | 26/87 30% | 23/80 29% | 19/83 23% | 26/69 38% | 4/67 6% | 30/70 43% | 26/69 38% | 18/82 22% | 24/66 36% | 9/74 12% | 21/72 29% |
| Horticulture Science and Services 4 | 23/87 26% | 23/80 29% | 14/83 17% | 25/69 26% | 3/67 4% | 23/70 33% | 29/69 42% | 11/82 13% | 20/66 30% | 6/74 8% | 22/72 31% |
| Horticulture Science and Services 5 | 3/87 3% | 6/80 7% | 15/83 18% | 7/69 10% | 4/67 6% | 10/70 14% | 9/69 13% | 13/82 16% | 9/66 14% | 8/74 11% | 4/72 6% |

| | | | | | | | | | | | |
|-------------------------------------|------------|------------|------------|------------|------------|-------------|------------|------------|-------------|--------------|-------------|
| Horticulture Science and Services 6 | 1/87 1% | 7/80 9% | 5/83 6% | 6/69 7% | 5/67 7% | 8/70 11% | 2/69 3% | 5/82 6% | 7/66 11% | 10/74 14% | 7/72 10% |
|-------------------------------------|------------|------------|------------|------------|------------|-------------|------------|------------|-------------|--------------|-------------|

** Alignment pending review

Alignment attempted, but no correlation to academic course

| Courses | Algebra 1 | Algebra 2 | Geometry | English 1 | English 2 | English 3 | English 4 |
|---|--------------|------------|-------------|--------------|--------------|--------------|--------------|
| Agriscience Foundations 1 | 14/67 21% | 4/75 5% | 8/54 15% | 11/46 24% | 11/45 24% | 11/45 24% | 11/45 24% |
| Introductory Horticulture 2 | ** | ** | ** | ** | ** | ** | ** |
| Horticulture Science 3 | ** | ** | ** | ** | ** | ** | ** |
| Landscape and Turf Science 4 | ** | ** | ** | ** | ** | ** | ** |
| Landscape and Turf Science 5 | ** | ** | ** | ** | ** | ** | ** |
| Sports & Recreational Turf Operations 6 | ** | ** | ** | ** | ** | ** | ** |

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. The FS for Mathematical Practices are designed for grades K-12 and describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education.

Instructors must incorporate the Florida Standards for Technical Subjects and Mathematical Practices throughout instruction of this CTE program.

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and

teachers which maximizes an ELL's need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. If so, the standards have been identified and cross walked with the corresponding CTE standard and/or benchmark.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Describe the history of agriculture and its influence on the global economy.
- 02.0 Practice agriscience safety skills and procedures.
- 03.0 Apply scientific and technological principles to agriscience issues.
- 04.0 Apply environmental principles to the agricultural industry.
- 05.0 Investigate and utilize basic scientific skills and principles in plant science.
- 06.0 Investigate and utilize basic scientific skills and principles in animal science.
- 07.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 08.0 Demonstrate agribusiness, employability and human relation skills.
- 09.0 Apply leadership and citizenship skills.
- 10.0 Discuss components of food safety and handling practices in agriculture.
- 11.0 Describe the horticulture industry.
- 12.0 Identify safety procedures in the workplace.
- 13.0 Identify and classify plants.
- 14.0 Demonstrate plant propagation techniques.
- 15.0 Identify growing media and fertilizers.
- 16.0 Explain irrigation techniques for plants and turf.
- 17.0 Describe Integrated Pest Management approaches.
- 18.0 Describe the principles and requirements of plant growth.
- 19.0 Apply best management practices in the horticulture industry.
- 20.0 Identify principles of landscape design.
- 21.0 Describe varieties and care of indoor plants.
- 22.0 Apply safety procedures in the workplace.
- 23.0 Classify plants based on scientific principles.
- 24.0 Demonstrate proper use of growing media and fertilizers
- 25.0 Demonstrate Integrated Pest Management approaches.
- 26.0 Identify the principles and requirements of plant growth.
- 27.0 Apply best management practices in landscape design.
- 28.0 Demonstrate customer service skills that are essential in dealing with clients.
- 29.0 Apply principles of landscape design and maintenance.
- 30.0 Harvest, transport, and install plant materials.
- 31.0 Identify procedures to operate, repair, and maintain tools and equipment.
- 32.0 Identify emerging technologies in the horticulture industry.
- 33.0 Demonstrate leadership, employability, communications and human relations skills.
- 34.0 Describe personal traits, attitudes, customer approaches, and activities that help successful selling
- 35.0 Propagate plants.
- 36.0 Operate, repair, and maintain tools and equipment.
- 37.0 Prepare growing media.

- 38.0 Irrigate plants.
- 39.0 Maintain and analyze records
- 40.0 Apply proper fertilizer application components.
- 41.0 Classify plants.
- 42.0 Irrigate plants using an irrigation system.
- 43.0 Maintain and analyze financial records. .
- 44.0 Fertilize plant material.
- 45.0 Control Pests.
- 46.0 Operate tools and equipment.
- 47.0 Maintain irrigation systems.
- 48.0 Maintain and analyze production records.
- 49.0 Manage and use fertilization schedules.
- 50.0 Use a pest control system

**Florida Department of Education
Student Performance Standards**

Course Title: Agriscience Foundations 1
Course Number: 8106810
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of agricultural history and the global impact of agriculture; career opportunities; scientific and research concepts; biological and physical science principles; environmental principles; agriscience safety; principles of leadership; and agribusiness, employability, and human relations skills in agriscience. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students will interact with materials and primary sources of data or with secondary sources of data to observe and understand the natural world. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 20% of classroom time will be dedicated to laboratory experiences.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|------------------------------------|---|--------------------|
| 01.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to: | | SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2; | |
| 01.01 Evaluate and explain emerging trends and the opportunities they may create within the AFNR systems. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.01.01.02.c |
| 01.02 Assess the economic impact of an AFNR system on a local, state, national and global level. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | CS.02.02.03.b |
| 01.03 Identify significant career patterns/shifts in the history of the agricultural industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.01.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-------------------------------------|--|--------------------|
| 01.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.06.02.01.a |
| 02.0 Practice agriscience safety skills and procedures--The student will be able to: | | SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7; | |
| 02.01 Identify the common causes and prevention of accidents in agriscience operations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.a |
| 02.02 Extract and utilize pertinent information from a container label and/or Safety Data Sheet (SDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | CS.03.04.03.a |
| 02.03 Identify proper disposal of hazardous waste materials and biohazards. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | ESS.04.01.02.c |
| 02.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.b |
| 03.0 Apply scientific and technological principles to agriscience issues--The student will be able to: | | SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1; | |
| 03.01 Employ scientific measurement skills. | | | |
| 03.02 Demonstrate safe and effective use of common laboratory equipment. | | | ESS.01.02.01.b |
| 03.03 Identify the parts and functions of plant and animal cells. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |
| 03.04 Describe the phases of cell reproduction. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 03.05 Implement the scientific method and science process skills through | LAFS.910.W.2.4 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|--------------------|
| the design and completion of an agriscience research project. | LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |
| 03.06 Interpret, analyze, and report data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | BS.02.01.01.b |
| 03.07 Investigate DNA and genetics applications in agriscience including the theory of probability. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | BS.01.01.01.a |
| 03.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.). | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | BS.03.01.03.b |
| 04.0 Apply environmental principles to the agricultural industry--The student will be able to: | | SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12 | |
| 04.01 Research how different climactic and geological activity influences agriculture. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | NRS.01.03.02.b |
| 04.02 Describe various ecosystems as they relate to the agriculture industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.03 Describe the environmental resources (soil, water, air) necessary for agriculture production. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.08.02.01.a |
| 04.04 Identify regulatory agencies that impact agricultural practices. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6 | | NRS.02.01.02.a |
| 04.05 Apply Best Management Practices that enhance the natural environment. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.06 Identify conservation practices related to natural resources. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.02.02.b |
| 05.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to: | | SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7; | |
| 05.01 Identify and describe the specializations within the plant science industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|---|
| | LAFS.1112.W.2.4 | | |
| 05.02 Categorize plants based on specific characteristics according to industry and scientific standards. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.01.01.a |
| 05.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc.... | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.03.01.a PS.02.03.02.a PS.02.03.05.a |
| 05.04 Identify the nutrients required for plant growth from the periodic table and explain their functions. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.01.02.01.a |
| 05.05 Analyze information from a fertilizer label. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | PS.01.03.04.b |
| 05.06 Propagate and grow plants through sexual and/or asexual reproduction. | | | PS.03.01.03.a PS.03.01.01.b |
| 05.07 Investigate the impacts of various pests and propose solutions for their control. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.03.03.01.c |
| 05.08 Investigate the nature and properties of food, fiber, and by-products from plants. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.09 Explore career opportunities in plant science. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.05.01.01.a |
| 06.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to: | | SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19; | |
| 06.01 Explain the economic importance of animals and the products obtained from animals. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.02 Analyze commercially important livestock breeds in Florida. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |
| 06.04 Compare and contrast animal welfare issues. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.02.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|---|--------------------|
| | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 06.05 Investigate the nature and properties of food, fiber, and by-products from animals. | | | AS.06.03.03.a |
| 06.06 Explore career opportunities in animal science. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | CS.05.01.01.a |
| 07.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to | | SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9; | |
| 07.01 Select and demonstrate proper use of hand tools in agriculture. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.04.02.a |
| 07.02 Operate service and maintain agriscience equipment, and instruments. | | | CS.03.04.03.b |
| 07.03 Manage facilities and supplies. | | | |
| 08.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to: | | | |
| 08.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE). | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 08.02 Utilize a record keeping system to collect, interpret, and analyze data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 08.03 Enhance oral communications through telephone, interview and presentation skills. | LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | CRP.04.01.02.b |
| 08.04 Enhance written communication by developing resumes and business letters. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2 | | CRP.04.02.02.b |
| 08.05 Demonstrate interpersonal (nonverbal) communication skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|-----------|---------------------------------|
| 08.06 Demonstrate good listening skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.04.03.01.a |
| 09.0 Apply leadership and citizenship skills--The student will be able to: | | | |
| 09.01 Identify and describe leadership characteristics. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.01.a |
| 09.02 Identify opportunities to apply acquired leadership skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.02.a |
| 09.03 Identify and demonstrate ways to be an active citizen. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.01.03.02.c |
| 09.04 Participate in community based learning activities. | | | CRP.01.03.01.a |
| 09.05 Demonstrate the ability to work cooperatively. | | | CRP.09.03.01.a |
| 09.06 Conduct formal and informal meetings using correct parliamentary procedure skills. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 09.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 09.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks. | | | CS.05.01.01.b CRP.10.02.02.b |
| 10.0 Discuss components of food safety and handling practices in agriculture - The student will be able to: | | | |
| 10.01 Demonstrate proper safety precautions and use of personal protective equipment. | | | FPP.01.01.01.b |
| 10.02 Evaluate the food safety responsibilities that occur along the food supply chain. | | | FPP.03.03.02.b |
| 10.03 Explain techniques and procedures for the safe handling of food products. | | | FPP.03.03.02.c |
| 10.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation). | | | FPP.03.03.01.b |
| 10.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply. | | | FPP.04.01.01.0b |

**Florida Department of Education
Student Performance Standards**

Course Title: **Introductory Horticulture 2**
Course Number: **8121510**
Course Credit: **1**

Course Description:

This course is designed to develop competencies in the areas of career opportunities; global importance of agriculture; plant classification; propagation; growing media; nutritional needs; fertilization; irrigation; pest identification; pest control, pruning; plant installation; transplanting; safe hand-tool use; and employability skills.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | | FS-M/LA | NGSSS-Sci | National Standards |
|-------------------------------------|---|----------------|--------------------|---------------------------|
| 11.0 | Describe the horticulture industry – the student will be able to: | | | |
| 11.01 | Describe the importance of horticulture to the American and global economies. | | | |
| 11.02 | Identify career opportunities in horticulture and educational requirements and continuing education opportunities for horticulture careers. | | | |
| 11.03 | Describe Florida laws and regulation as they apply to the horticulture industry. | | | |
| 11.04 | Describe the importance of horticulture to the environment, including sustainability practices | | | |
| 12.0 | Identify safety procedures in the workplace – the student will be able to: | | SC.912.L.17.14, 17 | |
| 12.01 | Identify the common causes of accidents in the horticulture industry. | | | |
| 12.02 | Demonstrate proper safety precautions and use of personal protective equipment specific to the horticulture industry. | | | |
| 12.03 | Explain, identify and utilize pertinent information from a container label and/or Material Safety Data Sheet (MSDS) according to Environmental Protection Agency (EPA), Worker Protection | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|-----------------|--|--------------------------------|
| Standard and Occupational Safety and Health Agency (OHSA) Regulations. | | | |
| 13.0 Identify and classify plants – the student will be able to: | MAFS.912.S-IC.2 | SC.912.L.14.2, 3, 7, 8, 10, 53 SC.912.L.15.4, 5, 6 SC.912.L.18.7, 8, 9 | |
| 13.01 Identify plants by botanical and common names. | | | PS.02.01.02.b |
| 13.02 Classify plants botanically. | | | PS.02.01.02.c |
| 13.03 Write botanical names for plants. | | | |
| 14.0 Demonstrate plant propagation techniques – the student will be able to: | | SC.912.L.14.7, 8 SC.912.L.16.3, 12, 14, 16 | |
| 14.01 Identify propagating and growing facilities and structures. | | | |
| 14.02 Prepare propagation media. | | | PS.01.02.01.a |
| 14.03 Select and collect propagation materials. | | | PS.01.02.01.c |
| 14.04 Demonstrate propagation by sexual and asexual methods. | | | PS.03.01.01.b PS.03.01.03.b |
| 14.05 Demonstrate environmental controls for propagation materials. | | | |
| 14.06 Identify and select proper rooting hormones based on plant characteristics. | | | |
| 15.0 Identify growing media and fertilizers – the student will be able to: | MAFS.912.S-IC.2 | SC.912.E.6.2, 4 SC.912.L.18.11 SC.912.P.8.1, 11 | |
| 15.01 Identify soil and media materials and appropriate containers. | | | |
| 15.02 Identify nutritional needs of plants. | | | PS.01.03.01.a |
| 15.03 Identify symptoms of nutritional deficiencies and toxicities of plants. | | | PS.01.03.02.c |
| 15.04 Identify types and kinds of fertilizers. | | | PS.01.03.04.a |
| 15.05 Identify methods of distributing fertilizers. | | | PS.01.03.04.c |
| 15.06 Interpret information on a label of fertilizer used in Florida. | | | |
| 16.0 Explain irrigation techniques for plants and turf – the student will be able | | SC.912.L.18.12 SC.912.E.7.1 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|-----------------|--|--------------------|
| to: | | | |
| 16.01 Identify water needs of plants. | | | PS.01.01.03.a |
| 16.02 Irrigate plants at recommended rates. | | | |
| 16.03 Identify the symptoms of excessive water and water stress in plants. | | | |
| 16.04 Describe the basic irrigation systems and principles used in the landscape and nursery. | | | |
| 17.0 Describe Integrated Pest Management approaches – the student will be able to: | | SC.912.L.14.9 | |
| 17.01 Identify common pests and pathogens of plants. | | | PS.03.03.01.a |
| 17.02 Describe life cycles of common pests and pathogens of plants. | | | PS.03.03.02.a |
| 17.03 Recognize signs of damage from pests and pathogens. | | | PS.03.03.02 |
| 18.0 Describe the principles and requirements of plant growth – the student will be able to: | MAFS.912.S-IC.2 | SC.912.E.7.1 SC.912.L.18.7, 9, 10 SC.912.P.10.1 | |
| 18.01 Explain how the energy of sunlight is converted to chemical energy through the process of photosynthesis and respiration. | | | PS.02.03.01.a |
| 18.02 Explain how photosynthesis in plants is directly affected by various environmental factors such as light and temperature. | | | PS.02.03.01.b |
| 18.03 Explain the process of respiration and transpiration and describe the flow of energy in plants. | | | PS.02.03.02.b |
| 18.04 Describe the influence of light and temperature on plant growth including phototropism. | | | |
| 19.0 Apply best management practices in the horticulture industry – the student will be able to: | | SC.912.L.17.9, 11, 12, 13, 14, 15 SC.912.N.1.1 SC.912.N.2.4 | |
| 19.01 Identify and apply Best Management Practices to reduce pollution and conserve water. | | | |
| 19.02 Identify and apply Best Management Practices on fertilizer recommendations for Florida plants including turf. | | | |
| 19.03 Explain the concept of nonpoint source pollution, and the watershed environment. | | | |
| 20.0 Identify principles of landscape design – the student will be able to: | | SC.912.L.17.17 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|-----------|--------------------|
| 20.01 Conduct a customer interview to determine needs and personal tastes of client. | | | PS.04.02.01.a |
| 20.02 Compare and contrast the use of line, form, texture and color in designing landscapes. | | | |
| 20.03 Identify the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes. | | | PS.04.02.02.b |
| 20.04 Identify points of emphasis and major design areas in the residential landscape. | | | |
| 20.05 Identify plant selection for a residential landscape using Florida Friendly Landscape Principles. | | | |
| 20.06 Read and interpret a landscape plan. | | | |
| 20.07 Develop skills for drawing and identifying symbols. | | | |
| 20.08 Draw and design a landscape plan for a small garden. | | | |
| 20.09 Construct a landscape display. | | | PS.04.02.02.c |
| 21.0 Describe varieties and care of indoor plants – the students should be able to: | | | |
| 21.01 Identify common indoor plants | | | |
| 21.02 Describe the lighting and environmental needs of indoor plants. | | | |
| 21.03 Describe water, cleaning, and fertilizations needs for plants used indoors. | | | |
| 21.04 Describe the most common problems with indoor foliage including pathogens, pests, and cultural damage. | | | |
| 21.05 Analyze the air quality benefits of indoor plants. | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Horticulture Science 3
Course Number: 8121520
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of industry regulations; plant classification; plant transportation; soil sampling and analysis; fertilizer calculations; recording keeping; irrigation components, water quality; drainage; integrated pest management; pesticide safety and regulations; equipment calibration; chemical growth regulators; xeriscaping; integrated landscape management; safe use of power equipment; record keeping; and employability skills.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|-----------------|--|--------------------|
| 22.0 Apply safety procedures in the workplace – the student will be able to: | | | |
| 22.01 Describe emergency procedures in the horticulture workplace. | | | CS.03.03.02.b |
| 22.02 Create preventive measures to avoid hazardous situations. | | | CS.03.03.01.a |
| 22.03 Identify appropriate PPE (Personal Protective Equipment) for all activities. | | | CS.03.04.01.b |
| 22.04 Use MSDS for all materials used. | | | CS.03.01.01.a |
| 22.05 Identify specific hazards with industry specific equipment, and conduct equipment care and maintenance. | | | CS.03.04.02.a |
| 22.06 Apply problem solving skills to correct a hazardous situation. | | | CS.03.01.02.c |
| 23.0 Classify plants based on scientific principles – the student will be able to: | MAFS.912.S-IC.2 | SC.912.L.14.2, 3, 7, 8, 10, 53 SC.912.L.15.4, 5, 6 SC.912.L.18.7, 8, 9 | |
| 23.01 Describe principles of plant biology and growth. | | | PS.01.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|--|-----------------|--|--------------------|
| 23.02 Explain the role of plants in the ecosystem. | | | |
| 23.03 Describe the major classifications of plants based on life cycle. | | | PS.02.01.01.c |
| 23.04 Demonstrate the use of botanical and common names of plants including genus and specific epithet and cultivar. | | | PS.02.01.02.c |
| 23.05 Demonstrate proper use of botanical names. | | | PS.02.01.01.a |
| 24.0 Demonstrate proper use of growing media and fertilizers – the student will be able to: | MAFS.912.S-IC.2 | SC.912.E.6.2, 4 SC.912.L.18.11 SC.912.P.8.5, 7, 11 | |
| 24.01 Apply information on a label of fertilizer, including updated BMP rules, used in Florida. | | | PS.01.03.04.b |
| 24.02 Apply fertilizer and soil amendments. | | | |
| 24.03 Identify materials that are needed to alter pH and calculate the amount to apply to change the pH. | | | PS.01.03.02.a |
| 24.04 Demonstrate the procedure for calibrating a fertilizer spreader or injector using appropriate mathematical concepts. | | | PS.01.03.04.c |
| 24.05 Identify essential elements and nutrients in plant growth including macronutrients and micronutrients. | | | PS.01.03.01.a |
| 24.06 Using references make fertilizer recommendations for ornamental plants, turf grass, and palms. | | | PS.01.03.03.c |
| 25.0 Demonstrate Integrated Pest Management approaches – the student will be able to: | MAFS.912.S-IC.2 | SC.912.L.14.9 SC.912.L.17.6, 7, 12, 13, 15 | |
| 25.01 Classify insects according to feeding habits. | | | PS.03.03.01.a |
| 25.02 Describe IMP (Integrated Pest Management) methods of controlling plant pests. | | | PS.03.03.03.a |
| 25.03 Diagnose and outline a plan for controlling pests on a horticultural crop. | | | PS.03.03.03.c |
| 25.04 Describe methods of controlling nematode pests on ornamental plants, and use BMPs to prevent infestation.. | | | |
| 25.05 Develop a pest control program for a horticultural crop using Integrated Pest Management. | | | |
| 25.06 Identify specific cultural, mechanical, chemical, and biological methods of weed management. | | | |
| 25.07 Identify evasive and poisonous plants in Florida. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-----------------|---|--------------------|
| 25.08 Identify types of weeds common to Florida. | | | |
| 26.0 Identify the principles and requirements of plant growth – the student will be able to: | | SC.912.L.14.7, 15, 17, 31 SC.912.N.1.1, 7 SC.912.P.8.8, 9, 10 | |
| 26.01 Demonstrate methods of pruning plants. | | | |
| 26.02 Identify appropriate time to prune plants. | | | |
| 26.03 Identify and select pruning tools. | | | |
| 26.04 Demonstrate proper use of pruning tools and care. | | | |
| 26.05 Demonstrate sanitation of tools to prevent the spread of disease. | | | |
| 26.06 Identify Plant Growth Regulators and their use on horticulture and landscape plants. | | | |
| 26.07 Outline and use a record book for the use of a plant growth regulator on a horticultural or nursery crop. | | | |
| 26.08 Identify appropriate pruning techniques to achieve plant size, form, and shape. | | | |
| 27.0 Apply best management practices in landscape design – the student will be able to: | MAFS.912.S-IC.2 | SC.912.L.17.9, 11, 12, 13, 14, 15 SC.912.N.1.1 SC.912.N.2.4 | |
| 27.01 Identify and apply Best Management Practices for the design and installation of landscapes. | | | PS.04.01.01.a |
| 27.02 Identify and apply Best Management Practices on the management and handling of pesticides. | | | |
| 28.0 Demonstrate customer service skills that are essential in dealing with clients.- the student will be able to: | | | |
| 28.01 Demonstrate ability to communicate clearly with the client. | | | |
| 28.02 Conduct a walk through and interview with client to assure clear vision. | | | |
| 28.03 Identify future expectations of the client relationship. | | | |
| 29.0 Apply principles of landscape design and maintenance – the student will be able to: | | SC.912.L.17.17 | |
| 29.01 Demonstrate the use of line, form, texture and color in designing landscapes. | | | PS.04.01.01.c |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|-----------------|---|--------------------|
| 29.02 Demonstrate the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes. | | | PS.04.02.01.a |
| 29.03 Apply points of emphasis and major design areas in the commercial landscape. | | | |
| 29.04 Identify plant selection for a commercial and residential landscape using Florida Friendly Landscape Principles. | | | |
| 29.05 Create a landscape plan for a residential or commercial property. | | | |
| 29.06 Calculate materials needed according to the identified landscape plan. | | | |
| 29.07 Identify factors in selecting turf for landscape installation. | | | |
| 30.0 Harvest, transport, and install plant materials – the student will be able to: | | SC.912.L.17.4, 15, 17 | |
| 30.01 Determine requirements for preserving plant viability. | | | |
| 30.02 Demonstrate proper landscape plant establishment techniques. | | | |
| 30.03 Select and prepare plants for transporting and transplanting. | | | |
| 30.04 Select horticultural products according to Florida grades and standards. | | | |
| 31.0 Identify procedures to operate, repair, and maintain tools and equipment – the student will be able to: | MAFS.912.S-IC.2 | SC.912.N.1.1 | |
| 31.01 Perform equipment pre-operational check. | | | |
| 31.02 Identify, maintain, and operate hand tools and power tools. | | | |
| 32.0 Identify emerging technologies in the horticulture industry – the student will be able to: | | SC.912.L.16.1, 2, 7, 9, 10 SC.912.L.17.15, 17 | |
| 32.01 Investigate DNA and genetic applications in horticulture including the theory of probability. | | | |
| 32.02 Evaluate advances in biotechnology that impact horticulture. (e.g. transgenic crops, biological controls, micro propagation etc.). | | | |
| 32.03 Investigate ways that GIS, Remote sensing, and precision agriculture, and UAV (Unmanned Aerial Vehicles) are used in the Horticulture industry. | | | |
| 33.0 Demonstrate leadership, employability, communications and human relations skills – the student will be able to: | | SC.912.N.1.7 | |
| 33.01 Identify appropriate work habits and personal characteristics. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|-----------|--------------------|
| 33.02 Identify proper employee hygiene habits. | | | |
| 33.03 Identify or demonstrate appropriate responses to criticism from employer, | | | |
| 33.04 Describe the importance of employee industry certifications. | | | |
| 33.05 Discuss education opportunities available in the area of Horticulture. | | | |
| 34.0 Describe personal traits, attitudes, customer approaches, and activities that help successful selling. – the student will be able to: | | | |
| 34.01 Demonstrate proper customer communication techniques. | | | |
| 34.02 Determine your products pricing structure. | | | |
| 34.03 Discuss components of customer satisfaction. | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Horticulture Science and Services 4
Course Number: 8121610
Course Credit: 1

Course Description:

This course is designed to further develop competencies in the areas of plant identification and classification; growing media; irrigation system set up; and maintaining and analyzing records including production costs.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-----------------|--|--------------------|
| 35.0 Propagate plants – the student will be able to: | MAFS.912.S-IC.2 | SC.912.L.14.7, 10, 31, 53 SC.912.L.15.4, 5, 6 SC.912.L.16.1, 2, 3, 14, 16, 17 SC.912.L.17.7 | |
| 35.01 Prepare propagation materials (seeds, cuttings, etc.) for planting. | | | |
| 35.02 Discuss cultural requirements for propagations including temperature, light, and moisture. | | | |
| 35.03 Demonstrate sanitation and safety practices when propagating. | | | |
| 36.0 Operate, repair, and maintain tools and equipment – the student will be able to: | | SC.912.N.1.1 | |
| 36.01 Identify, operate, and maintain tractor and power equipment. | | | |
| 37.0 Prepare growing media – the student will be able to: | | SC.912.P.8.9, 11 SC.912.L.14.6 SC.912.L.18.11 | |
| 37.01 Sterilize rooting, potting, and growing media. | | | |
| 37.02 Adjust pH and nutritional levels of media. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|-----------------|--|--------------------|
| 37.03 Fill and level benches and pots with media. | | | |
| 37.04 Demonstrate sanitation practices when handling and storing plant media materials. | | | |
| 38.0 Irrigate plants – the student will be able to: | | SC.912.E.7.1 SC.912.N.1.1 | |
| 38.01 Identify the components of irrigation systems. | | | |
| 38.02 Design an irrigation system for a propagation area. | | | |
| 38.03 Design an irrigation system for a growing structure. | | | |
| 38.04 Design an irrigation system for a retail display. | | | |
| 38.05 Design a microirrigation system | | | |
| 38.06 List problems associated with improper design, installation, and maintenance. | | | |
| 38.07 Explain and apply Best Management Practices as they apply to irrigation. | | | |
| 38.08 Apply general knowledge of appropriate state laws to irrigation practices. | | | |
| 39.0 Maintain and analyze records – the student will be able to: | MAFS.912.S-IC.2 | SC.912.N.1.1 | |
| 39.01 Create a plant and inventory supply list. | | | |
| 39.02 Maintain current plant and supply inventory. | | | |
| 39.03 Maintain job records, daily log sheets, and inventory. | | | |
| 39.04 Calculate labor costs involved with product pricing. | | | |
| 40.0 Apply proper fertilizer application components – the student will be able to: | MAFS.912.S-IC.2 | SC.912.N.1.1, 7 SC.912.N.2.4 SC.912.P.8.11 SC.912.P.12.12 | |
| 40.01 Determine proper application based on characteristics of plant species. | | | |
| 40.02 Examine how fertilizer application affects the water bodies in Florida. | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Horticulture Science and Services 5
Course Number: 8121620
Course Credit: 1

Course Description:

This course is designed to further develop competencies in the areas of identifying and evaluating IPM practices; maintaining and repairing irrigation systems; analyzing and evaluating fertilizer usage.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---------|--|--------------------|
| 41.0 Classify plants – the student will be able to: | | SC.912.L.14.7, 10, 31, 53 SC.912.L.15.4, 5, 6 SC.912.L.16.1, 2, 3, 14, 16, 17 SC.912.L.17.7 SC.912.N.1.1 SC.912.N.2.4 SC.912.P.12.12 | |
| 41.01 Identify plants appropriate to a region. | | | |
| 41.02 Classify plants according to growth habit. | | | |
| 41.03 Supply growth stimulants to propagation materials | | | |
| 41.04 Prepare flats and seedbeds and plant seeds. | | | |
| 42.0 Irrigate plants using an irrigation system – the student will be able to: | | SC.912.N.1.1 SC.912.N.2.4 | |
| 42.01 Use various types of irrigation systems (low volume, ebb and flow, drip, mat, re-circulating, etc.). | | | |
| 43.0 Maintain and analyze records – the student will be able to: | | SC.912.N.1.1 SC.912.N.2.4 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|-----------------|--|--------------------|
| 43.01 Prepare and maintain financial records. | | | |
| 44.0 Fertilize plant materials – the student will be able to: | MAFS.912.S-IC.2 | SC.912.L.17.16 SC.912.N.1.1, 6 SC.912.N.2.4 SC.912.P.8.11 SC.912.P.12.12 | |
| 44.01 Collect soil and leaf tissue samples for analysis. | | | |
| 44.02 Demonstrate proper handling and storage of fertilizers, observing safety precautions. | | | |
| 44.03 Evaluate, operate, and maintain fertilizer distribution equipment. | | | |
| 44.04 Create fertilizer schedule and/ or record of applications. | | | |
| 45.0 Control pests – the student will be able to: | MAFS.912.S-IC.2 | SC.912.L.17.13, 15, 16, 17 SC.912.N.1.1, 3, 4 SC.912.N.2.4 | |
| 43.01 Conduct a scouting in a nursery or landscape setting. | | | |
| 43.02 Report insect and disease damage. | | | |
| 43.03 Describe the differences between common and exotic pests. | | | |
| 43.04 Identify chemical spray damage. | | | |

**Florida Department of Education
Student Performance Standards**

Course Title: Horticulture Science and Services 6
Course Number: 8121630
Course Credit: 1

Course Description:

This course is designed to further develop competencies in the areas of irrigation; growing media; planting beds and sites; propagation; marketing; repair and maintenance of nursery equipment and facilities.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|-----------------|--|---------------------------|
| 46.0 Operate tools and equipment – the student will be able to: | | SC.912.N.1.1 SC.912.N.2.4 SC.912.P.10.3 SC.912.P.12.3, 4, 5 | |
| 46.01 Load, secure, and transport equipment. | | | |
| 47.0 Maintain irrigation systems– the student will be able to: | | SC.912.N.1.1 SC.912.N.2.4 | |
| 47.01 Maintain and repair an irrigation system. | | | |
| 47.02 Assemble a drip/mist irrigation system for an ornamental crop. | | | |
| 48.0 Maintain and analyze production records – the student will be able to: | | SC.912.N.1.1 SC.912.N.2.4 | |
| 48.01 Analyze and maintain production and sales records. | | | |
| 48.02 Determine plant production costs. | | | |
| 48.03 Prepare a budget. | | | |
| 49.0 Manage and use fertilization schedules – the student will be able to: | MAFS.912.S-IC.2 | SC.912.L.17.16 SC.912.N.1.1, 6 SC.912.N.2.4 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-----------------|--|--------------------|
| | | SC.912.P.8.11 SC.912.P.12.12 | |
| 49.01 Interpret and evaluate the results of soil and leaf tissue analysis and determine corrective actions. | | | |
| 49.02 Develop a fertilization schedule for various plant species. | | | |
| 49.03 Calculate rates of fertilizer application for turf, ornamental plants, and palms. | | | |
| 50.0 Use a pest control system – the student will be able to: | MAFS.912.S-IC.2 | SC.912.L.17.13, 15, 16, 17 SC.912.N.1.1, 3, 4 SC.912.N.2.4 | |
| 50.01 Select proper IPM practices (biological, chemical and physical) for control of insects, diseases, vertebrates and weeds. | | | |
| 50.02 Evaluate the efficacy and phytotoxicity of a chemical prior to inclusion in a growing program. | | | |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students

Extended Student Supervision

Because of the production and marketing cycle of the agriculture industry, this program requires individual instruction and supervision of students for the entire period beyond the 180-day school year.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization for providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different

competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

**Florida Department of Education
Curriculum Framework**

Program Title: Food Science Applications
Program Type: Career Preparatory
Career Cluster: Agriculture, Food and Natural Resources

Secondary – Career Preparatory

| | |
|----------------------------|---|
| Program Number | 8129200 |
| CIP Number | 0102030100 |
| Grade Level | 9-12 |
| Standard Length | 3 credits |
| Teacher Certification | Refer to Program Structure table |
| CTSO | FFA |
| SOC Codes (all applicable) | 19-1012 - Food Scientists and Technologists 35 -1012- First-Line Supervisors of Food Preparation and Serving Workers |

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to instruction in the application of biological, chemical, and physical principles of converting raw agricultural products into processed forms for human consumption and the storage of these products, human physiology and nutrition, food chemistry, agricultural products processing, food additives, food preparation and packaging,

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of one occupational completion point. Planned and Supervised Agricultural Experiences (SAE) must be provided through one or more of the following: (1) directed laboratory experience, (2) student project, (3) placement for experience, or (4) cooperative education.

The following table illustrates the secondary program structure:

| OCP | Course Number | Course Title | Teacher Certification | Length | SOC Code | Level | Graduation Requirement |
|-----|---------------|-----------------------------|-----------------------|----------|----------|-------|------------------------|
| A | 8106810 | Agriscience Foundations 1 | AGRICUTUR 1 @2 | 1 credit | 35-1012 | 3 | EQ |
| | 8129210 | Food Science Applications 2 | | 1 credit | | 3 | PA |
| | 8129220 | Food Science Applications 3 | | 1 credit | 19-1012 | 3 | |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Academic Alignment Tables

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

| Courses | Anatomy/ Physiology Honors | Astronomy Solar/Galactic Honors | Biology 1 | Chemistry 1 | Earth-Space Science | Environmental Science | Genetics | Integrated Science | Marine Science 1 Honors | Physical Science | Physics 1 |
|-----------------------------|----------------------------|---------------------------------|--------------|--------------|---------------------|-----------------------|--------------|--------------------|-------------------------|------------------|--------------|
| Ag. Foundations | 29/87 33% | 18/80 23% | 55/83 66% | 11/69 16% | 36/67 54% | 30/70 42% | 20/69 29% | 49/82 60% | 25/66 38% | 38/74 51% | 12/72 16% |
| Food Science Applications 2 | 6/87 7% | 5/80 6% | 25/83 30% | 4/69 6% | 22/67 33% | 5/70 7% | 6/69 9% | 23/82 28% | 7/66 11% | 21/74 28% | 4/72 6% |
| Food Science Applications 3 | 27/87 31% | 28/80 35% | 8/83 10% | 30/69 43% | 6/67 9% | 26/70 37% | 24/69 35% | 10/82 12% | 24/66 36% | 11/74 15% | 27/72 38% |

** Alignment pending review

Alignment attempted, but no correlation to academic course

| Courses | Algebra 1 | Algebra 2 | Geometry | English 1 | English 2 | English 3 | English 4 |
|-----------------------------|--------------|--------------|-------------|--------------|--------------|--------------|--------------|
| Agriscience Foundations 1 | 14/67 21% | 4/75 5% | 8/54 15% | 11/46 24% | 11/45 24% | 11/45 24% | 11/45 24% |
| Food Science Applications 2 | 6/67 9% | 7/75 9% | ** | ** | ** | ** | ** |
| Food Science Applications 3 | 13/67 19% | 13/75 17% | ** | ** | ** | ** | ** |

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. The FS for Mathematical Practices are designed for grades K-12 and describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education.

Instructors must incorporate the Florida Standards for Technical Subjects and Mathematical Practices throughout instruction of this CTE program.

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL’s need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. If so, the standards have been identified and cross walked with the corresponding CTE standard and/or benchmark.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Describe the history of agriculture and its influence on the global economy.
- 02.0 Practice agriscience safety skills and procedures.
- 03.0 Apply scientific and technological principles to agriscience issues.
- 04.0 Apply environmental principles to the agricultural industry.
- 05.0 Investigate and utilize basic scientific skills and principles in plant science.
- 06.0 Investigate and utilize basic scientific skills and principles in animal science.
- 07.0 Demonstrate the use of agriscience tools, equipment, and instruments.
- 08.0 Demonstrate agribusiness, employability and human relation skills.
- 09.0 Apply leadership and citizenship skills.
- 10.0 Discuss components of food safety and handling practices in agriculture.
- 11.0 Evaluate the significance and implications of changes and trends in the food products and processing industry.
- 12.0 Analyze the dangers of food hazards.
- 13.0 Apply safety and sanitation procedures in the handling, processing and storing of food products.
- 14.0 Discuss the role of regulatory agencies in the food industry.
- 15.0 Manage operational procedures and create equipment and facility maintenance plans.
- 16.0 Implement Hazard Analysis and Critical Control Point (HACCP) procedures to establish operating parameters.
- 17.0 Demonstrate worker safety procedures with food product and processing equipment and facilities.
- 18.0 Describe the biological composition and processing of foods.
- 19.0 Summarize the procedures for food service operations.
- 20.0 Explain the daily operations of a food service facility.
- 21.0 Demonstrate leadership, employability, communications and human relations skills.
- 22.0 Write lab reports to record, interpret and evaluate data
- 23.0 Students evaluate the importance of the food and fiber system to understand the impact on global economy
- 24.0 Students examine the scope of career opportunities in and the importance of agriculture to the economy.
- 25.0 Utilize harvesting, selection and inspection techniques to obtain quality food products for processing.
- 26.0 Describe how proteins, carbohydrates, lipids, vitamins and minerals are digested and how food preparation impacts nutritional value and quality.
- 27.0 Describe the chemical composition and processing of foods.
- 28.0 Describe the physical composition and processing of foods.
- 29.0 Evaluate, grade and classify processed food products.
- 30.0 Identify the importance of raw agricultural products to the food science industry.
- 31.0 Apply principles of science to food processing to provide a safe, wholesome and nutritious food supply.
- 32.0 Process, preserve, package and present food and food products for sale and distribution.
- 33.0 Explain the process of food product development.
- 34.0 Analyze the components of the marketing chain.
- 35.0 Explain the process of food product development.
- 36.0 Discuss food production distribution.

- 37.0 Work effectively with industry organizations, groups and regulatory agencies affecting the food products and processing industry.
- 38.0 Describe the economic and cultural impact of a global food market.
- 39.0 Discuss environmental issues impacting the production and processing of foods.
- 40.0 Write lab reports to record, interpret and evaluate data.
- 41.0 Explain the components of the American business system.
- 42.0 Investigate agricultural cooperatives structure and function.
- 43.0 Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance.

**Florida Department of Education
Student Performance Standards**

Course Title: Agriscience Foundations 1
Course Number: 8106810
Course Credit: 1

Course Description:

This course is designed to develop competencies in the areas of agricultural history and the global impact of agriculture; career opportunities; scientific and research concepts; biological and physical science principles; environmental principles; agriscience safety; principles of leadership; and agribusiness, employability, and human relations skills in agriscience. Laboratory-based activities are an integral part of this course. These include the safe use and application of appropriate technology, scientific testing and observation equipment.

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental quality, and safety procedures will be an integral part of this course. Students will interact with materials and primary sources of data or with secondary sources of data to observe and understand the natural world. Students will develop an understanding of measurement error, and develop the skills to aggregate, interpret, and present the data and resulting conclusions. Equipment and supplies will be provided to enhance these hands-on experiences for students. A minimum of 20% of classroom time will be dedicated to laboratory experiences.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-M

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|------------------------------------|---|--------------------|
| 01.0 Describe the history of agriculture and its influence on the global economy-- The student will be able to: | | SC.912.E.5.7; SC.912.L.14.1; SC.912.L.15.13; SC.912.L.17.1, 5, 13, 18, 20; SC.912.N.4.2; | |
| 01.01 Evaluate and explain emerging trends and the opportunities they may create within the AFNR systems. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.01.01.02.c |
| 01.02 Assess the economic impact of an AFNR system on a local, state, national and global level. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | CS.02.02.03.b |
| 01.03 Identify significant career patterns/shifts in the history of the agricultural industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.01.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|-------------------------------------|--|--------------------|
| 01.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.06.02.01.a |
| 02.0 Practice agriscience safety skills and procedures--The student will be able to: | | SC.912.L.14.6; SC.912.L.15.4; SC.912.L.16.7, 10; SC.912.L.17.12, 14, 15, 16, 18; SC.912.N.1.1, 2, 3; SC.912.N.4.2; SC.912.P.8.7; | |
| 02.01 Identify the common causes and prevention of accidents in agriscience operations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.a |
| 02.02 Extract and utilize pertinent information from a container label and/or Safety Data Sheet (SDS) following Environmental Protection Agency (EPA), Worker Protection Standard, and Occupational Safety and Health Agency (OSHA) regulations. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | CS.03.04.03.a |
| 02.03 Identify proper disposal of hazardous waste materials and biohazards. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | ESS.04.01.02.c |
| 02.04 Describe emergency procedures for: basic first aid, CPR, chemical spills, fire extinguisher use | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.03.03.b |
| 03.0 Apply scientific and technological principles to agriscience issues--The student will be able to: | | SC.912.E.7.8; SC.912.L.14.2, 3, 4, 5, 6, 8; SC.912.L.15.14, 15; SC.912.L.16.1, 2, 3, 4, 7, 9, 10, 12, 14, 15, 16, 17; SC.912.N.1.1, 2, 3, 4, 6, 7; SC.912.N.2.2, 5; SC.912.N.3.1; SC.912.N.4.1; | |
| 03.01 Employ scientific measurement skills. | | | |
| 03.02 Demonstrate safe and effective use of common laboratory equipment. | | | ESS.01.02.01.b |
| 03.03 Identify the parts and functions of plant and animal cells. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | |
| 03.04 Describe the phases of cell reproduction. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 03.05 Implement the scientific method and science process skills through | LAFS.910.W.2.4 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|--------------------|
| the design and completion of an agriscience research project. | LAFS.1112.W.2.4 LAFS.910.W.3.8 LAFS.1112.W.3.8 | | |
| 03.06 Interpret, analyze, and report data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | BS.02.01.01.b |
| 03.07 Investigate DNA and genetics applications in agriscience including the theory of probability. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | BS.01.01.01.a |
| 03.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.). | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | BS.03.01.03.b |
| 04.0 Apply environmental principles to the agricultural industry--The student will be able to: | | SC.912.E.6.1, 4; SC.912.E.7.1, 4, 6, 7, 8; SC.912.L.17.4, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20; SC.912.L.18.12 | |
| 04.01 Research how different climactic and geological activity influences agriculture. | LAFS.910.W.3.8 LAFS.1112.W.3.8 | | NRS.01.03.02.b |
| 04.02 Describe various ecosystems as they relate to the agriculture industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.03 Describe the environmental resources (soil, water, air) necessary for agriculture production. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.08.02.01.a |
| 04.04 Identify regulatory agencies that impact agricultural practices. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS910.L.3.6 LAFS.1112.L.3.6 | | NRS.02.01.02.a |
| 04.05 Apply Best Management Practices that enhance the natural environment. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 04.06 Identify conservation practices related to natural resources. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.02.02.b |
| 05.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to: | | SC.912.E.5.4; SC.912.L.14.2, 3, 5, 6, 7, 8, 9, 53; SC.912.L15.9, 14, 15; SC.912.L.17.6, 12, 16, 17, 19; SC.912.L.18.7, 8, 9; SC.912.P.8.5, 7; | |
| 05.01 Identify and describe the specializations within the plant science industry. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|---|---|---|
| | LAFS.1112.W.2.4 | | |
| 05.02 Categorize plants based on specific characteristics according to industry and scientific standards. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.01.01.a |
| 05.03 Examine the processes of plant growth including photosynthesis, respiration, transpiration, absorption, transfer, storage, reproduction, etc.... | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.02.03.01.a PS.02.03.02.a PS.02.03.05.a |
| 05.04 Identify the nutrients required for plant growth from the periodic table and explain their functions. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.01.02.01.a |
| 05.05 Analyze information from a fertilizer label. | LAFS.910.RI.1.1 LAFS.1112.RI.1.1 | | PS.01.03.04.b |
| 05.06 Propagate and grow plants through sexual and/or asexual reproduction. | | | PS.03.01.03.a PS.03.01.01.b |
| 05.07 Investigate the impacts of various pests and propose solutions for their control. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | PS.03.03.01.c |
| 05.08 Investigate the nature and properties of food, fiber, and by-products from plants. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 05.09 Explore career opportunities in plant science. | LAFS.910.W.3.7 LAFS.1112.W.3.7 | | CS.05.01.01.a |
| 06.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to: | | SC.912.L.14.11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 28, 29, 31, 32, 33, 34, 36, 40, 41, 42, 43, 45, 46, 47, 48, 51; SC.912.L.15.4, 5, 6, 7; SC.912.L.16.3, 4; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19; | |
| 06.01 Explain the economic importance of animals and the products obtained from animals. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.02 Analyze commercially important livestock breeds in Florida. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | |
| 06.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species. | LAFS.910.L.3.6 LAFS.1112.L.3.6 | | |
| 06.04 Compare and contrast animal welfare issues. | LAFS.910.W.2.4 LAFS.1112.W.2.4 | | AS.02.01.01.a |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|---|--------------------|
| | LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 06.05 Investigate the nature and properties of food, fiber, and by-products from animals. | | | AS.06.03.03.a |
| 06.06 Explore career opportunities in animal science. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | CS.05.01.01.a |
| 07.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to | | SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9; | |
| 07.01 Select and demonstrate proper use of hand tools in agriculture. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | CS.03.04.02.a |
| 07.02 Operate service and maintain agriscience equipment, and instruments. | | | CS.03.04.03.b |
| 07.03 Manage facilities and supplies. | | | |
| 08.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to: | | | |
| 08.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE). | LAFS910.SL.1.1 LAFS.1112.SL.1.1 LAFS.910.W.3.7 LAFS.1112.W.3.7 LAFS.910.W.3.8 LAFS.1112.W.3.8 LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.SL.2.4 LAFS.1112.SL.2.4 | | |
| 08.02 Utilize a record keeping system to collect, interpret, and analyze data. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 08.03 Enhance oral communications through telephone, interview and presentation skills. | LAFS.910.SL.2.6 LAFS.1112.SL.2.6 | | CRP.04.01.02.b |
| 08.04 Enhance written communication by developing resumes and business letters. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.L.1.1 LAFS.1112.L.1.1 LAFS.910.L.1.2 LAFS.1112.L.1.2 | | CRP.04.02.02.b |
| 08.05 Demonstrate interpersonal (nonverbal) communication skills. | LAFS910.SL.1.1 LAFS.1112.SL.1.1 | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|-----------|---------------------------------|
| 08.06 Demonstrate good listening skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.04.03.01.a |
| 09.0 Apply leadership and citizenship skills--The student will be able to: | | | |
| 09.01 Identify and describe leadership characteristics. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.01.a |
| 09.02 Identify opportunities to apply acquired leadership skills. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.09.01.02.a |
| 09.03 Identify and demonstrate ways to be an active citizen. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | CRP.01.03.02.c |
| 09.04 Participate in community based learning activities. | | | CRP.01.03.01.a |
| 09.05 Demonstrate the ability to work cooperatively. | | | CRP.09.03.01.a |
| 09.06 Conduct formal and informal meetings using correct parliamentary procedure skills. | LAFS.910.W.2.4 LAFS.1112.W.2.4 LAFS.910.W.2.6 LAFS.1112.W.2.6 | | |
| 09.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations. | LAFS.910.SL.1.1 LAFS.1112.SL.1.1 | | |
| 09.08 Develop both a leadership and a career development plan utilizing SMART goals that include 5, 10, and 20 year benchmarks. | | | CS.05.01.01.b CRP.10.02.02.b |
| 10.0 Discuss components of food safety and handling practices in agriculture - The student will be able to: | | | |
| 10.01 Demonstrate proper safety precautions and use of personal protective equipment. | | | FPP.01.01.01.b |
| 10.02 Evaluate the food safety responsibilities that occur along the food supply chain. | | | FPP.03.03.02.b |
| 10.03 Explain techniques and procedures for the safe handling of food products. | | | FPP.03.03.02.c |
| 10.04 Discuss the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, and irradiation). | | | FPP03.03.01.b |
| 10.05 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply. | | | FPP04.01.01.0b |

**Florida Department of Education
Student Performance Standards**

Course Title: Food Science Applications 2
Course Number: 8129210
Course Credit: 1

Course Description:

This course is designed to develop competencies in the concepts related to: the use of taste and other sensory tests in developing foods; the application of scientific principles in food processing; food marketing; nutritional and economic value of plant-based food products; safe and efficient distribution and handling of food products; environmental factors in food production and processing; the global and historical impact of food on people; and employability skills necessary in the food industry.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts

NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-LA

| CTE Standards and Benchmarks | | FS-M/LA | NGSSS-Sci | National Standards |
|------------------------------|---|---------|----------------------------------|--------------------|
| 14.0 | Evaluate the significance and implications of changes and trends in the food products and processing industry – the student will be able to: | | | |
| | Research and summarize the purposes and objectives of safety programs in food products and processing facilities. (Eg. Sanitation Standard Operating Procedures, Good manufacturing Practices, worker safety) | | | FPP.01.01.01.a |
| 14.01 | Identify methods of food preservation and give examples of foods preserved by each method. | | | FPP.03.02.03.a |
| 14.02 | Analyze and document attributes procedures of current safety programs in food products and processing facility. | | SC.912.N.1.1 | FPP.01.01.01.b |
| 14.03 | Devise and apply strategies to preserve foods using various methods and techniques. | | | FPP.03.02.03.c |
| 14.04 | Construct plans that ensure implementation of safety programs for food products and processing industry. | | SC.912.N.1.1 | FPP.01.01.01.c |
| 14.05 | Identify and explain environmental and safety concerns about the food supply. | | SC.912.L.17.20 | FPP.04.02.02.a |
| 14.06 | Research and summarize current issues related to the safety and environmental concerns about foods and food processing (e.g., | | SC.912.L.16.10 SC.912.L.17.20 | FPP.04.02.02.b |

| | | | | |
|-------|--|--|---------------|----------------|
| | Genetically Modified Organisms, microorganisms, contamination, and irradiation). | | SC.912.L.14.6 | |
| 14.07 | Examine and respond to consumer concerns about the environment and safety of the food supply using accurate information regarding food products and processing systems and practices. | | SC.912.N.1.1 | FPP.04.02.02.c |
| 15.0 | Analyze the dangers of food hazards – the student will be able to: | | | |
| 15.01 | Explain types of biological hazards. | | SC.912.L.14.6 | |
| 15.02 | Explain types of chemical hazards. | | SC.912.L.14.6 | |
| 15.03 | Explain types of physical hazards. | | SC.912.L.14.6 | |
| 15.04 | Identify the roles food allergens play in food safety. (Eg. Milk, egg, fish, shellfish, tree nuts, wheat, peanuts, soybeans) | | SC.912.L.14.6 | |
| 16.0 | Apply safety and sanitation procedures in the handling, processing and storing of food products – the student will be able to: | | | |
| 16.01 | Research and summarize procedures of safe handling protocols (eg. Hazard Analysis and Critical Control Points Plan (HACCP); Critical control Points procedures (CCP), Good Agriculture Practices Plan (GAP)) | | | FPP.01.02.02.a |
| 16.02 | Construct plans that ensure implementation of safe handling procedures on food products. | MAFS.912.S-IC.2.4 MAFS.912.S-IC.2.5 | | FPP.01.02.02.b |
| 16.03 | Examine, interpret and report outcomes from safe handling procedures and results from quality assurance tests. | | | FPP.01.02.02.c |
| 16.04 | Interpret and evaluate quality-assurance tests on food products and examine steps to and implement corrective procedures. | MAFS.912.S-IC.2.6 | SC.912.N.1.1 | FPP.01.02.03.c |
| 16.05 | Describe the effects food-borne pathogens have on food products and humans. | | SC.912.L.14.6 | FPP.01.02.04.a |
| 16.06 | Explain , document and execute the procedures of microbiological tests used to detect food borne pathogens. | MAFS.912.S-IC.2.3 | SC.912.L.14.6 | FPP.01.02.04.b |
| 17.0 | Discuss the role of regulatory agencies in the food industry – the student will be able to: | | | |
| 17.01 | Examine and describe the importance and usage of regulatory oversight of food safety and security in food products and processing. | | SC.912.L.14.6 | FPP.04.03.02.a |
| 17.02 | Assess and summarize the application if industry standards in the food products and processing industry. | | | FPP.04.03.02.b |
| 17.03 | Construct and implement plans that ensure adherence to industry standards for food products and processing. | | | FPP.04.03.02.c |
| 18.0 | Manage operational procedures and create equipment and facility maintenance plans – the student will be able to: | | | |

| | | | | |
|-------|--|---|-------------------------------|----------------|
| 18.01 | Identify and describe protocols for inspection and harvesting techniques for food products. | | | FPP.03.01.04.a |
| 18.02 | Explain the functions of the 8 Good Agriculture Practices (GAP). | | | |
| 18.03 | Research and categorize types of equipment used in food products and processing systems. | | SC.912.N.1.1 | FPP.01.01.01.a |
| 18.04 | Assess specifications and maintenance needs for equipment and facilities used in food products and processing systems (eg. Specifications for machines, sanitation procedures, repair protocols) | | SC.912.N.1.1 | FPP.01.01.02.b |
| 18.05 | Devise and implement strategies to maintain equipment to maintain equipment and facilities for food products and processing systems. | | | FPP.01.01.02.c |
| 19.0 | Implement Hazard Analysis and Critical Control Point (HACCP) procedures to establish operating parameters – the student will be able to: | | | |
| 19.01 | Examine and identify contamination hazards associated with food products and processing (physical, chemical and biological) | | | FPP.01.02.01.a |
| 19.02 | Outline procedures to eliminate possible contamination hazards associated with food products and processing. | | SC.912.N.1.1 | FPP.01.02.01.b |
| 19.03 | Explain the implementation of the seven principles of HACCP. | | | |
| 19.04 | Create an HACCP program for a food products and processing facility. | | SC.912.N.1.1 SC.912.L.14.6 | |
| 20.0 | Describe the biological composition and processing of foods – the student will be able to: | | | |
| 20.01 | Research and summarize the application of biochemistry in the development of new food products. | | SC.912.L.14.6 | FPP.02.02.03.a |
| 20.02 | | | | |
| 20.03 | Examine the principles of managing Food, Acid, Time, Temperature, Oxygen, and Moisture (FATTOM) in controlling food spoilage. | | SC.912.L.14.6 | |
| 20.04 | Test the effects of yeasts, bacteria, molds and enzymes in food processing. | MAFS.912.S-ID.1.1; MAFS.912.S-ID.1.4 | SC.912.N.1.1 | |
| 21.0 | Create food distribution plans and procedures to ensure safe delivery of food products. – the student will be able to: | | | |
| 21.01 | Assess and describe the environmental impact of distributing food locally and globally. | | SC.912.N.1.1 | FPP.03.03.01.a |
| 21.02 | Examine the various paths food products take to get from food processing centers to consumers. | | SC.912.N.1.1 | FPP.03.03.02.a |
| 21.03 | Interpret safety procedures used in food distribution to ensure a safe product is being delivered to consumers. | | | FPP.03.03.02.b |
| 21.04 | Make recommendations to improve safety procedures used in food distribution scenarios to ensure a safe product is being delivered to consumers. | | SC.912.N.1.1 | FPP.03.03.02.c |

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|-------|---|--|--------------|----------------|
| 21.05 | Research and summarize different types of market demands for food products (eg. Local food, organic, non-GMO) | | | FPP.03.03.03.a |
| 21.06 | Assess and explain how market demand for food products influences the distribution of food products. | | | FPP.03.03.03.b |
| 21.07 | Propose distribution plans for food products that meet specific market demands. | | | FPP.03.03.03.c |
| 21.08 | Research and evaluate different crisis management plans.(eg. Food recalls, bioterrorism) | | | |
| 22.0 | Demonstrate leadership, employability, communications and human relations skills – the student will be able to: | | | |
| 22.01 | Investigate career opportunities in the food industry and identify educational experiences necessary to prepare for those careers. | | SC.912.N.1.1 | |
| 22.02 | Identify the opportunities for leadership development available through an appropriate student and/or professional organization. | | | |
| 23.0 | Apply principles of nutrition and biology to develop food products that provide a safe, wholesome and nutritious food supply for local and global food systems. | | | |
| 23.01 | Research and summarize properties of common food constituents (eg. Proteins, carbohydrates, fats, vitamins, minerals) | | | FPP.02.01.01.a |
| 23.02 | Compare and contrast the relative value of food constituents relative to food product qualities (e.g., taste, appearance, etc.). | | | FPP.02.01.01.b |
| 23.03 | Analyze the properties of food products to identify food constituents and evaluate nutritional value. | | | FPP.02.01.01.c |
| 23.04 | Research and report methods of nutritional planning to meet essential needs for the human diet. (eg. My plate) | | | FPP.02.01.02.a |
| 23.05 | Compare and contrast the nutritional needs of different human diets. | | | FPP.02.01.02.b |
| 23.06 | Construct methods to design a healthy daily food guide for a variety of nutritional needs. | | | FPP.02.01.02.c |

**Florida Department of Education
Student Performance Standards**

Course Title: Food Science Applications 3
Course Number: 8129220
Course Credit: 1

Course Description:

This course is designed to develop competencies the food industry. The course addresses concepts related to: developing new food products; scientific experimentation with the chemical and biological components of foods; the impact of microbes in food production; the nutritional and economic value of animal-based food products; food spoilage and waste management; safety and security risks in the food supply; the international trade of foods; and employability skills necessary in the food industry.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|------------------|--------------|--------------------|
| 24.0 Utilize harvesting, selection and inspection techniques to obtain quality food products for processing – the student will be able to: | | | |
| 24.01 Identify and describe foods derived from different classifications of food products (eg. Meat, egg, poultry, fish, dairy, fruits, vegetables, grains, legumes, oilseeds, etc.) | | | FPP.03.01.04.a |
| 24.02 Summarize characteristics of quality and yield grades of food products. | | SC.912.N.1.1 | FPP.03.01.01.a |
| 24.03 Analyze factors that affect quality and yield grades of food products. | | SC.912.N.1.1 | FPP.03.01.01.b |
| 24.04 Evaluate and grade food products from different classifications of food products. | MAFS.912.N-Q 1.1 | SC.912.N.1.1 | FPP.03.01.04.c |
| 24.05 Develop, apply, and evaluate care and handling procedures to maintain original food and quality yield. | | | |
| 24.06 Examine and evaluate inspection and harvesting of animals using regulatory agency approved or industry approved techniques. | | SC.912.N.1.1 | FPP.03.01.03.c |
| 24.07 Examine and respond to consumer concerns about the inspection and harvesting techniques of animals using accurate information based on regulatory agency approved or industry approved | | | 03.01.03.c |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|--|-------------------|---------------|--------------------|
| techniques. | | | |
| 25.0 Apply principles of microbiology and chemistry to develop food products to provide a safe wholesome and nutritious food supply for local and global food systems – the student will be able to: | | | |
| 25.01 Examine and describe the basic chemical makeup of different types of food. | | SC.912.N.1.1 | FPP.02.02.01.a |
| 25.02 Explain how the chemical and physical properties of foods influence nutritional value and eating quality. | | SC.912.N.1.1 | FPP.02.02.01.b |
| 25.03 Design and conduct experiments to determine the chemical and physical properties of food products. | | SC.912.N.1.1 | FPP.02.02.01.c |
| 25.04 Identify common food additives and identify their properties (e.g., preservatives, antioxidants, buffers, stabilizers, colors, flavors, etc.). | | SC.912.N.1.1 | FPP.02.02.02.a |
| 25.05 Describe the purpose of common food additives and how they influence the chemistry of food. | | SC.912.N.1.1 | FPP.02.02.02.b |
| 25.06 Devise and apply strategies to determine what additives are utilized and why they are included in a variety of food products. | | SC.912.L.18. | FPP.02.02.02.c |
| 25.07 Research and summarize the application of biochemistry in the development of new food products (e.g., value added food products, genetically engineered food products, etc.). | | SC.912.L.18.1 | FPP.02.02.03.a |
| 25.08 Analyze how food products and processing facilities use biochemistry concepts to develop new food products. | | SC.912.L.18.1 | FPP.02.02.03.b |
| 25.09 Develop and implement plans to engineer new food items using biochemistry concepts. | | SC.912.P.8.11 | FPP.02.02.03.c |
| 26.0 Process, preserve, package and present food and food products for sale and distribution – the student will be able to: | | | |
| 26.01 Identify and explain English and metric measurements used in the food products and processing system. | MAFS.912.N-Q.1.3 | SC.912.N.1.1 | FPP.03.02.01.a |
| 26.02 Compare weights and measurements of products and perform conversions between units of measure. | MAFS.912.N-Q.1.2 | SC.912.N.1.1 | FPP.03.02.01.b |
| 26.03 Design plans to formulate and package food products using a variety of weights and measures. | MAFS.912.N-Q.1.1 | SC.912.N.1.1 | FPP.03.02.01.c |
| 26.04 Differentiate methods and materials for processing foods for sale as fresh-food products. | | SC.912.N.1.1 | FPP.03.02.02.a |
| 26.05 Outline appropriate methods and prepare foods for sale and distribution as fresh-food products. | | SC.912.N.1.1 | FPP.03.02.02.b |
| 26.06 Evaluate food quality factors on foods prepared for different markets (based on factors such as shelf life, shrinkage, | MAFS.912.S-IC.1.2 | SC.912.N.1.1 | FPP.03.02.02.c |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|--|---------|--|--------------------|
| appearance and weight). | | | |
| 26.07 Identify methods of food preservation and give examples of foods preserved by each method. | | SC.912.N.1.1 | FPP.04.03.03.a |
| 26.08 Analyze and document food preservation processes and methods on a variety of food products. | | SC.912.N.1.1 | FPP.03.02.03.b |
| 26.09 Summarize types of materials and methods used in food packaging and presentation. | | SC.912.N.1.1 | FPP.03.02.04.a |
| 26.10 Construct and implement methods of selecting packaging materials to store a variety of food products. | | SC.912.N.1.1 | FPP.03.02.04.c |
| 26.11 Analyze the degree of desirable food qualities of foods stored in various packaging. | | SC.912.N.1.1 | FPP.03.02.04.b |
| 26.12 Identify and summarize purposes of food storage procedures (first in/first out, temperature regulations) | | SC.912.N.1.1 | FPP.01.03.01.a |
| 26.13 Analyze characteristics of food products and determine appropriate storage procedures. | | SC.912.N.1.1 | FPP.01.03.01.b |
| 26.14 Prepare plans that ensure implementation of proper food storage procedures. | | SC.912.N.1.1 | FPP.01.03.01.c |
| 27.0 Explain the process of food product development – the student will be able to: | | | |
| 27.01 Research and summarize relevant factors in planning and developing a new food product. | | SC.912.N.1.1 SC.912.N.1.6 SC.912.N.1.7 | FPP.02.03.02.a |
| 27.02 Determine consumer preference and market potential for a new food product using a variety of methods. | | SC.912.N.1.1 | FPP.02.03.02.b |
| 27.03 Design new food products that meet a variety of goals. | | SC.912.N.1.1 SC.912.N.1.7 | FPP.02.02.02.c |
| 28.0 Analyze the components of the marketing chain – the student will be able to: | | | |
| 28.01 Examine and explain the importance of food labeling to the consumer. | | SC.912.N.1.1 | FPP.02.03.01.a |
| 28.02 Examine, interpret, and explain the meaning of required components of a food label. | | SC.912.N.1.1 | FPP.02.03.01.b |
| 28.03 Determine a strategy to prepare and label foods according to the established standards of regulatory agencies. | | SC.912.N.1.1 | FPP.02.03.01.c |
| 29.0 Explain the process of food product development – the student will be able to: | | | |
| 29.01 Develop a new food product. | | SC.912.N.1.1 SC.912.L.18.1 | |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|--|---|----------------------------------|--------------------|
| 29.02 Conduct and analyze a food market test. | | SC.912.N.1.1 | |
| 29.03 Apply sensory analysis techniques. | | SC.912.N.1.1 SC.912.L.14.50 | |
| 29.04 Conduct a cost analysis for a new food product. | MAFS.912.A-CED.1.1 MAFS.912.A-CED.1.2; MAFS.912.A-CED.1.3; MAFS.912.A-CED.1.4 MAFS.912.F-LE.2.5 | SC.912.N.1.1 | |
| 30.0 Discuss food production distribution – the student will be able to: | | | |
| 30.01 Research and document ways to reduce environmental impact from food distribution activities. | | SC.912.N.1.1 | FPP.03.03.01.b |
| 30.02 Devise and defend a strategy to determine ways for food distribution to reduce environmental impacts. | | | FPP.03.03.01.c |
| 31.0 Work effectively with industry organizations, groups and regulatory agencies affecting the food products and processing industry – the student will be able to: | | | |
| 31.01 Examine and summarize the purposes of organizations that influence or regulate the food products and processing industry. | | | FPP.04.03.01.a |
| 31.02 Evaluate the changes in the food products and processing industry brought about by industry organizations or regulatory agencies. | | SC.912.N.1.1 | FPP.04.03.02.b |
| 31.03 Construct and implement methods to obtain data about organizations, groups and regulatory agencies that affect the food products and processing industry. | | SC.912.N.1.1 | FPP.04.03.01.c |
| 32.0 Describe the economic and cultural impact of a global food market – the student will be able to: | | | |
| 32.01 Describe and explain the components of the food products and processing industry. | | SC.912.N.1.1 | FPP.04.02.01.a |
| 32.02 Analyze and document significant changes and trends in the food products and processing industry. | | SC.912.N.1.1 | FPP.04.02.01.b |
| 32.03 Predict and defend upcoming changes and trends in the food products and processing industry. | | | FPP.04.02.01.c |
| 32.04 Research and describe currents and emerging technologies related to food products and processing | | SC.912.L.17.20 SC.912.L.17.18 | FPP.04.02.03.a |
| 32.05 Evaluate desirable and undesirable outcomes of emerging technologies used in the food and processing systems. | | | FPP.04.02.03.b |
| 32.06 Research and evaluate the feasibility of implementing a current or emerging technology to improve a current food product or process used in a facility. | | | FPP.04.02.03.c |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|---------|----------------|--------------------|
| 32.07 Discusses possible causes of world hunger | | | |
| 32.08 Explain the relationship between global population growth and the food supply needs. | | | |
| 33.0 Discuss environmental issues impacting the production and processing of foods – the student will be able to: | | | |
| 33.01 Describe the requirements of water used in food processing. | | SC.912.L.18.12 | |
| 33.02 Discuss methods used in food processing for disposing of solid wastes. | | | |
| 33.03 Compare and contrast methods of wastewater management used in food processing. | | | |
| 34.0 Demonstrate leadership, employability, communications and human relations skills – the student will be able to: | | | |
| 34.01 Identify the opportunities for leadership development available through an appropriate student and/or professional organization. | | | |
| 34.02 Identify acceptable work habits and personal characteristics. | | | |
| 34.03 Identify acceptable employee hygiene habits. | | | |
| 34.04 Describe the importance of industry certifications. | | | |
| 35.0 Examine the scope of the food industry by valuating local and global polices, trends, and customs for food production. | | | FPP.04.01 |
| 35.01 Research and summarize examples of policy and legislation that affect food products and processing systems in the United States and around the world (e.g., labeling, GMOs, biosecurity, food system policy, dietary guidelines, etc.). | | | FPP.04.01.01.a |
| 35.02 Analyze the similarities and differences amongst policies and legislation that affect the food products and processing system in the U.S. or around the world. | | | FPP.04.01.01.b |
| 35.03 Articulate and defend a personal point of view on policies and legislation that affect the food products and processing system in the U.S. or around the world. | | | FPP.04.01.01.c |
| 35.04 Examine the impact of consumer trends on food products and processing practices (e.g., health and nutrition, organic, information about food products, local food movements, farm-to-fork supply chains, food system transparency, etc.). | | | FPP.04.01.02.a. |
| 35.05 Devise and implement a strategy to create food products that meet a specific consumer trend in a specific market. | | | FPP.04.01.02.c. |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|----------------|------------------|---------------------------|
| 35.06 Compare and contrast cultural differences regarding food products and processing practices. | | | FPP.04.01.03.a. |
| 35.07 Analyze food production and distribution outcomes based on cultural customs. | | | FPP.04.01.03.b |
| 35.08 Propose and implement culturally sensitive food processing and distribution practices. | | | FPP.04.01.03.c |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student.

Career and Technical Student Organization (CTSO)

FFA is the intercurricular career and technical student organization providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's Individual Educational Plan (IEP) or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Some secondary students with disabilities (ESE) may need additional time (i.e., longer than the regular school year), to master the student performance standards associated with a regular Occupational Completion Point (OCP) or a Modified Occupational Completion Point (MOCP). If

needed, a student may enroll in the same career and technical course more than once. Documentation should be included in the IEP that clearly indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

Florida Department of Education
Curriculum Framework

Program Title: Food Science Safety & Technology
Program Type: Non Career Preparatory
Career Cluster: Agriculture, Food, and Natural Resources

Secondary – Non Career Preparatory

| | |
|-----------------------|--|
| Program Number | 8500395 |
| CIP Number | 09200115PA |
| Grade Level | 9-12 |
| Standard Length | 1 credit |
| Teacher Certification | Refer to the <u>Course Structure</u> section. |
| CTSO | FCCLA FFA |

Purpose

This course provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the food science sector of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to instruction in the application of biological, chemical, and physical principles of converting raw agricultural products into processed forms for human consumption and safe food preparation, handling, packaging, food storage and distribution, and related aspects of human health and safety including toxicology and pathology.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Course Structure

This program is a planned sequence of instruction consisting of one course.

To teach the course listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the secondary course structure:

| Course Number | Course Title | Teacher Certification | Length | Level | Graduation Requirement |
|---------------|----------------------------------|----------------------------------|----------|-------|------------------------|
| 8500395 | Food Science Safety & Technology | FAM CON SCI 1 AGRICULTUR 1 @2 | 1 credit | 2 | |

(Graduation Requirement Abbreviations- EQ= Equally Rigorous Science, PA= Practical Arts, EC= Economics)

Academic Alignment Table

Academic alignment is an ongoing, collaborative effort of professional educators specializing in the fields of science, mathematics, English/language arts, and Career and Technical Education (CTE). This initiative supports CTE programs by improving student performance through the integration of academic content within CTE courses. Career and Technical Education courses that have been aligned to the Next Generation Sunshine State Standards for Science and the Florida Standards for Mathematics and English/Language Arts will show the following data: the quantity of academic standards in the CTE course; the total number of standards contained in the academic course; and the percentage of alignment to the CTE course.

| Courses | Anatomy/ Physiology Honors | Astronomy Solar/Galactic Honors | Biology 1 | Chemistry 1 | Earth-Space Science | Environmental Science | Genetics | Integrated Science | Marine Science 1 Honors | Physical Science | Physics 1 |
|----------------------------------|----------------------------|---------------------------------|--------------|-------------|---------------------|-----------------------|-------------|--------------------|-------------------------|------------------|------------|
| Food Science Safety & Technology | 10/87 11% | 5/80 6% | 27/83 33% | 5/69 7% | 22/67 33% | 5/70 7% | 7/69 10% | 25/82 30% | 7/66 32% | 24/74 32% | 4/72 6% |

** Alignment pending review

Alignment attempted, but no correlation to academic course

| Courses | Algebra 1 | Algebra 2 | Geometry | English 1 | English 2 | English 3 | English 4 |
|----------------------------------|------------|------------|----------|-----------|-----------|-----------|-----------|
| Food Science Safety & Technology | 6/67 9% | 7/75 9% | # | ** | ** | ** | ** |

** Alignment pending review

Alignment attempted, but no correlation to academic course

Florida Standards for Technical Subjects

Florida Standards (FS) for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects are the critical reading and writing literacy standards designed for grade 6 and above. These standards are predicated on teachers of history/social studies, science, and technical subjects using their content area expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. The FS for Mathematical Practices are designed for grades K-12 and describe varieties of expertise that educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education.

Instructors must incorporate the Florida Standards for Technical Subjects and Mathematical Practices throughout instruction of this CTE program.

Florida Standards for English Language Development (ELD)

English language learners communicate for social and instructional purposes within the school setting. ELD.K12.SI.1.1

English Language Development (ELD) Standards Special Notes:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate for social and instructional purposes within the school setting. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition.

National Standards (NS)

Some or all of the courses in this program have been aligned with Industry or National Standards. If so, the standards have been identified and cross walked with the corresponding CTE standard and/or benchmark.

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Evaluate the significance and implications of changes and trends in the food products and processing industry.
- 02.0 Analyze the dangers of food hazards.
- 03.0 Apply safety and sanitation procedures in the handling, processing and storing of food products.
- 04.0 Manage operational procedures and create equipment and facility maintenance plans.
- 05.0 Implement Hazard Analysis and Critical Control Point (HACCP) procedures to establish operating parameters.
- 06.0 Demonstrate worker safety procedures with food product and processing equipment and facilities.
- 07.0 Summarize the procedures for food service operations.
- 08.0 Explain the daily operations of a food service facility.
- 09.0 Identify and explain the effects of microorganisms on food.
- 10.0 Compare and contrast the different methods of food preservation.

**Florida Department of Education
Student Performance Standards**

Course Title: Food Science Safety & Technology
Course Number: 8500395
Course Credit: 1

Course Description:

This course prepares students in the application of biological, chemical, and physical principles of converting raw agricultural products into processed forms for human consumption and safe food preparation, handling, packaging, food storage and distribution, and related aspects of human health and safety including toxicology and pathology.

Abbreviations:

FS-M/LA = Florida Standards for Math/Language Arts
 NGSSS-Sci = Next Generation Sunshine State Standards for Science

Note: This course is pending alignment in the following categories: FS-/LA

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|--|----------------|---|---------------------------|
| 01.0 Evaluate the significance and implications of changes and trends in the food products and processing industry – the student will be able to: | | | |
| 01.01 Discuss the history and describe and explain the components. (e.g., processing, distribution, byproducts) of the food products and processing industry.) | | | |
| 01.02 Analyze and document attributes and procedures of current safety programs in food products and processing facilities. | | SC.912.N.1.1 | FPP01.01.01.b |
| 01.03 Research and categorize types of equipment used in food products and processing systems. | | SC.912.N.1.1 | FPP.01.01.02.a |
| 01.04 Assess specifications and maintenance needs for equipment and facilities used in food products and processing systems (e.g., specifications for machines, sanitation procedures, repair protocol, etc.). | | SC.912.L.17.20 | FPP.01.01.02.b |
| 01.05 Devise and implement strategies to maintain equipment and facilities for food products and processing systems. | | SC.912.L.16.10 SC.912.L.17.20 SC.912.L.14.6 | FPP.01.01.02.c |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|---|--|---------------|--------------------|
| 01.06 Determine appropriate industry response to consumer concerns to assure a safe and wholesome food supply. | | SC.912.N.1.1 | FPP.04.02.02.a |
| 02.0 Analyze the dangers of food hazards – the student will be able to: | | | |
| 02.01 Examine and identify contamination hazards associated with food products and processing (e.g., physical, chemical and biological). | | SC.912.L.14.6 | FPP.01.02.01.a |
| 02.02 Outline procedures to eliminate possible contamination hazards associated with food products and processing. | | SC.912.L.14.6 | FPP.01.02.01.b |
| 02.03 Identify sources of contamination in food products and/or processing facilities and develop ways to eliminate contamination | | SC.912.L.14.6 | FPP.01.02.01.c |
| 02.04 Identify the roles food allergens play in food safety. | | SC.912.L.14.6 | |
| 03.0 Apply safety and sanitation procedures in the handling, processing and storing of food products – the student will be able to: | | | |
| 03.01 Explain techniques and procedures for the safe handling of food products. | | | FPP.01.02.01.b |
| 03.02 Evaluate food product handling procedures. | | SC.912.N.1.1 | FPP.01.02.02.a |
| 03.03 Demonstrate approved food product handling techniques. | | | |
| 03.04 Describe the importance of performing quality-assurance tests on food products. | MAFS.912.S-IC.2.3 | | FPP.01.02.02.c |
| 03.05 Perform quality-assurance tests on food products. | MAFS.912.S-IC.2.4 MAFS.912.S-IC.2.5 | | FPP.01.02.03.b |
| 03.06 Interpret quality-assurance test results and apply corrective procedures. | MAFS.912.S-IC.2.6 | SC.912.N.1.1 | FPP.01.02.03.c |
| 03.07 Describe the effects food-borne pathogens have on food products and humans. | | SC.912.L.14.6 | FPP.01.02.04.a |
| 03.08 Explain the importance of microbiological tests in food product preparation, listing common spoilage and pathogenic microorganisms. | MAFS.912.S-IC.2.3 | SC.912.L.14.6 | FPP.01.02.04.b |
| 03.09 Conduct and interpret microbiological tests for food-borne pathogens and implement corrective procedures. | MAFS.912.S-IC.2.6 | SC.912.N.1.1 | FPP.01.02.04.c |
| 03.10 Explain the importance of record keeping in a food products and processing system. | | | FPP.01.03.02.a |
| 03.11 Discuss documentation procedures in a food products and processing system. | | | FPP.01.03.02.b |
| 03.12 Demonstrate proper record keeping in a food products and processing system. | MAFS.912.N-Q.1.3 | | FPP.01.03.02.c |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|---|---|-------------------------------|--------------------|
| 04.0 Manage operational procedures and create equipment and facility maintenance plans – the student will be able to: | | | |
| 04.01 Explain the importance of developing and maintaining Sanitation Standard Operating Procedures (SSOP). | | | |
| 04.02 Evaluate the SSOP of a food products and processing company. | | SC.912.N.1.1 | |
| 04.03 Develop SSOP for a food products and processing company. | | SC.912.N.1.1 | |
| 04.04 Explain the purpose of Good Manufacturing Practices (GMP). | | | |
| 04.05 Evaluate the GMP of a food products and processing company. | | SC.912.N.1.1 | |
| 04.06 Implement GMP for a food products and processing company. | | SC.912.N.1.1 | |
| 04.07 Identify reasons for using a planned maintenance program to maintain equipment and facilities. | | SC.912.N.1.1 | FPP.01.01.02.b |
| 04.08 Develop a basic equipment and facility maintenance program. | | SC.912.N.1.1 | |
| 04.09 Perform basic equipment and facility maintenance in a food products and processing operation. | | | FPP.01.01.02.c |
| 05.0 Implement Hazard Analysis and Critical Control Point (HACCP) procedures to establish operating parameters – the student will be able to: | | | |
| 05.01 Research and summarize procedures of safe handling protocols (e.g., Hazard Analysis and Critical Control Points Plan (HACCP); Critical Control Point procedures (CCP); Good Agricultural Practices Plan (GAP), etc.). | | | FPP.01.02.02.a |
| 05.02 Construct plans that ensure implementation of safe handling procedures on food products. | | SC.912.N.1.1 SC.912.L.14.6 | FPP.01.02.02.b |
| 05.03 Analyze the effectiveness of a food products and processing company's Critical Control Point (CCP) procedures. | MAFS.912.F-LE.1.1 MAFS.912.F-LE.1.2 MAFS.912.F-LE.1.3; MAFS.912.F-LE.1.4; MAFS.912.F-LE.2.5 | SC.912.N.1.1 SC.912.L.14.6 | |
| 05.04 Identify the seven principles of HACCP. | | SC.912.L.15.4 | |
| 05.05 Explain the implementation of the seven principles of HACCP. | | | |
| 05.06 Implement an HACCP program for a food products and processing facility. | MAFS.912.S-ID.1.1 MAFS.912.S-ID.1.4 | SC.912.N.1.1 SC.912.L.14.6 | |
| 06.0 Demonstrate worker safety procedures with food product and processing equipment and facilities – the student will be able to: | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSS-Sci | National Standards |
|--|---------|-------------------------------|--------------------|
| 06.01 Explain safety standards that must be observed in facility design and equipment use. | | SC.912.N.1.1 SC.912.L.14.6 | |
| 06.02 Outline guidelines for personnel safety in the food products and processing industry. | | SC.912.N.1.1 SC.912.L.14.6 | |
| 06.03 Evaluate a facility to determine the implementation of safety procedures. | | SC.912.N.1.1 SC.912.L.14.6 | |
| 07.0 Summarize the procedures for food service operations – the student will be able to: | | | |
| 07.01 Develop criteria for purchasing considerations. | | SC.912.N.1.1 | |
| 07.02 Develop criteria for receiving considerations | | SC.912.N.1.1 | |
| 07.03 Facilitate proper use of current general inspection guidelines. | | | |
| 07.04 Select proper criteria for inspecting specific types of food. | | SC.912.N.1.1 | |
| 07.05 Explain general storage guidelines. | | | |
| 07.06 Compare storage guidelines for specific types of food. | | | FPP.03.02.04.c |
| 07.07 Demonstrate proper food preparation techniques. | | | |
| 07.08 Explain proper procedures for cooked food. (See current Food Code for temperature information) | | SC.912.L.14.6 | |
| 07.09 Recommend proper cooling and reheating procedures for various food items. (See current Food Code for temperatures) | | SC.912.L.14.6 | |
| 07.10 Explain procedures for holding food for service. | | SC.912.L.14.6 | |
| 07.11 Demonstrate proper techniques in serving food. | | SC.912.L.14.6 | |
| 07.12 Develop a plan for offsite service handling of food. | | SC.912.N.1.1 SC.912.L.14.6 | |
| 08.0 Explain the daily operations of a food service facility – the student will be able to: | | | |
| 08.01 Discuss proper use of food safety management systems. | | SC.912.N.1.1 | |
| 08.02 Determine procedures for active managerial control. | | SC.912.N.1.1 | |
| 08.03 Develop a plan for crisis management. | | SC.912.N.1.1 | |
| 08.04 Design a plan for operating safely. | | | |

| CTE Standards and Benchmarks | FS-M/LA | NGSSS-Sci | National Standards |
|---|--|---|--------------------|
| 08.05 Describe procedures for installing and maintaining kitchen equipment. | | | |
| 08.06 Demonstrate proper procedures for cleaning. | | | |
| 08.07 Demonstrate proper procedures for sanitizing. | | | |
| 08.08 Develop a cleaning program. | | SC.912.L.14.6 | |
| 08.09 Explain the importance of (IPM) Integrated Pest Management programs. | | SC.912.L.15.4 SC.912.L.14.6 | |
| 08.10 Identify pests. | | SC.912.L.14.6 | |
| 08.11 Explain the importance of working with a pest control operator. | | | |
| 09.0 Identify and explain the effects of microorganisms on food – the student will be able to: | | | |
| 09.01 Compare the beneficial and detrimental effects of microorganisms on food. | | SC.912.L.14.6 | |
| 09.02 Identify the characteristic of selected microorganisms and related food borne diseases. | | SC.912.L.14.6 | |
| 09.03 Describe the environmental conditions necessary for the growth of selected microorganisms. | | SC.912.L.14.6 | |
| 09.04 Explain and demonstrate the cause and effect relationship between using accepted food handling procedures and preventing food borne diseases. | | SC.912.L.14.6 | |
| 09.05 Conduct and appraise scientific experimentation of the biological magnification of certain classified microorganisms, such as yeast, mold and bacteria. | MAFS.912.S-ID.1.1 MAFS.912.S-ID.1.4 | SC.912.L.14.6 SC.912.N.1.1 | |
| 10.0 Compare and contrast the different methods of food preservation – the student will be able to: | | | |
| 10.01 Describe and give methods of how fermentation is useful in preserving foods. | | SC.912.L.18.8 | |
| 10.02 Describe and give examples of how chemicals are useful in preserving foods. | | SC.912.P.8.2 | |
| 10.03 Describe and give examples of temperature-related methods used in preservation of foods. | | SC.912.P.8.2 | |
| 10.04 Conduct an experiment in fermentation, chemical, or temperature-related method of food preservation. | MAFS.912.S-ID.1.1 MAFS.912.S-ID.1.4 | SC.912.N.1.1 SC.912.P.8.2 SC.912.L.18.8 | |

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

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On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

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In addition to accommodations, some secondary students with disabilities (students with an IEP served in Exceptional Student Education (ESE)) will need modifications to meet their needs. Modifications change the outcomes or what the student is expected to learn, e.g., modifying the curriculum of a secondary career and technical education course. Note: postsecondary curriculum and regulated secondary programs cannot be modified.

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indicates that it is anticipated that the student may need an additional year to complete an OCP/MOCP. The student should work on different competencies and new applications of competencies each year toward completion of the OCP/MOCP. After achieving the competencies identified for the year, the student earns credit for the course. It is important to ensure that credits earned by students are reported accurately. The district's information system must be designed to accept multiple credits for the same course number for eligible students with disabilities.

**Florida Department of Education
Curriculum Framework**

Program Title: Skilled Cattle Worker
Career Cluster: Agriculture, Food and Natural Resources

| CCC | |
|----------------------------|--|
| CIP Number | 0101000001 |
| Program Type | College Credit Certificate (CCC) |
| Program Length | 30 |
| CTSO | N/A |
| SOC Codes (all applicable) | 11-9013 - Farmers, Ranchers, and Other Agricultural Managers |

Purpose

This certificate program is part of the Agricultural Production Technology AS degree program (1101000000).

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS or AAS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.).

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Agriculture, Food and Natural Resources career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Agriculture, Food and Natural Resources career cluster.

The content includes but is not limited to the fundamental care and management of beef production in the areas of movement, general health, pastures, and forages utilizing record keeping and industry standard practices of animal welfare.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Standards

After successfully completing this program, the student will be able to perform the following:

- 01.0 Manage crops.
- 02.0 Manage livestock.
- 03.0 Manage machinery and equipment.
- 04.0 Manage facilities.
- 05.0 Keep and analyze financial, production and personnel records.
- 06.0 Integrate state and federal regulations into the operation.
- 07.0 Demonstrate leadership, communication, employability and human relations skills.

Florida Department of Education
Student Performance Standards

Program Title: Skilled Cattle Worker
 CIP Number: 0101000001
 Program Length: 30 credit hours
 SOC Code(s): 11-9013

This certificate program is part of the Agricultural Production Technology AS degree program (1101000000). At the completion of this program, the student will be able to:

| | |
|-------|--|
| 01.0 | Manage crops – the student will be able to: |
| 01.01 | Prepare a land use plan. |
| 01.02 | Determine long-range conservation practices. |
| 01.03 | Prepare soil for crops. |
| 01.04 | Select crop varieties best suited for land, market and type of farm operation. |
| 01.05 | Determine seeding/planting rate and spacing. |
| 01.06 | Calibrate and adjust planting equipment |
| 01.07 | Plant crops. |
| 01.08 | Select appropriate cultural practices including cultivation, fertilization and irrigation. |
| 01.09 | Identify and control diseases, insects and pests. |
| 01.10 | Determine maturity of crops. |
| 01.11 | Harvest crops. |
| 01.12 | Store crops. |
| 01.13 | Determine the most advantageous method of marketing crops. |
| 02.0 | Manage livestock – the student will be able to: |
| 02.01 | Select and/or breed livestock. |
| 02.02 | Determine nutritional requirements and balance livestock rations. |

| | |
|-------|---|
| 02.03 | Prepare a feeding schedule. |
| 02.04 | Determine quality of pasture range or forage. |
| 02.05 | Provide for winter rations and supplements. |
| 02.06 | Maintain pasture fertility and quality. |
| 02.07 | Develop a breeding/marketing plan for operation. |
| 02.08 | Cull unproductive animals. |
| 02.09 | Provide aid for animals with parturition problems. |
| 02.10 | Care for newborn livestock. |
| 02.11 | List causes of livestock infertility. |
| 02.12 | Provide mineral supplement for animals. |
| 02.13 | Determine most advantageous method of marketing livestock. |
| 02.14 | Transport livestock. |
| 02.15 | Identify and treat disorders, diseases and pests of livestock. |
| 03.0 | Manage machinery and equipment – the student will be able to: |
| 03.01 | Assess needs for the purchases of new or replacement equipment. |
| 03.02 | Maintain oil, fuel and hydraulic levels in equipment. |
| 03.03 | Maintain tires, batteries and coolant system on all equipment and vehicles. |
| 03.04 | Operate and service small gasoline engines. |
| 03.05 | Replace hoses, belts and lines. |
| 03.06 | Cut and weld with oxy-acetylene and arc welding equipment. |
| 03.07 | Observe safety procedures when operating farm equipment. |
| 03.08 | Develop a general maintenance schedule. |
| 04.0 | Manage facilities – the student will be able to: |

| | |
|-------|--|
| 04.01 | Safely operate and maintain general farm shop tools and equipment. |
| 04.02 | Install and maintain electrical wiring and equipment. |
| 04.03 | Square and build a farm structure. |
| 04.04 | Determine a bill of materials for a farm construction project. |
| 04.05 | Form and pour concrete. |
| 04.06 | Build and repair fences, gates and pens. |
| 04.07 | Develop a general maintenance schedule for facilities and equipment. |
| 05.0 | Keep and analyze financial, production and personnel records – the student will be able to: |
| 05.01 | Keep fertilization and pesticide use records. |
| 05.02 | Keep equipment maintenance and service records. |
| 05.03 | Record cultural and production information. |
| 05.04 | Determine cost efficiency of operations. |
| 06.0 | Integrate state and federal regulations into operation – the student will be able to: |
| 06.01 | List agencies responsible for inspecting and regulating operation of product. |
| 06.02 | Secure necessary inspection certificates and registrations. |
| 06.03 | List reasons for the necessity of inspections, certifications and registrations. |
| 07.0 | Demonstrate leadership, communication, employability and human relations skills – the student will be able to: |
| 07.01 | Develop citizenship awareness and responsibility. |
| 07.02 | Demonstrate effective communication skills. |
| 07.03 | Complete an employment application |
| 07.04 | Demonstrate job interview skills. |
| 07.05 | Demonstrate job interview skills. |
| 07.06 | Recognize appropriate work habits. |

07.07 Identify associations and societies associated with occupation or profession.

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities to meet individual needs and ensure equal access. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.