

# Agriscience & Technology

**8001 18 weeks**

**8004 36 weeks**

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## Course Description

**Suggested Grade Level: 8**

Through classroom instruction and hands-on laboratory activities, students will explore the fields of agriculture, food, and natural resources (AFNR), to include: global agriculture; new and emerging technologies; agricultural mechanics; and careers in agribusiness; animal systems; environmental services; food products and processing; natural resources systems; plant systems; and power, structural, and technical systems.

*Note: Completer sequences and certifications do not apply.*

## Task Essentials Table

8004	8001	Tasks/Competencies
+	+	Identify the role of supervised agricultural experiences (SAEs) in agricultural education.
+	+	Participate in an SAE.
+	+	Identify the benefits and responsibilities of FFA membership.
+	+	Describe leadership characteristics and opportunities as they relate to agriculture and FFA.
○	○	Apply for an FFA degree and/or an agricultural proficiency award.
+	+	Identify class rules, safety precautions, and procedures.
+	+	Explore new and emerging technologies in agriculture and agriscience.
+	+	Identify the components of an agricultural/agriscience research project.

<input checked="" type="radio"/>	<input checked="" type="radio"/>	Identify safety procedures in performing experiments.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Perform an agriculture/agriscience experiment.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Define terms related to trade.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Explore global agriculture.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Explain the relationship of global trade to Virginia agriculture.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Identify the significance of agribusiness in agriscience.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Identify types of agribusiness.
<input checked="" type="radio"/>	<input type="radio"/>	Identify risks inherent in agribusiness.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Identify characteristics of an entrepreneur.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Explore career opportunities related to agriculture, food, and natural resources (AFNR).
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Demonstrate safety practices.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Demonstrate measuring skills.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Interpret plans for constructing an agriculture project.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Identify new and emerging equipment and tools in agriscience.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Identify portable hand tools, portable power tools, equipment, and accessories.
<input checked="" type="radio"/>	<input type="radio"/>	Demonstrate the use of hand tools, portable power tools, equipment, and accessories.
<input checked="" type="radio"/>	<input type="radio"/>	Demonstrate woodworking skills.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Explain the principles of electricity.
<input checked="" type="radio"/>	<input type="radio"/>	Demonstrate basic electrical wiring skills.
<input type="radio"/>	<input type="radio"/>	Shape metal.
<input type="radio"/>	<input type="radio"/>	Explain the arc-welding process.
<input type="radio"/>	<input type="radio"/>	Operate arc-welding equipment.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Explain the operating principles of small engines.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Categorize breeds of animals.
<input checked="" type="radio"/>	<input type="radio"/>	Identify equipment used in the care of companion and/or livestock animals.
<input checked="" type="radio"/>	<input type="radio"/>	Evaluate types of companion and/or livestock animal feed.

<input checked="" type="radio"/>	<input type="radio"/>	Explore healthcare and maintenance practices for companion and/or livestock animals.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Identify the importance of natural resource management.
<input type="radio"/>	<input type="radio"/>	Determine the volume and value of timber.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Identify Virginia trees as sawtimber, pulpwood, and/or ornamentals.
<input type="radio"/>	<input type="radio"/>	Explain soil fertility.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Discuss the importance of water to agriculture.
<input checked="" type="radio"/>	<input type="radio"/>	Analyze a water sample.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Identify common garden, landscape, and interior plants.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Describe integrated pest management.
<input type="radio"/>	<input type="radio"/>	Explore the principles of floral design.
<input type="radio"/>	<input type="radio"/>	Explore the principles of landscape design.
<input type="radio"/>	<input type="radio"/>	Identify common horticultural and landscape tools, equipment, technologies, and practices.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Explore the food industry as it relates to agriculture, agriscience, and agribusiness.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Research foodborne illnesses.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Describe methods of food processing and preservation.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Explain food labels.

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/pub17/PLAW-116pub17.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 31

# 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 32

# 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](#)

[Virginia SAE Record Book](#)

## 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 33

### 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 34**

### **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 35**

### **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?

## **Becoming Oriented to Agriscience Technology**

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### **Task Number 36**

**Identify class rules, safety precautions, and procedures.**

#### **Definition**

Identification of rules, safety precautions, and procedures includes

- following teacher, school, and division guidelines
- locating posted rules and safety procedures.

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

- How can a student contribute to a positive classroom atmosphere?



- How do classroom rules prepare students for the workplace?

## **Task Number 37**

### **Explore new and emerging technologies in agriculture and agriscience.**

#### **Definition**

Exploration includes one or more of the following:

- Agribusiness
- Animal systems
- Environmental services
- Food products and processing
- Natural resources systems
- Plant systems
- Power, structural, and technical systems

Exploration also includes

- defining *agriscience* and *technology*
- citing technology applications in AFNR
- demonstrating the use of technology in AFNR
- exploring alternative uses of technology for the future.

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

- How have technologies related to agriculture changed over time? How have the skills that workers need for employment changed?
- What are some ethical issues animal scientists must consider when exploring new technologies?
- How does plant science research affect consumers?
- How might new technologies help the farmer? The consumer?
- What are some recent advances in agricultural marketing?
- How is technology used in agriscience and agriculture?
- How are mobile devices used in agricultural practices today?
- How are drones, satellite/navigation systems, and 3D printers used in agriscience and agriculture?

## **Task Number 38**

### **Identify the components of an agricultural/agriscience research project.**

#### **Definition**

Identification includes

- defining *scientific method*
- listing the steps in the scientific method
- explaining the function of each step in the scientific method
- investigating the Virginia FFA Organization's Agriscience Fair requirements and certifications.

### **Process/Skill Questions**

- What are the steps in the scientific method?
- How is a hypothesis written?
- What are effective ways of collecting and presenting data?
- What is a variable? What is the difference between an independent variable and a dependent variable?

## **Task Number 39**

### **Identify safety procedures in performing experiments.**

#### **Definition**

Identification includes safety practices and procedures when conducting experiments.

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

- What should be done if an accident were to occur in the laboratory during an experiment?
- How might one persuade classmates to adhere to safety procedures and practices during an experiment?
- Where can one locate the Agriscience Fair Program Handbook?

## **Task Number 40**

### **Perform an agriculture/agriscience experiment.**

#### **Definition**

Performance includes

- demonstrating safety procedures and practices
- defining a problem/question
- developing a hypothesis
- identifying the experimental variables
- identifying the constants
- collecting data
- analyzing the results of the experiment
- forming conclusions based on results of the experiment.

Performance may also include

- graphing results
- communicating findings

- preparing a written report for a science project, as stated in the [Virginia FFA Organization's Agriscience Fair](#) materials.

## Process/Skill Questions

- What can be learned from the experiment and applied to the next experiment?
- What was surprising about the experiment?

# Understanding Global Agriculture

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## Task Number 41

### Define terms related to trade.

#### Definition

Definition includes terms such as

- *economics*
- *export*
- *import*
- *supply and demand*
- *tariff*
- *commodity*
- *trade balance*
- *sustainability*.

Definition may also include

- how the terms apply to international agriculture
- examples of exported and imported products and a description of the value of exports and imports to agriculture
- discussion of the purpose and types of tariffs
- description of non-tariff trade barriers
- discussion of the function of the World Trade Organization (WTO).

## Process/Skill Questions

- What are some current controversial issues regarding trade with other countries?
- What products are not available in the United States because they are not currently being imported?
- How have trade decisions affected AFNR businesses in Virginia?

## Task Number 42

## **Explore global agriculture.**

### **Definition**

Exploration includes

- types of agriculture around the world
- effects of elements such as climate, soil, water availability, and topography
- global agricultural production
- the role of agriculture globally
- the role of global environmental protection and best management practices (BMPs).

### **Process/Skill Questions**

- How are other countries similar and different from the United States in terms of agricultural production?
- Why is global agriculture important?
- How do environmental and cultural factors influence agricultural production and practices in different regions?
- What are the effects of global agriculture on the economy in Virginia (or the United States)?

## **Task Number 43**

### **Explain the relationship of global trade to Virginia agriculture.**

#### **Definition**

Explanation includes

- a description of the effect of trade on Virginia's economy
  - positive effects (e.g., wider market for Virginia producers)
  - negative effects (e.g., invasive species)
- the identification of exported and imported products at the local and state level
- the identification of countries that trade with Virginia
- a description of the influence of Virginia's port.

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

- How would Virginia agriculture be different if the state did not participate in international trade?
- What are the key commodities exported globally from Virginia?
- What percentage of Virginia's agricultural commodities are imported? Exported?

## **Understanding AFNR Businesses**

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## Task Number 44

### Identify the significance of agribusiness in agriscience.

#### Definition

Identification includes

- defining *agribusiness*
- defining *free enterprise*
- describing the importance and scope of agribusiness.

#### Process/Skill Questions

- What new agribusinesses have started within the past five years?
- What is the difference between agriculture and agribusiness?

## Task Number 45

### Identify types of agribusiness.

#### Definition

Identification includes agribusinesses in the community and terms such as *agritourism*, *agritainment*, the *agriservice sector*, and the importance of these within the community and economy.

Identification also includes the following:

- Agribusiness
- Animal systems
- Environmental services
- Food products and processing
- Natural resources systems
- Plant systems
- Power, structural, and technical systems

#### Process/Skill Questions

- What local agribusinesses exist?
- How has the economy changed in the past century? How can agricultural businesses succeed in a changing economy?

## Task Number 46

### Identify risks inherent in agribusiness.

## Definition

Identification includes

- cybersecurity risks
- biosecurity risks (e.g., salmonella outbreaks)
- bioterrorism
- environmental effects
- consumer (mis)perceptions
- liability.

## Process/Skill Questions

- What Internet agribusinesses are popular?
- How does media and marketing affect consumers and producers?

## Task Number 47

### Identify characteristics of an entrepreneur.

#### Definition

Identification includes

- defining *entrepreneur* and *entrepreneurship*
- discussing advantages, challenges, and disadvantages of entrepreneurship
- identifying entrepreneurial businesses
- evaluating personal potential as an entrepreneur.

## Process/Skill Questions

- What are the advantages and disadvantages of being an entrepreneur?
- What are the characteristics of a successful entrepreneur? What skills are necessary to be successful?
- How can entrepreneurship relate to an SAE?

## Task Number 48

### Explore career opportunities related to agriculture, food, and natural resources (AFNR).

#### Definition

Exploration includes

- listing possible AFNR careers related to this course
- describing each career and the education and experience required

- exploring job opportunities, salaries, working conditions, and benefits.

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

Additional teacher resources: [Advance CTE AFNR Career Cluster](#) information; [AgCareers.com](#); [Career in STEM: Animal Scientist](#); [O\\*Net Online](#), [U.S. Department of Labor](#)

## Process/Skill Questions

- What are some local career opportunities in each of the AFNR career pathways?
- What level of education is required for various careers in each of the AFNR career pathways?
- What are the potential salaries and opportunities for advancement in various careers in the agriculture industry?
- What AFNR careers are available in government agencies?
- How would an individual start his/her own AFNR business?
- What are some careers related to this course?

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# Understanding Agricultural Mechanics

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## Task Number 49

### Demonstrate safety practices.

#### Definition

Demonstration includes

- explaining the importance of safety
- describing safety practices and procedures for using hand tools, portable power tools and equipment
- describing safety practices and procedures when working with animals
- describing safety practices and procedures when applying chemicals and combustibles
- describing safety practices and procedures when working with plants
- using personal protective equipment (PPE) and safety data sheets (SDS) as required
- passing all safety tests with a score of 100 percent.

Safety tests must cover all tools and equipment used in this course and ensure that students know the parts of each tool and piece of equipment used and the procedures for using each piece of equipment. Additionally, students must demonstrate safe operation.

## Process/Skill Questions

- What are possible consequences of a situation when safety practices are not followed?
- Why is laboratory safety important for all individuals in the area?
- Why is respiratory protection important?
- Why is it important to adjust the fit of safety goggles?
- When should hearing protection be used?
- What types of PPE are used to protect the skin?
- Why is it important to remove jewelry prior to working in the lab?
- What is the importance of selecting the right tool for the job being performed?
- Why is it important to ensure animal well-being when handling animals?
- What is the American National Standards Institute (ANSI)? What does ANSI Z87+ represent on safety glasses?
- What are physical, chemical, fire, and biological hazards?

## Task Number 50

### Demonstrate measuring skills.

#### Definition

Demonstration includes

- defining terminology related to measurement
- identifying common units of measurement
- comparing the U.S. customary system and the metric system
- choosing appropriate measuring devices and units for the task
- measuring length to the nearest 16th of an inch.

## Process/Skill Questions

- What is the importance of measurement?
- What are various consequences of not measuring correctly?
- When do the differences between the U.S. customary system and the metric system present challenges?
- What are the common units of length, weight, mass, and capacity used in the U.S. customary and metric systems of measurement?

## Task Number 51

### Interpret plans for constructing an agriculture project.

#### Definition

Interpretation includes



- identifying materials and supplies needed
- reading project plans
- identifying steps in the construction of an agricultural project.

### **Process/Skill Questions**

- What are some problems one may encounter in interpreting plans? What resources (including people) may help resolve those problems?
- Why are accurate measurements so important?

## **Task Number 52**

### **Identify new and emerging equipment and tools in agriscience.**

#### **Definition**

Identification may include

- tools for deoxyribonucleic acid (DNA) analysis, modification, and forensics
- global positioning systems (GPS)
- robotics
- drones
- artificial intelligence (AI)
- apps
- 3D-printer technology
- precision agriculture.

### **Process/Skill Questions**

- How are drones used in agriculture?
- What are examples of how 3D-printed items can be used in agriscience?
- How has GPS technology affected agriculture?

## **Task Number 53**

### **Identify portable hand tools, portable power tools, equipment, and accessories.**

#### **Definition**

Identification includes

- basic hand tools
- basic portable power tools and equipment
- basic woodworking accessories
- categories of tools and accessories
- safety features associated with each type

- an explanation of their uses.

Teacher resource: [Virginia FFA Association Middle School Agriscience CDE Handbook](#)

### **Process/Skill Questions**

- What portable power equipment, hand tools, and accessories are common in AFNR careers?
- What might a person who has never used hand tools need to know before working with them?

## **Task Number 54**

### **Demonstrate the use of hand tools, portable power tools, equipment, and accessories.**

#### **Definition**

Demonstration involves

- practicing safety procedures associated with the use of hand tools, portable power tools, equipment and accessories
- describing the uses of selected hand tools, portable power tools, equipment, and accessories
- using selected hand tools, portable power tools, equipment, and accessories under the supervision of an instructor.

### **Process/Skill Questions**

- What is the best and safest way to learn how to use unfamiliar tools?
  - What dangers are associated with power cords?
  - What types of PPE should be worn when operating power tools and equipment?
- 

## **Task Number 55**

### **Demonstrate woodworking skills.**

#### **Definition**

Demonstration may include

- identifying wood species and properties
- identifying wood products
- practicing safety procedures for woodworking
- identifying tools used in woodworking
- describing procedures for woodworking
- determining woodworking procedures based on the type of lumber

- marking wood for cutting
- cutting wood square and/or at an angle
- fastening wood
- preparing wood surfaces for finishing.

### **Process/Skill Questions**

- What is the difference between pine and hardwood boards?
  - How is the grit of sandpaper determined?
- 

## **Task Number 56**

### **Explain the principles of electricity.**

#### **Definition**

Explanation includes the relationship among volts, amperes, and watts.

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

- What are some basic safety practices when working around electricity?
- How is current measured?
- What is an insulator? What is a conductor?
- How is electricity produced?

## **Task Number 57**

### **Demonstrate basic electrical wiring skills.**

#### **Definition**

Demonstration includes

- identifying the necessary components of an electrical circuit
- constructing a working electrical circuit
- repairing a nonworking electrical circuit.

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

- What are some important resources one can use to find information about electrical wiring?
  - What is a *ground*? Why is it important?
  - What are common reasons for electrical circuit malfunction?
-

## **Task Number 58**

### **Shape metal.**

#### **Definition**

Shaping metal includes

- practicing safety procedures for hot and cold metal working
- identifying tools used for hot and cold metal working
- describing procedures for hot and cold metal working
- determining whether metal should be worked hot or cold
- marking metal for hot and cold work
- cutting, bending, twisting, filing and drilling metal.

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

- What are some ways agriculturists use metals?
  - How do artists use metals?
- 

## **Task Number 59**

### **Explain the arc-welding process.**

#### **Definition**

Explanation includes

- identification of the three properties of metals
- description of the effects welding has on the properties of metal
- identification of the electrical principles involved in arc welding
- the steps involved in the arc-welding process.

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

- What safety procedures must be followed when welding?
- What equipment should be used to handle hot metal?
- What PPE is necessary when welding?

## **Task Number 60**

### **Operate arc-welding equipment.**

#### **Definition**

Operation includes

- following welding safety procedures
- selecting equipment necessary for welding
- striking an arc and running a bead.

### **Process/Skill Questions**

- What are examples of situations where welding is necessary in agriculture?
  - What number filter lens is necessary when arc welding?
  - How can a worker protect others that are in the welding area when welding is occurring?
  - What are different methods for running a bead?
  - What equipment is necessary when welding (in addition to PPE)?
- 

## **Task Number 61**

**Explain the operating principles of small engines.**

### **Definition**

Explanation includes

- the principles of an internal combustion engine
- identification of the necessary requirements of an engine
- description of the parts of a small engine.

### **Process/Skill Questions**

- Who in the community works on four-stroke cycle engines?
- What machines use four-stroke cycle engines?
- What is the difference between a two-stroke and a four-stroke engine?

## **Exploring Animal Science**

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### **Task Number 62**

**Categorize breeds of animals.**

### **Definition**

Categorization includes

- defining *companion animal*
- defining *livestock animal*
- differentiating among companion and livestock animal categories
- naming species of companion and livestock animals
- explaining the importance of animal breeds.

### **Process/Skill Questions**

- What are the benefits of companion animals to society?
- What are the different classifications of dogs according to the American Kennel Club?
- How are cats classified?
- What are three different rabbit breeds? How do they differ?
- What are four common types of livestock?
- How are rabbits classified?
- What are four types of rabbit fur?
- Why would society opt to create a new breed of animal?

## **Task Number 63**

### **Identify equipment used in the care of companion and/or livestock animals.**

#### **Definition**

Identification includes equipment used in grooming, health care, and maintenance of animals.

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

- Why is grooming important?
- What preventive care is necessary for healthy animals?
- What are the space and equipment requirements for a specific animal?

## **Task Number 64**

### **Evaluate types of companion and/or livestock animal feed.**

#### **Definition**

Evaluation includes a wide range of feed from a variety of resources such as

- pet stores
- farm/agriculture supply stores
- veterinary offices
- catalogs
- chain stores
- grocery stores.

## Process/Skill Questions

- What is a complete feed?
  - What are the nutritive and non-nutritive components of a complete feed?
  - What information is included on a feed label?
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## Task Number 65

### Explore healthcare and maintenance practices for companion and/or livestock animals.

#### Definition

Exploration should reflect

- safety procedures in the handling of a companion and/or livestock animals
- responsible care for an animal
- the definition of *zoonosis*
  - discussion of zoonosis prevention
  - discussion of antibiotic resistance and related issues
- a list of exotic and/or wild animals in Virginia requiring a permit for possession or ownership.

## Process/Skill Questions

- What is a zoonotic disease?
- What are common zoonotic diseases?
- How can diseases be prevented?
- What is a parasite? How can parasites be controlled?
- What are three animals that require a permit for possession or ownership in Virginia?

## Exploring Natural Resources

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## Task Number 66

### Identify the importance of natural resource management.

#### Definition

Identification includes

- defining *natural resource, extraction, depletion, protection, and management of natural resources*
- describing the major categories of natural resources (e.g., soil, water, air, minerals) in Virginia and the United States.
- explaining renewable and nonrenewable natural resources
- explaining what makes something a natural resource, biotic and abiotic.

### **Process/Skill Questions**

- Why are natural resources a valuable part of life?
- What are some things one could do to conserve natural resources?
- What is the difference between conservation and preservation of natural resources?
- What local, state, and federal agencies are involved in conservation?
- What are biotic and abiotic natural resources?
- What are some careers related to natural resource management?

## **Task Number 67**

### **Determine the volume and value of timber.**

#### **Definition**

Determination includes

- defining terminology associated with measurement of pulpwood and standing timber
- identifying tools used for measuring timber
- describing safety procedures
- differentiating tools for measuring stacked and standing timber
- measuring a tree's diameter, logs, and bolts
- converting measurements into cubic feet and volume board feet
- using the market price for pulpwood and sawtimber to calculate market values.

### **Process/Skill Questions**

- What are some factors that could influence the sale of wood products?
- What are the common methods of marketing timber?
- What is a Biltmore stick? When would one use a Biltmore stick?
- How is volume board feet calculated?

## **Task Number 68**

### **Identify Virginia trees as sawtimber, pulpwood, and/or ornamentals.**

#### **Definition**

Identification includes native species of Virginia forest trees, common ornamentals, and the difference between sawtimber and pulpwood.



## Process/Skill Questions

- What trees are typically used for pulpwood?
- What are common products created from sawtimber?
- Why are trees classified as sawtimber or pulpwood?
- How are ornamental trees used?
- What is silviculture?
- What are some careers related to forestry?

## Task Number 69

### Explain soil fertility.

#### Definition

Explanation includes

- soil type
- soil properties
  - biological
  - chemical
  - physical
- soil's ability to absorb and store water.

## Process/Skill Questions

- Why is soil important to the environment, economy, and to life?
- What are some different soil types and their uses?
- What are the five soil formation factors?
- How does the age of a soil influence its fertility? Why?
- How does pH affect nutrient availability? Why?
- What is soil texture, and how does it affect fertility?
- What are some careers related to soil management?

## Task Number 70

### Discuss the importance of water to agriculture.

#### Definition

Discussion includes the importance of quality, sources, and supply of water to

- agricultural producers
- agricultural processors
- homeowners.

Discussion also includes the effects of

- agricultural producers
- agricultural processors
- homeowners

on water quality and supply.

### **Process/Skill Questions**

- How do homeowners affect water quality?
- How are producers dependent upon a quality water supply?
- What are BMPs that can be used by homeowners, producers, and processors to protect water quality and supply?
- What are some careers related to water quality management?

## **Task Number 71**

### **Analyze a water sample.**

#### **Definition**

Analysis includes a discussion of the reasons for collecting and analyzing a water sample. Analysis includes

- determining turbidity
- examining pollutants
- following the scientific process.

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

- Why might an agribusiness analyze a water sample?
- What are the steps involved in the scientific process?

## **Exploring Horticultural Sciences**

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### **Task Number 72**

#### **Identify common garden, landscape, and interior plants.**

#### **Definition**

Identification includes

- the definition of *horticulture*
- examples of
  - common garden plants
  - landscaping plants
  - interior plants.

### **Process/Skill Questions**

- What are some concerns in caring for interior plants?
- What are three examples of common garden plants?
- What are three examples of landscaping plants?
- What are three examples of interior plants?
- What are some careers associated with the horticulture industry?

## **Task Number 73**

### **Describe integrated pest management.**

#### **Definition**

Description includes

- differentiating among beneficial and nonbeneficial insects
- defining *pest*, *pesticide*, and *invasive species*
- identifying pest control methods
  - cultural
  - chemical
  - biological
  - mechanical.

### **Process/Skill Questions**

- What are the different classifications of pesticides?
- What methods are used to control pests?
- What makes a species invasive?
- What are some careers associated with pest management?

## **Task Number 74**

### **Explore the principles of floral design.**

#### **Definition**

Exploration includes the art of attractively arranging cut flowers and foliage for a variety of occasions.

### **Process/Skill Questions**

- What are some careers associated with floral design?
- What types of floral design exist?
- What rules govern floral design?
- What is the role of color in floral design?

## Task Number 75

### Explore the principles of landscape design.

#### Definition

Exploration includes

- defining the term *landscape design*
- describing the most commonly used materials in landscape design
- describing the phases of landscape design
- describing the principles of landscape design
- describing the maintenance of landscapes
- defining the term *interiorscaping*.

#### Process/Skill Questions

- What is the definition of a landscape plan?
- What are some examples of landscape embellishments? Why and when are they used?
- How has technology affected landscape design?
- What are some careers in the landscaping field?

## Task Number 76

### Identify common horticultural and landscape tools, equipment, technologies, and practices.

#### Definition

Identification includes

- description of equipment and supplies used in the horticulture and landscape industries
- discussion of the use of technologies (e.g., AutoCAD) in horticulture
- explanation of new and emerging practices in horticulture (e.g., using drones to survey land).

Teacher resource: [FFA CDE for Nursery and Floriculture](#)

#### Process/Skill Questions

- What are some types of equipment and tools used in the horticulture and landscape industries?
- Why is it important to follow Occupational Safety and Health Administration (OSHA) rules and regulations?

- Why is it important to know about the maintenance of the equipment used in the horticulture and landscape industries?

## Exploring Food Science

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### Task Number 77

#### Explore the food industry as it relates to agriculture, agriscience, and agribusiness.

##### Definition

Exploration includes

- key terms (*foodborne illness, pasteurization, organic, natural, free-range, gluten-free, fats, homogenization, hydroponics, aquaponics*)
- local food movement (e.g., community gardens and urban agriculture)
- food availability (e.g., food deserts)
- government regulatory agencies (e.g., United States Department of Agriculture [USDA], Food and Drug Administration [FDA]).

##### Process/Skill Questions

- What is the importance of a safe and wholesome food supply on the U.S. economy?
- What is urban farming? How is it different from rural agriculture?
- What is hydroponics?
- What are the basic concepts of the *buy-fresh, buy-local* movement? Why is this important?
- What are the roles of the USDA and the FDA in regulating food safety?

### Task Number 78

#### Research foodborne illnesses.

##### Definition

Research includes

- the definition of *foodborne illness*
- sources of foodborne illnesses
- food-handling procedures
- prevention methods
- safety precautions.

## Process/Skill Questions

- What are the possible sources of foodborne illnesses?
- What precautions can be taken to prevent foodborne illnesses?

## Task Number 79

### Describe methods of food processing and preservation.

#### Definition

Description may include examples such as

- freezing
- canning
- salting
- smoking
- drying
- dehydrating
- freeze drying
- cold processing
- heat processing
- irradiation
- pasteurization.

## Process/Skill Questions

- What are the benefits and risks of eating processed foods?
- What are the dietary implications of canning and other preservation methods?

## Task Number 80

### Explain food labels.

#### Definition

Explanation includes

- the definition of *balanced diet*
- serving size
- nutritional values
- ingredients
- comparison of labels
- the role of marketing
- interpretation of labels (e.g., mislabeling, misleading labels).

Teacher resource: [USDA's Choose My Plate](#)

## Process/Skill Questions

- What are the benefits of a balanced diet?
- What information is included on a food label?
- What are the differences among *use by*, *sell by*, and production dates on a product?
- What does *organic* mean? Are organic foods always better? Explain.

## SOL Correlation by Task

31	Identify the role of supervised agricultural experiences (SAEs) in agricultural education.	English: 8.5, 8.6
32	Participate in an SAE.	English: 8.6, 8.7, 8.8, 8.9
33	Identify the benefits and responsibilities of FFA membership.	English: 8.6, 8.7, 8.8, 8.9
34	Describe leadership characteristics and opportunities as they relate to agriculture and FFA.	English: 8.6
35	Apply for an FFA degree and/or an agricultural proficiency award.	English: 8.6
36	Identify class rules, safety precautions, and procedures.	English: 8.6
37	Explore new and emerging technologies in agriculture and agriscience.	English: 8.4, 8.6, 8.9
38	Identify the components of an agricultural/agriscience research project.	English: 8.4, 8.6 Science: LS.1, PS.1
39	Identify safety procedures in performing experiments.	English: 8.6
40	Perform an agriculture/agriscience experiment.	English: 8.6, 8.7 Mathematics: 6.10, 6.11, 7.9, 8.12, 8.13 Science: LS.1, PS.1
41	Define terms related to trade.	English: 8.4
42	Explore global agriculture.	English: 8.6, 8.9 History and Social Science: WG.4, WG.14, WG.16, WG.17
43	Explain the relationship of global trade to Virginia agriculture.	English: 8.6
44	Identify the significance of agribusiness in agriscience.	English: 8.4, 8.6
45	Identify types of agribusiness.	English: 8.6 History and Social Science: WG.4
46	Identify risks inherent in agribusiness.	English: 8.6 History and Social Science: WG.17
47	Identify characteristics of an entrepreneur.	English: 8.4, 8.6
48	Explore career opportunities related to agriculture, food, and natural resources (AFNR).	
49	Demonstrate safety practices.	English: 8.6
50	Demonstrate measuring skills.	English: 8.4, 8.6

51	Interpret plans for constructing an agriculture project.	English: 8.6
52	Identify new and emerging equipment and tools in agriscience.	English: 8.6
53	Identify portable hand tools, portable power tools, equipment, and accessories.	English: 8.6
54	Demonstrate the use of hand tools, portable power tools, equipment, and accessories.	
55	Demonstrate woodworking skills.	
56	Explain the principles of electricity.	English: 8.6 Science: PS.11
57	Demonstrate basic electrical wiring skills.	
58	Shape metal.	
59	Explain the arc-welding process.	English: 8.6
60	Operate arc-welding equipment.	
61	Explain the operating principles of small engines.	English: 8.6
62	Categorize breeds of animals.	English: 8.4, 8.6
63	Identify equipment used in the care of companion and/or livestock animals.	English: 8.6
64	Evaluate types of companion and/or livestock animal feed.	
65	Explore healthcare and maintenance practices for companion and/or livestock animals.	English: 8.4, 8.6
66	Identify the importance of natural resource management.	English: 8.4, 8.6 History and Social Science: WG.4, WG.16
67	Determine the volume and value of timber.	English: 8.4, 8.6
68	Identify Virginia trees as sawtimber, pulpwood, and/or ornamentals.	English: 8.6
69	Explain soil fertility.	English: 8.6
70	Discuss the importance of water to agriculture.	English: 8.1
71	Analyze a water sample.	English: 8.6
72	Identify common garden, landscape, and interior plants.	English: 8.4, 8.6
73	Describe integrated pest management.	English: 8.4, 8.6
74	Explore the principles of floral design.	English: 8.6
75	Explore the principles of landscape design.	English: 8.4, 8.6
76	Identify common horticultural and landscape tools, equipment, technologies, and practices.	English: 8.6
77	Explore the food industry as it relates to agriculture, agriscience, and agribusiness.	English: 8.6 History and Social Science: WG.17
78	Research foodborne illnesses.	English: 8.4, 8.9
79	Describe methods of food processing and preservation.	English: 8.6
80	Explain food labels.	English: 8.4, 8.6



# Appendix: Career Cluster Information

<b>Career Cluster: Agriculture, Food and Natural Resources</b>	
<b>Pathway</b>	<b>Occupations</b>
<b>Agribusiness Systems</b>	<b>Agricultural Commodity Broker</b> <b>Agricultural Economist</b> <b>Agricultural Loan Officer</b> <b>Agricultural Products Sales Representative</b> <b>Farm Products Purchasing Agent and Buyer</b> <b>Farm, Ranch Manager</b> <b>Farmer/Rancher</b> <b>Feed, Farm Supply Store Sales Manager</b> <b>Sales Manager</b>
<b>Animal Systems</b>	<b>Agricultural Products Sales Representative</b> <b>Animal Breeder, Husbandry</b> <b>Animal Geneticist</b> <b>Animal Nutritionist</b> <b>Animal Scientist</b> <b>Aquacultural Manager</b> <b>Poultry Manager</b> <b>Veterinarian</b> <b>Veterinary Technician</b>
<b>Environmental Service Systems</b>	<b>Agricultural Products Sales Representative</b> <b>Environmental Compliance Inspector</b> <b>Environmental Sampling and Analysis Technician</b> <b>Hazardous Materials Handler</b> <b>Recycling Coordinator</b> <b>Secondary School Teacher</b> <b>Toxicologist</b> <b>Turf Farmer</b> <b>Water Conservationist</b>
<b>Food Products and Processing Systems</b>	<b>Biochemist</b> <b>Food Scientist</b>
<b>Natural Resources Systems</b>	<b>Ecologist</b> <b>Fish and Game Officer</b> <b>Fisheries Technician</b> <b>Forest Manager, Forester</b> <b>Forest Technician</b> <b>Geological Technician</b> <b>Logging Equipment Operator</b> <b>Microbiologist</b> <b>Outdoor Recreation Guide</b> <b>Park Manager</b> <b>Park Technician</b> <b>Range Technician</b> <b>Wildlife Manager</b>
<b>Plant Systems</b>	<b>Agricultural Products Sales Representative</b> <b>Botanist</b> <b>Certified Crop Advisor</b> <b>Crop Grower</b> <b>Custom Harvester</b> <b>Farm, Ranch Manager</b> <b>Farmer/Rancher</b> <b>Floral Designer</b> <b>Floral Shop Manager</b> <b>Forest Geneticist</b>

**Career Cluster: Agriculture, Food and Natural Resources**

<b>Pathway</b>	<b>Occupations</b>
	<b>Golf Course Superintendent Machine Setter, Operator Nursery and Greenhouse Manager Ornamental Horticulturist Plant Breeder/ Geneticist Secondary School Teacher Soil and Plant Scientist Tree Surgeon Turf Farmer</b>
<b>Power, Structural, and Technical Systems</b>	<b>Agricultural Engineer Agricultural Equipment Operator Agricultural Equipment Parts Manager Agricultural Equipment Parts Salesperson Machinist Parts Manager Welder</b>