

**2012 - 2013**

**Florida Department of Education  
Curriculum Framework**

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

<b>Secondary – Career Preparatory</b>	
Program Number	8113000
CIP Number	0103010301
Grade Level	9-12, 30, 31
Standard Length	4 credits
Teacher Certification	AGRICULTUR 1 @2
CTSO	FFA
SOC Codes (all applicable)	19-4091
Facility Code	203 <a href="http://www.fldoe.org/edfacil/sref.asp">http://www.fldoe.org/edfacil/sref.asp</a> (State Requirements for Educational Facilities)
Targeted Occupation List	<a href="http://www.labormarketinfo.com/wec/TargetOccupationList.htm">http://www.labormarketinfo.com/wec/TargetOccupationList.htm</a>
Perkins Technical Skill Attainment Inventory	<a href="http://www.fldoe.org/workforce/perkins/perkins_resources.asp">http://www.fldoe.org/workforce/perkins/perkins_resources.asp</a>
Industry Certifications	<a href="http://www.fldoe.org/workforce/fcpea/default.asp">http://www.fldoe.org/workforce/fcpea/default.asp</a>
Statewide Articulation	<a href="http://www.fldoe.org/workforce/dwdframe/artic_frame.asp">http://www.fldoe.org/workforce/dwdframe/artic_frame.asp</a>

### **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 environmental resources 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.

## Program Structure

This program is a planned sequence of instruction consisting of four courses with 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	Length	SOC Code	Level
A	8106810	Agriscience Foundations 1	1 credit	19-4091	3
	8106850	Agricultural Biotechnology 2	1 credit		3
	8113010	Environmental Resources 3	1 credit		3
	8113020	Environmental Resources 4	1 credit		3

## Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

## Special Notes

### Academic Alignment

Some or all of the courses in this program have been aligned to the Next Generation Sunshine State Standards contained in specific math and science core academic courses. This alignment resulted from a collaborative review by Career and Technical Education (CTE) teachers and core academic teachers. The table below contains the results of the alignment efforts. Data shown in the table includes the number of academic standards in the CTE course, the total number of math and science standards contained in the academic course, and the percentage of alignment to the CTE course. The following academic courses were included in the alignment (see code for use in table).

Academic Subject Area	Academic Course
Math	Algebra 1 (ALG1) Algebra 2 (ALG2) Geometry (GEO)
Science	Anatomy/Physiology Honors (APH) Astronomy Solar/Galactic Honors (ASGH) Biology 1 (BIO1) Chemistry 1 (CHM1) Earth-Space Science (ESS) Genetics (GEN) Marine Science 1 Honors (MS1H) Physical Science (PS) Physics 1 (PHY1)

Course	Math			Science								
	ALG1	ALG2	GEO	APH	ASGH	BIO1	CHM1	ESS	GEN	MS1H	PS	PHY1
Ag. Foundations	9/36 25%	#	2/45 4%	32/53 60%	19/52 37%	40/56 71%	21/55 38%	22/58 38%	23/35 66%	28/42 67%	24/56 43%	19/53 36%
Ag Biotechnology 2	11/36 31%	2/41 5%	2/45 4%	12/53 23%	6/52 12%	33/56 59%	13/55 24%	8/58 14%	19/35 54%	11/42 26%	12/56 21%	8/53 15%
Environmental Resources 3	5/36 14%	3/41 7%	4/45 9%	4/53 8%	9/52 17%	10/56 18%	12/55 22%	9/58 16%	6/35 17%	17/42 40%	12/56 21%	11/53 21%
Environmental Resources 4	1/36 3%	3/41 7%	3/45 7%	1/53 2%	1/52 2%	4/56 7%	2/55 4%	1/58 2%	2/35 6%	3/42 7%	2/56 4%	1/53 2%

\*\* Alignment pending

# Alignment attempted, but no correlation to academic course.

### **Extended Student Supervision**

Because of the production and marketing cycle of the agricultural industries, 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 appropriate 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. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

### **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.

### **Essential Skills**

Essential skills identified by the Division of Career and Adult Education have been integrated into the standards and benchmarks of this program. These skills represent the general knowledge and skills considered by industry to be essential for success in careers across all career clusters. Students preparing for a career served by this program at any level should be able to demonstrate these skills in the context of this program. A complete list of Essential Skills and links to instructional resources in support of these Essential Skills are published on the CTE Essential Skills page of the FL-DOE website ([http://www.fldoe.org/workforce/dwdframe/essential\\_skills.asp](http://www.fldoe.org/workforce/dwdframe/essential_skills.asp)).

### **Accommodations**

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's 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 postsecondary service provider. 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 Individual Educational Plan (IEP) served in Exceptional Student Education or 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 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).

### **Articulation**

For details on articulation agreements which correlate to programs and industry certifications refer to [http://www.fldoe.org/workforce/dwdframe/artic\\_frame.asp](http://www.fldoe.org/workforce/dwdframe/artic_frame.asp).

### **Bright Futures/Gold Seal Scholarship**

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. Eligibility requirements are available online at [https://www.osfaffelp.org/bfiehs/fnbpcm02\\_CCTMain.aspx](https://www.osfaffelp.org/bfiehs/fnbpcm02_CCTMain.aspx).

### **Fine Arts/Practical Arts Credit**

Many courses in CTE programs meet the Fine Arts/Practical Arts credit for high school graduation. A listing of approved CTE courses is published each year as a supplemental resource to the Course Code Directory (<http://www.fldoe.org/articulation/CCD/default.asp>).

### **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 Identify the historical, social, cultural and potential applications of biotechnology.
- 11.0 Conduct scientific investigation and apply results.
- 12.0 Demonstrate leadership, employability, communication and human relation skills.
- 13.0 Practice agricultural laboratory safety.
- 14.0 Demonstrate laboratory skills as applied to biotechnology.
- 15.0 Demonstrate the application of biotechnology to Agriculture, Food and Natural Resources (AFNR).
- 16.0 Demonstrate language arts knowledge and skills.
- 17.0 Demonstrate mathematics knowledge and skills.
- 18.0 Demonstrate science knowledge and skills.
- 19.0 Use oral and written communication skills in creating, expressing and interpreting information and ideas.
- 20.0 Solve problems using critical thinking skills, creativity and innovation.
- 21.0 Use information technology tools.
- 22.0 Collect and test samples used to determine soil characteristics.
- 23.0 Determine the quality and quantity of water resources.
- 24.0 Identify, classify and preserve samples and specimens of native flora and fauna.
- 25.0 Identify major ecosystems in Florida.
- 26.0 Collect, record and analyze data.
- 27.0 Demonstrate orienteering and map reading skills.
- 28.0 Research environmental issues.
- 29.0 Understand the management of lands.
- 30.0 Investigate the application of weather systems in the agricultural industry.
- 31.0 Practice sustainable agriculture.
- 32.0 Explain the relationship between agriculture and regulatory processes.
- 33.0 Identify environmental detriments to agriculture.
- 34.0 Describe the roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment.
- 35.0 Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance.
- 36.0 Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives.
- 37.0 Describe the importance of professional ethics and legal responsibilities.
- 38.0 Explain the importance of employability skill and entrepreneurship skills.
- 39.0 Demonstrate personal money-management concepts, procedures, and strategies.

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**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.

Standards included in this course of instruction have been aligned to the academic courses shown below. This table shows the number of aligned benchmarks, the total number of academic benchmarks, and the percentage of alignment.

Math		Science					
<b>Algebra 1</b>	9/36 25%	<b>Biology 1</b>	40/56 71%	<b>Anatomy/Physiology Honors</b>	32/53 60%	<b>Astronomy Solar/Galactic Honors</b>	19/52 37%
<b>Algebra 2</b>	#	<b>Chemistry 1</b>	21/55 38%	<b>Genetics</b>	23/35 66%	<b>Marine Science 1 Honors</b>	28/42 67%
<b>Geometry</b>	2/45 4%	<b>Physics 1</b>	19/53 36%	<b>Earth-Space Science</b>	22/58 38%	<b>Physical Science</b>	24/56 43%

\*\* Alignment pending

# Alignment attempted, but no correlation to academic course.

01.0 Describe the history of agriculture and its influence on the global economy--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:  
 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; MA.912.A.2.1; MA.912.S.3.1, 3; MA.912.A.10.1, 2, 3

- 01.01 Investigate the origin and history of agriculture and its relationship to science and technology.
- 01.02 Analyze the impact of agriculture on the local, state, national and global economy.
- 01.03 Identify significant career patterns/shifts in the history of the agricultural industry.
- 01.04 Examine the role of the agricultural industry in the interaction of population, food, energy, and the environment.

02.0 Practice agriscience safety skills and procedures--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:  
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; MA.912.A.2.1, 2; MA.912.S.3.1, 2

- 02.01 Identify the common causes and prevention of accidents in agriscience operations.
- 02.02 Demonstrate proper safety precautions and use of personal protective equipment.
- 02.03 Evaluate the food safety responsibilities that occur along the food supply chain.
- 02.04 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.
- 02.05 Identify proper disposal of hazardous waste materials and biohazards.
- 02.06 Describe emergency procedures.

03.0 Apply scientific and technological principles to agriscience issues--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:  
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; MA.912.S.3.1, 9; MA.912.S.4.2; MA.912.S.5.1, 2, 3, 4, 5; MA.912.S.1.2; MA.912.A.1.4; MA.912.A.10.1

- 03.01 Employ scientific measurement skills.
- 03.02 Demonstrate safe and effective use of common laboratory equipment.
- 03.03 Identify the parts and functions of plant and animal cells.
- 03.04 Describe the phases of cell reproduction.
- 03.05 Implement the scientific method and science process skills through the design and completion of an agriscience research project.
- 03.06 Interpret, analyze, and report data.
- 03.07 Investigate DNA and genetics applications in agriscience including the theory of probability.
- 03.08 Evaluate advances in biotechnology that impact agriculture (e.g. transgenic crops, biological controls, etc.).

04.0 Apply environmental principles to the agricultural industry--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:  
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.
- 04.02 Describe various ecosystems as they relate to the agriculture industry.
- 04.03 Describe the environmental resources (soil, water, air) necessary for agriculture production.
- 04.04 Identify regulatory agencies that impact agricultural practices.
- 04.05 Apply Best Management Practices that enhance the natural environment.
- 04.06 Identify conservation practices related to natural resources.

05.0 Investigate and utilize basic scientific skills and principles in plant science--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards: 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; MA.912.A.2.1; MA.912.S.3.2; MA.912.A.10.1; MA.912.D.7.2

- 05.01 Identify and describe the specializations within the plant science industry.
- 05.02 Categorize plants based on specific characteristics according to industry and scientific standards.
- 05.03 Examine the processes of plant growth including photosynthesis and respiration.
- 05.04 Identify the nutrients required for plant growth from the periodic table and explain their functions.
- 05.05 Analyze information from a fertilizer label.
- 05.06 Propagate and grow plants through sexual and/or asexual reproduction.
- 05.07 Investigate the impacts of various pests and propose solutions for their control.
- 05.08 Investigate the nature and properties of food, fiber, and by-products from plants.
- 05.09 Explore career opportunities in plant science.

06.0 Investigate and utilize basic scientific skills and principles in animal science--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards: 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; MA.912.D.7.2; MA.912.F.5.1, 2

- 06.01 Explain the economic importance of animals and the products obtained from animals.
- 06.02 Categorize animals according to use, type, breed, and scientific classification.
- 06.03 Illustrate correct terminologies for animal species and conditions (e.g. age, sex, etc.) within those species.
- 06.04 Compare basic internal and external anatomy of animals.
- 06.05 Demonstrate scientific practices in the management, health, safety, and technology of the animal agriculture.
- 06.06 Compare and contrast animal welfare issues.
- 06.07 Investigate the nature and properties of food, fiber, and by-products from animals.
- 06.08 Explore career opportunities in animal science.

07.0 Demonstrate the use of agriscience tools, equipment, and instruments--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards: SC.912.L.14.4; SC.912.P.12.2, 3, 4, 9; MA.912.A.1.4, 5; MA.912.A.2.1; MA.912.G.3.1; MA.912.G.8.6; MA.912.S.3.2; MA.912.G.2.5; MA.912.G.7.5; MA.912.A.5.1, 4

- 07.01 Select and demonstrate proper use of agriscience tools, equipment, and instruments.

- 07.02 Examine various physical science principles as applied in selected mechanical applications (e.g. levers, pulleys, hydraulics, and internal combustion).
- 07.03 Solve time, distance, area, volume, ratio, proportion, and percentage problems in agriscience.
- 07.04 Service and maintain agriscience equipment, instruments, facilities, and supplies.

08.0 Demonstrate agribusiness, employability and human relation skills--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:  
MA.912.A.1.4, 5; MA.912.S.1.1

- 08.01 Develop, implement, and maintain work based learning through Supervised Agricultural Experiences (SAE).
- 08.02 Utilize a record keeping system to collect, interpret, and analyze data.
- 08.03 Enhance oral communications through telephone, interview and presentation skills.
- 08.04 Enhance written communication by developing resumes and business letters.
- 08.05 Demonstrate interpersonal (nonverbal) communication skills.
- 08.06 Demonstrate good listening skills.

09.0 Apply leadership and citizenship skills--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:  
MA.912.D.7.2

- 09.01 Identify and describe leadership characteristics.
- 09.02 Identify opportunities to apply acquired leadership skills.
- 09.03 Identify and demonstrate ways to be an active citizen.
- 09.04 Participate in community based learning activities.
- 09.05 Demonstrate the ability to work cooperatively.
- 09.06 Conduct formal and informal meetings using correct parliamentary procedure skills.
- 09.07 Identify the opportunities for leadership development available through the National FFA Organization and/or professional organizations.

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**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.

Standards included in this course of instruction have been aligned to the academic courses shown below. This table shows the number of aligned benchmarks, the total number of academic benchmarks, and the percentage of alignment.

Math		Science					
<b>Algebra 1</b>	11/36 31%	<b>Biology 1</b>	33/56 59%	<b>Anatomy/Physiology Honors</b>	12/53 23%	<b>Astronomy Solar/Galactic Honors</b>	6/52 12%
<b>Algebra 2</b>	2/41 5%	<b>Chemistry 1</b>	13/55 24%	<b>Genetics</b>	19/35 54%	<b>Marine Science 1 Honors</b>	10/42 26%
<b>Geometry</b>	2/45 4%	<b>Physics 1</b>	8/53 15%	<b>Earth-Space Science</b>	8/58 14%	<b>Physical Science</b>	12/56 21%

\*\* Alignment pending

# Alignment attempted, but no correlation to academic course.

10.0 Identify the historical, social, cultural and potential applications of biotechnology--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:  
 SC.912.L.15.1, 2, 3, 5, 8, 14; SC.912.L.16.10; SC.912.L.17.13; SC.912.N.2.1, 2;  
 MA.912.A.2.2, 4, 13;

- 10.01 Define biotechnology and explore the historical impact on agriculture.
- 10.02 Explain the developmental progression of biotechnology.
- 10.03 Investigate current applications of biotechnology in agriculture.
- 10.04 Investigate current research in agricultural biotechnology.
- 10.05 Examine potential applications of biotechnology in agriculture and compare them with alternative approaches to improving agriculture.
- 10.06 Research emerging problems and issues associated with agricultural biotechnology.
- 10.07 Describe the role of agencies that regulate biotechnology.
- 10.08 Interpret the major regulatory issues related to biotechnology.
- 10.09 Explore ethical, legal and social biotechnology issues.
- 10.10 Evaluate the benefits and risks associated with biotechnology.

- 10.11 Investigate the emergence and evolution of biological organisms and their use in biotechnology.
- 10.12 Examine intellectual properties associated with biotechnology by defining their components.
- 10.13 Examine an ethical dilemma associated with biotechnology by identifying its components.

11.0 Conduct scientific investigation and apply results--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards: LA.912.2.23; LA.912.4.22; SC.912.N.3.1, 4; MA.912.A.2.1; MA.912.A.10.1, 2; MA.912.S.1.2; MA.912.S.3.2;

- 11.01 Discuss the differences between scientific laws and scientific theories.
- 11.02 Explain the process of scientific inquiry.
- 11.03 Analyze research being conducted in agricultural biotechnology.
- 11.04 Design an agricultural experiment using appropriate control measures.
- 11.05 Devise a system for recording data.
- 11.06 Collect and record data using SI units.
- 11.07 Summarize data and draw defensible conclusions.
- 11.08 Prepare a report on the experiment conducted.
- 11.09 Plan and conduct follow-up experiments using the scientific method.

12.0 Demonstrate leadership, employability, communication and human relation skills--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards: SC.912.N.1.1, 3, 5, 7; SC.912.N.2.2, 5; SC.912.N.4.1, 2; MA.912.A.1.1, 4;

- 12.01 Conduct group meetings using parliamentary procedure and public speaking skills.
- 12.02 Follow acceptable work habits, personal characteristics and hygiene habits for the biotechnology workplace.
- 12.03 Identify or demonstrate appropriate responses to criticism and coaching from employer, supervisor, or other persons.
- 12.04 Conduct a job search and identify advanced training opportunities and the requirements.
- 12.05 Prepare a resume.

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 properly.
- 13.03 Document safety training and practices using Material Safety Data Sheets (MSDS) and Occupational Safety and Health Administration (OSHA) standards.
- 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 Demonstrate laboratory skills as applied to biotechnology--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:  
SC.912.L.14.4, 6, 52; SC.912.L.16.1, 2, 3, 5, 9, 15, 16; SC.912.L.18. 4, 12;  
SC.912.P.8.7; MA.912.A.1.5, MA.912.S.1.2

- 14.01 Maintain and interpret biotechnology laboratory records.
- 14.02 Operate laboratory equipment and measurement devices.
- 14.03 Demonstrate aseptic techniques in the biotechnology laboratory.
- 14.04 Select an appropriate standard operating procedure for working with biological materials.
- 14.05 Prepare buffers, reagents, solutions and media.
- 14.06 Inventory biological and chemical materials, and maintain accurate records of supplies and expiration dates.
- 14.07 Isolate, maintain, quantify and store cell cultures.
- 14.08 Explain the molecular basis for heredity and the tools and techniques used in DNA and RNA manipulations.
- 14.09 Extract and purify DNA.
- 14.10 Perform protein separation techniques and interpret the results.
- 14.11 Describe how antibodies are formed and how they can be used in biotechnology applications.
- 14.12 Research and describe the use of biotechnology to detect microbes.

15.0 Demonstrate the application of biotechnology to Agriculture, Food and Natural Resources (AFNR)--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:  
SC.912.L.14.2; SC.912.L.15.13, 14, 15; SC.912.L.16.10; SC.912.L.17.2, 8, 11, 20;  
SC.912.L.18.1, 2, 3, 4, 6, 7, 8, 11; SC.912.P.8.12; MA.912.A.2.13;

- 15.01 Explain biological, social, agronomic and economic reasons for genetic modification of eukaryotes.
- 15.02 Differentiate the roles of carbohydrates, fats, and proteins in biotechnology applications.
- 15.03 Diagram the processes used to produce transgenic eukaryotes.
- 15.04 Describe enzymes, the changes they cause in foods and the physical and chemical parameters that affect enzymatic reactions.
- 15.05 Describe processes by which enzymes are produced through biotechnology.
- 15.06 Compare and contrast the use of natural organisms and genetically engineered organisms in the treatment of wastes.
- 15.07 Diagram the process by which organisms are genetically engineered for waste treatment.
- 15.08 Describe the benefits and risks associated with the use of biotechnology to increase productivity and improve quality of agricultural products.
- 15.09 Investigate and report on genetic engineering procedures used in the production of agricultural products.
- 15.10 Explain the functions of hormones in animals.
- 15.11 Describe the processes used to produce animal hormones from transgenic organisms.
- 15.12 Identify foods produced through fermentation.
- 15.13 Compare and contrast bioengineering and conventional pathways used in food processing.

- 15.14 Explain biomass and sources of biomass.
- 15.15 Assess the characteristics of biomass that make it useful for biofuels production.
- 15.16 Describe the process used in producing alcohol from biomass.
- 15.17 Diagram the process used in producing biodiesel from biomass.
- 15.18 Illustrate the process used in producing methane from biomass.
- 15.19 Describe the selective plant breeding process.
- 15.20 Assess the benefits, risks and opportunities associated with using biotechnology to promote animal health.
- 15.21 Describe the use of biotechnology in bioremediation.
- 15.22 Describe the processes involved in biotreatment of biological and chemical wastes.
- 15.23 Explain the global importance of biodiversity.
- 15.24 Explain the positive and negative impacts of agricultural practices on wild populations.
- 15.25 Explain how biotechnology tools can be used to monitor the effects of agricultural practices on wild populations.
- 15.26 Describe the processes used in the production of molecules for use in industrial applications.

16.0 Demonstrate language arts knowledge and skills--The students will be able to: AF2.0

This standard supports the following Next Generation Sunshine State Standards:  
SC.912.N.1.1; SC.912.N.3.5

- 16.01 Locate, comprehend and evaluate key elements of oral and written information. AF2.4
- 16.02 Draft, revise, and edit written documents using correct grammar, punctuation and vocabulary. AF2.5
- 16.03 Present information formally and informally for specific purposes and audiences. AF2.9

17.0 Demonstrate mathematics knowledge and skills--The students will be able to: AF3.0

This standard supports the following Next Generation Sunshine State Standards:  
SC.912.N.3.5; MA.912.A.1.4, 5; MA.912.A.2.2, 6, 7, 13; MA.912.A.3.2, 3;  
MA.912.A.10.1, 2; MA.912.D.4.1; MA.912.G.8.2, 3; MA.912.S.1.2; MA.912.S.3.2, 3;

- 17.01 Demonstrate knowledge of arithmetic operations. AF3.2
- 17.02 Construct charts/tables/graphs using functions and data. AF3.5
- 17.03 Analyze and apply data and measurements to solve problems and interpret documents. AF3.4

18.0 Demonstrate science knowledge and skills--The students will be able to: AF4.0

This standard supports the following Next Generation Sunshine State Standards:  
SC.912.N.1.1, 2, 3, 4, 4, 6, 7; MA.912.A.2.1; MA.912.A.3.1; MA.912.A.10.1, 2;  
MA.912.S.1.1, 2; MA.912.S.2.1; MA.912.S.3.2, 3;

- 18.01 Discuss the role of creativity in constructing scientific questions, methods and explanations. AF4.1

18.02 Formulate scientifically investigable questions, construct investigations, collect and evaluate data, and develop scientific recommendations based on findings. AF4.3

19.0 Use oral and written communication skills in creating, expressing and interpreting information and ideas--The students will be able to:

This standard supports the following Next Generation Sunshine State Standards: SC.912.N.1.1; MA.912.G.8.2, 3; MA.912.A.2.1, 2; MA.912.A.10.1;

- 19.01 Select and employ appropriate communication concepts and strategies to enhance oral and written communication in the workplace. CM1.0
- 19.02 Locate, organize and reference written information from various sources. CM3.0
- 19.03 Design, develop and deliver formal and informal presentations using appropriate media to engage and inform diverse audiences. CM5.0
- 19.04 Interpret verbal and nonverbal cues/behaviors that enhance communication. CM6.0
- 19.05 Apply active listening skills to obtain and clarify information. CM7.0
- 19.06 Develop and interpret tables and charts to support written and oral communications. CM8.0
- 19.07 Exhibit public relations skills that aid in achieving customer satisfaction. CM10.0

20.0 Solve problems using critical thinking skills, creativity and innovation--The students will be able to:

This standard supports the following Next Generation Sunshine State Standards: MA.912.A.10.1, 2; SC.912.N.1.1, 4, 5, 6, 7; SC.912.N.2.1, 2, 4, 5; SC.912.N.3.5; SC.912.N.4.1; MA.912.A.2.2, 13; MA.912.A.10.1; MA.912.S.2.1; MA.912.S.3.1;

- 20.01 Employ critical thinking skills independently and in teams to solve problems and make decisions. PS1.0
- 20.02 Employ critical thinking and interpersonal skills to resolve conflicts. PS2.0
- 20.03 Identify and document workplace performance goals and monitor progress toward those goals. PS3.0
- 20.04 Conduct technical research to gather information necessary for decision-making. PS4.0

21.0 Use information technology tools--The students will be able to:

This standard supports the following Next Generation Sunshine State Standards: MA.912.A.3.11, 12;

- 21.01 Use Personal Information Management (PIM) applications to increase workplace efficiency. IT1.0
- 21.02 Employ technological tools to expedite workflow including word processing, databases, reports, spreadsheets, multimedia presentations, electronic calendar, contacts, email, and internet applications. IT2.0
- 21.03 Employ computer operations applications to access, create, manage, integrate, and store information. IT3.0
- 21.04 Employ collaborative/groupware applications to facilitate group work. IT4.0

2012 - 2013

**Florida Department of Education  
Student Performance Standards**

**Course Title:** Environmental Resources 3  
**Course Number:** 8113010  
**Course Credit:** 1

**Course Description:**

This course is designed to develop competencies in the areas of water resources, native flora and fauna, Florida ecosystems, soil characteristics, and collecting, recording and analyzing data.

Standards included in this course of instruction have been aligned to the academic courses shown below. This table shows the number of aligned benchmarks, the total number of academic benchmarks, and the percentage of alignment.

Math		Science					
<b>Algebra 1</b>	5/36 14%	<b>Biology 1</b>	10/56 18%	<b>Anatomy/Physiology Honors</b>	4/53 8%	<b>Astronomy Solar/Galactic Honors</b>	9/52 17%
<b>Algebra 2</b>	3/41 7%	<b>Chemistry 1</b>	12/55 22%	<b>Genetics</b>	6/35 17%	<b>Marine Science 1 Honors</b>	17/42 40%
<b>Geometry</b>	4/45 9%	<b>Physics 1</b>	11/53 21%	<b>Earth-Space Science</b>	9/58 16%	<b>Physical Science</b>	12/56 21%

\*\* Alignment pending

# Alignment attempted, but no correlation to academic course.

22.0 Collect and test samples used to determine soil characteristics--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:  
 SC.912.L.17.10; SC.912.N.1.1, 3, 4, 5, 6; MA.912.A.3.11, 15; MA.912.A.8.3, 5;  
 MA.912.A.10.1; MA.912.S.3.2;

- 22.01 Collect soil samples from test area and complete soil data forms.
- 22.02 Determine soil pH using pH test kit.
- 22.03 Conduct soil, mineral and elemental analysis using soil test kit.
- 22.04 Determine and record texture, structure, temperature and color of each soil layer.
- 22.05 Construct a soil profile or soil pit.
- 22.06 Analyze soil data and write lab report.
- 22.07 Determine the effect of texture, density, and porosity on permeability/infiltration rates and seasonal high groundwater table.
- 22.08 Examine the relationship between soil texture, water movement and water holding capacity.
- 22.09 Determine land class capability utilizing resources, such as: NRCS County Soil Survey, using Geographic Information Systems or other resources.

23.0 Determine the quality and quantity of water resources--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards: SC.912.L.17.16; SC.912.N.1.1; MA.912.A.2.13; MA.912.A.3.2, 15; MA.912.S.3.2;

- 23.01 Determine water quality of groundwater, rivers, lakes, and spring water.
- 23.02 Determine stream flow.
- 23.03 Collect, store and label water samples from a representative test site.
- 23.04 Determine the quality of water samples by measuring for pH, turbidity, dissolved solids and dissolved oxygen.
- 23.05 Investigate water shed boundaries and drainage patterns.
- 23.06 Monitor water levels of rivers, streams, ponds and lakes.

24.0 Identify, classify and preserve samples and specimens of flora and fauna--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards: SC.912.L.17.7, 11, 12; SC.912.N.1.1

- 24.01 Identify invasive species and their impact on the environment.
- 24.02 Perform a comprehensive ecological study of a forest.
- 24.03 Identify native species and their range, habitat, and functions.
- 24.04 Identify threatened and endangered upland species, range, and habitat.
- 24.05 Demonstrate sample collection and preservation methods.

25.0 Identify major ecosystems in Florida--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards: SC.912.L.15.3; SC.912.L.17.1, 6, 7, 8, 9, 15, 16; MA.912.G.2.3, 5;

- 25.01 Identify common plant and animal species of the major ecosystems.
- 25.02 Identify the boundary between uplands and wetlands using resources such as: aerial photographs, soils, plants, and/or hydrology.
- 25.03 Identify environmental factors affecting Florida's major ecosystems.
- 25.04 Identify threatened and endangered plant and animal species of specific habitats.
- 25.05 Analyze political, biological, economical, and sociological impacts on managing ecosystems.
- 25.06 Trace the effects of pollution through an ecosystem.
- 25.07 Demonstrate knowledge of biodegradable and non-biodegradable products.
- 25.08 Explain how lack of predation contributes to uncontrollable exotic populations.
- 25.09 Explain how exotic populations stress native.

26.0 Collect, record and analyze data--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards: LA.910.2.2.3; LA.910.4.2.2; MA.912.A.1.5; MA.912.A.2.1, 2; MA.912.A.3.1; MA.912.A.10.1, 2; MA.912.S.1.2; MA.912.S.1.1, 2; MA.912.S.2.1; MA.912.S.3.2, 3; SC.912.N.1.1, 2, 3, 6;

- 26.01 Maintain lab journal.
- 26.02 Construct data tables.
- 26.03 Compile data.

- 26.04 Make inferences from data.
- 26.05 Use word processing, databases, computer graphics, statistics programs, spreadsheets, Internet, and Geographic Information Systems (GIS).

27.0 Demonstrate orienteering and map reading skills--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:  
MA.912.G.2.3, 5; MA.912.G.5.4; MA.912.S.1.2; MA.912.S.3.2; MA.912.T.2.1;

- 27.01 Interpret legal land descriptions.
- 27.02 Interpret current and historical aerial photography for land cover and land use applications.
- 27.03 Explain topographic map symbols and legends.
- 27.04 Measure acreage on maps.
- 27.05 Determine location and other information from maps, using technology such as Global Positioning System (GPS) and compass.
- 27.06 Measure elevation in the field using survey equipment.

28.0 Research environmental issues--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:  
MA.912.S.3.1, 2; SC.912.L.17.13, 14, 16; SC.912.N.1.1, 2, 3, 4, 5, 6, 7

- 28.01 Conduct an environmental issue investigation.
- 28.02 Develop an action plan based on investigation.
- 28.03 Prepare and present oral and written presentation.

2012 - 2013

**Florida Department of Education  
Student Performance Standards**

**Course Title:** Environmental Resources 4  
**Course Number:** 8113020  
**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.

Standards included in this course of instruction have been aligned to the academic courses shown below. This table shows the number of aligned benchmarks, the total number of academic benchmarks, and the percentage of alignment.

Math		Science					
<b>Algebra 1</b>	1/36 3%	<b>Biology 1</b>	4/56 7%	<b>Anatomy/Physiology Honors</b>	1/53 2%	<b>Astronomy Solar/Galactic Honors</b>	1/52 2%
<b>Algebra 2</b>	3/41 7%	<b>Chemistry 1</b>	2/55 4%	<b>Genetics</b>	2/35 6%	<b>Marine Science 1 Honors</b>	3/42 7%
<b>Geometry</b>	3/45 7%	<b>Physics 1</b>	1/53 2%	<b>Earth-Space Science</b>	1/58 2%	<b>Physical Science</b>	2/56 4%

\*\* Alignment pending

# Alignment attempted, but no correlation to academic course.

**29.0 Understand the management of lands--The student will be able to:**

This standard supports the following Next Generation Sunshine State Standards:  
 MA.912.G.2.3, 5, 7; SC.912.L.17.13, 18

- 29.01 Describe the management of federal lands.
- 29.02 Describe the management of state lands.
- 29.03 Describe the management of local lands.
- 29.04 Describe the management of private lands.
- 29.05 Demonstrate how burning of vegetation releases nutrients into the soil.
- 29.06 Investigate the merits of growing season burns versus non-growing season burns.
- 29.07 Demonstrate safety precautions for controlled burns and legal ramifications.
- 29.08 Identify different types of buffers and riparian zones and their applications.
- 29.09 Determine the applications and benefits of buffers.
- 29.10 Develop and discuss theoretical strategies for managing/ eradicating exotic species.

**30.0 Investigate the application of weather systems in the agricultural industry--The student will be able to:**

This standard supports the following Next Generation Sunshine State Standards:  
MA.912.A.10.1; MA.912.S.3.2; SC.912.L.17.8; SC.912.N.1.1

- 30.01 Interpret a weather map.
- 30.02 Obtain and record measurements of local rainfall, temperature, air pressure, relative humidity, cloud cover and type, and wind speed, using resources such as Florida Automated Weather Network.
- 30.03 Demonstrate the use of a hurricane-tracking chart.
- 30.04 Analyze the impact of weather in regards to risk management.

31.0 Practice sustainable agriculture--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:  
MA.912.S.1.2; MA.912.S.3.2; SC.912.L.17.12, 13, 14, 20

- 31.01 Describe why it is important to sustain domestic agriculture.
- 31.02 Explain international issues affecting domestic agriculture.
- 31.03 Apply principles of nutrient, water, and waste management to environmental problems.
- 31.04 Compare practices that either enhance or hinder the sustainability of agriculture.
- 31.05 Analyze the benefit of recent technological advances on the agricultural industry.
- 31.06 Identify and monitor erosion hazards and environmental quality.
- 31.07 Differentiate between point and non-point sources of pollution.
- 31.08 Describe Best Management Practices (BMP) and their significance.
- 31.09 Identify Best Management Practices relevant in your area.

32.0 Explain the relationship between agriculture and regulatory processes--The student will be able to

- 32.01 Identify environmental regulations and their impacts to agriculture.
- 32.02 Identify regulatory agencies that govern agriculture activities.
- 32.03 Compare alternative programs to regulations (Examples: local partnerships, agricultural BMPs and others).

33.0 Identify environmental detriments to agriculture--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:  
MA.912.A.8.3, 5, 7

- 33.01 Identify diseases and pests that impact agriculture production.
- 33.02 Explain methods to control and eradicate diseases and pests.
- 33.03 Describe isolation or quarantine methods to minimize spread of diseases and pests.

34.0 Describe the roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment--The students will be able to:

- 34.01 Describe the nature and types of business organizations. SY1.0
- 34.02 Explain the effect of key organizational systems on performance and quality.
- 34.03 List and describe quality control systems and/or practices common to the workplace. SY2.0

34.04 Explain the impact of the global economy on business organizations.

35.0 Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance--The students will be able to:

This standard supports the following Next Generation Sunshine State Standards:  
SC.912.E.5.10; SC.912.E.6.4; SC.912.E.7.8; SC.912.N.1.1, 4, 7;

35.01 Describe personal and jobsite safety rules and regulations that maintain safe and healthy work environments. SHE1.0

35.02 Explain emergency procedures to follow in response to workplace accidents.

35.03 Create a disaster and/or emergency response plan. SHE2.0

36.0 Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives--The students will be able to:

This standard supports the following Next Generation Sunshine State Standards:  
SC.912.N.1.1, 2, 3, 4, 5, 6, 7;

36.01 Employ leadership skills to accomplish organizational goals and objectives. LT1.0

36.02 Establish and maintain effective working relationships with others in order to accomplish objectives and tasks. LT3.0

36.03 Conduct and participate in meetings to accomplish work tasks. LT4.0

36.04 Employ mentoring skills to inspire and teach others. LT5.0

37.0 Describe the importance of professional ethics and legal responsibilities--The students will be able to:

This standard supports the following Next Generation Sunshine State Standards:  
SC.912.N.1.3, 4, 7; SC.912.N.2.2, 4, 5

37.01 Evaluate and justify decisions based on ethical reasoning. ELR1.0

37.02 Evaluate alternative responses to workplace situations based on personal, professional, ethical, legal responsibilities, and employer policies. ELR1.1

37.03 Identify and explain personal and long-term consequences of unethical or illegal behaviors in the workplace. ELR1.2

37.04 Interpret and explain written organizational policies and procedures. ELR2.0

38.0 Explain the importance of employability skill and entrepreneurship skills--The students will be able to:

This standard supports the following Next Generation Sunshine State Standards:  
SC.912.N.1.1; SC.912.N.2.4, 5;

38.01 Identify and demonstrate positive work behaviors needed to be employable. ECD1.0

38.02 Develop personal career plan that includes goals, objectives, and strategies. ECD2.0

38.03 Examine licensing, certification, and industry credentialing requirements. ECD3.0

- 38.04 Maintain a career portfolio to document knowledge, skills, and experience. ECD5.0
- 38.05 Evaluate and compare employment opportunities that match career goals. ECD6.0
- 38.06 Identify and exhibit traits for retaining employment. ECD7.0
- 38.07 Identify opportunities and research requirements for career advancement. ECD8.0
- 38.08 Research the benefits of ongoing professional development. ECD9.0
- 38.09 Examine and describe entrepreneurship opportunities as a career planning option. ECD10.0

39.0 Demonstrate personal money-management concepts, procedures, and strategies--The students will be able to:

This standard supports the following Next Generation Sunshine State Standards: SC.912.N.1.1, 5, 6, 7; SC.912.N.2.1, 2, 4, 5; SC.912.N.3.5; MA.912.A.1.1, 2, 3, 4, 5, 7, 13; MA.912.A.3.11, MA.912.A.10.1, 2, 3; MA.912.D.7.2; MA.912.F.3.6, 14; MA.912.F.4.1, 2, 3, 8, 10, 11, 12, 14; LA.910.3.1.3

- 39.01 Identify and describe the services and legal responsibilities of financial institutions. FL2.0
- 39.02 Describe the effect of money management on personal and career goals. FL3.0
- 39.03 Develop a personal budget and financial goals. FL3.1
- 39.04 Complete financial instruments for making deposits and withdrawals. FL3.2
- 39.05 Maintain financial records. FL3.3
- 39.06 Read and reconcile financial statements. FL3.4
- 39.07 Research, compare and contrast investment opportunities.