

**Florida Department of Education
CLUSTER CURRICULUM FRAMEWORK**

Cluster Title: Natural Resources Science
Cluster Type: Job Preparatory
Occupational Area: Agriscience and Natural Resources
Components: Two Programs, One Core, and Three Occupational Completion Points

	Secondary	PSAV
Grade Level	9-12, 30, 31	30, 31
Facility Code	203	203
CTSO	FFA	PAS
Coop Method	Yes	Yes
Apprenticeship	Yes	Yes

- I. **PURPOSE:** The purpose of the programs in this cluster is to prepare students for employment or advanced training in the natural resources industry.

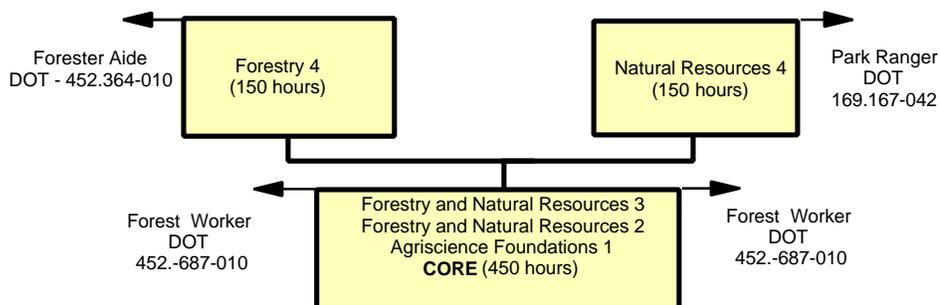
This cluster of programs focuses on broad, transferable skills, stresses the understanding of all aspects of the natural resources industry, and demonstrates elements of the industry such as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

- II. **CLUSTER STRUCTURE:** This cluster is a planned sequence of instruction consisting of two programs with one common core and three occupational completion points. The recommended sequence allows students to complete specified portions of the program for employment or to remain for advanced training. A student who completes the applicable competencies at any occupational completion point may either continue with the training program or terminate as an occupational completer.

It is recommended that students complete the core or demonstrate a mastery of student performance standards contained in the core before advancing to the course(s) in the next level of either of the programs, Forestry or Natural Resources.

The following diagram illustrates the **CLUSTER STRUCTURE:**

NATURAL RESOURCES SCIENCES CLUSTER



At the secondary level, this cluster consists of the following courses, which include the core:

FORESTRY PROGRAM - 3 secondary credits

CORE

- 8106810 - Agriscience Foundations 1
- 8118310 - Forestry and Natural Resources 2
- 8118320 - Forestry and Natural Resources 3

- 8118330 - Forestry 4

NATURAL RESOURCES PROGRAM - 4 secondary credits

CORE

- 8106810 - Agriscience Foundations 1
- 8118310 - Forestry and Natural Resources 2
- 8118320 - Forestry and Natural Resources 3

- 8112110 - Natural Resources 4

- III. **SPECIAL NOTE:** The FFA (for secondary) and the National Postsecondary Agricultural Student Organization (for postsecondary) are the appropriate Career Technical Student Organizations for providing leadership training and for reinforcing specific vocational skills. Career Technical Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, FAC.

Classroom, shop, and laboratory activities are an integral part of this cluster. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes found in the industry. Equipment and supplies should be provided to enhance hands-on experiences for students in their chosen occupation. A generic equipment list is available for the programs in this cluster.

The programs in this cluster may be offered in postsecondary adult vocational (PSAV) courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

Cooperative training - OJT is appropriate for this program. Whenever cooperative training - OJT is offered, the following are required for each student: a training plan, signed by the student, teacher, and employer, which includes instructional objectives and a list of on-the-job and in-school learning experiences; a workstation that reflects equipment, skills, and tasks that are relevant to the occupation which the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade levels required for postsecondary adult vocational students to exit the programs in this cluster are listed before the intended outcomes for each program. These grade-level numbers correspond to grade-equivalent scores obtained on one of the state-designated basic-skills examinations. If a student does not meet the basic-skills level required for completion of the program, remediation should be provided concurrently in Vocational Instructional Preparation (VPI). Please refer to the Rule for exemptions.

When a secondary student with a disability is enrolled in a vocational class with modifications to the curriculum framework, the particular outcomes and student performance standards which the student must master to earn credit must be specified on an individual basis. The job or jobs for which the student is being trained should be reflected in the student's desired post school outcome statement on the Transition Individual Educational Plan (Transition IEP).

SCANS Competencies: To accomplish the Secretary's Commission on Achieving Necessary Skills (SCANS) competencies, instructional strategies for this cluster must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate methods to improve students' personal qualities and higher-order thinking skills.

Florida Department of Education
 INTENDED OUTCOMES

Program Title: Forestry

	Secondary	PSAV
Program Number	8118300	A010314
CIP Number	0103.049901	0103.049901
Grade Level	9-12, 30, 31	30, 31
Standard Length	4 credits	600 hours
Certification	VOC AGRI @4 FORESTRY #7 AGRI @4 AGRICULTUR 1 @2 AGRI RES #7	VOC AGRI @4 FORESTRY @7 G AGRI @2 @4 AGRICULTUR 1 @2 AGRI RES @7 G
Basic-Skills Grade Level		
Math		9
Language		9
Reading		9

INTENDED OUTCOMES: After successfully completing the appropriate outcomes for each occupational completion point of this program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE A

FOREST WORKER - DOT Code 452.687-010

- 01.0 Describe the socioeconomic role of the agricultural industry.
- 02.0 Apply scientific and technological principles to the agricultural industry.
- 03.0 Practice agricultural safety.
- 04.0 Demonstrate the use of tools, equipment, and instruments in the agricultural industry.
- 05.0 Describe the principles of integrated pest management (IPM).
- 06.0 Describe the principles of plant and/or animal growth and reproduction.
- 07.0 Apply business skills and economic principles to the agricultural industry.
- 08.0 Explain the basic marketing processes in the agricultural industry.
- 09.0 Demonstrate human relations, communications, and leadership skills.
- 10.0 Describe the forestry and natural resources industry.
- 11.0 Practice forestry and natural resources safety.
- 12.0 Operate, maintain, and repair machinery, equipment, and facilities.
- 13.0 Identify the major ecosystems in Florida.
- 14.0 Monitor water resources.
- 15.0 Collect and test soil samples.
- 16.0 Assist in managing wildlife populations.
- 17.0 Assist in controlling and using fire in forests and other lands.
- 18.0 Assist in managing forest pests.
- 19.0 Identify applicable local, state, and federal rules and regulations and assistance programs.
- 20.0 Apply multi-use principles to forest and other lands.
- 21.0 Perform basic surveying operations.
- 22.0 Read and interpret aerial photographs and maps.
- 23.0 Collect and test water samples.
- 24.0 Analyze and interpret soil survey data.
- 25.0 Apply the principles of Best Management Practices (BMP).

- 26.0 Perform basic nursery operation activities.
- 27.0 Identify technological advances in the industry.
- 28.0 Identify wildlife population management practices.
- 29.0 Identify multi-use principles for forest and other lands.
- 30.0 Apply basic financial management skills.
- 31.0 Demonstrate leadership and employability skills.
- 32.0 Monitor air quality.

OCCUPATIONAL COMPLETION POINT - DATA CODE B

FORESTER AIDE - DOT Code 452.364-010

- 33.0 Apply the principles of basic nursery operations.
- 34.0 Assist in managing the urban forest.
- 35.0 Describe timber marketing procedures and techniques.
- 36.0 Apply business management skills and identify appropriate legal documents.
- 37.0 Measure trees and forest volume.
- 38.0 Perform preventive maintenance, checks, and services for forestry equipment.
- 39.0 Explain the basic silvicultural systems used in forest management.
- 40.0 Prescribe burning for forest management.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Forestry
Secondary Number: 8118300
Postsecondary Number: A010314

OCCUPATIONAL COMPLETION POINT - DATA CODE A

FOREST WORKER - DOT Code 452.687-010

01.0 DESCRIBE THE SOCIOECONOMIC ROLE OF THE AGRICULTURAL INDUSTRY--The student will be able to:

- 01.01 Prepare a report on the history of the agricultural industry.
- 01.02 Discuss the impact of agricultural products and services on the local, state, national, and global economy.
- 01.03 Investigate career opportunities in the agricultural industry and identify educational experiences necessary to prepare for those careers.
- 01.04 Discuss the role of the agricultural industry in the interaction of population, food, energy, and the environment.

02.0 APPLY SCIENTIFIC AND TECHNOLOGICAL PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 02.01 Discuss the importance of scientific classification in agriculture.
- 02.02 Use the scientific method to solve problems in agriculture.
- 02.03 Explain the use of genetics in agriculture, including probability applications.
- 02.04 Analyze the impact of recent technology on the agricultural industry.
- 02.05 Identify and describe the components of an ecosystem both biotic and abiotic.
- 02.06 Construct and analyze a diagram of a biological food web and subsequent food chains.
- 02.07 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
- 02.08 Evaluate soil profiles, land-capability classes, and soil conservation practices.
- 02.09 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.
- 02.10 Explain the interaction of one natural resource on another.
- 02.11 Describe the causes and effects of air, water, and land pollution and identify ways to prevent pollution.
- 02.12 Explain the flow of energy from the sun through agricultural systems.
- 02.13 Describe the environmental requirements necessary for a productive natural or man-made aquaculture system.
- 02.14 Apply principles of waste management to environmental problems common to agricultural systems.
- 02.15 Understand the concept of best management practices (BMP) as applied to agriculture.
- 02.16 Identify advances in biotechnology impacting agriculture such as transgenic crops and biological controls.
- 02.17 Identify computer technology advances such as Geographic Information Systems (GIS) and Global Positioning Systems (GPS).

03.0 PRACTICE AGRICULTURAL SAFETY--The student will be able to:

- 03.01 List the most common causes of agricultural accidents.
- 03.02 Discuss the importance of following proper safety precautions in the agricultural industry.
- 03.03 Demonstrate safety procedures in the classroom, laboratory, and workplace.
- 03.04 Describe symptoms of pesticide poisoning.
- 03.05 Extract pertinent information from a pesticide label and Material Safety Data Sheet (MSDS).
- 03.06 Select, mix, and apply a nonrestricted chemical, according to the label and according to Environmental Protection Agency (EPA), MSDS, and Worker Protection Standard regulations.
- 03.07 Clean and store pesticide application equipment, safety clothing, and safety equipment.
- 03.08 Identify the proper disposal of containers and residual pesticides.
- 03.09 Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation (CPR).

04.0 DEMONSTRATE THE USE OF TOOLS, EQUIPMENT AND INSTRUMENTS IN THE AGRICULTURAL INDUSTRY--The student will be able to:

- 04.01 Choose the proper tools, equipment, and instruments for a specific job.
- 04.02 Describe the principles of selected mechanical applications (e.g. levers, pulleys, hydraulics, internal combustion).
- 04.03 Calibrate spray equipment; solve time, distance, area, volume ratio, proportion, and percentage problems in agriscience.
- 04.04 Demonstrate the ability to use an equipment manual.
- 04.05 Demonstrate the use of selected tools, equipment, and instruments.
- 04.06 Service, maintain, and store tools, equipment, instruments, and supplies.

05.0 DESCRIBE THE PRINCIPLES OF PEST MANAGEMENT --The student will be able to:

- 05.01 Identify types of pests and beneficials.
- 05.02 Identify and select an appropriate control for each type of pest and/or weed.
- 05.03 Describe the principles and benefits of integrated pest management.

06.0 DESCRIBE THE PRINCIPLES OF PLANT AND/OR ANIMAL NUTRIENT GROWTH AND REPRODUCTION--The student will be able to:

For plant:

- 06.01 Describe the structure functions of plant parts including roots, stems, leaves, and flowers.
- 06.02 Describe the processes of plant growth including photosynthesis, respiration and nutrient uptake.
- 06.03 Propagate plants through sexual and asexual means.
- 06.04 Identify the nutrients required for plant growth and development and the role of each.
- 06.05 Extract pertinent information from a fertilizer label.

For animal:

- 06.07 Identify the nutrients required for animal growth and development and the role of each.
 - 06.08 Identify and describe the anatomical systems of animals and the functions of each including major components.
 - 06.09 Describe the process of animal reproduction.
- 07.0 APPLY BUSINESS SKILLS AND ECONOMIC PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:
- 07.01 Explain the basic economic principles in the agricultural industry.
 - 07.02 Explain the importance and impacts of local, state, and federal regulations and required documentation affecting the agricultural industry.
 - 07.03 Describe the types of agribusiness by organizational structure (i.e. sole proprietorship, partnership, corporation, cooperatives).
 - 07.04 Select and use computer applications.
 - 07.05 Analyze and interpret agribusiness data.
 - 07.06 Keep and maintain supervised agricultural experience (SAE) records.
 - 07.07 Interpret legal descriptions of land.
- 08.0 EXPLAIN THE BASIC MARKETING PROCESSES IN THE AGRICULTURAL INDUSTRY--The student will be able to:
- 08.01 Describe key factors in marketing agricultural products.
 - 08.02 Select agricultural products according to grades and standards.
- 09.0 DEMONSTRATE HUMAN-RELATIONS, COMMUNICATIONS, AND LEADERSHIP SKILLS--The student will be able to:
- 09.01 Demonstrate acceptable work habits and attitudes.
 - 09.02 Correctly follow oral and written directions and ask questions that clarify directions, as needed.
 - 09.03 Communicate effectively in verbal, written, and nonverbal modes.
 - 09.04 Recognize and demonstrate good listening skills.
 - 09.05 Conduct small informal and formal group meetings.
 - 09.06 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.
 - 09.07 Recognize and demonstrate communications skills in the workplace.
 - 09.08 Demonstrate effective telephone skills.
- 10.0 DESCRIBE THE FORESTRY AND NATURAL RESOURCES INDUSTRY--The student will be able to:
- 10.01 Identify career and educational opportunities in the forestry and natural resources industries.
 - 10.02 Describe the importance of forestry and natural resources.
 - 10.03 Identify professional and interest organizations and trade journals in the forestry and natural resources industries.
- 11.0 PRACTICE FORESTRY AND NATURAL RESOURCES SAFETY--The student will be able to:
- 11.01 Identify and eliminate hazards of the workplace.

- 11.02 Observe color-coded warnings in work areas and on equipment and machinery.
 - 11.03 Demonstrate safety procedures and workplace "housekeeping" practices.
 - 11.04 Identify safe and effective fire extinguishing techniques.
 - 11.05 Apply minor first aid treatment and identify emergency procedures.
 - 11.06 Safely handle and store flammable and nonrestricted chemicals.
 - 11.07 Select personal safety equipment and appropriate clothing.
 - 11.08 Operate machinery and equipment according to the safety recommendations of the manufacturers.
 - 11.09 Comply with Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) safety rules and regulations.
 - 11.10 Describe Florida's "Right-to-Know" law (as recorded in the Florida Statutes, Chapter 442).
- 12.0 OPERATE, MAINTAIN, AND REPAIR MACHINERY, EQUIPMENT, AND FACILITIES--The student will be able to:
- 12.01 Use the equipment operator, parts, and repair manuals.
 - 12.02 Service and maintain small gasoline engines.
 - 12.03 Operate, service, and maintain tractors and equipment.
 - 12.04 Keep records of the maintenance and repair of equipment and machinery.
 - 12.05 Prepare equipment for storage.
 - 12.06 Use shop and lab instruments and equipment.
 - 12.07 Perform minor welding repairs using arc and oxy-acetylene equipment.
 - 12.08 Maintain and repair facilities.
- 13.0 IDENTIFY THE MAJOR ECOSYSTEMS IN FLORIDA--The student will be able to:
- 13.01 Define "ecosystem" and identify the major ecosystems in Florida.
 - 13.02 Identify common plant and animal species of the major ecosystems.
 - 13.03 Identify environmental factors affecting each ecosystem in Florida.
 - 13.04 Identify habitats of the most threatened and endangered plant and animal species in Florida.
 - 13.05 Identify the hydrologic cycle of and the major uses for water.
- 14.0 MONITOR WATER RESOURCES--The student will be able to:
- 14.01 Identify important physical and chemical properties of water.
 - 14.02 Identify present and potential sources of water pollution.
 - 14.03 Determine stream flow.
 - 14.04 Monitor water levels of rivers, streams, ponds, and lakes.
 - 14.05 Identify and monitor erosion hazards and environmental quality.
- 15.0 COLLECT AND TEST SOIL SAMPLES--The student will be able to:
- 15.01 Identify important physical and chemical properties of soil.
 - 15.02 Collect soil samples representative of an area, complete soil data forms, and submit them for laboratory analysis.
 - 15.03 Test soil for acidity or alkalinity and recommend proper soil additives to correct the pH level.
 - 15.04 Determine the appropriate conservation management practices for planting a particular area.

- 15.05 Determine land classes according to soil classification standards.
- 16.0 ASSIST IN MANAGING WILDLIFE POPULATIONS--The student will be able to:
- 16.01 Prepare a brief report on the history of wildlife management in Florida.
- 16.02 Identify private, state, and federal agencies that are involved in animal wildlife conservation.
- 16.03 Interpret wildlife, game, and fishing laws, rules, and regulations.
- 16.04 Identify the pests, insects, and diseases of common wildlife species.
- 16.05 Identify the exotic plants and animals that threaten game and nongame species.
- 17.0 ASSIST IN CONTROLLING AND USING FIRE IN FORESTS AND OTHER LANDS--The student will be able to:
- 17.01 Identify the major causes of wildfire.
- 17.02 Assist in determining fire danger in forests and other lands.
- 17.03 Describe personal safety procedures for forest fire fighters.
- 17.04 Identify and describe the use of basic tools for forest fire fighting.
- 17.05 Explain the uses of prescribed burning in forestry, natural resources, and wildlife management.
- 17.06 Identify the different types of burning assistance that are available through agencies or vendors.
- 18.0 ASSIST IN MANAGING FOREST PESTS--The student will be able to:
- 18.01 Identify common forest pests, insects, and diseases.
- 18.02 Assist with common forest pest control.
- 18.03 Assist with chemical, mechanical, and other controls of undesirable species.
- 19.0 IDENTIFY APPLICABLE LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS AND ASSISTANCE PROGRAMS--The student will be able to:
- 19.01 Locate applicable portions of comprehensive plans.
- 19.02 Identify agencies affecting land and wildlife utilization.
- 19.03 Identify agencies regulating employee/employer relations (e.g., the Occupational Safety and Health Administration [OSHA]).
- 19.04 Identify public- and private-assistance programs for private landowners.
- 19.05 Describe applicable local, state, and federal rules and regulations.
- 20.0 APPLY MULTI-USE PRINCIPLES TO FORESTS AND OTHER LANDS--The student will be able to:
- 20.01 Identify the types of land ownership.
- 20.02 Assist in preparing a multi-use plan for forests and other lands.
- 21.0 PERFORM BASIC SURVEYING OPERATIONS--The student will be able to:
- 21.01 Make linear measurements and calculate an area of land.
- 21.02 Perform basic surveying operations.
- 21.03 Locate a land area, using a legal land description.

- 22.0 READ AND INTERPRET AERIAL PHOTOGRAPHS AND MAPS--The student will be able to:
- 22.01 Interpret the terms, symbols, and scales used on soil and topographic maps.
 - 22.02 Use maps and aerial photographs for determining acreage.
 - 22.03 Use aerial photographs to identify major timber types and land features.
- 23.0 COLLECT AND TEST WATER SAMPLES--The student will be able to:
- 23.01 Collect, store, and label water samples.
 - 23.02 Determine the quality of water samples by measuring for pH, turbidity, dissolved solids, and dissolved oxygen.
- 24.0 ANALYZE AND INTERPRET SOIL SURVEY DATA--The student will be able to:
- 24.01 Locate a designated site in the soil survey.
 - 24.02 Analyze and interpret soil survey data.
 - 24.03 Apply soil survey information to silvicultural practices and environmental management.
- 25.0 APPLY THE PRINCIPLES OF BEST MANAGEMENT PRACTICES (BMP)--The student will be able to:
- 25.01 Define the terms used in best management practices (BMP).
 - 25.02 Determine erosion and slope coefficients, using the BMP manual.
 - 25.03 Solve problems in land use, applying the principles found in the BMP manual.
- 26.0 PERFORM BASIC NURSERY OPERATION ACTIVITIES--The student will be able to:
- 26.01 Identify methods of propagation.
 - 26.02 Perform basic nursery operation activities, such as pruning, trimming, and fertilizing.
 - 26.03 Maintain plants.
- 27.0 IDENTIFY TECHNOLOGICAL ADVANCES IN THE INDUSTRY--The student will be able to:
- 27.01 Identify and use basic computer application software.
 - 27.02 Identify satellite surveying operations and laser systems.
 - 27.03 Identify satellite thermal infrared imagery.
 - 27.04 Identify computer mapping systems and geographic information systems.
 - 27.05 Use electronic communication devices.
- 28.0 IDENTIFY WILDLIFE POPULATION MANAGEMENT PRACTICES--The student will be able to:
- 28.01 Identify appropriate management practices for a wildlife habitat.
 - 28.02 Identify species of Florida's common wildlife (land and aquatic) and classify them as game, nongame, endangered, or threatened.
- 29.0 IDENTIFY MULTIUSE PRINCIPLES FOR FOREST AND OTHER LANDS--The student will be able to:

- 29.01 Identify legal responsibilities for private and public landowners when land is used by the public.
 - 29.02 Identify the different types of leases and their necessary components.
- 30.0 APPLY BASIC FINANCIAL MANAGEMENT SKILLS--The student will be able to:
- 30.01 Complete basic financial records.
 - 30.02 Demonstrate the use of banking procedures.
 - 30.03 Calculate interest on loans.
 - 30.04 Complete selected income tax return forms.
- 31.0 DEMONSTRATE LEADERSHIP AND EMPLOYABILITY SKILLS--The student will be able to:
- 31.01 Conduct group meetings, using parliamentary procedure and public speaking skills.
 - 31.02 Identify documents that may be required for a job application.
 - 31.03 Complete a job application form.
 - 31.04 Demonstrate competencies in job interview techniques.
 - 31.05 Demonstrate knowledge of how to make job changes appropriately.
 - 31.06 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
 - 31.07 Describe the importance of a drug free workplace and the industry policies regarding drug use.
 - 31.08 Demonstrate appropriate responses to performance evaluations from an employer, a supervisor, or other persons in the workplace.
- 32.0 MONITOR AIR QUALITY--The student will be able to:
- 32.01 Identify important physical and chemical properties of air.
 - 32.02 Identify present and potential sources of air pollution.
 - 32.03 Collect representative air samples.
 - 32.04 Analyze and interpret lab results.
 - 32.05 Identify air pollution control equipment.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
FORESTER AIDE - DOT Code 452.364-010

- 33.0 APPLY THE PRINCIPLES OF BASIC NURSERY OPERATIONS--The student will be able to:
- 33.01 Select the method of, and assist in, site preparation.
 - 33.02 Care for seedlings from the nursery to planting.
 - 33.03 Plant tree seedlings, using a hand or mechanical planter.
 - 33.04 Explain the requirements for reforestation.
- 34.0 ASSIST IN MANAGING THE URBAN FOREST--The student will be able to:
- 34.01 Assist in selecting, planting, and transplanting trees in the urban landscape.
 - 34.02 Demonstrate proper tree pruning, trimming, and fertilization techniques.
 - 34.03 Describe the procedure for an urban tree inventory.
 - 34.04 Describe the basic requirements for a tree protection ordinance.
 - 34.05 Develop a vegetative plan for improving wildlife habitat in urban areas.

- 34.06 Develop a plan for the basic maintenance of tree health.
- 35.0 DESCRIBE TIMBER MARKETING PROCEDURES AND TECHNIQUES--The student will be able to:
- 35.01 Identify the products made from trees and other natural resources and their value.
- 35.02 Select and mark trees to be removed in timber stand improvement.
- 35.03 Conduct a simple cruise.
- 35.04 Calculate the volume and value of timber.
- 35.05 Identify the components of timber sales contracts.
- 35.06 Identify the methods of harvesting and erosion prevention.
- 36.0 APPLY BUSINESS MANAGEMENT SKILLS AND IDENTIFY APPROPRIATE LEGAL DOCUMENTS--The student will be able to:
- 36.01 Identify business liability and the use of liability insurance.
- 36.02 Identify applicable insurance requirements.
- 36.03 Identify and complete basic business tax liability forms.
- 36.04 Identify eligibility requirements for greenbelt, bluebelt, and homestead tax exemptions.
- 36.05 Interpret enterprise budgets and amortization tables.
- 36.06 Identify the characteristics of legal documents (such as contracts, deeds, and leases).
- 37.0 MEASURE TREES AND FOREST VOLUME--The student will be able to:
- 37.01 Identify and describe the use of tree measuring tools and instruments, such as dendrometers, hypsometers, increment boards, prisms, volume tables, and logger's tape.
- 37.02 Measure trees and forests, using selected forest measurement tools.
- 38.0 PERFORM PREVENTIVE MAINTENANCE, CHECKS, AND SERVICES FOR FORESTRY EQUIPMENT--The student will be able to:
- 38.01 Perform daily operator maintenance checks for equipment.
- 38.02 Determine the preventive maintenance procedures, using the equipment operator manuals.
- 38.03 Perform scheduled preventive maintenance procedures.
- 38.04 Interpret and perform operator's troubleshooting procedures as described in the operator's manual.
- 38.05 Keep records of the maintenance and servicing of equipment.
- 39.0 EXPLAIN THE BASIC SILVICULTURAL SYSTEMS USED IN FOREST MANAGEMENT--The student will be able to:
- 39.01 Identify basic silvicultural systems.
- 39.02 Conduct a site evaluation.
- 39.03 Select tree species according to the site evaluation.
- 39.04 Explain the requirements for tree growth for effective forest management.
- 39.05 Determine site quality and growth rate for a timber stand.
- 39.06 Prepare a basic forest management plan, including cost and profit analyses.
- 40.0 PRESCRIBE BURNING FOR FOREST MANAGEMENT--The student will be able to:

- 40.01 Develop a plan for a prescribed burning, including permits, maps, and descriptions of desirable burning conditions and fire lines.
- 40.02 Prepare a smoke management plan.
- 40.03 Describe the requirements for obtaining different types of burning authorization and the applicable restrictions.
- 40.04 Prepare a prescribed burning authorization request.
- 40.05 Explain the effects of fuel characteristics and weather factors on fire behavior.
- 40.06 Identify the precautions to be followed in using fire as a management tool.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

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

COURSE DESCRIPTION:

This course was developed as a core and is designed to develop competencies in the areas of agricultural history; global importance of agriculture; career opportunities; applied scientific and technological concepts; ecosystems; agricultural safety; principles of integrated pest management; principles of plant and animal growth; economic principles; agricultural marketing; and human relations skills.

01.0 DESCRIBE THE SOCIOECONOMIC ROLE OF THE AGRICULTURAL INDUSTRY--The student will be able to:

- 01.01 Prepare a report on the history of the agricultural industry.
- 01.02 Discuss the impact of agricultural products and services on the local, state, national, and global economy.
- 01.03 Investigate career opportunities in the agricultural industry and identify educational experiences necessary to prepare for those careers.
- 01.04 Discuss the role of the agricultural industry in the interaction of population, food, energy, and the environment.

02.0 APPLY SCIENTIFIC AND TECHNOLOGICAL PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 02.01 Discuss the importance of scientific classification in agriculture.
- 02.02 Use the scientific method to solve problems in agriculture.
- 02.03 Explain the use of genetics in agriculture, including probability applications.
- 02.04 Analyze the impact of recent technology on the agricultural industry.
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- 02.06 Construct and analyze a diagram of a biological food web and subsequent food chains.
- 02.07 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
- 02.08 Evaluate soil profiles, land-capability classes, and soil conservation practices.
- 02.09 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.
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- 02.12 Explain the flow of energy from the sun through agricultural systems.
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 - 02.15 Understand the concept of best management practices (BMP) as applied to agriculture.
 - 02.16 Identify advances in biotechnology impacting agriculture such as transgenic crops and biological controls.
 - 02.17 Identify computer technology advances such as Geographic Information Systems (GIS) and Global Positioning Systems (GPS).
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 - 03.02 Discuss the importance of following proper safety precautions in the agricultural industry.
 - 03.03 Demonstrate safety procedures in the classroom, laboratory, and workplace.
 - 03.04 Describe symptoms of pesticide poisoning.
 - 03.05 Extract pertinent information from a pesticide label and Material Safety Data Sheet (MSDS).
 - 03.06 Select, mix, and apply a nonrestricted chemical, according to the label and according to Environmental Protection Agency (EPA), MSDS, and Worker Protection Standard regulations.
 - 03.07 Clean and store pesticide application equipment, safety clothing, and safety equipment.
 - 03.08 Identify the proper disposal of containers and residual pesticides.
 - 03.09 Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation (CPR).
- 04.0 DEMONSTRATE THE USE OF TOOLS, EQUIPMENT AND INSTRUMENTS IN THE AGRICULTURAL INDUSTRY--The student will be able to:
- 04.01 Choose the proper tools, equipment, and instruments for a specific job.
 - 04.02 Describe the principles of selected mechanical applications (e.g. levers, pulleys, hydraulics, internal combustion).
 - 04.03 Calibrate spray equipment; solve time, distance, area, volume ratio, proportion, and percentage problems in agriscience.
 - 04.04 Demonstrate the ability to use an equipment manual.
 - 04.05 Demonstrate the use of selected tools, equipment, and instruments.
 - 04.06 Service, maintain, and store tools, equipment, instruments, and supplies.
- 05.0 DESCRIBE THE PRINCIPLES OF PEST MANAGEMENT --The student will be able to:
- 05.01 Identify types of pests and beneficials.
 - 05.02 Identify and select an appropriate control for each type of pest and/or weed.
 - 05.03 Describe the principles and benefits of integrated pest management.
- 06.0 DESCRIBE THE PRINCIPLES OF PLANT AND/OR ANIMAL NUTRIENT GROWTH AND REPRODUCTION--The student will be able to:
- For plant:
- 06.01 Describe the structure functions of plant parts including roots, stems, leaves, and flowers.

- 06.02 Describe the processes of plant growth including photosynthesis, respiration and nutrient uptake.
- 06.03 Propagate plants through sexual and asexual means.
- 06.04 Identify the nutrients required for plant growth and development and the role of each.
- 06.05 Extract pertinent information from a fertilizer label.

For animal:

- 06.07 Identify the nutrients required for animal growth and development and the role of each.
- 06.08 Identify and describe the anatomical systems of animals and the functions of each including major components.
- 06.09 Describe the process of animal reproduction.

07.0 APPLY BUSINESS SKILLS AND ECONOMIC PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 07.01 Explain the basic economic principles in the agricultural industry.
- 07.02 Explain the importance and impacts of local, state, and federal regulations and required documentation affecting the agricultural industry.
- 07.03 Describe the types of agribusiness by organizational structure (i.e. sole proprietorship, partnership, corporation, cooperatives).
- 07.04 Select and use computer applications.
- 07.05 Analyze and interpret agribusiness data.
- 07.06 Keep and maintain supervised agricultural experience (SAE) records.
- 07.07 Interpret legal descriptions of land.

08.0 EXPLAIN THE BASIC MARKETING PROCESSES IN THE AGRICULTURAL INDUSTRY--The student will be able to:

- 08.01 Describe key factors in marketing agricultural products.
- 08.02 Select agricultural products according to grades and standards.

09.0 DEMONSTRATE HUMAN-RELATIONS, COMMUNICATIONS, AND LEADERSHIP SKILLS--The student will be able to:

- 09.01 Demonstrate acceptable work habits and attitudes.
- 09.02 Correctly follow oral and written directions and ask questions that clarify directions, as needed.
- 09.03 Communicate effectively in verbal, written, and nonverbal modes.
- 09.04 Recognize and demonstrate good listening skills.
- 09.05 Conduct small informal and formal group meetings.
- 09.06 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.
- 09.07 Recognize and demonstrate communications skills in the workplace.
- 09.08 Demonstrate effective telephone skills.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8118310
Course Title: Forestry and Natural Resources 2
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the areas of career opportunities; safety; operation, maintenance and repair of machinery, equipment and facilities; soil testing, surveying; water resources; and financial management skills.

10.0 DESCRIBE THE FORESTRY AND NATURAL RESOURCES INDUSTRY--The student will be able to:

- 10.01 Identify career and educational opportunities in the forestry and natural resources industries.
- 10.02 Describe the importance of forestry and natural resources.
- 10.03 Identify professional and interest organizations and trade journals in the forestry and natural resources industries.

11.0 PRACTICE FORESTRY AND NATURAL RESOURCES SAFETY--The student will be able to:

- 11.01 Identify and eliminate hazards of the workplace.
- 11.02 Observe color-coded warnings in work areas and on equipment and machinery.
- 11.03 Demonstrate safety procedures and workplace "housekeeping" practices.
- 11.04 Identify safe and effective fire extinguishing techniques.
- 11.05 Apply minor first aid treatment and identify emergency procedures.
- 11.06 Safely handle and store flammable and nonrestricted chemicals.
- 11.07 Select personal safety equipment and appropriate clothing.
- 11.08 Operate machinery and equipment according to the safety recommendations of the manufacturers.

12.0 OPERATE, MAINTAIN, AND REPAIR MACHINERY, EQUIPMENT, AND FACILITIES--The student will be able to:

- 12.01 Use the equipment operator parts, and repair manuals.
- 12.02 Service and maintain small gasoline engines.
- 12.03 Operate, service, and maintain tractors and equipment.
- 12.06 Use shop and lab instruments and equipment.
- 12.07 Perform minor welding repairs using arc and oxy-acetylene equipment.

14.0 MONITOR WATER RESOURCES--The student will be able to:

- 14.01 Identify important physical and chemical properties of water.
- 14.02 Identify present and potential sources of water pollution.

15.0 COLLECT AND TEST SOIL SAMPLES--The student will be able to:

- 15.01 Identify important physical and chemical properties of soil.

- 15.02 Collect soil samples representative of an area, complete soil data forms, and submit them for laboratory analysis.
 - 15.03 Test soil for acidity or alkalinity and recommend proper soil additives to correct the pH level.
 - 15.04 Determine the appropriate conservation management practices for planting a particular area.
 - 15.05 Determine land classes according to soil classification standards.
- 20.0 APPLY MULTI-USE PRINCIPLES TO FORESTS AND OTHER LANDS--The student will be able to:
- 20.01 Identify the types of land ownership.
- 21.0 PERFORM BASIC SURVEYING OPERATIONS--The student will be able to:
- 21.01 Make linear measurements and calculate an area of land.
 - 21.02 Perform basic surveying operations.
 - 21.03 Locate a land area, using a legal land description.
- 22.0 READ AND INTERPRET AERIAL PHOTOGRAPHS AND MAPS--The student will be able to:
- 22.01 Interpret the terms, symbols, and scales used on soil and topographic maps.
- 24.0 ANALYZE AND INTERPRET SOIL SURVEY DATA--The student will be able to:
- 24.01 Locate a designated site in the soil survey.
 - 24.02 Analyze and interpret soil survey data.
- 26.0 PERFORM BASIC NURSERY OPERATION ACTIVITIES--The student will be able to:
- 26.01 Identify methods of propagation.
 - 26.02 Perform basic nursery operation activities, such as pruning, trimming, and fertilizing.
 - 26.03 Maintain plants.
- 30.0 APPLY BASIC FINANCIAL MANAGEMENT SKILLS--The student will be able to:
- 30.01 Complete basic financial records.
 - 30.02 Demonstrate the use of banking procedures.
- 31.0 DEMONSTRATE LEADERSHIP AND EMPLOYABILITY SKILLS--The student will be able to:
- 31.01 Conduct group meetings, using parliamentary procedure and public speaking skills.
 - 31.02 Identify documents that may be required for a job application.
 - 31.03 Complete a job application form.
 - 31.04 Demonstrate competencies in job-interview techniques.
- 32.0 MONITOR AIR QUALITY--The student will be able to:
- 32.01 Identify important physical and chemical properties of air.
 - 32.02 Identify present and potential sources of air pollution.
 - 32.03 Collect representative air samples.
 - 32.04 Analyze and interpret lab results.
 - 32.05 Identify air pollution control equipment.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8118320
Course Title: Forestry and Natural Resources 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the areas of safety; operation, maintenance, and repair of machinery, equipment and facilities; ecosystems; water resources; wildlife populations; fire use and control; pest management; analyzing and interpreting data.

- 11.0 PRACTICE FORESTRY AND NATURAL RESOURCES SAFETY--The student will be able to:
 - 11.09 Comply with Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) safety rules and regulations.
 - 11.10 Describe Florida's "Right-to-Know" law (as recorded in the Florida Statutes, Chapter 442).

- 12.0 OPERATE, MAINTAIN, AND REPAIR MACHINERY, EQUIPMENT, AND FACILITIES--The student will be able to:
 - 12.04 Keep records of the maintenance and repair of equipment and machinery.
 - 12.05 Prepare equipment for storage.
 - 12.08 Maintain and repair facilities.

- 13.0 IDENTIFY THE MAJOR ECOSYSTEMS IN FLORIDA--The student will be able to:
 - 13.01 Define "ecosystem" and identify the major ecosystems in Florida.
 - 13.02 Identify common plant and animal species of the major ecosystems.
 - 13.03 Identify environmental factors affecting each ecosystem in Florida.
 - 13.04 Identify habitats of the most threatened and endangered plant and animal species in Florida.
 - 13.05 Identify the hydrologic cycle of and the major uses for water.

- 14.0 MONITOR WATER RESOURCES--The student will be able to:
 - 14.03 Determine stream flow.
 - 14.04 Monitor water levels of rivers, streams, ponds, and lakes.
 - 14.05 Identify and monitor erosion hazards and environmental quality.

- 16.0 ASSIST IN MANAGING WILDLIFE POPULATIONS--The student will be able to:
 - 16.01 Prepare a brief report on the history of wildlife management in Florida.
 - 16.02 Identify private, state, and federal agencies that are involved in animal wildlife conservation.
 - 16.03 Interpret wildlife, game, and fishing laws, rules, and regulations.

- 16.04 Identify the pests, insects, and diseases of common wildlife species.
- 16.05 Identify the exotic plants and animals that threaten game and nongame species.
- 17.0 ASSIST IN CONTROLLING AND USING FIRE IN FORESTS AND OTHER LANDS--The student will be able to:
 - 17.01 Identify the major causes of wildfire.
 - 17.02 Assist in determining fire danger in forests and other lands.
 - 17.03 Describe personal safety procedures for forest fire fighters.
 - 17.04 Identify and describe the use of basic tools for forest fire fighting.
 - 17.05 Explain the uses of prescribed burning in forestry, natural resources, and wildlife management.
 - 17.06 Identify the different types of burning assistance that are available through agencies or vendors.
- 18.0 ASSIST IN MANAGING FOREST PESTS--The student will be able to:
 - 18.01 Identify common forest pests, insects, and diseases.
 - 18.02 Assist with common forest pest control.
 - 18.03 Assist with chemical, mechanical, and other controls of undesirable species.
- 19.0 IDENTIFY APPLICABLE LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS AND ASSISTANCE PROGRAMS--The student will be able to:
 - 19.01 Locate applicable portions of comprehensive plans.
 - 19.02 Identify agencies affecting land and wildlife utilization.
 - 19.03 Identify agencies regulating employee/employer relations (e.g., the Occupational Safety and Health Administration [OSHA]).
 - 19.04 Identify public- and private-assistance programs for private-land owners.
 - 19.05 Describe applicable local, state, and federal rules and regulations.
- 20.0 APPLY MULTI-USE PRINCIPLES TO FORESTS AND OTHER LANDS--The student will be able to:
 - 20.02 Assist in preparing a multi-use plan for forests and other lands.
- 22.0 READ AND INTERPRET AERIAL PHOTOGRAPHS AND MAPS--The student will be able to:
 - 22.02 Use maps and aerial photographs for determining acreage.
 - 22.03 Use aerial photographs to identify major timber types and land features.
- 23.0 COLLECT AND TEST WATER SAMPLES--The student will be able to:
 - 23.01 Collect, store, and label water samples.
 - 23.02 Determine the quality of water samples by measuring for pH, turbidity, dissolved solids, and dissolved oxygen.
- 24.0 ANALYZE AND INTERPRET SOIL SURVEY DATA--The student will be able to:
 - 24.03 Apply soil survey information to silvicultural practices and environmental management.

- 25.0 APPLY THE PRINCIPLES OF BEST MANAGEMENT PRACTICES (BMP)--The student will be able to:
- 25.01 Define the terms used in best management practices (BMP).
 - 25.02 Determine erosion and slope coefficients, using the BMP manual.
 - 25.03 Solve problems in land use, applying the principles found in the BMP manual.
- 27.0 IDENTIFY TECHNOLOGICAL ADVANCES IN THE INDUSTRY--The student will be able to:
- 27.01 Identify and use basic computer application software.
 - 27.02 Identify satellite surveying operations and laser systems.
 - 27.03 Identify satellite thermal infrared imagery.
 - 27.04 Identify computer mapping systems and geographic information systems.
 - 27.05 Use electronic communication devices.
- 28.0 IDENTIFY WILDLIFE POPULATION MANAGEMENT PRACTICES--The student will be able to:
- 28.01 Identify appropriate management practices for a wildlife habitat.
 - 28.02 Identify species of Florida's common wildlife (land and aquatic) and classify them as game, nongame, endangered, or threatened.
- 29.0 IDENTIFY MULTI-USE PRINCIPLES FOR FOREST AND OTHER LANDS--The student will be able to:
- 29.01 Identify legal responsibilities for private- and public-land owners when land is used by the public.
 - 29.02 Identify the different types of leases and their necessary components.
- 30.0 APPLY BASIC FINANCIAL MANAGEMENT SKILLS--The student will be able to:
- 30.03 Calculate interest on loans.
 - 30.04 Complete selected income tax return forms.
- 31.0 DEMONSTRATE LEADERSHIP AND EMPLOYABILITY SKILLS--The student will be able to:
- 31.05 Demonstrate knowledge of how to make job changes appropriately.
 - 31.06 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
 - 31.07 Describe the importance of a drug free workplace and the industry policies regarding drug use.
 - 31.08 Demonstrate appropriate responses to performance evaluations from an employer, a supervisor, or other persons in the workplace.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8118330
Course Title: Forestry 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the areas of urban forest; timber marketing; business management skills; measuring trees and forest volume; silvicultural systems; prescribed burning; preventative maintenance.

- 33.0 APPLY THE PRINCIPLES OF BASIC NURSERY OPERATIONS--The student will be able to:
- 33.01 Select the method of, and assist in, site preparation.
 - 33.02 Care for seedlings from the nursery to planting.
 - 33.03 Plant tree seedlings, using a hand or mechanical planter.
 - 33.04 Explain the requirements for reforestation.
- 34.0 ASSIST IN MANAGING THE URBAN FOREST--The student will be able to:
- 34.01 Assist in selecting, planting, and transplanting trees in the urban landscape.
 - 34.02 Demonstrate proper tree pruning, trimming, and fertilization techniques.
 - 34.03 Describe the procedure for an urban tree inventory.
 - 34.04 Describe the basic requirements for a tree protection ordinance.
 - 34.05 Develop a vegetative plan for improving wildlife habitat in urban areas.
 - 34.06 Develop a plan for the basic maintenance of tree health.
- 35.0 DESCRIBE TIMBER MARKETING PROCEDURES AND TECHNIQUES--The student will be able to:
- 35.01 Identify the products made from trees and other natural resources and their value.
 - 35.02 Select and mark trees to be removed in timber stand improvement.
 - 35.03 Conduct a simple cruise.
 - 35.04 Calculate the volume and value of timber.
 - 35.05 Identify the components of timber sales contracts.
 - 35.06 Identify the methods of harvesting and erosion prevention.
- 36.0 APPLY BUSINESS MANAGEMENT SKILLS AND IDENTIFY APPROPRIATE LEGAL DOCUMENTS--The student will be able to:
- 36.01 Identify business liability and the use of liability insurance.
 - 36.02 Identify applicable insurance requirements.
 - 36.03 Identify and complete basic business tax liability forms.
 - 36.04 Identify eligibility requirements for greenbelt, bluebelt, and homestead tax exemptions.
 - 36.05 Interpret enterprise budgets and amortization tables.
 - 36.06 Identify the characteristics of legal documents (such as contracts, deeds, and leases).

- 37.0 MEASURE TREES AND FOREST VOLUME--The student will be able to:
- 37.01 Identify and describe the use of tree measuring tools and instruments, such as dendrometers, hypsometers, increment boards, prisms, volume tables, and logger's tape.
 - 37.02 Measure trees and forests, using selected forest measurement tools.
- 38.0 PERFORM PREVENTIVE MAINTENANCE, CHECKS, AND SERVICES FOR FORESTRY EQUIPMENT--The student will be able to:
- 38.01 Perform daily operator maintenance checks for equipment.
 - 38.02 Determine the preventive maintenance procedures, using the equipment operator manuals.
 - 38.03 Perform scheduled preventive maintenance procedures.
 - 38.04 Interpret and perform operator's troubleshooting procedures as described in the operator's manual.
 - 38.05 Keep records of the maintenance and servicing of equipment.
- 39.0 EXPLAIN THE BASIC SILVICULTURAL SYSTEMS USED IN FOREST MANAGEMENT--The student will be able to:
- 39.01 Identify basic silvicultural systems.
 - 39.02 Conduct a site evaluation.
 - 39.03 Select tree species according to the site evaluation.
 - 39.04 Explain the requirements for tree growth for effective forest management.
 - 39.05 Determine site quality and growth rate for a timber stand.
 - 39.06 Prepare a basic forest management plan, including cost and profit analyses.
- 40.0 PRESCRIBE BURNING FOR FOREST MANAGEMENT--The student will be able to:
- 40.01 Develop a plan for a prescribed burning, including permits, maps, and descriptions of desirable burning conditions and fire lines.
 - 40.02 Prepare a smoke management plan.
 - 40.03 Describe the requirements for obtaining different types of burning authorization and the applicable restrictions.
 - 40.04 Prepare a prescribed burning authorization request.
 - 40.05 Explain the effects of fuel characteristics and weather factors on fire behavior.
 - 40.06 Identify the precautions to be followed in using fire as a management tool.

Florida Department of Education
 INTENDED OUTCOMES

Program Title: Natural Resources

	Secondary	PSAV
Program Number	8112100	A010301
CIP Number	0103.010100	0103.010100
Grade Level	9-13, 30, 31	30, 31
Standard Length	4 credits	600 hours
Certification	VOC AGRI @4 AGRI @4 AGRI RES #7 FORESTRY #7 AGRICULTUR 1 @2	VOC AGRI @4 AGRI @2 @4 AGRI RES @7 G FORESTRY @7 G AGRICULTUR 1 @2
Basic Skills Grade Level		
Math		9
Language		9
Reading		9

INTENDED OUTCOMES: After successfully completing the appropriate outcomes for each occupational completion point of this program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE A

FOREST WORKER - DOT Code 452.687-010

- 01.0 Describe the socioeconomic role of the agricultural industry.
- 02.0 Apply scientific and technological principles to the agricultural industry.
- 03.0 Practice agricultural safety.
- 04.0 Demonstrate the use of tools, equipment, and instruments in the agricultural industry.
- 05.0 Describe the principles of integrated pest management (IPM).
- 06.0 Describe the principles of plant and/or animal growth and reproduction.
- 07.0 Apply business skills and economic principles to the agricultural industry.
- 08.0 Explain the basic marketing processes in the agricultural industry.
- 09.0 Demonstrate human relations, communications, and leadership skills.
- 10.0 Describe the forestry and natural resources industry.
- 11.0 Practice forestry and natural resources safety.
- 12.0 Operate, maintain, and repair machinery, equipment, and facilities.
- 13.0 Identify the major ecosystems in Florida.
- 14.0 Monitor water resources.
- 15.0 Collect and test soil samples.
- 16.0 Assist in managing wildlife populations.
- 17.0 Assist in controlling and using fire in forests and other lands.
- 18.0 Assist in managing forest pests.
- 19.0 Identify applicable local, state, and federal rules and regulations and assistance programs.
- 20.0 Apply multi-use principles to forest and other lands.
- 21.0 Perform basic surveying operations.
- 22.0 Read and interpret aerial photographs and maps.
- 23.0 Collect and test water samples.
- 24.0 Analyze and interpret soil-survey data.
- 25.0 Apply the principles of Best Management Practices (BMP).
- 26.0 Perform basic nursery-operation activities.
- 27.0 Identify technological advances in the industry.

- 28.0 Identify wildlife-population management practices.
- 29.0 Identify multi-use principles for forest and other lands.
- 30.0 Apply basic financial-management skills.
- 31.0 Demonstrate leadership and employability skills.
- 32.0 Monitor air quality.

OCCUPATIONAL COMPLETION POINT - DATA CODE B

PARK RANGER - DOT Code 169.167-042

- 33.0 Describe the practices used in soil conservation.
- 34.0 Collect, test, and determine quality-of-water samples.
- 35.0 Identify methods for basic land and water reclamation.
- 36.0 Explain the principles of managing threatened or endangered species.
- 37.0 Investigate ecosystems.
- 38.0 Describe the principles of wildlife management.
- 39.0 Perform preventive maintenance, checks, and services for equipment specific to the natural resources industry.
- 40.0 Perform maintenance activities for parks and recreational areas.
- 41.0 Prescribe burning for natural resources management.
- 42.0 Explain the multi-use principles of outdoor lands.

**Florida Department of Education
STUDENT PERFORMANCE STANDARDS**

Program Title: Natural Resources
Secondary Number: 8112100
Postsecondary Number: A010301

OCCUPATIONAL COMPLETION POINT - DATA CODE A

FOREST WORKER - DOT Code 452.687-010

01.0 DESCRIBE THE SOCIOECONOMIC ROLE OF THE AGRICULTURAL INDUSTRY--The student will be able to:

- 01.01 Prepare a report on the history of the agricultural industry.
- 01.02 Discuss the impact of agricultural products and services on the local, state, national, and global economy.
- 01.03 Investigate career opportunities in the agricultural industry and identify educational experiences necessary to prepare for those careers.
- 01.04 Discuss the role of the agricultural industry in the interaction of population, food, energy, and the environment.

02.0 APPLY SCIENTIFIC AND TECHNOLOGICAL PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 02.01 Discuss the importance of scientific classification in agriculture.
- 02.02 Use the scientific method to solve problems in agriculture.
- 02.03 Explain the use of genetics in agriculture, including probability applications.
- 02.04 Analyze the impact of recent technology on the agricultural industry.
- 02.05 Identify and describe the components of an ecosystem both biotic and abiotic.
- 02.06 Construct and analyze a diagram of a biological food web and subsequent food chains.
- 02.07 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
- 02.08 Evaluate soil profiles, land-capability classes, and soil conservation practices.
- 02.09 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.
- 02.10 Explain the interaction of one natural resource on another.
- 02.11 Describe the causes and effects of air, water, and land pollution and identify ways to prevent pollution.
- 02.12 Explain the flow of energy from the sun through agricultural systems.
- 02.13 Describe the environmental requirements necessary for a productive natural or man-made aquaculture system.
- 02.14 Apply principles of waste management to environmental problems common to agricultural systems.
- 02.15 Understand the concept of best management practices (BMP) as applied to agriculture.
- 02.16 Identify advances in biotechnology impacting agriculture such as transgenic crops and biological controls.
- 02.17 Identify computer technology advances such as Geographic Information Systems (GIS) and Global Positioning Systems (GPS).

03.0 PRACTICE AGRICULTURAL SAFETY--The student will be able to:

- 03.01 List the most common causes of agricultural accidents.
- 03.02 Discuss the importance of following proper safety precautions in the agricultural industry.
- 03.03 Demonstrate safety procedures in the classroom, laboratory, and workplace.
- 03.04 Describe symptoms of pesticide poisoning.
- 03.05 Extract pertinent information from a pesticide label and Material Safety Data Sheet (MSDS).
- 03.06 Select, mix, and apply a nonrestricted chemical, according to the label and according to Environmental Protection Agency (EPA), MSDS, and Worker Protection Standard regulations.
- 03.07 Clean and store pesticide application equipment, safety clothing, and safety equipment.
- 03.08 Identify the proper disposal of containers and residual pesticides.
- 03.09 Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation (CPR).

04.0 DEMONSTRATE THE USE OF TOOLS, EQUIPMENT AND INSTRUMENTS IN THE AGRICULTURAL INDUSTRY--The student will be able to:

- 04.01 Choose the proper tools, equipment, and instruments for a specific job.
- 04.02 Describe the principles of selected mechanical applications (e.g. levers, pulleys, hydraulics, internal combustion).
- 04.03 Calibrate spray equipment; solve time, distance, area, volume ratio, proportion, and percentage problems in agriscience.
- 04.04 Demonstrate the ability to use an equipment manual.
- 04.05 Demonstrate the use of selected tools, equipment, and instruments.
- 04.06 Service, maintain, and store tools, equipment, instruments, and supplies.

05.0 DESCRIBE THE PRINCIPLES OF PEST MANAGEMENT --The student will be able to:

- 05.01 Identify types of pests and beneficials.
- 05.02 Identify and select an appropriate control for each type of pest and/or weed.
- 05.03 Describe the principles and benefits of integrated pest management.

06.0 DESCRIBE THE PRINCIPLES OF PLANT AND/OR ANIMAL NUTRIENT GROWTH AND REPRODUCTION--The student will be able to:

For plant:

- 06.01 Describe the structure functions of plant parts including roots, stems, leaves, and flowers.
- 06.02 Describe the processes of plant growth including photosynthesis, respiration and nutrient uptake.
- 06.03 Propagate plants through sexual and asexual means.
- 06.04 Identify the nutrients required for plant growth and development and the role of each.
- 06.05 Extract pertinent information from a fertilizer label.

For animal:

- 06.07 Identify the nutrients required for animal growth and development and the role of each.
 - 06.08 Identify and describe the anatomical systems of animals and the functions of each including major components.
 - 06.09 Describe the process of animal reproduction.
- 07.0 APPLY BUSINESS SKILLS AND ECONOMIC PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:
- 07.01 Explain the basic economic principles in the agricultural industry.
 - 07.02 Explain the importance and impacts of local, state, and federal regulations and required documentation affecting the agricultural industry.
 - 07.03 Describe the types of agribusiness by organizational structure (i.e. sole proprietorship, partnership, corporation, cooperatives).
 - 07.04 Select and use computer applications.
 - 07.05 Analyze and interpret agribusiness data.
 - 07.06 Keep and maintain supervised agricultural experience (SAE) records.
 - 07.07 Interpret legal descriptions of land.
- 08.0 EXPLAIN THE BASIC MARKETING PROCESSES IN THE AGRICULTURAL INDUSTRY--The student will be able to:
- 08.01 Describe key factors in marketing agricultural products.
 - 08.02 Select agricultural products according to grades and standards.
- 09.0 DEMONSTRATE HUMAN-RELATIONS, COMMUNICATIONS, AND LEADERSHIP SKILLS--The student will be able to:
- 09.01 Demonstrate acceptable work habits and attitudes.
 - 09.02 Correctly follow oral and written directions and ask questions that clarify directions, as needed.
 - 09.03 Communicate effectively in verbal, written, and nonverbal modes.
 - 09.04 Recognize and demonstrate good listening skills.
 - 09.05 Conduct small informal and formal group meetings.
 - 09.06 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.
 - 09.07 Recognize and demonstrate communications skills in the workplace.
 - 09.08 Demonstrate effective telephone skills.
- 10.0 DESCRIBE THE FORESTRY AND NATURAL RESOURCES INDUSTRY--The student will be able to:
- 10.01 Identify career and educational opportunities in the forestry and natural resources industries.
 - 10.02 Describe the importance of forestry and natural resources.
 - 10.03 Identify professional and interest organizations and trade journals in the forestry and natural resources industries.
- 11.0 PRACTICE FORESTRY AND NATURAL RESOURCES SAFETY--The student will be able to:
- 11.01 Identify and eliminate hazards of the workplace.

- 11.02 Observe color-coded warnings in work areas and on equipment and machinery.
 - 11.03 Demonstrate safety procedures and workplace "housekeeping" practices.
 - 11.04 Identify safe and effective fire extinguishing techniques.
 - 11.05 Apply minor first aid treatment and identify emergency procedures.
 - 11.06 Safely handle and store flammable and nonrestricted chemicals.
 - 11.07 Select personal safety equipment and appropriate clothing.
 - 11.08 Operate machinery and equipment according to safety recommendations of the manufacturers.
 - 11.09 Comply with Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) safety rules and regulations.
 - 11.10 Describe Florida's "Right-to-Know" law (as recorded in the Florida Statutes, Chapter 442).
- 12.0 OPERATE, MAINTAIN, AND REPAIR MACHINERY, EQUIPMENT, AND FACILITIES--The student will be able to:
- 12.01 Use the equipment operator parts, and repair manuals.
 - 12.02 Service and maintain small gasoline engines.
 - 12.03 Operate, service, and maintain tractors and equipment.
 - 12.04 Keep records of the maintenance and repair of equipment and machinery.
 - 12.05 Prepare equipment for storage.
 - 12.06 Use shop and lab instruments and equipment.
 - 12.07 Perform minor welding repairs using arc and oxy-acetylene equipment.
 - 12.08 Maintain and repair facilities.
- 13.0 IDENTIFY THE MAJOR ECOSYSTEMS IN FLORIDA--The student will be able to:
- 13.01 Define "ecosystem" and identify the major ecosystems in Florida.
 - 13.02 Identify common plant and animal species of the major ecosystems.
 - 13.03 Identify environmental factors affecting each ecosystem in Florida.
 - 13.04 Identify habitats of the most threatened and endangered plant and animal species in Florida.
 - 13.05 Identify the hydrologic cycle of and the major uses for water.
- 14.0 MONITOR WATER RESOURCES--The student will be able to:
- 14.01 Identify important physical and chemical properties of water.
 - 14.02 Identify present and potential sources of water pollution.
 - 14.03 Determine stream flow.
 - 14.04 Monitor water levels of rivers, streams, ponds, and lakes.
 - 14.05 Identify and monitor erosion hazards and environmental quality.
- 15.0 COLLECT AND TEST SOIL SAMPLES--The student will be able to:
- 15.01 Identify important physical and chemical properties of soil.
 - 15.02 Collect soil samples representative of an area, complete soil-data forms, and submit them for laboratory analysis.
 - 15.03 Test soil for acidity or alkalinity and recommend proper soil additives to correct the pH level.
 - 15.04 Determine the appropriate conservation management practices for planting a particular area.

- 15.05 Determine land classes according to soil classification standards.
- 16.0 ASSIST IN MANAGING WILDLIFE POPULATIONS--The student will be able to:
- 16.01 Prepare a brief report on the history of wildlife management in Florida.
- 16.02 Identify private, state, and federal agencies that are involved in animal wildlife conservation.
- 16.03 Interpret wildlife, game, and fishing laws, rules, and regulations.
- 16.04 Identify the pests, insects, and diseases of common wildlife species.
- 16.05 Identify exotic plants and animals that threaten game and nongame species.
- 17.0 ASSIST IN CONTROLLING AND USING FIRE IN FORESTS AND OTHER LANDS--The student will be able to:
- 17.01 Identify the major causes of wildfire.
- 17.02 Assist in determining fire danger in forests and other lands.
- 17.03 Describe personal safety procedures for forest-fire fighters.
- 17.04 Identify and describe the use of basic tools for forest-fire fighting.
- 17.05 Explain the uses of prescribed burning in forestry, natural resources, and wildlife management.
- 17.06 Identify the different types of burning assistance that are available through agencies or vendors.
- 18.0 ASSIST IN MANAGING FOREST PESTS--The student will be able to:
- 18.01 Identify common forest pests, insects, and diseases.
- 18.02 Assist with common forest pest control.
- 18.03 Assist with chemical, mechanical, and other controls of undesirable species.
- 19.0 IDENTIFY APPLICABLE LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS AND ASSISTANCE PROGRAMS--The student will be able to:
- 19.01 Locate applicable portions of comprehensive plans.
- 19.02 Identify agencies affecting land and wildlife utilization.
- 19.03 Identify agencies regulating employee/employer relations (e.g., OSHA).
- 19.04 Identify public and private assistance programs for private landowners.
- 19.05 Describe applicable local, state, and federal rules and regulations.
- 20.0 APPLY MULTI-USE PRINCIPLES TO FORESTS AND OTHER LANDS--The student will be able to:
- 20.01 Identify the types of land ownership.
- 20.02 Assist in preparing a multi-use plan for forests and other lands.
- 21.0 PERFORM BASIC SURVEYING OPERATIONS--The student will be able to:
- 21.01 Make linear measurements and calculate an area of land.
- 21.02 Perform basic surveying operations.
- 21.03 Locate a land area, using a legal land description.

- 22.0 READ AND INTERPRET AERIAL PHOTOGRAPHS AND MAPS--The student will be able to:
- 22.01 Interpret the terms, symbols, and scales used on soil and topographic maps.
 - 22.02 Use maps and aerial photographs for determining acreage.
 - 22.03 Use aerial photographs to identify major timber types and land features.
- 23.0 COLLECT AND TEST WATER SAMPLES--The student will be able to:
- 23.01 Collect, store, and label water samples.
 - 23.02 Determine the quality of water samples by measuring for pH, turbidity, dissolved solids, and dissolved oxygen.
- 24.0 ANALYZE AND INTERPRET SOIL SURVEY DATA--The student will be able to:
- 24.01 Locate a designated site in the soil survey.
 - 24.02 Analyze and interpret soil survey data.
 - 24.03 Apply soil survey information to silvicultural practices and environmental management.
- 25.0 APPLY THE PRINCIPLES OF BEST MANAGEMENT PRACTICES (BMP)--The student will be able to:
- 25.01 Define the terms used in best management practices (BMP).
 - 25.02 Determine erosion and slope coefficients, using the BMP manual.
 - 25.03 Solve problems in land use, applying the principles found in the BMP manual.
- 26.0 PERFORM BASIC NURSERY OPERATION ACTIVITIES--The student will be able to:
- 26.01 Identify methods of propagation.
 - 26.02 Perform basic nursery operation activities, such as pruning, trimming, and fertilizing.
 - 26.03 Maintain plants.
- 27.0 IDENTIFY TECHNOLOGICAL ADVANCES IN THE INDUSTRY--The student will be able to:
- 27.01 Identify and use basic computer application software.
 - 27.02 Identify satellite surveying operations and laser systems.
 - 27.03 Identify satellite thermal infrared imagery.
 - 27.04 Identify computer mapping systems and geographic-information systems.
 - 27.05 Use electronic communication devices.
- 28.0 IDENTIFY WILDLIFE POPULATION MANAGEMENT PRACTICES--The student will be able to:
- 28.01 Identify appropriate management practices for a wildlife habitat.
 - 28.02 Identify species of Florida's common wildlife (land and aquatic) and classify them as game, nongame, endangered, or threatened.
- 29.0 IDENTIFY MULTI-USE PRINCIPLES FOR FOREST AND OTHER LANDS--The student will be able to:

- 29.01 Identify legal responsibilities for private and public landowners when land is used by the public.
 - 29.02 Identify the different types of leases and their necessary components.
- 30.0 APPLY BASIC FINANCIAL MANAGEMENT SKILLS--The student will be able to:
- 30.01 Complete basic financial records.
 - 30.02 Demonstrate the use of banking procedures.
 - 30.03 Calculate interest on loans.
 - 30.04 Complete selected income tax return forms.
- 31.0 DEMONSTRATE LEADERSHIP AND EMPLOYABILITY SKILLS--The student will be able to:
- 31.01 Conduct group meetings, using parliamentary procedure and public-speaking skills.
 - 31.02 Identify documents that may be required for a job application.
 - 31.03 Complete a job application form.
 - 31.04 Demonstrate competencies in job interview techniques.
 - 31.05 Demonstrate knowledge of how to make job changes appropriately.
 - 31.06 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
 - 31.07 Describe the importance of a drug free workplace and the industry policies regarding drug use.
 - 31.08 Demonstrate appropriate responses to performance evaluations from an employer, a supervisor, or other persons in the workplace.
- 32.0 MONITOR AIR QUALITY--The student will be able to:
- 32.01 Identify important physical and chemical properties of air.
 - 32.02 Identify present and potential sources of air pollution.
 - 32.03 Collect representative air samples.
 - 32.04 Analyze and interpret lab results.
 - 32.05 Identify air pollution control equipment.

OCCUPATIONAL COMPLETION POINT - DATA CODE B

PARK RANGER - DOT Code 169.167-042

- 33.0 DESCRIBE PRACTICES IN SOIL CONSERVATION--The student will be able to:
- 33.01 Locate a designated site using a soil survey map.
 - 33.02 Analyze and interpret soil survey data.
 - 33.03 Apply soil survey information to silvicultural practices and environmental management.
 - 33.04 Describe practices in soil conservation.
- 34.0 COLLECT, TEST, AND DETERMINE THE QUALITY-OF-WATER SAMPLES--The student will be able to:
- 34.01 Collect, store, and label water samples.
 - 34.02 Determine the quality-of-water samples by measuring for pH, turbidity, dissolved solids and dissolved oxygen.
 - 34.03 Investigate watershed boundaries and drainage patterns.
 - 34.04 Calculate the volume and surface area of ponds, lakes, and streams.
 - 34.05 Assist in planning the improvements of waterways, ponds, stream banks, and shorelines.

- 35.0 IDENTIFY METHODS FOR BASIC LAND AND WATER RECLAMATION--The student will be able to:
- 35.01 Explain requirements for the regeneration of indigenous plant species.
 - 35.02 Identify the needs and benefits of land and water reclamation.
 - 35.03 Identify the methods for basic land and water reclamation.
- 36.0 EXPLAIN THE PRINCIPLES OF MANAGING THREATENED OR ENDANGERED SPECIES--The student will be able to:
- 36.01 Identify threatened or endangered species in the local area.
 - 36.02 Explain the importance of saving the threatened or endangered species.
 - 36.03 Explain the interdependency of threatened or endangered species and environmental factors affecting them.
 - 36.04 Identify and locate rules and regulations on managing threatened and endangered species.
 - 36.05 Interpret the recovery plans for the threatened or endangered species.
- 37.0 INVESTIGATE ECOSYSTEMS--The student will be able to:
- 37.01 Explain how ecosystems interact with each other.
 - 37.02 Describe transition zones and investigate life in a transition zone.
 - 37.03 Investigate and analyze human influence on ecosystems.
 - 37.04 Explain the meteorological aspects of ecosystems.
 - 37.05 Investigate and analyze the impact of pollution on ecosystems.
- 38.0 DESCRIBE THE PRINCIPLES OF WILDLIFE MANAGEMENT--The student will be able to:
- 38.01 Describe the characteristics of wildlife population dynamics.
 - 38.02 Survey the wildlife in selected ecosystems and identify its food web.
 - 38.03 Describe game and nongame wildlife programs in Florida, including those that purchase and protect wildlife habitats.
 - 38.04 Identify rules and regulations that affect game and nongame wildlife.
- 39.0 PERFORM PREVENTIVE MAINTENANCE, CHECKS, AND SERVICES FOR EQUIPMENT SPECIFIC TO THE NATURAL RESOURCES INDUSTRY--The student will be able to:
- 39.01 Perform daily operator maintenance checks for equipment.
 - 39.02 Determine preventive maintenance procedures, using the equipment operator manuals.
 - 39.03 Perform scheduled preventive maintenance procedures.
 - 39.04 Interpret and perform operator's troubleshooting procedures as described in the manual.
 - 39.05 Keep records of the maintenance and servicing of equipment.
- 40.0 PERFORM MAINTENANCE ACTIVITIES FOR PARKS AND RECREATIONAL AREAS--The student will be able to:
- 40.01 Identify outdoor use organizations and describe their purposes and functions.
 - 40.02 Explain the dynamics of using volunteers in parks and in recreational and other outdoor areas.

- 40.03 Perform maintenance activities in parks and in recreational and other outdoor areas.
 - 40.04 Identify rules and regulations that pertain to the management of parks and recreational areas, including those relating to security.
 - 40.05 Construct a selected recreational structure, such as a sign, a wildlife nesting shelter, and a picnic table.
 - 40.06 Develop a basic design for a recreational area.
- 41.0 PRESCRIBE BURNING FOR NATURAL RESOURCES MANAGEMENT--The student will be able to:
- 41.01 Develop a plan for a prescribed burning, including permits, maps, and descriptions of desirable burning conditions and fire lines.
 - 41.02 Prepare a smoke management plan.
 - 41.03 Describe the requirements for obtaining different types of burning authorization and the applicable restrictions.
 - 41.04 Prepare a prescribed burning authorization request.
 - 41.05 Explain the effects of fuel characteristics and weather factors on fire behavior.
 - 41.06 Identify the precautions to be followed in using fire as a management tool.
- 42.0 EXPLAIN THE MULTI-USE PRINCIPLES OF OUTDOOR LANDS--The student will be able to:
- 42.01 Explain policies for dealing with park visitors.
 - 42.02 Demonstrate the safe use and maintenance of common outdoor equipment.
 - 42.03 Interpret park and campground rules, regulations, and historical and natural features for park visitors.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

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

COURSE DESCRIPTION:

This course was developed as a core and is designed to develop competencies in the areas of agricultural history; global importance of agriculture; career opportunities; applied scientific and technological concepts; ecosystems; agricultural safety; principles of integrated pest management; principles of plant and animal growth; economic principles; agricultural marketing; and human relations skills.

01.0 DESCRIBE THE SOCIOECONOMIC ROLE OF THE AGRICULTURAL INDUSTRY--The student will be able to:

- 01.01 Prepare a report on the history of the agricultural industry.
- 01.02 Discuss the impact of agricultural products and services on the local, state, national, and global economy.
- 01.03 Investigate career opportunities in the agricultural industry and identify educational experiences necessary to prepare for those careers.
- 01.04 Discuss the role of the agricultural industry in the interaction of population, food, energy, and the environment.

02.0 APPLY SCIENTIFIC AND TECHNOLOGICAL PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 02.01 Discuss the importance of scientific classification in agriculture.
- 02.02 Use the scientific method to solve problems in agriculture.
- 02.03 Explain the use of genetics in agriculture, including probability applications.
- 02.04 Analyze the impact of recent technology on the agricultural industry.
- 02.05 Identify and describe the components of an ecosystem both biotic and abiotic.
- 02.06 Construct and analyze a diagram of a biological food web and subsequent food chains.
- 02.07 Describe and diagram the water, carbon, nitrogen, oxygen, sulfur, and phosphorus cycles.
- 02.08 Evaluate soil profiles, land-capability classes, and soil conservation practices.
- 02.09 List the components of Florida's fresh water systems (lakes, ground water, aquifer, sink holes, rivers, and swamps) and explain the importance of managing these resources.
- 02.10 Explain the interaction of one natural resource on another.
- 02.11 Describe the causes and effects of air, water, and land pollution and identify ways to prevent pollution.
- 02.12 Explain the flow of energy from the sun through agricultural systems.
- 02.13 Describe the environmental requirements necessary for a productive natural or man-made aquaculture system.

- 02.14 Apply principles of waste management to environmental problems common to agricultural systems.
 - 02.15 Understand the concept of best management practices (BMP) as applied to agriculture.
 - 02.16 Identify advances in biotechnology impacting agriculture such as transgenic crops and biological controls.
 - 02.17 Identify computer technology advances such as Geographic Information Systems (GIS) and Global Positioning Systems (GPS).
- 03.0 PRACTICE AGRICULTURAL SAFETY--The student will be able to:
- 03.01 List the most common causes of agricultural accidents.
 - 03.02 Discuss the importance of following proper safety precautions in the agricultural industry.
 - 03.03 Demonstrate safety procedures in the classroom, laboratory, and workplace.
 - 03.04 Describe symptoms of pesticide poisoning.
 - 03.05 Extract pertinent information from a pesticide label and Material Safety Data Sheet (MSDS).
 - 03.06 Select, mix, and apply a nonrestricted chemical, according to the label and according to Environmental Protection Agency (EPA), MSDS, and Worker Protection Standard regulations.
 - 03.07 Clean and store pesticide application equipment, safety clothing, and safety equipment.
 - 03.08 Identify the proper disposal of containers and residual pesticides.
 - 03.09 Discuss the proper procedures of basic first aid and cardiopulmonary resuscitation (CPR).
- 04.0 DEMONSTRATE THE USE OF TOOLS, EQUIPMENT AND INSTRUMENTS IN THE AGRICULTURAL INDUSTRY--The student will be able to:
- 04.01 Choose the proper tools, equipment, and instruments for a specific job.
 - 04.02 Describe the principles of selected mechanical applications (e.g. levers, pulleys, hydraulics, internal combustion).
 - 04.03 Calibrate spray equipment; solve time, distance, area, volume ratio, proportion, and percentage problems in agriscience.
 - 04.04 Demonstrate the ability to use an equipment manual.
 - 04.05 Demonstrate the use of selected tools, equipment, and instruments.
 - 04.06 Service, maintain, and store tools, equipment, instruments, and supplies.
- 05.0 DESCRIBE THE PRINCIPLES OF PEST MANAGEMENT --The student will be able to:
- 05.01 Identify types of pests and beneficials.
 - 05.02 Identify and select an appropriate control for each type of pest and/or weed.
 - 05.03 Describe the principles and benefits of integrated pest management.
- 06.0 DESCRIBE THE PRINCIPLES OF PLANT AND/OR ANIMAL NUTRIENT GROWTH AND REPRODUCTION--The student will be able to:
- For plant:
- 06.01 Describe the structure functions of plant parts including roots, stems, leaves, and flowers.

- 06.02 Describe the processes of plant growth including photosynthesis, respiration and nutrient uptake.
- 06.03 Propagate plants through sexual and asexual means.
- 06.04 Identify the nutrients required for plant growth and development and the role of each.
- 06.05 Extract pertinent information from a fertilizer label.

For animal:

- 06.07 Identify the nutrients required for animal growth and development and the role of each.
- 06.08 Identify and describe the anatomical systems of animals and the functions of each including major components.
- 06.09 Describe the process of animal reproduction.

07.0 APPLY BUSINESS SKILLS AND ECONOMIC PRINCIPLES TO THE AGRICULTURAL INDUSTRY--The student will be able to:

- 07.01 Explain the basic economic principles in the agricultural industry.
- 07.02 Explain the importance and impacts of local, state, and federal regulations and required documentation affecting the agricultural industry.
- 07.03 Describe the types of agribusiness by organizational structure (i.e. sole proprietorship, partnership, corporation, cooperatives).
- 07.04 Select and use computer applications.
- 07.05 Analyze and interpret agribusiness data.
- 07.06 Keep and maintain supervised agricultural experience (SAE) records.
- 07.07 Interpret legal descriptions of land.

08.0 EXPLAIN THE BASIC MARKETING PROCESSES IN THE AGRICULTURAL INDUSTRY--The student will be able to:

- 08.01 Describe key factors in marketing agricultural products.
- 08.02 Select agricultural products according to grades and standards.

09.0 DEMONSTRATE HUMAN-RELATIONS, COMMUNICATIONS, AND LEADERSHIP SKILLS--The student will be able to:

- 09.01 Demonstrate acceptable work habits and attitudes.
- 09.02 Correctly follow oral and written directions and ask questions that clarify directions, as needed.
- 09.03 Communicate effectively in verbal, written, and nonverbal modes.
- 09.04 Recognize and demonstrate good listening skills.
- 09.05 Conduct small informal and formal group meetings.
- 09.06 Identify the opportunities for leadership development available through an appropriate student and/or professional organization.
- 09.07 Recognize and demonstrate communications skills in the workplace.
- 09.08 Demonstrate effective telephone skills.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8118310
Course Title: Forestry and Natural Resources 2
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the areas of career opportunities; safety; operation, maintenance and repair of machinery, equipment and facilities; soil testing, surveying; water resources; and financial management skills.

10.0 DESCRIBE THE FORESTRY AND NATURAL RESOURCES INDUSTRY--The student will be able to:

- 10.01 Identify career and educational opportunities in the forestry and natural resources industries.
- 10.02 Describe the importance of forestry and natural resources.
- 10.03 Identify professional and interest organizations and trade journals in the forestry and natural resources industries.

11.0 PRACTICE FORESTRY AND NATURAL RESOURCES SAFETY--The student will be able to:

- 11.01 Identify and eliminate hazards of the workplace.
- 11.02 Observe color-coded warnings in work areas and on equipment and machinery.
- 11.03 Demonstrate safety procedures and workplace "housekeeping" practices.
- 11.04 Identify safe and effective fire extinguishing techniques.
- 11.05 Apply minor first aid treatment and identify emergency procedures.
- 11.06 Safely handle and store flammable and nonrestricted chemicals.
- 11.07 Select personal safety equipment and appropriate clothing.
- 11.08 Operate machinery and equipment according to the safety recommendations of the manufacturers.

12.0 OPERATE, MAINTAIN, AND REPAIR MACHINERY, EQUIPMENT, AND FACILITIES--The student will be able to:

- 12.01 Use the equipment operator parts, and repair manuals.
- 12.02 Service and maintain small gasoline engines.
- 12.03 Operate, service, and maintain tractors and equipment.
- 12.06 Use shop and lab instruments and equipment.
- 12.07 Perform minor welding repairs using arc and oxy-acetylene equipment.

14.0 MONITOR WATER RESOURCES--The student will be able to:

- 14.01 Identify important physical and chemical properties of water.
- 14.02 Identify present and potential sources of water pollution.

15.0 COLLECT AND TEST SOIL SAMPLES--The student will be able to:

- 15.01 Identify important physical and chemical properties of soil.

- 15.02 Collect soil samples representative of an area, complete soil data forms, and submit them for laboratory analysis.
 - 15.03 Test soil for acidity or alkalinity and recommend proper soil additives to correct the pH level.
 - 15.04 Determine the appropriate conservation management practices for planting a particular area.
 - 15.05 Determine land classes according to soil classification standards.
- 20.0 APPLY MULTI-USE PRINCIPLES TO FORESTS AND OTHER LANDS--The student will be able to:
- 20.01 Identify the types of land ownership.
- 21.0 PERFORM BASIC SURVEYING OPERATIONS--The student will be able to:
- 21.01 Make linear measurements and calculate an area of land.
 - 21.02 Perform basic surveying operations.
 - 21.03 Locate a land area, using a legal land description.
- 22.0 READ AND INTERPRET AERIAL PHOTOGRAPHS AND MAPS--The student will be able to:
- 22.01 Interpret the terms, symbols, and scales used on soil and topographic maps.
- 24.0 ANALYZE AND INTERPRET SOIL SURVEY DATA--The student will be able to:
- 24.01 Locate a designated site in the soil survey.
 - 24.02 Analyze and interpret soil survey data.
- 26.0 PERFORM BASIC NURSERY OPERATION ACTIVITIES--The student will be able to:
- 26.01 Identify methods of propagation.
 - 26.02 Perform basic nursery operation activities, such as pruning, trimming, and fertilizing.
 - 26.03 Maintain plants.
- 30.0 APPLY BASIC FINANCIAL MANAGEMENT SKILLS--The student will be able to:
- 30.01 Complete basic financial records.
 - 30.02 Demonstrate the use of banking procedures.
- 31.0 DEMONSTRATE LEADERSHIP AND EMPLOYABILITY SKILLS--The student will be able to:
- 31.01 Conduct group meetings, using parliamentary procedure and public speaking skills.
 - 31.02 Identify documents that may be required for a job application.
 - 31.03 Complete a job application form.
 - 31.04 Demonstrate competencies in job-interview techniques.
- 32.0 MONITOR AIR QUALITY--The student will be able to:
- 32.01 Identify important physical and chemical properties of air.
 - 32.02 Identify present and potential sources of air pollution.
 - 32.03 Collect representative air samples.
 - 32.04 Analyze and interpret lab results.
 - 32.05 Identify air pollution control equipment.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8118320
Course Title: Forestry and Natural Resources 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the areas of safety; operation, maintenance, and repair of machinery, equipment and facilities; ecosystems; water resources; wildlife populations; fire use and control; pest management; analyzing and interpreting data.

- 11.0 PRACTICE FORESTRY AND NATURAL RESOURCES SAFETY--The student will be able to:
 - 11.09 Comply with Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) safety rules and regulations.
 - 11.10 Describe Florida's "Right-to-Know" law (as recorded in the Florida Statutes, Chapter 442).

- 12.0 OPERATE, MAINTAIN, AND REPAIR MACHINERY, EQUIPMENT, AND FACILITIES--The student will be able to:
 - 12.04 Keep records of the maintenance and repair of equipment and machinery.
 - 12.05 Prepare equipment for storage.
 - 12.08 Maintain and repair facilities.

- 13.0 IDENTIFY THE MAJOR ECOSYSTEMS IN FLORIDA--The student will be able to:
 - 13.01 Define "ecosystem" and identify the major ecosystems in Florida.
 - 13.02 Identify common plant and animal species of the major ecosystems.
 - 13.03 Identify environmental factors affecting each ecosystem in Florida.
 - 13.04 Identify habitats of the most threatened and endangered plant and animal species in Florida.
 - 13.05 Identify the hydrologic cycle of and the major uses for water.

- 14.0 MONITOR WATER RESOURCES--The student will be able to:
 - 14.03 Determine stream flow.
 - 14.04 Monitor water levels of rivers, streams, ponds, and lakes.
 - 14.05 Identify and monitor erosion hazards and environmental quality.

- 16.0 ASSIST IN MANAGING WILDLIFE POPULATIONS--The student will be able to:
 - 16.01 Prepare a brief report on the history of wildlife management in Florida.
 - 16.02 Identify private, state, and federal agencies that are involved in animal wildlife conservation.
 - 16.03 Interpret wildlife, game, and fishing laws, rules, and regulations.

- 16.04 Identify the pests, insects, and diseases of common wildlife species.
- 16.05 Identify the exotic plants and animals that threaten game and nongame species.
- 17.0 ASSIST IN CONTROLLING AND USING FIRE IN FORESTS AND OTHER LANDS--The student will be able to:
 - 17.01 Identify the major causes of wildfire.
 - 17.02 Assist in determining fire danger in forests and other lands.
 - 17.03 Describe personal safety procedures for forest fire fighters.
 - 17.04 Identify and describe the use of basic tools for forest fire fighting.
 - 17.05 Explain the uses of prescribed burning in forestry, natural resources, and wildlife management.
 - 17.06 Identify the different types of burning assistance that are available through agencies or vendors.
- 18.0 ASSIST IN MANAGING FOREST PESTS--The student will be able to:
 - 18.01 Identify common forest pests, insects, and diseases.
 - 18.02 Assist with common forest pest control.
 - 18.03 Assist with chemical, mechanical, and other controls of undesirable species.
- 19.0 IDENTIFY APPLICABLE LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS AND ASSISTANCE PROGRAMS--The student will be able to:
 - 19.01 Locate applicable portions of comprehensive plans.
 - 19.02 Identify agencies affecting land and wildlife utilization.
 - 19.03 Identify agencies regulating employee/employer relations (e.g., the Occupational Safety and Health Administration [OSHA]).
 - 19.04 Identify public- and private-assistance programs for private-land owners.
 - 19.05 Describe applicable local, state, and federal rules and regulations.
- 20.0 APPLY MULTI-USE PRINCIPLES TO FORESTS AND OTHER LANDS--The student will be able to:
 - 20.02 Assist in preparing a multi-use plan for forests and other lands.
- 22.0 READ AND INTERPRET AERIAL PHOTOGRAPHS AND MAPS--The student will be able to:
 - 22.02 Use maps and aerial photographs for determining acreage.
 - 22.03 Use aerial photographs to identify major timber types and land features.
- 23.0 COLLECT AND TEST WATER SAMPLES--The student will be able to:
 - 23.01 Collect, store, and label water samples.
 - 23.02 Determine the quality of water samples by measuring for pH, turbidity, dissolved solids, and dissolved oxygen.
- 24.0 ANALYZE AND INTERPRET SOIL SURVEY DATA--The student will be able to:
 - 24.03 Apply soil survey information to silvicultural practices and environmental management.

- 25.0 APPLY THE PRINCIPLES OF BEST MANAGEMENT PRACTICES (BMP)--The student will be able to:
- 25.01 Define the terms used in best management practices (BMP).
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 - 25.03 Solve problems in land use, applying the principles found in the BMP manual.
- 27.0 IDENTIFY TECHNOLOGICAL ADVANCES IN THE INDUSTRY--The student will be able to:
- 27.01 Identify and use basic computer application software.
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- 29.01 Identify legal responsibilities for private- and public-land owners when land is used by the public.
 - 29.02 Identify the different types of leases and their necessary components.
- 30.0 APPLY BASIC FINANCIAL MANAGEMENT SKILLS--The student will be able to:
- 30.03 Calculate interest on loans.
 - 30.04 Complete selected income tax return forms.
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- 31.05 Demonstrate knowledge of how to make job changes appropriately.
 - 31.06 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
 - 31.07 Describe the importance of a drug free workplace and the industry policies regarding drug use.
 - 31.08 Demonstrate appropriate responses to performance evaluations from an employer, a supervisor, or other persons in the workplace.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8112110
Course Title: Natural Resources 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in soil conservation; water quality; water reclamation; endangered species; ecosystems; wildlife management; prescribed burning; and multi-use principles of outdoor lands.

33.0 DESCRIBE PRACTICES IN SOIL CONSERVATION--The student will be able to:

- 33.01 Locate a designated site using a soil survey map.
- 33.02 Analyze and interpret soil survey data.
- 33.03 Apply soil survey information to silvicultural practices and environmental management.
- 33.04 Describe practices in soil conservation.

34.0 COLLECT, TEST, AND DETERMINE THE QUALITY-OF-WATER SAMPLES--The student will be able to:

- 34.01 Collect, store, and label water samples.
- 34.02 Determine the quality-of-water samples by measuring for pH, turbidity, dissolved solids and dissolved oxygen.
- 34.03 Investigate watershed boundaries and drainage patterns.
- 34.04 Calculate the volume and surface area of ponds, lakes, and streams.
- 34.05 Assist in planning the improvements of waterways, ponds, stream banks, and shorelines.

35.0 IDENTIFY METHODS FOR BASIC LAND AND WATER RECLAMATION--The student will be able to:

- 35.01 Explain requirements for the regeneration of indigenous plant species.
- 35.02 Identify the needs and benefits of land and water reclamation.
- 35.03 Identify the methods for basic land and water reclamation.

36.0 EXPLAIN THE PRINCIPLES OF MANAGING THREATENED OR ENDANGERED SPECIES--The student will be able to:

- 36.01 Identify threatened or endangered species in the local area.
- 36.02 Explain the importance of saving the threatened or endangered species.
- 36.03 Explain the interdependency of threatened or endangered species and environmental factors affecting them.
- 36.04 Identify and locate rules and regulations on managing threatened and endangered species.
- 36.05 Interpret the recovery plans for the threatened or endangered species.

37.0 INVESTIGATE ECOSYSTEMS--The student will be able to:

- 37.01 Explain how ecosystems interact with each other.

- 37.02 Describe transition zones and investigate life in a transition zone.
 - 37.03 Investigate and analyze human influence on ecosystems.
 - 37.04 Explain the meteorological aspects of ecosystems.
 - 37.05 Investigate and analyze the impact of pollution on ecosystems.
- 38.0 DESCRIBE THE PRINCIPLES OF WILDLIFE MANAGEMENT--The student will be able to:
- 38.01 Describe the characteristics of wildlife population dynamics.
 - 38.02 Survey the wildlife in selected ecosystems and identify its food web.
 - 38.03 Describe game and nongame wildlife programs in Florida, including those that purchase and protect wildlife habitats.
 - 38.04 Identify rules and regulations that affect game and nongame wildlife.
- 39.0 PERFORM PREVENTIVE MAINTENANCE, CHECKS, AND SERVICES FOR EQUIPMENT SPECIFIC TO THE NATURAL RESOURCES INDUSTRY--The student will be able to:
- 39.01 Perform daily operator maintenance checks for equipment.
 - 39.02 Determine preventive maintenance procedures, using the equipment operator manuals.
 - 39.03 Perform scheduled preventive maintenance procedures.
 - 39.04 Interpret and perform operator's troubleshooting procedures as described in the manual.
 - 39.05 Keep records of the maintenance and servicing of equipment.
- 40.0 PERFORM MAINTENANCE ACTIVITIES FOR PARKS AND RECREATIONAL AREAS--The student will be able to:
- 40.01 Identify outdoor-use organizations and describe their purposes and functions.
 - 40.02 Explain the dynamics of using volunteers in parks and in recreational and other outdoor areas.
 - 40.03 Perform maintenance activities in parks and in recreational and other outdoor areas.
 - 40.04 Identify rules and regulations that pertain to the management of parks and recreational areas, including those relating to security.
 - 40.05 Construct a selected recreational structure, such as a sign, a wildlife nesting shelter, and a picnic table.
 - 40.06 Develop a basic design for a recreational area.
- 41.0 PRESCRIBE BURNING FOR NATURAL RESOURCES MANAGEMENT--The student will be able to:
- 41.01 Develop a plan for a prescribed burning, including permits, maps, and descriptions of desirable burning conditions and fire lines.
 - 41.02 Prepare a smoke management plan.
 - 41.03 Describe the requirements for obtaining different types of burning authorization and the applicable restrictions.
 - 41.04 Prepare a prescribed burning authorization request.
 - 41.05 Explain the effects of fuel characteristics and weather factors on fire behavior.
 - 41.06 Identify the precautions to be followed in using fire as a management tool.

42.0 EXPLAIN THE MULTIUSE PRINCIPLES OF OUTDOOR LANDS--The student will be able to:

- 42.01 Explain policies for dealing with park visitors.
- 42.02 Demonstrate the safe use and maintenance of common outdoor equipment.
- 42.03 Interpret park and campground rules, regulations, and historical and natural features for park visitors.