

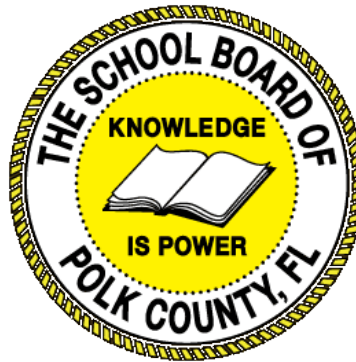
# Individual Test Item Specifications

---

8121520- Horticulture 3

---

2015



*The contents of this document were developed under a grant from the United States Department of Education. However, the content does not necessarily represent the policy of the United States Department of Education, and you should not assume endorsement by the federal government.*

# Table of Contents

I. Guide to the Individual Benchmark Specifications .....	1
Benchmark Classification System .....	1
Definitions of Benchmark Specifications .....	3
II. Individual Benchmark Specifications .....	4

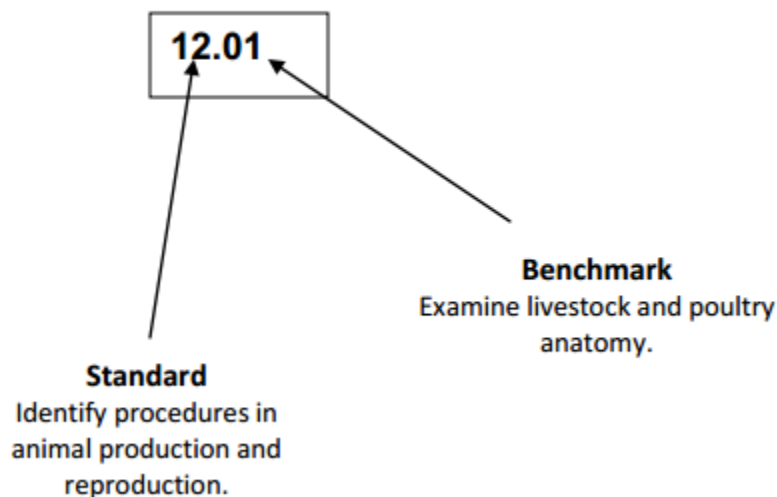
## I. Guide to the Individual Benchmark Specifications

Content specific guidelines are given in the *Individual Benchmark Specifications* for each course. The *Specifications* contains specific information about the alignment of items with the Florida Standards. It identifies the manner in which each benchmark is assessed, provides content limits and stimulus attributes for each benchmark, and gives specific information about content, item types, and response attributes.

### Benchmark Classification System

- Each Career and Technical Education course has its own set of course standards. The benchmarks are organized numerically, with two numbers separated by a decimal point. The first number is the standard number, and the second number is the benchmark number. You will see these numbers on the Item Specifications for each course.

An example, from Agritechnology 1:



*The image above describes the components of a Career and Technical Education Standard and Benchmark classification system.*

Each MAFS benchmark is labeled with a system of letters and numbers.

- The four letters in the *first position* of the label identify the **Subject**.
- The number(s) in the *second position* represents the **Grade Level**.
- The letter(s) in the *third position* represents the **Category**.
- The number in the fourth position shows the **Domain**.
- The number in the *fifth position* identifies the **Cluster**.
- The number in the last position identifies the specific **Benchmark**.



*The image above describes the components of a Florida Standard and Benchmark classification system.*

## Definitions of Benchmark Specifications

The *Individual Benchmark Specifications* provides standard-specific guidance for assessment item development for the Florida Department of Education Career and Technical Education item banks. For each benchmark assessed, the following information is provided.

<b>Reporting Category</b>	is a grouping of related benchmarks that can be used to summarize and report achievement.
<b>Standard</b>	refers to the standard statement presented in the Florida Standards.
<b>Benchmark</b>	refers to the benchmark statement presented in the Florida Standards. In some cases, two or more related benchmarks are grouped together because the assessment of one benchmark addresses another benchmark.
<b>Item Types</b>	are used to assess the benchmark or group of benchmark.
<b>Cognitive Complexity</b>	ideal level at which item should be assessed.
<b>Benchmark Clarifications</b>	explain how achievement of the benchmark will be demonstrated by students. In other words, the clarification statements explain what the student will do when responding to questions.
<b>Content Limits</b>	define the range of content knowledge and that should be assessed in the items for the benchmark.
<b>Stimulus Attributes</b>	define the types of stimulus materials that should be used in the items, including the appropriate use of graphic materials and item context or content.
<b>Response Attributes</b>	define the characteristics of the answers that a student must choose or provide.
<b>Content Focus</b>	addresses the broad key terms and concepts associated with the examples found in the standards, benchmarks, or benchmark clarifications.
<b>Sample Items</b>	are provided for each type of question assessed. The correct answer for all sample items is provided.

## II. Individual Benchmark Specifications

<b>Standard</b>	28.0 Apply safety procedures in the workplace.
<b>Benchmark</b>	28.01 Describe emergency procedures in the horticulture workplace.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)= (ER)=X
<b>Cognitive Complexity Level</b>	L,M
<b>Benchmark Clarification</b>	The student will describe emergency procedure in the workplace.
<b>Content Focus</b>	Emergency procedures in the horticultural workplace such as hazardous situations, MSDS for materials, equipment emergencies, and/or person or property related emergencies
<b>Content Limits</b>	The content may include but is not limited to horticulture workplace emergencies; emergencies dealing with chemicals, equipment, personnel, property, environmental, health or weather. The items may include MSDS.
<b>Stimulus Attributes</b>	The stimulus may include scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may include fundamental knowledge of emergency procedures and/or identifying hazards or emergency procedures; may include choosing or identifying pragmatic actions in emergency scenarios.
<b>Sample Item</b>	In which location at a wholesale plant nursery should emergency telephone numbers be posted? A. in the chemical cabinet B. in the equipment storage shed C. in the business office of the nursery D. in a common area such as a break room Answer: D

<b>Standard</b>	28.0 Apply safety procedures in the workplace.
<b>Benchmark</b>	28.03 Identify appropriate PPE (Personal Protective Equipment) for all activities.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)=X (ER)=
<b>Cognitive Complexity Level</b>	L,M
<b>Benchmark Clarification</b>	The student will identify proper PPE.
<b>Content Focus</b>	PPE and related items associated with various aspects of the horticulture industry
<b>Content Limits</b>	The content may include but is not limited to different types of PPE used for a variety of activities expected to be encountered in a workplace within the horticulture industry.
<b>Stimulus Attributes</b>	The stimulus may include scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may be identifying or choosing PPE or related items in a variety of situations/conditions; may include identifying common correct or incorrect PPE.
<b>Sample Item</b>	Which personal protective equipment (PPE) would be appropriate to wear when applying pesticide with a compressed air sprayer? A. ear plugs B. leather gloves C. PVC gloves D. steel toe leather boots Answer: C

<b>Standard</b>	28.0 Apply safety procedures in the workplace.
<b>Benchmark</b>	28.05 Identify specific hazards with industry specific equipment, and conduct equipment care and maintenance.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)=X (ER)=
<b>Cognitive Complexity Level</b>	L,M
<b>Benchmark Clarification</b>	The student will identify specific hazards with industry specific maintenance.
<b>Content Focus</b>	Horticulture equipment, care and maintenance and/or associated hazards
<b>Content Limits</b>	The content may include but is not limited to horticulture industry related equipment, maintenance and/or associated hazard; problem solving applied to a hazardous situation.
<b>Stimulus Attributes</b>	The stimulus may include scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may include identifying specific hazards within the horticulture industry, solving or identifying a hazardous situation, using MSDS, or enacting preventive measures.
<b>Sample Item</b>	Which is likely to occur when the top quadrant of a chainsaw's bar comes in contact with something while the chain is moving? A. chopping B. kickback C. pulling force D. pushing force Answer: B



<b>Standard</b>	29.0 Classify plants based on scientific principles.
<b>Benchmark</b>	29.01 Describe principles of plant biology and growth.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)= (ER)=X
<b>Cognitive Complexity Level</b>	L,M
<b>Benchmark Clarification</b>	The student will describe the principles of plant biology and growth.
<b>Content Focus</b>	Plant biology and growth; ecosystem and life cycle
<b>Content Limits</b>	The content may include but is not limited to plant biology, growth, role in ecosystem and/or classifications of plants based on the life cycle.
<b>Stimulus Attributes</b>	The stimulus may include scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may be pictures, illustrations, graphs or selections identifying plants, life cycles, growth, classification of plants, plant biology or plant roles in the ecosystem.
<b>Sample Item</b>	Which is a byproduct of photosynthesis? A. carbon dioxide B. chlorine C. methane D. oxygen Answer: D

<b>Standard</b>	29.0 Classify plants based on scientific principles.
<b>Benchmark</b>	29.04 Demonstrate the use of botanical and common names of plants including genus and specific epithet and cultivar.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=XX (SA)= (P)= (ER)=
<b>Cognitive Complexity Level</b>	L
<b>Benchmark Clarification</b>	The student will demonstrate the use of botanical and common names of plants including genus and species and cultivar.
<b>Content Focus</b>	Botanical, common, genus, species, specific epithet, and/or cultivar of plants
<b>Content Limits</b>	The content may include but is not limited to botanical, common, genus, species, specific epithet, and/or cultivar of horticulture plants, weeds, or invasives.
<b>Stimulus Attributes</b>	The stimulus may include actual plants, scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may require students to identify plants by one or more names ranging from common, genus, species, and or cultivar; may include identifying/selecting a picture, description or illustration.
<b>Sample Item</b>	Which two characteristics are displayed in all plants of the genus Fraxinus? A. simple and opposite leaves B. simple and alternate leaves C. opposite and compound leaves D. alternate and compound leaves Answer: C

<b>Standard</b>	29.0 Classify plants based on scientific principles.
<b>Benchmark</b>	29.05 Demonstrate proper use of botanical names.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)= (ER)=X
<b>Cognitive Complexity Level</b>	L,M
<b>Benchmark Clarification</b>	The student will demonstrate the proper use of botanical names.
<b>Content Focus</b>	Genus, species and cultivar names of plants
<b>Content Limits</b>	The content may include but is not limited to genus, species and cultivar names of horticultural plants, weeds or invasives.
<b>Stimulus Attributes</b>	The stimulus may include actual plants, scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may require student to select or identify plants according to their genus, species, and/or cultivar; may include pictures, scenarios, graphs, actual plants; may include properly writing botanical name.
<b>Sample Item</b>	Acer rubrum is the botanical name for Red Maple. Which classification is Acer? A. class B. genus C. order D. species Answer: B

<b>Standard</b>	30.0 Demonstrate proper use of growing media and fertilizers.
<b>Benchmark</b>	30.01 Apply information on a label of fertilizer, including updated BMP rules, used in Florida.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)=X (ER)=
<b>Cognitive Complexity Level</b>	L,M
<b>Benchmark Clarification</b>	The student will apply information obtained from fertilizer labels to increase the effectiveness of horticultural practices.
<b>Content Focus</b>	Terms commonly found on fertilizer labels, BMP rules, and/or amendments for soil
<b>Content Limits</b>	The content may include but is not limited to liquid, granular, slow release or other fertilizers used in residential, commercial or agricultural applications. May include label interpretation and applications based on label or BMPs.
<b>Stimulus Attributes</b>	The stimulus may include scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may require student to determine which course of action to take based on plant appearance/performance and/or fertilizer label or BMPs; may require identification, justification, or application using label and/or BMPs as a guide.
<b>Sample Item</b>	Marshall spread 5000 pounds of 6-8-10 fertilizer on his vegetable garden. How many pounds of potassium did he apply? A. 30 B. 40 C. 50 D. 500 Answer: D

<b>Standard</b>	30.0 Demonstrate proper use of growing media and fertilizers.
<b>Benchmark</b>	30.03 Identify materials that are needed to alter pH and calculate the amount to apply to change the pH.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)=X (ER)=
<b>Cognitive Complexity Level</b>	L,M
<b>Benchmark Clarification</b>	The student will demonstrate the proper technique of calculating pH levels and employ appropriate materials that are used to alter levels.
<b>Content Focus</b>	Materials that are associated with agricultural/horticultural applications to alter ph in growing media; terms associated with calculation/manipulation of ph
<b>Content Limits</b>	The content may include but is not limited to pH alterations and/or calculations to change or maintain pH for agricultural or residential applications. The items may include factors used in changing pH.
<b>Stimulus Attributes</b>	The stimulus may include scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may require the student to select, predict, identify, or use the component that will influence the pH; may apply the calculation to create the intended pH level.
<b>Sample Item</b>	Which of the following could be added to a soil to raise the pH? A. lime B. oak leaves C. perlite D. tannic acid Answer: A

<b>Standard</b>	30.0 Demonstrate proper use of growing media and fertilizers.
<b>Benchmark</b>	30.04 Demonstrate the procedure for calibrating a fertilizer spreader or injector using appropriate mathematical concepts.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)=X (ER)=
<b>Cognitive Complexity Level</b>	M,H
<b>Benchmark Clarification</b>	The student will identify proper mathematical and mechanical procedures for calibrating fertilizer spreaders and injectors.
<b>Content Focus</b>	Calibration of spreader/injector and/or applying math concepts to do so; units of measurements associated with liquids, area, volume, speed, and distance
<b>Content Limits</b>	The content may include but is not limited to application or injection in agricultural applications. The content may include but is not limited to liquid, granular, or time released fertilizers.
<b>Stimulus Attributes</b>	The stimulus may include scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may require student to identify correct calibration or appropriate formula for application; may be a performance-based application.
<b>Sample Item</b>	If a fertilizer spreader being towed behind a tractor at an average speed of 5 MPH covers a 10' swath at the proper application rate, how many minutes will it take to spread fertilizer over one acre? A. 4-5 minutes B. 8-9 minutes C

<b>Standard</b>	30.0 Demonstrate proper use of growing media and fertilizers.
<b>Benchmark</b>	30.05 Identify essential elements and nutrients in plant growth including macronutrients and micronutrients.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)= (ER)=X
<b>Cognitive Complexity Level</b>	L,M
<b>Benchmark Clarification</b>	The student will apply knowledge of plant macronutrients and micronutrients to enhance plant growth.
<b>Content Focus</b>	Macro and micronutrients required for plant growth
<b>Content Limits</b>	The content may include but is not limited to macro and micronutrients required for plant growth. The items may analyze various plants and make nutritional recommendations.
<b>Stimulus Attributes</b>	The stimulus may include actual samples, scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may include fundamental knowledge of plant nutritional requirements; may include identifying nutrients which plant or plants need to perform various functions or to restore vigor.
<b>Sample Item</b>	Which nutritional deficiency is characterized by yellowing leaves? A. iron B. magnesium C. nitrogen D. zinc Answer: C

<b>Standard</b>	31.0 Demonstrate Integrated Pest Management approaches.
<b>Benchmark</b>	31.01 Classify insects according to feeding habits.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)= (ER)=X
<b>Cognitive Complexity Level</b>	L,M
<b>Benchmark Clarification</b>	The student will identify and compare feeding patterns of insects.
<b>Content Focus</b>	Insect species/names, types of mouth-parts, and insect hosts /food source (plant or animal)
<b>Content Limits</b>	The content may include but is not limited to insects one may encounter in the horticulture industry (including non-insects or arachnids). The content may include beneficial as well as insect pests. The content may also include damage, evidence left by in
<b>Stimulus Attributes</b>	The stimulus may include actual samples, scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may include identifying insects, insect damage, larvae, or other evidence; may include pictures, illustrations, graphs or models; may be demonstrated using performance measures.
<b>Sample Item</b>	Which insect feeds in the cambium layer of living pine trees, often girdling them and causing them to die? A. aphid B. cicada C. katydid D. southern pine beetle Answer: D



<b>Standard</b>	31.0 Demonstrate Integrated Pest Management approaches.
<b>Benchmark</b>	31.02 Describe IMP (Integrated Pest Management) methods of controlling plant pests.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)= (ER)=
<b>Cognitive Complexity Level</b>	L,M
<b>Benchmark Clarification</b>	The student will distinguish from a variety of plant pest control methods that one that is best suited for particular pest situations.
<b>Content Focus</b>	Pests such as insects, arachnids, weeds, nematodes, pathogens, and their appropriate controls (biological, chemical, cultural)
<b>Content Limits</b>	The content may include but is not limited to pests encountered in the horticulture industry. The content may include a variety of controls (biological, chemical and/or cultural).
<b>Stimulus Attributes</b>	The stimulus may include scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may include fundamental knowledge of plant pests and the control of plant pests; may include picture, graph or chart; may include identifying a problem and/or offering a solution.
<b>Sample Item</b>	Which is a biological control of many types of scale insects? A. aphids B. horticultural oils C. insecticidal sprays D. parasitic wasps Answer: D

<b>Standard</b>	31.0 Demonstrate Integrated Pest Management approaches.
<b>Benchmark</b>	31.06 Identify specific cultural, mechanical, chemical, and biological methods of weed management.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)= (ER)=X
<b>Cognitive Complexity Level</b>	L,M
<b>Benchmark Clarification</b>	The student will compare and contrast different methods of controlling weeds.
<b>Content Focus</b>	Mechanical control, crop competition, rotation, mulching, weed barriers, fire, biological control, chemical control or any combination used in the horticulture industry
<b>Content Limits</b>	The content may include but is not limited to chemical control, biological control, fire, crop rotation/competition, mechanical control, mulching, weed barriers or any combination which may be used in the horticulture industry. The content may include ide
<b>Stimulus Attributes</b>	The stimulus may include actual samples, scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may include identifying method or methods of control; may include pictures, graphs, or charts.
<b>Sample Item</b>	Which method of weed control is deep cultivation?  A. biological B. chemical C. mechanical D. seasonal Answer: C

<b>Standard</b>	31.0 Demonstrate Integrated Pest Management approaches.
<b>Benchmark</b>	31.07 Identify invasive and poisonous plants in Florida.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)= (ER)=X
<b>Cognitive Complexity Level</b>	L,M
<b>Benchmark Clarification</b>	The student will distinguish plant species that are invasive and poisonous in Florida.
<b>Content Focus</b>	Native and non-native poisonous plants and/or plants that are non-native with invasive/aggressive growth characteristics
<b>Content Limits</b>	The content may include but is not limited to invasive and poisonous plants (or seeds) in all of Florida's range. The content may include plants that are poisonous or irritating to touch or any part that may be poisonous if burned or ingested.
<b>Stimulus Attributes</b>	The stimulus may include scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may include identifying poisonous or invasive plants, characteristics, seeds, or toxicity level; may include pictures, illustrations, graphs or models.
<b>Sample Item</b>	Which poisonous vine has yellow flowers, oppositely arranged leaves, and is native to Florida? A. air potato B. Carolina jasmine C. kudzu D. poison ivy Answer: B

<b>Standard</b>	32.0 Identify the principles and requirements of plant growth.
<b>Benchmark</b>	32.01 Demonstrate methods of pruning plants.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)=X (ER)=
<b>Cognitive Complexity Level</b>	M,H
<b>Benchmark Clarification</b>	The student will apply different methods of pruning plants to meet the needs of the particular environmental contexts.
<b>Content Focus</b>	Pruning of plants (vines, flowers, ornamentals, trees, and foliage plants); terms associated with pruning
<b>Content Limits</b>	The content may include but is not limited to identifying/performing pruning or any aspect of pruning. May include identification of improper pruning, prescription of pruning, and/or selection of proper tools for situation.
<b>Stimulus Attributes</b>	The stimulus may include actual pruning situation, scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may include identifying fundamental knowledge of pruning methods, and/or proper selection of tools to perform job.
<b>Sample Item</b>	Which of the following would be appropriate to prune with loppers?  A. African iris B. impatient stem C. 1/3" maple limb D. 2" pine limb Answer: C

<b>Standard</b>	32.0 Identify the principles and requirements of plant growth.
<b>Benchmark</b>	32.03 Identify and select pruning tools.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)=X (ER)=
<b>Cognitive Complexity Level</b>	L,M
<b>Benchmark Clarification</b>	The student will infer the appropriate pruning tools needed for a particular plants.
<b>Content Focus</b>	Shears, pole saw, chainsaw, loppers, hedge shears, grass shears, anvil and blade pruner, hook and blade pruner and other cutting tools
<b>Content Limits</b>	The content should be limited to tools used to prune Florida plants.
<b>Stimulus Attributes</b>	The stimulus may include actual plants and pruning tools, scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may identify or select proper tools commonly used in horticulture pruning operations.
<b>Sample Item</b>	Lisa needs to prune a five-inch diameter branch from an oak tree. Which tool is most appropriate for this task? A. hedge shears B. loppers C. pole saw D. pruning shears Answer: C

<b>Standard</b>	32.0 Identify the principles and requirements of plant growth.
<b>Benchmark</b>	32.04 Demonstrate proper use of pruning tools and care.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)=X (ER)=X
<b>Cognitive Complexity Level</b>	L,M,H
<b>Benchmark Clarification</b>	Thes student will show how to safely utilize and maintain pruning tools.
<b>Content Focus</b>	Tools and/ or treatments applied to tools used for pruning
<b>Content Limits</b>	The content may include but is not limited to tools and/or use of tools used to prune plants used in the horticulture industry or the care of such tools.
<b>Stimulus Attributes</b>	The stimulus may include actual plants and pruning tools, scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may include identifying, using, and/or proper care of pruning tool(s).
<b>Sample Item</b>	Which tool is recommended to use to sharpen chainsaw chains? A. belt sander B. flat bastard file C. round file D. whet rock Answer: C

<b>Standard</b>	32.0 Identify the principles and requirements of plant growth.
<b>Benchmark</b>	32.06 Identify Plant Growth Regulators and their use on horticulture and landscape plants.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)= (ER)=X
<b>Cognitive Complexity Level</b>	M,H
<b>Benchmark Clarification</b>	The student will select and apply Plant Growth Regulators for horticulture and landscape plants.
<b>Content Focus</b>	Hormones or synthetic compounds which affect plant growth
<b>Content Limits</b>	The content may include but is not limited to compounds and/or hormones which serve as growth regulators on horticulture and/or landscape plants. The content may include but is not limited to Auxins, Gibberellins, or Cytokinins.
<b>Stimulus Attributes</b>	The stimulus may include scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may be demonstrated using performance measures; may include identifying specific growth regulators and/or their desired effect on horticulture and/or landscape plants; may include recommendation of growth regulators to obtain predicted result
<b>Sample Item</b>	Which hormone is produced in the terminal buds of plants and stimulates root growth? A. auxins B. estrogen C. cytokinins D. testosterone Answer: A

<b>Standard</b>	33.0 Apply best management practices in landscape design.
<b>Benchmark</b>	33.01 Identify and apply Best Management Practices for the design and installation of landscapes.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)=X (ER)=
<b>Cognitive Complexity Level</b>	L,M
<b>Benchmark Clarification</b>	The student will demonstrate Best Management Practices in the design and construction of landscapes.
<b>Content Focus</b>	Management of fertilization, pruning, vigor, size, form, production, safety, mulching, planting, disposal of material, pesticides and other facets of bmps
<b>Content Limits</b>	The content may include but is not limited to installation, fertilization, pesticide use, material disposal, pruning, safety, design, and production with regards to horticulture.
<b>Stimulus Attributes</b>	The stimulus may include scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may be demonstrated using performance measures; may include identifying appropriate BMPs; may include identifying inappropriate practices.
<b>Sample Item</b>	What is the proper minimum distance liquid fertilizer should be applied from the edge of a waterway? A. 1 foot B. 3 feet C. 6 feet D. 10 feet Answer: B



<b>Standard</b>	34.0 Demonstrate customer service skills that are essential in dealing with clients.
<b>Benchmark</b>	34.01 Demonstrate ability to communicate clearly with the client.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)=X (ER)=
<b>Cognitive Complexity Level</b>	M,H
<b>Benchmark Clarification</b>	The student will employ effective communication skills when dealing with clients.
<b>Content Focus</b>	Communication with clients/customers, proper educate, manners, ethics and/or decorum
<b>Content Limits</b>	The content may include but is not limited to communication skills, techniques, manners, and/or ethics.
<b>Stimulus Attributes</b>	The stimulus may include scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may be demonstrated using performance measures, identifying proper or improper customer relations strategies, techniques, skills, manners, or ethics.
<b>Sample Item</b>	Which factor would be most important for a salesman of retail plants? A. business attire B. hair style C. knowledge of plants D. sales experience Answer: C

<b>Standard</b>	35.0 Apply principles of landscape design and maintenance.
<b>Benchmark</b>	35.02 Demonstrate the principles of design (unity, repetition, balance, emphasis and scale) as they apply to landscapes.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)=X (ER)=X
<b>Cognitive Complexity Level</b>	L,M,H
<b>Benchmark Clarification</b>	The student will apply various principles of landscaping design to the creation of landscapes.
<b>Content Focus</b>	Functional areas, base or foundation plantings, site analyses, inventories, types of plantings, Florida friendly principles, border plantings, screen plantings, line, form, texture, and/or color
<b>Content Limits</b>	The content may include but is not limited to principles of design for residential or commercial landscapes. The content may include but is not limited to plant selection, design types, design processes, and/or functional areas.
<b>Stimulus Attributes</b>	The stimulus may include scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may be demonstrated using performance measures; may include identifying design principles and or types; may include fundamental knowledge of principles of design as they apply to landscapes.
<b>Sample Item</b>	Which is the first step in preparing a landscape design?  A. Shop for plants. B. Perform a site survey. C. Identify the private area. D. Map the property to be landscaped. Answer: D

<b>Standard</b>	35.0 Apply principles of landscape design and maintenance.
<b>Benchmark</b>	35.04 Identify a plant selection for a commercial or residential landscape using Florida Friendly landscape principles
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)= (ER)=X
<b>Cognitive Complexity Level</b>	M,H
<b>Benchmark Clarification</b>	The student will distinguish between different commercial and residential landscape plants guided by Florida Friendly principles.
<b>Content Focus</b>	May include plant species and/or varieties used in residential or commercial landscapes in Florida. May include application of Florida Friendly Principles.
<b>Content Limits</b>	The content may include but is not limited to plant identification, selection, and/or recommendation for commercial or residential applications.
<b>Stimulus Attributes</b>	The stimulus may include scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may be demonstrated using performance measures; may include identification, selection and/or recommendation of plants with regards to Florida-Friendly Landscaping principles.
<b>Sample Item</b>	Which plant would be well suited for an area that floods? A. black gum B. flowering dogwood C. turkey oak D. yew podocarpus Answer: A

<b>Standard</b>	35.0 Apply principles of landscape design and maintenance.
<b>Benchmark</b>	35.05 Create a landscape plan for a residential or commercial property.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)=X (ER)=X
<b>Cognitive Complexity Level</b>	M,H
<b>Benchmark Clarification</b>	The student will design and construct a plan for a residential or commercial landscape.
<b>Content Focus</b>	May include plants used in Florida landscapes, landscape terms, scale, common practices in Florida commercial and or residential landscape. May include <b>Florida</b> Grades and Standards for plants.
<b>Content Limits</b>	The content may include but is not limited to creating a landscape plan or parts of a landscape plan. May include interpreting a landscape plan of parts of a landscape plan.
<b>Stimulus Attributes</b>	The stimulus may include scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may be demonstrated using performance measures.
<b>Sample Item</b>	Which plant would be the best choice for a corner planting in the landscape of a single story house? A. anise B. Hollywood juniper C. laurel oak D. society garlic Answer: B

<b>Standard</b>	36.0 Harvest, transport, and install plant materials.
<b>Benchmark</b>	36.02 Demonstrate proper landscape plant establishment techniques.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)=X (ER)=X
<b>Cognitive Complexity Level</b>	L,M,H
<b>Benchmark Clarification</b>	The student will develop and construct plant landscapes using the appropriate establishment techniques.
<b>Content Focus</b>	Pruning, fertilizing, mulching, sodding, planting, plant selection, procedures, staking, bracing, watering, and others as specified in a landscape plan
<b>Content Limits</b>	The content may include but is not limited to those specified on the landscape plans, fertilization, sodding, mulching, planting, plant selection, planting procedures, watering, staking and/or bracing.
<b>Stimulus Attributes</b>	The stimulus may include scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may be demonstrated using performance measures; may include identifying proper/improper techniques of establishment; may include demonstration of fundamental knowledge of plant establishment techniques.
<b>Sample Item</b>	Which is the acceptable practice when handling and planting balled and burlapped plants? A. Carry the plants by the trunks. B. Remove the burlap prior to planting. C. Allow the woven plastic wraps to remain on the stem. D. Pull back the top one third

<b>Standard</b>	36.0 Harvest, transport, and install plant materials.
<b>Benchmark</b>	36.04 Select horticultural products according to Florida grades and standards.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)=X (ER)=
<b>Cognitive Complexity Level</b>	M,H
<b>Benchmark Clarification</b>	The student will distinguish horticultural products by employing knowledge of Florida's product grades and standards.
<b>Content Focus</b>	Florida Fancy, Florida #1, Florida #2, cull
<b>Content Limits</b>	The content may include but is not limited to application of Florida Grades and Standards to certain plants, pruning, or growth patterns of plants.
<b>Stimulus Attributes</b>	The stimulus may include scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may be demonstrated using performance measures and may include fundamental knowledge of Florida Grades and Standards.
<b>Sample Item</b>	Which is the highest grade, according to Florida Grades and Standards, that a shade tree with co-dominant stems beginning on the lower half of the tree can be graded? A. Florida Fancy B. Florida #1 C. Florida #2 D. cull Answer: C

<b>Standard</b>	37.0 Identify procedures to operate, repair, and maintain tools and equipment.
<b>Benchmark</b>	37.01 Perform equipment pre-operational check.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)=X (ER)=
<b>Cognitive Complexity Level</b>	L,M,H
<b>Benchmark Clarification</b>	The student will demonstrate proper pre-operational and safety check prior to utilizing equipment.
<b>Content Focus</b>	Common equipment or tools used in the horticulture field.
<b>Content Limits</b>	Items may include but are not limited to tools/equipment powered by electricity, gas, diesel, LP, or hand tools, diagnostic instruments, or repair items.
<b>Stimulus Attributes</b>	The stimulus may include scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may be demonstrated using performance measures and may include fundamental knowledge of equipment operation, repair and/or maintenance.
<b>Sample Item</b>	<p>What is an indication that engine oil that has been contaminated with water?</p> <p>A. frothy  B. milky appearance  C. dark brown or black  D. honey-like viscosity  Answer: B</p>

<b>Standard</b>	37.0 Identify procedures to operate, repair, and maintain tools and equipment.
<b>Benchmark</b>	37.02 Identify, maintain, and operate hand tools and power tools.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)=X (ER)=X
<b>Cognitive Complexity Level</b>	L,M,H
<b>Benchmark Clarification</b>	The student will demonstrate the use of hand and power tools.
<b>Content Focus</b>	Sharpening, reconditioning, lubricating or otherwise operating, maintaining and/or operating hand or power tools
<b>Content Limits</b>	The content is limited to tools used in the horticulture industry or tools used to maintain or repair tools used in the horticulture industry.
<b>Stimulus Attributes</b>	The stimulus may include scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may be demonstrated using performance measures.
<b>Sample Item</b>	<p>What should be checked frequently in order to ensure that an air-cooled lawn mower engine does not run too hot?</p> <p>A. block and head fins  B. fan clutch  C. radiator coolant level  D. water pump  Answer: A</p>



<b>Standard</b>	39.0 Demonstrate leadership, employability, communications and human relations skills.
<b>Benchmark</b>	39.05 Discuss education opportunities available in the area of Horticulture.
<b>Item Types</b> (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)=X (ER)=X
<b>Cognitive Complexity Level</b>	L,M,H
<b>Benchmark Clarification</b>	The student will identify educational opportunities that are offered in Horticulture.
<b>Content Focus</b>	Degrees, professional certifications, and/or endorsements
<b>Content Limits</b>	The content may include but is not limited to FNGLA certifications, AA degrees, BS degrees or other pertinent endorsements. The content may include pesticide, fertilizer or other chemical application endorsements.
<b>Stimulus Attributes</b>	The stimulus may include scenarios, pictures, charts, diagrams, and/or tables.
<b>Response Attributes</b>	The response may be demonstrated using performance measures.
<b>Sample Item</b>	What is the length of time between FNGLA horticulture professional certification renewals? A. annually B. three years C. five years D. ten years Answer: B