

# Landscaping II

8039 36 weeks

## Table of Contents

Acknowledgments.....	1
Course Description.....	2
Task Essentials Table.....	2
Curriculum Framework.....	4
SOL Correlation by Task.....	28
FFA Information.....	30
Appendix: Credentials, Course Sequences, and Career Cluster Information.....	31

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## Course Description

**Suggested Grade Level:** 11 or 12

Landscaping II offers skilled workers satisfying career opportunities in varying work environments. The expanding and ever-evolving green industry requires skilled workers for high-demand occupations that offer educational and leadership opportunities. This course focuses on preparing students for entry-level employment in the landscaping industry through hands-on experiences, to include landscape design, installation, and maintenance, incorporating technology, plant and soil science, and utilizing landscaping tools, equipment, and machinery.

*As noted in [Superintendent's Memo #058-17 \(2-28-2017\)](#), this Career and Technical Education (CTE) course must maintain a maximum pupil-to-teacher ratio of 20 students to one teacher, due to safety regulations. The 2016-2018 biennial budget waiver of the teacher-to-pupil ratio staffing requirement does not apply.*

## Task Essentials Table

8039	Tasks/Competencies
<input checked="" type="checkbox"/>	Identify the role of supervised agricultural experiences (SAEs) in agricultural education.
<input checked="" type="checkbox"/>	Participate in an SAE.
<input checked="" type="checkbox"/>	Identify the benefits and responsibilities of FFA membership.
<input checked="" type="checkbox"/>	Describe leadership characteristics and opportunities as they relate to agriculture and FFA.
<input type="checkbox"/>	Apply for an FFA degree and/or an agricultural proficiency award.
<input checked="" type="checkbox"/>	Develop a presentation to highlight a career opportunity in the landscaping industry.

<input checked="" type="radio"/>	Analyze opportunities in continuing education, training, licensure, and certification.
<input checked="" type="radio"/>	Follow safety procedures for personal protection in the landscaping industry.
<input checked="" type="radio"/>	Adhere to safe operation procedures for hand tools, power tools, and landscaping equipment and machinery.
<input checked="" type="radio"/>	Maintain tools and equipment.
<input checked="" type="radio"/>	Research specialty garden styles.
<input checked="" type="radio"/>	Analyze elements of the xerophytic garden.
<input checked="" type="radio"/>	Apply principles of the landscape design process.
<input type="radio"/>	Draw a landscape design, using computer-aided design (CAD).
<input type="radio"/>	Establish requirements of the commercial inventory survey.
<input checked="" type="radio"/>	Design a water feature in the landscape.
<input checked="" type="radio"/>	Design a landscape irrigation system.
<input checked="" type="radio"/>	Design a landscape lighting system.
<input checked="" type="radio"/>	Select plant materials for landscape installation.
<input type="radio"/>	Design interior plantscapes.
<input checked="" type="radio"/>	Develop a landscaping course portfolio.
<input checked="" type="radio"/>	Install plant materials.
<input checked="" type="radio"/>	Outline turf installation methods and procedures.
<input type="radio"/>	Install a landscape irrigation system.
<input type="radio"/>	Install a landscape lighting system.
<input type="radio"/>	Install a water feature in the landscape.
<input checked="" type="radio"/>	Install hardscape options in the landscape.
<input checked="" type="radio"/>	Maintain the landscape using sustainable practices.
<input checked="" type="radio"/>	Maintain landscape plant materials.
<input checked="" type="radio"/>	Research cultural practices to ensure the health of landscape plants.
<input checked="" type="radio"/>	Demonstrate maintenance activities for turf.

<input type="radio"/>	Conduct winterization of the landscape.
<input checked="" type="radio"/>	Describe the landscape contract process (i.e., bidding).
<input checked="" type="radio"/>	Calculate estimated materials needed for a landscaping job using a commercial and/or residential plan.
<input type="radio"/>	Price a landscape maintenance contract.
<input type="radio"/>	Create a business plan for an entrepreneurial landscaping enterprise.
<input type="radio"/>	Research the role of human resources in the landscape industry.
<input checked="" type="radio"/>	Describe the role of professional and trade organizations in the landscaping industry.
<input checked="" type="radio"/>	Describe the legal and ethical responsibilities of managing a landscaping business.
<input checked="" type="radio"/>	Incorporate technology into the landscaping industry.

Legend:  Essential  Non-essential  Omitted

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**Note: Competencies 39-43 have been added to ensure compliance with federal legislation: National FFA Organization's Federal Charter Amendments Act (Public Law 116-7, <https://www.congress.gov/116/plaws/publ7/PLAW-116publ7.pdf>). All inquiries may be sent to [cte@doe.virginia.gov](mailto:cte@doe.virginia.gov). Students are provided opportunities for leadership, personal growth, and career success. Instruction is delivered through three major components: classroom and laboratory instruction, supervised agricultural experience (SAE) program, and student leadership (FFA).**

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# Curriculum Framework

## Task Number 39

### Identify the role of supervised agricultural experiences (SAEs) in agricultural education.

#### Definition

Identification should include

- defining an SAE program as *an opportunity for students to consider multiple careers and occupations in the agriculture, food, and natural resources (AFNR) industries, learn expected workplace behavior, develop specific skills within an industry, and apply academic and occupational skills in the workplace or a simulated workplace environment*
- researching the Foundational SAE

- career exploration and planning
- personal financial planning and management
- workplace safety
- employability skills for college and career readiness
- agricultural literacy
- researching the Immersion SAE
  - entrepreneurship/ownership
  - placement/internships
  - research (experimental, analytical, invention)
  - school business enterprises
  - service learning
- developing a plan to participate in an SAE, based on personal and career goals
- researching available awards and degrees, based on SAE participation.

Teacher resource: [SAE Resources](#), National Council for Agricultural Education

### Process/Skill Questions

- What are examples of SAEs related to this course and in the AFNR industries?
- Where can a copy of the Virginia SAE Record Book be found?
- What is an Immersion SAE?
- How does a placement/internship SAE differ from an ownership/entrepreneurship SAE?
- How does an SAE provide relevant work experience and contribute to the development of critical thinking skills?
- How is the SAE an extended individualized instructional component of a student's Career Plan of Study?
- How can an SAE be used to provide evidence of student growth and participation in authentic, work-related tasks?
- What are the four types of SAEs?
- What are the advantages of participating in work-based learning experiences and projects?
- How does one choose an appropriate SAE in which to participate?

## Task Number 40

### Participate in an SAE.

#### Definition

Participation should include

- developing, completing, or continuing a plan to participate in an SAE as a work-based learning experience, based on personal and career goals
- documenting experience, connections, positions held, and competencies attained, using the *Virginia SAE Record Book*
- researching available awards and degrees, based on SAE participation.

Teacher resources:

[FFA SAE](#)

[The Agricultural Experience Tracker](#)

## Process/Skill Questions

- What are the advantages of participating in work-based learning experiences and projects?
- How do SAEs help prepare students for the workforce?
- What are some examples of SAEs in AFNR?

# Exploring Leadership Opportunities through FFA

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## Task Number 41

### Identify the benefits and responsibilities of FFA membership.

#### Definition

Identification should include

- benefits
  - listing opportunities to participate in community improvement projects and career development events (CDEs) and leadership development events (LDEs)
  - exploring leadership development opportunities
- responsibilities
  - researching the responsibilities of FFA officers, committees, and members
  - locating resources that guide participation in FFA activities
  - explaining the FFA Creed, Motto, Salute, and mission statement
  - explaining the meaning of the FFA emblem, colors, and symbols
  - explaining significant events and the history of the organization.

## Process/Skill Questions

- How does one become an FFA member?
- What is the FFA's mission and how does it accomplish its mission?
- What are the benefits and responsibilities of FFA membership?
- What five FFA activities are available through the local chapter?
- What are some significant events in FFA history? How have these events shaped membership over time?
- What is the FFA program of activities (POA), and how is it used?

## Task Number 42

# **Describe leadership characteristics and opportunities as they relate to agriculture and FFA.**

## **Definition**

Description should include

- examples of successful leaders
- types of leadership
  - autocratic
  - participative
  - laissez-faire
  - servant
  - followership
- positive leadership qualities and traits of successful leaders
- opportunities for participating in leadership activities in FFA
- demonstrating methods for conducting an effective meeting.

## **Process/Skill Questions**

- Who are some successful leaders in the agriculture industry?
- What qualities make a successful leader?
- What are leadership traits?
- What is the difference between positive and negative leadership?

## **Task Number 43**

### **Apply for an FFA degree and/or an agricultural proficiency award.**

## **Definition**

Application should include

- identifying types of FFA degrees
  - Greenhand
  - Chapter
  - State
  - American
- identifying proficiency award areas
  - entrepreneurship
  - placement
  - combined
  - agriscience research
- exploring CDEs and LDEs related to this course
- identifying all SAE criteria to be eligible for the award
- identifying the type of award
- applying for an FFA award.

Teacher resource: [FFA Agricultural Proficiency Awards](#)

## Process/Skill Questions

- Where are the awards and their application criteria located?
- What are the benefits of winning an FFA award?
- What are the benefits and requirements of an FFA degree?
- What FFA awards are available?
- How does the FFA degree program reward FFA members in all phases of leadership, skills, and occupational development?
- What is the highest degree that can be conferred upon an FFA member at the national level?
- What are the requirements for a Greenhand FFA degree?

# Gaining an Overview of the Landscaping Industry

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## Task Number 44

**Develop a presentation to highlight a career opportunity in the landscaping industry.**

### Definition

Development should include

- a description of the selected landscaping career
- the education, skills, attitude, and experience required for the career
- job opportunities, salaries, and benefits
- entrepreneurial and self-employment opportunities.

Many websites offer career exploration resources, including [Virginia Education Wizard](#), the Virginia Department of Education's Career Planning Guide, and the [FFA's Ag Explorer](#).

## Process/Skill Questions

- What are some local career opportunities in each of the landscaping career pathways?
- What level of education is required for careers in each of the landscaping career pathways?
- What are the potential salaries and opportunities for advancement in careers in the landscaping industry?
- What landscaping careers are available through government agencies?
- How would an individual start a landscaping business?
- How will landscaping careers evolve in the future?
- What is the occupational outlook for careers in the landscaping industry?

## Task Number 45



## **Analyze opportunities in continuing education, training, licensure, and certification.**

### **Definition**

Analysis might include

- postsecondary education programs
- employer training and professional growth options
- industry certification options
- Virginia Cooperative Extension services or workshops
- professional conferences
- park and garden classes
- industry field days.

### **Process/Skill Questions**

- How can certifications advance career plans?
- Where in Virginia can one receive an associate or bachelor's degree in horticulture?
- What opportunities are available through the local cooperative extension service?

## **Task Number 46**

## **Follow safety procedures for personal protection in the landscaping industry.**

### **Definition**

Following procedures should include

- identifying requirements related to clothing and personal protective equipment (PPE)
- demonstrating safety procedures when using chemicals, equipment, and other supplies
- completing industry and employer safety certifications.

### **Process/Skill Questions**

- What clothing and equipment are required for personal safety in the landscaping industry?
- How do clothing and equipment keep workers in the landscaping industry safe?
- Why do laws exist regarding safety procedures in the landscaping industry?

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## **Task Number 47**

# **Adhere to safe operation procedures for hand tools, power tools, and landscaping equipment and machinery.**

## **Definition**

Adherence should include

- following classroom and school safety policies
- following manufacturer's guidelines and safety recommendations
- following Occupational Safety and Health Administration (OSHA) standards
- wearing PPE
- being aware of electrical, chemical, and fire hazards
- applying first aid
- using eyewash stations
- reporting personal injuries
- reporting tool and equipment defects.

## **Process/Skill Questions**

- How can one's personal choice of clothing affect the use of landscaping tools and equipment?
  - How do classroom, school safety policies, and industry safety standards help prevent accidents?
  - Where can instructions on safe operation procedures for operating portable or stationary power tools, machinery, and equipment be found?
- 

## **Task Number 48**

### **Maintain tools and equipment.**

#### **Definition**

Maintenance could include

- checking and maintaining the oil level in the engines of power equipment
- checking and maintaining tire pressure on equipment
- maintaining fuel levels and using proper fuel or fuel mixtures
- servicing and maintaining battery and electrical systems
- loading, securing, and transporting equipment
- performing minor tune-ups on engines.

#### **Process/Skill Questions**

- Why is it important to check engine oil levels?
- What are some safety precautions associated with loading, securing, and transporting equipment and machinery?
- What happens if an improperly mixed fuel is used in machinery or equipment?

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# Designing the Landscape

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## Task Number 49

### Research specialty garden styles.

#### Definition

Research should include analyzing the factors behind the creation of specialty gardens and delineating the design elements, signature plant materials, and hardscape features of the following styles:

- Asian gardens
- Tropical gardens
- Sanctuary gardens
- Edible gardens
- Container gardens
- Wheelchair and elderly-accessible gardens
- Children's gardens
- Butterfly gardens
- Rooftop gardens
- Wildlife gardens
- Plant-specific gardens (e.g., herbs, heirloom plants, wildflowers)

#### Process/Skill Questions

- What is the difference between Chinese and Japanese garden styles?
- How can gardens be constructed to accommodate visitors with physical disabilities?
- What elements should be included in a garden devoted to children's horticulture education?
- What features are necessary in a garden to attract wildlife?
- What are the economic and environmental benefits inspiring the development of rooftop gardens?
- What hardscape elements could be included in a sanctuary garden?
- How can container gardening be a good option for urban living?

## Task Number 50

### Analyze elements of the xerophytic garden.

#### Definition

Analysis should include

- identifying the seven principles of xeriscaping, such as
  - planning and design
  - analyzing soil
  - selecting appropriate plants
  - selecting adaptable turf
  - installing suitable irrigation
  - mulching
  - practicing efficient maintenance
- examining the economic incentives for xeriscaping
- comparing the environmental effect of xeriscapes to that of traditional landscapes
- selecting plant materials adaptable to a xeriscaping approach in their hardiness zone.

### **Process/Skill Questions**

- What are common plants in xerophytic gardens, aside from cacti?
- How can turf be used in a xerophytic garden?
- What are some irrigation concerns related to xerophytic gardens?
- How does mulching conserve water?
- What are the financial benefits of using a xerophytic approach to landscaping?
- How is xeriscaping friendly to the environment?

## **Task Number 51**

### **Apply principles of the landscape design process.**

#### **Definition**

Application should include

- evaluating a landscape design, based on the use of balance, focalization, simplicity, rhythm, color, line, proportion, and unity in the plan
- analyzing a landscape using the outdoor room concept
- developing a landscape plan through a series of sequential drawings (e.g., functional, preliminary, final).

#### **Process/Skill Questions**

- How are artistic principles used to evaluate the effectiveness of a landscape design?
- What landscape elements can be used to create outdoor walls, floors, and ceilings?
- How do the functional, preliminary, and final landscape drawings differ?

## **Task Number 52**

### **Draw a landscape design, using computer-aided design (CAD).**

## Definition

Drawing should include

- identifying and using drafting software
- differentiating among plan, elevation, perspective, and axonometric views
- using landscape plan symbols for plant materials and hardscape features
- labeling landscape plans, using a range of lettering styles and methods
- using engineering and architectural scales
- creating a balanced landscape plan incorporating title block, plant material list, and a variety of plan views.

## Process/Skill Questions

- What is the difference between deciduous and evergreen plant symbols?
- How can the size and font of different design elements be manipulated?
- What is the difference between an architectural and engineering scale?
- When are multiple view plans of a landscape feature appropriate?

## Task Number 53

### Establish requirements of the commercial inventory survey.

## Definition

Establishment should include

- interviewing the client to determine planned uses for the property
- determining a budget for the landscape project
- cataloging the natural and man-made features of the planned project site
- researching legal aspects of the site (e.g., property lines, zoning, setbacks, easements, right-of-ways, off-site factors, historical considerations)
- procuring and interpreting topographic information
- creating a base map
- conducting soil sampling to determine the landscape site, nutritional status, and soil type
- identifying climatic concerns (e.g., hardiness zone, site orientation, and microclimates)
- accounting for Environmental Protection Agency (EPA) and sustainability guidelines.

## Process/Skill Questions

- What natural and synthetic features need to be itemized in a site survey?
- How could issues such as zoning, easements, EPA regulations, and property lines be researched?
- What is the difference between a base and topographical map?
- How does soil structure affect plant growth?
- How does a microclimate affect a plant's hardiness?

## Task Number 54

# Design a water feature in the landscape.

## Definition

Design could include documenting the process of

- examining historical uses of water in the landscape
- determining the function of the planned water feature
- comparing formal with informal water feature designs
- investigating construction techniques for water features
- researching filtration systems
- studying the creation of a balanced pond ecosystem through the use of scavengers, fish, and plants
- identifying plant material for the water garden, including floating, marginal, and submerged plants
- examining water quality issues for the ornamental water feature
- outlining seasonal maintenance of water features
- exploring sources of water garden products for pond construction, stocking, and maintenance
- choosing one design from a variety of water features and options.

## Process/Skill Questions

- How has water been used in landscapes over the centuries?
- What are some possible water feature designs?
- How is a waterfall constructed?
- How is water quality maintained in a water feature?
- What types of plants are used in a water garden?
- When are water features considered high-maintenance additions in a garden?
- What are the different types of aquatic plants?

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## Task Number 55

# Design a landscape irrigation system.

## Definition

Design should include

- analyzing the need for irrigation in ornamental landscapes
- identifying the physical components of landscape irrigation systems
- comparing the applications of spray and drip irrigation
- examining the effect of water quality on the operation of irrigation systems
- designing irrigation system layouts
- practicing water pressure calculations
- outlining seasonal maintenance procedures
- describing the importance of a backflow preventer.

## Process/Skill Questions

- Which irrigation systems are environmentally friendly?
- What type of spray patterns can be obtained with sprinkler heads?
- How are irrigation systems prepared for winter?
- What time of day should sprinkler systems be activated?
- Does water pressure change throughout an irrigation system?
- Why is a backflow preventer important? What are the maintenance requirements for it?

## **Task Number 56**

### **Design a landscape lighting system.**

#### **Definition**

Design could include

- identifying the voltage involved in the landscape lighting
- analyzing the purpose of landscape lighting
- identifying the physical components of a landscape lighting system
- demonstrating the different effects achieved by landscape lighting, such as
  - shadow lighting
  - up lighting
  - down lighting
  - silhouette lighting
  - walkway lighting
  - security lighting.

#### **Process/Skill Questions**

- What is the purpose of landscaping lighting, and how can it enhance a landscape design?
- How does landscape lighting increase safety, enhance security, and give the landscape character?
- What level of electrician should install landscape lighting?
- What is the difference between shadow and silhouette lighting?
- Why would a client want landscape lighting controlled by a timer?

## **Task Number 57**

### **Select plant materials for landscape installation.**

#### **Definition**

Selection should include

- keying plants according to their botanical characteristics
- demonstrating an understanding of the binomial system
- identifying plants by their botanical and common names from cuttings, photos, slides, and living specimens

- delineating seasonal features of identified landscape plant materials such as bloom, fruit, fall color, and twig interest
- identifying plants on the Virginia FFA Nursery/Landscape Career Development Event Identification List
- expanding identification knowledge base to include plants on the Virginia Nursery and Landscape Association exam
- visiting botanical gardens and nurseries to expand plant identification knowledge.

### **Process/Skill Questions**

- How does a plant key work?
- Why does the binomial system use Latin?
- How can a plant be identified when the leaves are gone?
- What is the difference between a common box and old English box?
- Where is the nearest public garden?
- Who can take the Virginia Nursery and Landscape Association exam?
- Why is it helpful to know a plant's seasonal characteristics?

## **Task Number 58**

### **Design interior plantscapes.**

#### **Definition**

Design should include

- comparing the environmental variables of interior plantscapes to outdoor landscapes
- evaluating interior light based on intensity, duration, and quality
- exploring the significance of and biological processes behind plant acclimatization for interior plantscape applications
- outlining the installation process for an interior tree
- identifying plant selections for interior plantscapes
- describing the mechanics of watering and providing drainage for interior plantings
- describing special nutritional concerns of interior plantscapes
- identifying maintenance issues of interior plantscapes.

### **Process/Skill Questions**

- What are the career opportunities in the interior plantscape field?
- Which trees and shrubs used in outdoor landscapes can be successful in interior plantscapes?
- What is *acclimatization*?
- How are trees planted inside an enclosed space?
- How do fertilization requirements differ between outdoor plants and interior plants?
- What issues are associated with interior plantings? What are the solutions?

## **Task Number 59**



# Develop a landscaping course portfolio.

## Definition

Development should include

- assembling a collection of landscape drawings such as
  - plan views
  - elevation views
  - perspective views
  - axonometric views
- digitally documenting landscape installations
- providing examples of computer-aided landscape designs and 3D imaging
- incorporating a summary of landscape maintenance projects
- developing recommendations for clients
- publishing the portfolio in digital and hard-copy formats
- distributing the portfolio to potential clients.

## Process/Skill Questions

- When is it appropriate to include digitally created landscape plans in a portfolio?
- How should a landscape portfolio be prepared?
- How can plant material knowledge be showcased in a portfolio?
- How important is the use of color-rendered drawings?

# Installing Landscaping Features

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## Task Number 60

### Install plant materials.

#### Definition

Installation should include

- identifying planting techniques for container, ball-and-burlapped, and bare-root plants
- taking steps to prevent root girdling
- amending backfill soil
- identifying the tools needed for installing bulbs, groundcovers, shrubs, trees, and large specimens
- identifying planting guides/charts for installing flower bulbs
- outlining the approach to installing ground covers
- comparing the seasonal installations of bare-root, container, and ball-and-burlapped plant materials
- analyzing post-transplant procedures including staking, trunk wrapping, and the use of antitranspirants
- watering and caring for plants.

## Process/Skill Questions

- What does *B&B* represent?
  - How should backfill soil be amended before refilling the transplant hole?
  - What special tools are helpful when planting bulbs?
  - When are the optimal times and conditions for transplanting?
  - What is *root girdling*?
- 

## Task Number 61

### Outline turf installation methods and procedures.

#### Definition

Outline should include

- identifying turf species
- listing and interpreting label information required for seed packaging
- reviewing soil preparation methods for turf installation
- comparing seeding, sprigging, plugging, and sodding installation methods
- researching methods of grading
- delineating drainage systems for turf installations.

#### Process/Skill Questions

- What are warm- and cool-season grasses?
  - What are the parts of a grass plant?
  - What equipment is needed to sow grass seed?
  - What are the differences between sprigs and plugs?
  - How is sod produced?
  - Why are drainage systems installed in turf installations?
  - What would dictate what grade to use?
- 

## Task Number 62

### Install a landscape irrigation system.

#### Definition

Installation should include

- analyzing the need for irrigation in ornamental landscapes
- identifying the physical components of landscape irrigation systems

- comparing the applications of spray and drip irrigation
- examining the effect of water quality on the operation of irrigation systems
- designing irrigation system layouts
- practicing water pressure calculations
- outlining seasonal maintenance procedures
- describing the importance of a backflow preventer.

### **Process/Skill Questions**

- Which irrigation systems are the most environmentally friendly?
- What type of spray patterns can be obtained with sprinkler heads?
- How are irrigation systems prepared for winter?
- What time of day should sprinkler systems be activated?
- Does water pressure change throughout an irrigation system?
- Why is a backflow preventer important? What are the maintenance requirements for it?

## **Task Number 63**

### **Install a landscape lighting system.**

#### **Definition**

Installation should include

- identifying the voltage involved in landscape lighting
- analyzing the purpose of landscape lighting
- identifying the physical components of a landscape lighting system
- demonstrating the different effects achieved by landscape lighting, such as
  - shadow lighting
  - up lighting
  - down lighting
  - silhouette lighting
  - walkway lighting
  - security lighting.

### **Process/Skill Questions**

- Where can supplies for landscaping lighting be purchased?
- What could be the outcome of improperly installed landscape lighting?
- What determines the selection of the type of landscape lighting used?
- Why would a client want landscape lighting controlled by a timer?

## **Task Number 64**

### **Install a water feature in the landscape.**

#### **Definition**

Installation could include

- researching the historical uses of water features in landscape design
- determining the function of the planned water feature
- comparing formal with informal water feature designs
- investigating the construction techniques for water features
- researching filtration systems
- studying the creation of a balanced pond ecosystem through the use of scavengers, fish, and plants
- identifying plant material for the water garden, including floating, marginal, and submerged plants
- examining water quality issues with various water features
- outlining seasonal maintenance of water features
- exploring the sources of water garden products for pond construction, stocking, and maintenance
- choosing one design from a variety of water features and options
- incorporating one or more of the following
  - a fountain
  - a pond
  - a stream
  - a disappearing stream
  - a dry stream bed
  - pumps, motors, electronics, and a filtration system.

### **Process/Skill Questions**

- How does one determine whether to use formal or informal water feature designs in a landscape?
- What are the factors to consider when choosing plant material for a water garden?
- What is included in the seasonal maintenance of water features in a water garden?

## **Task Number 65**

### **Install hardscape options in the landscape.**

#### **Definition**

Installation could include

- identifying construction materials for
  - pavement
  - fences
  - retaining walls
  - steps
  - decks
  - patios
  - pergolas
  - trellises
  - bridges
  - arbors
- comparing installation costs, aesthetics, maintenance, and longevity of various hardscape elements
- calculating the riser-tread ratio of steps

- determining the necessary height of a privacy enclosure based on the line of sight.

### **Process/Skill Questions**

- What materials can be used to surface a walkway?
- Why is the riser-tread ratio of steps significant?
- What elements influence the maintenance of a wooden fence?
- Which would be more expensive to install, a redwood deck or a flagstone patio?
- How tall should a fence be to ensure privacy?

## **Maintaining the Landscape**

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### **Task Number 66**

#### **Maintain the landscape using sustainable practices.**

##### **Definition**

Maintenance should include

- using native plants, when possible
- reducing the use of pesticides and fertilizers
- designing tree placement to influence heating and cooling
- composting
- preventing runoff

##### **Process/Skill Questions**

- Why should one consider using native plants in the landscape?
  - How can trees be planted to reduce home heating and cooling costs?
  - What landscaping techniques could be used to prevent runoff?
  - Why is it important to prevent runoff when designing a landscape?
- 

### **Task Number 67**

#### **Maintain landscape plant materials.**

##### **Definition**

Maintenance should include

- reviewing the options in plant nutrition and soil analysis methods
- outlining mulching procedures and comparing mulching products
- describing the methods for edging plant beds
- identifying when and where edging is erroneous
- researching tools, techniques, and timing of pruning practices
- delineating the options of weed management
- identifying water requirements based on plant maturity and climate conditions.

### **Process/Skill Questions**

- When should evergreen trees be pruned?
- What are some mechanical ways of edging plant beds?
- How can weeds be prevented?
- Why are white rocks comparable to using mulch?
- How effective are fertilizer stakes?

## **Task Number 68**

### **Research cultural practices to ensure the health of landscape plants.**

#### **Definition**

Research should include

- identifying Integrated Pest Management (IPM) procedures
- identifying pesticide certification programs
- identifying common landscape-plant injuries (and recommended treatment), including those resulting from
  - mowers and mechanical equipment
  - snow, ice, wind, sun scald, hail, and soil heaving
  - drought
  - fertilizer burn
  - chemical injury
  - nutrient deficiencies
  - vandalism
  - incorrect light exposure
  - poor drainage
- identifying common landscape plant pests (and recommendations for management), such as
  - insects
  - mites
  - fungi
  - bacteria
  - viruses
  - nematodes
  - rodents, rabbits, and deer
  - parasitic plants

- identifying landscape winterization procedures.

## Process/Skill Questions

- What nutrient is in short supply when a plant's leaves are yellowing between the veins?
- What pests could cause holes in hosta leaves?
- How are viruses transmitted among plants?
- What alternatives to pesticides are there to deter insects and animals?

## Task Number 69

### Demonstrate maintenance activities for turf.

#### Definition

Demonstration should include

- describing aeration rationale and equipment
- identifying mowing equipment
- explaining mowing recommendations for a range of turf varieties
- demonstrating lawn renovation practices
- describing control measures for thatch buildup
- identifying a pest management program
- identifying turf disease management program
- demonstrating soil testing
- explaining soil nutrition, such as
  - fertilizer analysis
  - value of trace elements
  - nitrogen formulations
  - fertilization schedules
  - fertilizer application rates
  - fertilizer applicators
- demonstrating proper watering techniques based on turfgrass species.

#### Process/Skill Questions

- What is *lawn striping*?
- What is wrong with mowing grass close to the ground to achieve a clipped appearance?
- What can happen if a lawn is overseeded in the summer?
- Why do some fertilizers take additional time before becoming active?
- When should a vertical mower be used for mowing steep slopes?
- How do Japanese beetles affect turf?
- What considerations should be taken when deciding whether to rake grass clippings?

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## Task Number 70

# Conduct winterization of the landscape.

## Definition

Conducting winterization should include

- identifying plants likely to suffer winter damage
- prescribing prevention or control
- procedures for the following examples of winter injury:
  - Ice or heavy snow damage
  - Salt damage on hardscape features and plants
  - Windburn
  - Sunscald
  - Heaving

## Process/Skill Questions

- Why do homeowners wrap boxwoods in burlap?
- What parts of the plant receive sunscald?
- Which plants are susceptible to heaving?
- How can plants be protected from heavy snows?
- Which type of plants are most susceptible to ice damage?

# Managing a Landscape Enterprise

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## Task Number 71

### Describe the landscape contract process (i.e., bidding).

#### Definition

Description should include

- identifying avenues of surfacing landscape projects for bidding
- listing the components of standard contracts
- distinguishing between prime contractors and subcontractors
- itemizing the documents to be included in a bid package
- analyzing input costs to be considered in estimating a bid
- identifying sources for procuring standard contracting forms
- analyzing the effect of a contract specifications on landscape project quality
- reviewing the *American Standard for Nursery Stock*, a uniform industry reference on sizing of plant materials.

#### Process/Skill Questions



- How are bids solicited for public projects?
- How does a landscape contractor become bonded?
- How is the life expectancy of equipment factored into a bid estimate?
- What references are available to estimate costs in a landscape bid?
- Why would a landscaper employ subcontractors on a project?
- Why are contract specifications important?
- What is a *project manual*?

## Task Number 72

### Calculate estimated materials needed for a landscaping job using a commercial and/or residential plan.

#### Definition

Calculation should include

- defining the term *take-off* as it applies to estimating construction costs
- completing quantity calculations of plants, hardscape supplies, and turf
- completing time calculations for installing segments of the landscape project
- completing linear, surface area, cubic volume, and conversion calculations
- completing soil compaction calculations
- completing pit and ball calculations.

#### Process/Skill Questions

- What are the number of 15' x 12' sod rolls that will be needed to cover an area 20' x 50'?
- How many cubic yards of mulch will be needed to cover a bed 22' x 55' to a depth of 3"?
- Why are pit and ball calculations necessary?
- What happens to the soil that does not fit back in a hole after a plant is installed?
- What is the labor cost of two employees making \$12 per hour, with the ability to install one tree in 45 minutes, when the project requires the installation of 22 trees?

## Task Number 73

### Price a landscape maintenance contract.

#### Definition

Pricing a contract includes

- itemizing the tasks to be performed
- estimating the number of times a service will be performed
- estimating the employee time required to complete tasks
- calculating the cost of supplies and equipment expenses related to the task
- measuring the size of a property
- incorporating a reasonable rate of return on investment

- preparing a maintenance contract document
- establishing contacts for maintenance contracts through media and industry outlets
- investigating tasks that can be completed by maintenance firms in the off-season (e.g., snow removal, holiday lighting or decorating).

### **Process/Skill Questions**

- What equipment is needed to establish a landscape maintenance business?
- What are some methods to expand a client list?
- What is a typical profit margin in the landscape maintenance business?
- What maintenance tasks need to be performed in the off-season?
- What does *seasonal color* mean?

## **Task Number 74**

### **Create a business plan for an entrepreneurial landscaping enterprise.**

#### **Definition**

Creation should include

- investigating sole proprietorship, partnership, and corporate structures for a business organization
- researching lending sources for small businesses and determining capital needs
- analyzing the market for potential competition of proposed services
- considering personnel requirements for a proposed enterprise
- projecting cash flow and pricing structures
- researching equipment and supply vendors.

### **Process/Skill Questions**

- What is the age when an individual can start a business?
- What are the differences among a sole proprietorship, a partnership, and a corporation?
- Which companies sell landscape equipment?
- How are potential employees identified?
- Who would loan money to a start-up business, other than a bank?
- How can a landscape entrepreneur plan for fluctuations within the industry?

## **Task Number 75**

### **Research the role of human resources in the landscape industry.**

#### **Definition**

Research should include how a human resources department works to

- analyze the available labor supply for the landscaping industry
- outline landscaping career opportunities

- identify employee recruiting techniques
- adhere to state and federal regulations regarding employment
- analyze horticulture, communication, and computer skills needed for successful employment in the landscape industry
- analyze benefit packages offered in the landscape industry
- review personal résumés and cover letters
- interview job candidates
- interview landscape employers regarding the qualities desired in employees.

### **Process/Skill Questions**

- What skills do employers consider crucial to job success?
- What information should be included on a résumé?
- What are the predictable questions in an interview?
- What resources are available to assist in the job search?

## **Task Number 76**

### **Describe the role of professional and trade organizations in the landscaping industry.**

#### **Definition**

Description should include

- distinguishing between professional and trade organizations
- researching websites of professional and trade organizations for opportunities and membership information
- analyzing the role these organizations play in
  - industry research
  - information dissemination
  - political lobbying
  - job placement
  - educational programs
  - publications
  - conference sponsorship
  - educational scholarship programs.

### **Process/Skill Questions**

- How might one receive funding to attend professional conferences?
- What are the typical membership fees in professional organizations?
- Why would the landscaping industry want to lobby legislatures?
- What is an example of a professional landscaping organization?

## **Task Number 77**

# **Describe the legal and ethical responsibilities of managing a landscaping business.**

## **Definition**

Description should include

- outlining the ways in which the government affects business operations
- researching state and national governmental bodies, which oversee landscaping businesses
- explaining the purpose of SDS
- reviewing workers' compensation guidelines.

## **Process/Skill Questions**

- What does OSHA represent?
- How should companies communicate with employees on workplace safety issues?
- What does SDS represent?
- Who pays for workers' compensation in the case of a workplace accident?

# **Task Number 78**

## **Incorporate technology into the landscaping industry.**

### **Definition**

Incorporating technology should include

- identifying the role of technology in business processes for a landscape firm
- outlining applications of technology in the project estimating process
- using CAD software in producing landscape plans
- demonstrating the effect of computer imaging software in marketing landscape plans
- exploring the role of the Internet in procurement of landscape plant materials and hard goods
- demonstrating the use of technology in the selection of plant materials
- identifying the use of drones.

### **Process/Skill Questions**

- What types of technology can be applied to the accounting, payroll, billing, inventory control, and business correspondence of a landscape firm?
- What opportunities do CAD programs offer as compared to traditional drafting techniques?
- What are commercial applications of computer imaging software in the landscaping industry?
- How do landscape supply firms utilize the Internet in marketing their products?

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## **SOL Correlation by Task**

39	Identify the role of supervised agricultural experiences (SAEs) in agricultural education.	English: 11.3, 11.5, 12.3, 12.5
40	Participate in an SAE.	English: 11.5, 11.8, 12.5, 12.8
41	Identify the benefits and responsibilities of FFA membership.	English: 11.5, 11.6, 11.7, 11.8, 12.5, 12.6, 12.7, 12.8
42	Describe leadership characteristics and opportunities as they relate to agriculture and FFA.	English: 11.5, 12.5 History and Social Science: VUS.8, VUS.9, VUS.10, VUS.11, WHII.8, WHII.10, WHII.11
43	Apply for an FFA degree and/or an agricultural proficiency award.	English: 11.5, 12.5
44	Develop a presentation to highlight a career opportunity in the landscaping industry.	English: 11.5, 12.5
45	Analyze opportunities in continuing education, training, licensure, and certification.	English: 11.5, 12.5
46	Follow safety procedures for personal protection in the landscaping industry.	English: 11.5, 12.5 History and Social Science: GOVT.16
47	Adhere to safe operation procedures for hand tools, power tools, and landscaping equipment and machinery.	English: 11.5, 11.8, 12.5, 12.8 History and Social Science: GOVT.16
48	Maintain tools and equipment.	
49	Research specialty garden styles.	English: 11.5, 11.8, 12.5, 12.8
50	Analyze elements of the xerophytic garden.	English: 11.5, 12.5
51	Apply principles of the landscape design process.	English: 11.5, 12.5
52	Draw a landscape design, using computer-aided design (CAD).	English: 11.5, 11.6, 11.7, 12.5, 12.6, 12.7 Mathematics: G.3
53	Establish requirements of the commercial inventory survey.	English: 11.1, 11.5, 11.6, 11.7, 11.8, 12.1, 12.5, 12.6, 12.7, 12.8
54	Design a water feature in the landscape.	English: 11.5, 11.8, 12.5, 12.8 Science: BIO.8
55	Design a landscape irrigation system.	English: 11.5, 11.6, 11.7, 12.5, 12.6, 12.7
56	Design a landscape lighting system.	English: 11.5, 12.5
57	Select plant materials for landscape installation.	English: 11.5, 12.5 Science: BIO.4, BIO.8
58	Design interior plantscapes.	English: 11.5, 11.6, 11.7, 12.5, 12.6, 12.7 Science: BIO.8
59	Develop a landscaping course portfolio.	English: 11.1, 11.5, 11.6, 11.7, 12.1, 12.5, 12.6
60	Install plant materials.	English: 11.5, 11.6, 11.7, 12.5, 12.6, 12.7
61	Outline turf installation methods and procedures.	English: 11.5, 11.6, 11.7, 11.8, 12.5, 12.6, 12.7, 12.8
62	Install a landscape irrigation system.	English: 11.5, 11.6, 11.7, 12.5, 12.6, 12.7
63	Install a landscape lighting system.	English: 11.5, 11.6, 11.7, 12.5, 12.6, 12.7
64	Install a water feature in the landscape.	English: 11.5, 11.6, 11.7, 12.5, 12.6, 12.7

65	Install hardscape options in the landscape.	English: 11.5, 12.5 Mathematics: G.8
66	Maintain the landscape using sustainable practices.	Science: BIO.8
67	Maintain landscape plant materials.	
68	Research cultural practices to ensure the health of landscape plants.	English: 11.5, 11.6, 11.7, 11.8, 12.5, 12.6, 12.7, 12.8 Science: BIO.4
69	Demonstrate maintenance activities for turf.	English: 11.5, 12.5
70	Conduct winterization of the landscape.	English: 11.5, 12.5
71	Describe the landscape contract process (i.e., bidding).	English: 11.5, 11.6, 11.7, 12.5, 12.6, 12.7
72	Calculate estimated materials needed for a landscaping job using a commercial and/or residential plan.	English: 11.3, 12.3
73	Price a landscape maintenance contract.	English: 11.8, 12.8
74	Create a business plan for an entrepreneurial landscaping enterprise.	English: 11.5, 11.6, 11.7, 11.8, 12.5, 12.6, 12.7, 12.8
75	Research the role of human resources in the landscape industry.	English: 11.5, 11.6, 11.8, 12.5, 12.6, 12.8
76	Describe the role of professional and trade organizations in the landscaping industry.	English: 11.5, 11.8, 12.5, 12.8
77	Describe the legal and ethical responsibilities of managing a landscaping business.	English: 11.5, 11.6, 11.7, 11.8, 12.5, 12.6, 12.7, 12.8
78	Incorporate technology into the landscaping industry.	English: 11.2, 11.5, 11.6, 11.7, 11.8, 12.5, 12.6, 12.7, 12.8

## FFA Information

The National FFA is an organization dedicated to preparing members for leadership and careers in the science, business, and technology of agriculture. Local, state, and national activities and award programs provide opportunities to apply knowledge and skills acquired through agriculture education.

For additional information about the student organization, see the [National FFA website](#) and the [Virginia FFA Association website](#).

## Entrepreneurship Infusion Units

Entrepreneurship Infusion Units may be used to help students achieve additional, focused competencies and enhance the validated tasks/competencies related to identifying and starting a new business venture. Because the unit is a complement to certain designated courses and is not mandatory, all tasks/competencies are marked “optional.”

# Appendix: Credentials, Course Sequences, and Career Cluster Information

## Industry Credentials: Only apply to 36-week courses

- Certified Grounds Technician Test
- Certified Turfgrass Professional Examination
- Chesapeake Bay Landscape Professional, Associate (CBLP-A) Examination
- College and Work Readiness Assessment (CWRA+)
- Customer Service Examination
- Customer Service Specialist (CSS) Examination
- Horticulture-Landscaping Assessment
- Landscape Management Certification Examination
- National Career Readiness Certificate Assessment
- Urban Forestry Certification Test
- Workplace Readiness Skills for the Commonwealth Examination

**Concentration sequences:** *A combination of this course and those below, equivalent to two 36-week courses, is a concentration sequence. Students wishing to complete a specialization may take additional courses based on their career pathways. A program completer is a student who has met the requirements for a CTE concentration sequence and all other requirements for high school graduation or an approved alternative education program.*

- Agricultural Business Fundamentals I (8022/36 weeks)
- Agricultural Business Management III (8026/36 weeks)
- Agricultural Business Operations II (8024/36 weeks)
- Applied Agricultural Concepts (8072/18 weeks)
- Applied Agricultural Concepts (8073/36 weeks)
- Floriculture (8038/36 weeks)
- Greenhouse Plant Production and Management (8035/36 weeks)
- Horticulture Sciences (8034/36 weeks)
- Introduction to Plant Systems (8007/36 weeks)
- Landscaping I (8036/36 weeks)
- Turfgrass Management (8051/36 weeks)
- Turfgrass Management, Advanced (8054/36 weeks)

Career Cluster: Agriculture, Food and Natural Resources	
Pathway	Occupations
Environmental Service Systems	Environmental Compliance Inspector Environmental Sampling and Analysis Technician
Plant Systems	Botanist Plant Breeder/ Geneticist Tree Surgeon