

2012 - 2013

**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	8112000
CIP Number	0101030300
Grade Level	9-12, 30, 31
Standard Length	3 credits
Teacher Certification	AGRICULTUR 1 @2
CTSO	FFA
SOC Codes (all applicable)	45-2093
Facility Code	203 http://www.fldoe.org/edfacil/sref.asp (State Requirements for Educational Facilities)
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Industry Certifications	http://www.fldoe.org/workforce/fcpea/default.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

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 aquaculture sector 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.

Program Structure

This program is a planned sequence of instruction consisting of three courses and 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	45-2093	3
	8112010	Aquaculture 2	1 credit		2
	8112020	Aquaculture 3	1 credit		2

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%
Aquaculture 2	5/36 14%	1/41 2%	4/45 9%	38/53 72%	27/52 52%	50/56 89%	30/55 55%	21/58 36%	24/35 66%	36/42 86%	35/56 63%	30/53 57%
Aquaculture 3	5/36 14%	#	4/45 9%	22/53 42%	28/52 54%	35/56 63%	35/55 67%	30/58 52%	20/35 57%	36/42 86%	40/56 71%	34/53 64%

** Alignment pending

Alignment attempted, but no correlation to academic course.

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).

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.

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.

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 Describe the nature and origin of and career opportunities in aquaculture.
- 11.0 Demonstrate the management and environmentally sound use of water and land resources.
- 12.0 Apply biological principles to the reproduction, identification and growth of aquaculture species.

- 13.0 Safely operate, maintain and repair machinery, equipment and facilities used in aquaculture.
- 14.0 Assist in the propagation and culture of an aquaculture organism.
- 15.0 Describe procedures used in locating markets and marketing aquaculture products.
- 16.0 Apply business management skills in managing an aquaculture operation.
- 17.0 Identify applicable local, state, and federal rules and regulations and assistance programs.
- 18.0 Demonstrate leadership, employability, communications and human relations skills.
- 19.0 Demonstrate language arts knowledge and skills.
- 20.0 Demonstrate mathematics knowledge and skills.
- 21.0 Demonstrate science knowledge and skills.
- 22.0 Use oral and written communication skills in creating, expressing and interpreting information and ideas.
- 23.0 Solve problems using critical thinking skills, creativity and innovation.
- 24.0 Use information technology tools.
- 25.0 Assist in producing aquaculture species in one or more of the following: ponds, cages, tanks, raceways, net pens.
- 26.0 Control disease, pest and water quality problems.
- 27.0 Assist in harvesting and processing aquaculture species.
- 28.0 Describe the roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment.
- 29.0 Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance.
- 30.0 Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives.
- 31.0 Describe the importance of professional ethics and legal responsibilities.
- 32.0 Explain the importance of employability skill and entrepreneurship skills.
- 33.0 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					
Algebra 1	9/36 25%	Biology 1	40/56 71%	Anatomy/Physiology Honors	32/53 60%	Astronomy Solar/Galactic Honors	19/52 37%
Algebra 2	#	Chemistry 1	21/55 38%	Genetics	23/35 66%	Marine Science 1 Honors	28/42 67%
Geometry	2/45 4%	Physics 1	19/53 36%	Earth-Space Science	22/58 38%	Physical Science	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: 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.

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					
Algebra 1	5/36 25%	Biology 1	50/56 89%	Anatomy/Physiology Honors	38/53 72%	Astronomy Solar/Galactic Honors	27/52 52%
Algebra 2	1/41 2%	Chemistry 1	30/55 55%	Genetics	24/35 66%	Marine Science 1 Honors	36/42 86%
Geometry	4/45 9%	Physics 1	30/53 57%	Earth-Space Science	21/58 36%	Physical Science	35/56 63%

** Alignment pending

Alignment attempted, but no correlation to academic course.

10.0 Describe the nature and origin of and career opportunities in aquaculture--The students 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.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;

- 10.01 List the definition of aquaculture as defined by the Florida Division of Aquaculture.
- 10.02 Compare and contrast aquaculture and fisheries.
- 10.03 List and describe major global aquatic crops and animals.
- 10.04 Explain the history of aquaculture.
- 10.05 List and describe aquaculture related occupations.
- 10.06 Determine the educational requirements and experience needed to enter and advance in aquaculture occupations.

11.0 Demonstrate the management and environmentally sound use of water and land resources--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards: MA.912.A.2.13; MA.912.A.10.1, 2; MA.912.G.8.3; MA.912.S.1.2; MA.912.S.3.2; HE.912.C.1.3; HE.912.C.1.8; LA.1112.2.2.3; LA.1112.4.2.2, 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

- 11.01 Identify and describe the physical and chemical characteristics of water for use in aquaculture.
- 11.02 Explain how changes in water affect aquatic life.
- 11.03 Be able to measure the dissolved oxygen, pH, total ammonia nitrogen (TAN), unionized ammonia, nitrite, nitrate, salinity, hardness, alkalinity, turbidity, chlorine/chloramine and carbon dioxide in a water system
- 11.04 Explain how the nitrogen cycle is related to maintaining healthy fish.

12.0 Apply biological principles to the reproduction, identification and growth of aquaculture species--The students will be able to:

This standard supports the following Next Generation Sunshine State Standards: MA.912.S.1.2; MA.912.S.3.2; HE.912.C.1.3; HE.912.C.1.8; LA.1112.2.2.3; LA.1112.4.2.2; SC.912.E.5.8; 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

- 12.01 Define morphology, anatomy, and physiology.
- 12.02 Identify and describe the anatomy and physiology of crustaceans.
- 12.03 Identify and describe the anatomy and physiology of mollusks.
- 12.04 Identify and describe the anatomy and physiology of fish.
- 12.05 Identify and describe the basic morphology of aquatic macroalgae and microalgae.
- 12.06 List and describe important characteristics in choosing a production species.
- 12.07 Identify and describe common aquaculture organism by family, genus and species.
- 12.08 List and describe the chemical and physical factors which influence the growth of aquatic fauna and flora.
- 12.09 Identify aquaculture species of commercial importance in your area.
- 12.10 Describe necessary biosecurity measures for various aquaculture facilities.

13.0 Safely operate, maintain and repair machinery, equipment and facilities used in aquaculture --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; HE.912.C.1.3; HE.912.C.1.8; LA.1112.2.2.3; LA.1112.4.2.2; 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

- 13.01 Recognize and observe safety practices necessary in carrying out aquaculture activities.

- 13.02 Inspect, maintain and perform basic repairs on aquaculture machinery, equipment and facilities.
- 13.03 Safely operate aquaculture machinery and equipment.
- 13.04 Discuss the safety and maintenance of a re-circulating aquaculture system (RAS) including biological, chemical, and mechanical filtration, degassing, sterilization, and foam fractionation.

14.0 Assist in the propagation and culture of an aquaculture organism. --The student will be able to:

This standard supports the following Next Generation Sunshine State Standards: HE.912.C.1.3; HE.912.C.1.8; LA.1112.2.2.3; LA.1112.4.2.2; MA.912.S.1.2; MA.912.S.3.2; SC.912.L.14.1, 6, 32, 33, 35, 41; SC.912.L.15.12, 13, 15; SC.912.L.16.1, 2, 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;

- 14.01 Identify/describe facilities used in a grow-out operation.
- 14.02 List sources of aquaculture organisms and how they are produced.
- 14.03 Determine the purpose and functions of a hatchery.
- 14.04 Describe and contrast the reproductive anatomy of aquaculture organisms.
- 14.05 Describe and contrast types of spawning exhibited by aquaculture organisms.
- 14.06 Discuss proper broodstock conditioning and spawning techniques for aquaculture organisms.
- 14.07 Discuss proper grow-out techniques for aquaculture organisms.

15.0 Describe procedures used in locating markets and marketing aquaculture products--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards: 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

- 15.01 Identify possible market outlets for aquaculture products.
- 15.02 Identify the steps in securing a specific market outlet for a given species.
- 15.03 Describe the product characteristics of a marketable product.

16.0 Apply business management skills in managing an aquaculture operation--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards: MA.912.A.2.13; MA.912.A.10.1, 2; MA.912.D.4.1; MA.912.F.4.3; MA.912.S.3.2

- 16.01 Identify and list functions in the management process.
- 16.02 Demonstrate basic bookkeeping skills.
- 16.03 Complete Supervised Agricultural Experience (SAE) records.

17.0 Identify applicable local, state and federal rules, regulations and assistance programs--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
HE.912.C.1.3; HE.912.C.1.8; LA.1112.2.2.3; LA.1112.4.2.2; MA.912.S.1.2;
MA.912.S.3.2; SC.912.L.17.11, 12, 13, 14, 15, 16, 17; SC.912.N.4.1, 2

- 17.01 Identify and observe laws and regulations affecting the industry in the local area.
- 17.02 Describe process to obtain required permits, licenses, leases, etc. for production and marketing.
- 17.03 Identify and list agencies regulating the industry and their functions.
- 17.04 Identify and list government assistance programs available to the industry.

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

This standard supports the following Next Generation Sunshine State Standards:
SC.912.N.1.7; MA.912.A.1.1, 4;

- 18.01 Conduct group meetings, using parliamentary procedure and public-speaking skills.
- 18.02 Identify acceptable work habits (ethics) and desired personal characteristics.
- 18.03 Demonstrate acceptable employee-hygiene habits.
- 18.04 Secure information about a job.
- 18.05 Complete a job application.

19.0 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

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

20.0 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; MA.912.G.8.3; MA.912.S.1.2;
MA.912.S.3.2, 3;

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

21.0 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.912.3.1; MA.912.A.10.1, 2;
MA.912.S.1.1, 2; MA.912.S.2.1; MA.912.S.3.2, 3;

- 21.01 Discuss the role of creativity in constructing scientific questions, methods and explanations. AF4.1
- 21.02 Formulate scientifically investigable questions, construct investigations, collect and evaluate data, and develop scientific recommendations based on findings. AF4.3

22.0 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.G8.2, 3; MA.912.A.2.1, 2; MA.912.A.10.1;

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

23.0 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;

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

24.0 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;

- 24.01 Use Personal Information Management (PIM) applications to increase workplace efficiency. IT1.0

- 24.02 Employ technological tools to expedite workflow including word processing, databases, reports, spreadsheets, multimedia presentations, electronic calendar, contacts, email, and internet applications. IT2.0
- 24.03 Employ computer operations applications to access, create, manage, integrate, and store information. IT3.0
- 24.04 Employ collaborative/groupware applications to facilitate group work. IT4.0

2012 - 2013

**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.

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					
Algebra 1	5/36 14%	Biology 1	35/56 63%	Anatomy/Physiology Honors	22/53 42%	Astronomy Solar/Galactic Honors	28/52 54%
Algebra 2	#	Chemistry 1	35/55 37%	Genetics	20/35 57%	Marine Science 1 Honors	36/42 86%
Geometry	4/45 9%	Physics 1	34/53 34%	Earth-Space Science	30/58 52%	Physical Science	40/56 71%

** Alignment pending

Alignment attempted, but no correlation to academic course.

11.0 Demonstrate the management and environmentally sound use of water and land resources--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
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;
MA.912.A.3.9; MA.912.F.3.15; MA.912.G.7.5, 7; MA.912.G.8.3

- 11.05 Calculate volume in circular, rectangular and irregular shaped water structures.
- 11.06 Identify and explain point and non-point pollution management associated with aquaculture.
- 11.07 Determine soil types, land slope and other factors to consider in choosing a location for an aquaculture operation.
- 11.08 Discuss Florida Department of Agriculture and Consumer Services (FDACS) Best Management Practices (BMP) for managing water usage and aquaculture affluent.
- 11.09 Discuss different stages of construction of ponds and/or other aquaculture production facilities.
- 11.10 Discuss the advantages and disadvantages of hydroponics and aquaponics.

- 14.0 Assist in the propagation and culture of an aquaculture organism.--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards: 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;

- 14.08 Identify and describe the methods of reproducing aquaculture organisms.
- 14.05 Identify and describe the hatchery facilities used in aquaculture.
- 14.06 Select a method of producing seed for a selected species.
- 14.07 List and explain the process for hatching eggs in different aquaculture organisms.
- 14.08 Determine the types and sizes of feeds to grow different life stages of aquaculture organisms.
- 14.09 Discuss the proper methods for harvesting, grading and transporting seed, fry and juvenile aquaculture organisms.

- 15.0 Describe procedures used in locating markets and marketing aquaculture products.--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards: 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; MA.912.A.2.13; MA.912.A.3.2

- 15.04 Develop a marketing plan for an aquaculture product.
- 15.05 Determine laws and regulations involved in transporting and marketing aquaculture organisms.
- 15.06 Market aquaculture products.

- 16.0 Apply business management skills in managing an aquaculture operation.--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards: 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; MA.912.A.2.13; MA.912.A.3.2; MA.912.A.10.1, 2; MA.912.S.3.2

- 16.04 Determine cost of production/harvesting and profitability of different systems.
- 16.05 Determine procedures and costs for acquiring the land/water, machinery, equipment structures, etc., needed for an operation specified by the instructor.
- 16.06 Complete forms related to (a) land purchase, (b) water leases, (c) permits, (d) licenses, (e) financial loans, (f) insurance, (g) others specified by the instructor.
- 16.07 Keep records related to: (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, (h) others specified by instructor.
- 16.08 Manage a production/harvesting system.
- 16.09 Complete Supervised Occupational Experienced (SAE) records.

18.0 Demonstrate leadership, employability, communication, and human relations 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;

- 18.06 Demonstrate competence in job-interview techniques.
- 18.07 Demonstrate proper office procedures.
- 18.08 Demonstrate appropriate response to criticism from employer, supervisor, or other persons in the workplace.
- 18.09 Demonstrate knowledge of how to appropriately make a career change, including resigning from a job.
- 18.10 Write a resume.

25.0 Assist in producing aquaculture species in one or more of the following: pond, cage, tank, raceway, net pen--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
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;
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; MA.912.A.3.2

- 25.01 Identify the types of growing systems and important factors in their selection, design and use.
- 25.02 Determine economic factors to consider in choosing a system for commercial production.
- 25.03 Identify and describe facility construction and site requirements.
- 25.04 Select species for a specific culture facility.
- 25.05 Determine feeding methods and calculate feeding rates for an aquaculture organism.
- 25.06 Assist in managing water quality in one or more production systems.

26.0 Control disease, pest and water quality problems--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards:
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; MA.912.G.8.2, 3;

- 26.01 Identify major diseases of several locally important commercial species and list different methods of prevention and treatment.
- 26.02 Identify major pests of several locally important commercial species and list recommended control methods.
- 26.03 Describe methods of prevention, treatment and control of the major diseases and pests previously identified.
- 26.04 Identify water quality problems.
- 26.05 Determine water quality parameters and describe corrective action where needed.

27.0 Assist in harvesting and processing aquaculture species--The student will be able to:

This standard supports the following Next Generation Sunshine State Standards: SC.912.E.5.8; SC.912.E.7.1, 2, 3, 4, 5; SC.912.L.14.4, 16, 19, 53; SC.912.L.17.1, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19; SC.912.L.18.7, 8, 9, 12; SC.912.N.1.1, 4; SC.912.N.2.4, 5; SC.912.N.3.5; SC.912.N.4.1, 2; SC.912.P.10.1, 3, 4, 5, 6, 7, 8, 9, 18; SC.912.P.12.2, 3, 4, 5, 6, 9, 12, 13;

- 27.01 Recognize and observe safety and sanitary practices including biosecurity in harvesting and processing aquaculture organisms.
- 27.02 Determine harvesting practices recommended for aquaculture organisms.
- 27.03 Determine equipment, labor, financial and legal requirements for harvesting aquaculture organisms.
- 27.04 Harvest aquaculture organisms using recommended practices.
- 27.05 Determine processing and packaging practices recommended for aquaculture organisms.
- 27.06 Determine equipment, labor, financial and legal requirements for processing and packaging aquaculture organisms.
- 27.07 Process and/or package aquaculture organisms using recommended practices.
- 27.08 Compare and contrast methods for shipping aquaculture organisms.

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

This standard supports the following Next Generation Sunshine State Standards: SC.912.E.7.7, 9; SC.912.L.17.11; SC.912.N.1.1, 4; SC.912.N.2.2; MA.912.A.10.1; MA.912.A.8.1, 7;

- 28.01 Describe the nature and types of business organizations. SY1.0
- 28.02 Explain the effect of key organizational systems on performance and quality.
- 28.03 List and describe quality control systems and/or practices common to the workplace. SY2.0
- 28.04 Explain the impact of the global economy on business organizations

29.0 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;

- 29.01 Describe personal and jobsite safety rules and regulations that maintain safe and healthy work environments. SHE1.0
- 29.02 Explain emergency procedures to follow in response to workplace accidents.
- 29.03 Create a disaster and/or emergency response plan. SHE2.0

30.0 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

- 30.01 Employ leadership skills to accomplish organizational goals and objectives. LT1.0
- 30.02 Establish and maintain effective working relationships with others in order to accomplish objectives and tasks. LT3.0
- 30.03 Conduct and participate in meetings to accomplish work tasks. LT4.0
- 30.04 Employ mentoring skills to inspire and teach others. LT5.0

31.0 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

- 31.01 Evaluate and justify decisions based on ethical reasoning. ELR1.0
- 31.02 Evaluate alternative responses to workplace situations based on personal, professional, ethical, legal responsibilities, and employer policies. ELR1.1
- 31.03 Identify and explain personal and long-term consequences of unethical or illegal behaviors in the workplace. ELR1.2
- 31.04 Interpret and explain written organizational policies and procedures. ELR2.0

32.0 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;

- 32.01 Identify and demonstrate positive work behaviors needed to be employable. ECD1.0
- 32.02 Develop personal career plan that includes goals, objectives, and strategies. ECD2.0
- 32.03 Examine licensing, certification, and industry credentialing requirements. ECD3.0
- 32.04 Maintain a career portfolio to document knowledge, skills, and experience. ECD5.0
- 32.05 Evaluate and compare employment opportunities that match career goals. ECD6.0
- 32.06 Identify and exhibit traits for retaining employment. ECD7.0
- 32.07 Identify opportunities and research requirements for career advancement. ECD8.0
- 32.08 Research the benefits of ongoing professional development. ECD9.0
- 32.09 Examine and describe entrepreneurship opportunities as a career planning option. ECD10.0

33.0 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.910.3.13

- 33.01 Identify and describe the services and legal responsibilities of financial institutions. FL2.0
- 33.02 Describe the effect of money management on personal and career goals. FL3.0
- 33.03 Develop a personal budget and financial goals. FL3.1
- 33.04 Complete financial instruments for making deposits and withdrawals. FL3.2
- 33.05 Maintain financial records. FL3.3
- 33.06 Read and reconcile financial statements. FL3.4
- 33.07 Research, compare and contrast investment opportunities.