

# Agriscience Exploration

**8005 9 weeks**

**8003 18 weeks**

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## Acknowledgments

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# Course Description

**Suggested Grade Level: 7**

Students explore science as it relates to agriculture and develop an understanding of human relations, communication, the importance of agriculture to the economy, and key scientific terms related to the field of agriculture.

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

## Task Essentials Table

8003	8005	Tasks/Competencies
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Identify the role of supervised agricultural experiences (SAEs) in agricultural education.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Participate in an SAE.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Identify the benefits and responsibilities of FFA membership.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Describe leadership characteristics and opportunities as they relate to agriculture and FFA.
<input type="checkbox"/>	<input type="checkbox"/>	Apply for an FFA degree and/or an agricultural proficiency award.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Identify class rules, safety precautions, and procedures.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Identify topics associated with agriculture, agriscience, and agribusiness.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Explain the importance of agriculture to Virginia, the United States, and the world.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Describe the relationship of agriculture to other segments of society.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Describe natural resources.
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Identify conservation measures.

<input type="radio"/>	<input type="radio"/>	Identify soil compositions.
<input type="radio"/>	<input type="radio"/>	Explain factors affecting soil erosion.
<input type="radio"/>	<input type="radio"/>	Describe soil erosion control measures.
<input type="radio"/>	<input type="radio"/>	Explore water quality.
<input type="radio"/>	<input type="radio"/>	Explain human impact on air quality.
<input checked="" type="radio"/>	<input type="radio"/>	Determine the economic importance of forestry.
<input checked="" type="radio"/>	<input type="radio"/>	Explain the basic types, parts, and growth processes of trees.
<input checked="" type="radio"/>	<input type="radio"/>	Identify Virginia forest trees.
<input type="radio"/>	<input type="radio"/>	Explore forest wildlife.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Explain the importance of agricultural research.
<input type="radio"/>	<input type="radio"/>	Identify agricultural research in animal science.
<input type="radio"/>	<input type="radio"/>	Identify agricultural research in plant science.
<input type="radio"/>	<input type="radio"/>	Identify research in agricultural engineering technology.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Determine the economic importance of agricultural and horticultural crops.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Describe the life processes of plants.
<input checked="" type="radio"/>	<input type="radio"/>	Explain methods of plant reproduction and transplanting.
<input checked="" type="radio"/>	<input type="radio"/>	Demonstrate proper watering and fertilization of plants.
<input checked="" type="radio"/>	<input type="radio"/>	Identify plants.
<input checked="" type="radio"/>	<input type="radio"/>	Explain the use of hydroponics and aquaponics in growing plants.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Determine the importance of animals to agriculture.
<input type="radio"/>	<input type="radio"/>	Explain the importance of animal evaluation.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Identify breeds of animals.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Identify basic practices for the care of animals.
<input type="radio"/>	<input type="radio"/>	Describe new technologies in animal science.
<input type="radio"/>	<input type="radio"/>	Describe ethical concerns related to animal welfare.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Identify laboratory procedures and policies.

<input checked="" type="radio"/>	<input checked="" type="radio"/>	Identify safety practices and procedures.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Interpret simple plans.
<input checked="" type="radio"/>	<input type="radio"/>	Use basic hand tools for woodworking.
<input checked="" type="radio"/>	<input type="radio"/>	Perform woodworking skills.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	Use measuring tools.
<input checked="" type="radio"/>	<input type="radio"/>	Use wood fasteners.
<input checked="" type="radio"/>	<input type="radio"/>	Finish and preserve wood.

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 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](#)

## 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.

## 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 Exploration

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## Task Number 36

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

#### Definition

Identification of rules, safety precautions, and procedures should include teacher and school guidelines.

#### Process/Skill Questions

- How will you contribute to a positive classroom atmosphere?
- Why do we have classroom rules?
- In what ways do classroom rules prepare you for the work world?

## Task Number 37

### Identify topics associated with agriculture, agriscience, and agribusiness.

#### Definition

Identification will be made by

- developing definitions of *agriculture*, *agriscience*, and *agribusiness*
- citing examples of agriculture, agriscience, and agribusiness topics.

#### Process/Skill Questions



- How does agriculture affect your life?
- What are some careers that are involved in agriculture?
- What are some examples of agribusiness in our community?

# Recognizing the Importance of Agriculture/Agriscience

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## Task Number 38

**Explain the importance of agriculture to Virginia, the United States, and the world.**

### Definition

Explanation should include

- identifying agricultural regions in Virginia
- exploring differences in agricultural regions in Virginia
- analyzing the impact agriculture has on Virginia
- listing the top 10 agricultural products of Virginia
- explaining how Virginia's agriculture affects the United States
- explaining the impact agriculture has on the United States
- explaining the impact agriculture has on the world.

### Process/Skill Questions

- What are Virginia's top agriculture products?
- What agricultural products does Virginia export? Import?
- What are the roles of Virginia's international/global agricultural trade offices?

## Economics and Personal Finance Standards of Learning

### EPF.5

The student will demonstrate knowledge of a nation's economic goals, including full employment, stable prices, and economic growth by

- a. describing economic indicators, such as gross domestic product (GDP), consumer price index (CPI), and unemployment rate;
- b. describing the causes and effects of unemployment, inflation, and reduced economic growth;
- c. describing the fluctuations of the business cycle; and
- d. describing strategies for achieving national economic goals.

### EPF.8

The student will demonstrate knowledge of the role of government in a market economy by

- a. identifying goods and services provided by government to benefit society;
- b. identifying the role the government plays in providing a legal structure to protect property rights and enforce contracts;
- c. providing examples of government regulation of the market;
- d. explaining that governments redistribute wealth; and
- e. explaining that taxes and fees fund all government-provided goods and services.

### **EPF.9**

The student will demonstrate knowledge of the global economy by

- a. explaining that when parties trade voluntarily, all benefit;
- b. distinguishing between absolute and comparative advantage;
- c. distinguishing between trade deficit and trade surplus;
- d. explaining exchange rates, and the impact of a strong dollar and weak dollar on economic decisions;
- e. describing the costs and benefits of trade barriers;
- f. describing the effects of international trade agreements and the World Trade Organization; and
- g. explaining growing economic interdependence.

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## **Task Number 39**

### **Describe the relationship of agriculture to other segments of society.**

#### **Definition**

Description should include

- an examination of the relationship between agriculture and business and industry
- identification of jobs that are directly associated with agriculture and jobs that are indirectly associated with agriculture.

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

- How do commercial production farms differ from small farms in terms of farming practices and products grown?
- What populations do small farms serve?
- What challenges and obstacles do small farmers face with governmental agencies?
- What careers are indirectly associated with agriculture?
- Why is an understanding of business practices important to farmers?

## **Conserving Natural Resources**

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## Task Number 40

### Describe natural resources.

#### Definition

Description may include

- forestry/plants
- water
- air
- soils/minerals
- wildlife

and explaining the differences among renewable, exhaustible, and inexhaustible resources.

#### Process/Skill Questions

- What are some examples of natural resources?
- Why is it so important to protect our natural resources?
- What are some examples of renewable resources? Exhaustible/nonrenewable resources? Inexhaustible resources?
- What is the difference between renewable and recyclable resources?

## Task Number 41

### Identify conservation measures.

#### Definition

Identification may include

- defining *conservation*
- explaining why conservation is essential to the protection of the environment
- describing actions that contribute to one's ecological footprint
- listing methods of conservation
- identifying various agencies' roles in conservation (e.g., DEQ, EPA, USDA, local organizations)
- describing the roles of recycling, composting, and waste management.

#### Process/Skill Questions

- What is an "ecological footprint"?
- What are some common methods of conservation?
- What local, regional, state, and federal agencies are involved in conservation?
- How do recycling, composting, and waste management contribute to conservation?

- What is the difference between preservation and conservation?
- What role to governmental agencies (e.g., Department of Environmental Quality [DEQ], Environmental Protection Agency [EPA], United States Department of Agriculture [USDA], local organizations) play in conservation of natural resources?

## **Task Number 42**

### **Identify soil compositions.**

#### **Definition**

Identification should include

- description of the composition of the ideal soil
- list of factors that contribute to soil composition
- description of a soil horizon
- description of soil texture.

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

- What are the components of soil? Why do agriculturalists need to understand the composition of soil?
- What farming practices can be implemented to improve soil quality?
- How does crop rotation affect the quality and composition of soil?
- How is the quality and nutrients of crops affected when soil is mismanaged?

## **Task Number 43**

### **Explain factors affecting soil erosion.**

#### **Definition**

Identification should include

- definition of the terms *soil* and *soil erosion*
- identification of the factors affecting soil erosion
- identification of the four main types of soil erosion.

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

- How does the average American contribute to soil erosion?
- What farming practices contribute to soil erosion?

## **Task Number 44**

### **Describe soil erosion control measures.**

## Definition

Discussion will include

- identification of basic practices of soil conservation on the farm
- identification of practices of non-farm soil conservation methods.

## Process/Skill Questions

- What benefit does a farmer gain from conserving soil?
- How can a homeowner conserve soil?
- What are specific instances in which governmental laws to address soil conservation are violated?
- How are the Clean Water Act and soil related? What are the challenges in enforcing the Clean Water Act?

## Task Number 45

### Explore water quality.

#### Definition

Exploration should include

- identification of sources of water
- definition of *watershed*
- examination of a watershed
- identification of methods to maintain water quality.

#### Process/Skill Questions

- What are the measures you take to conserve water?
- How might you influence others to conserve water?
- How do your local officials address water conservation?
- What are common sources of water pollution?

## Task Number 46

### Explain human impact on air quality.

#### Definition

Explanation should include

- discussion of the importance of air quality
- definition of *air pollution*
- identification of pollutants that affect air quality
- list of ways an individual can keep the air clean.

## Process/Skill Questions

- What are examples of health problems caused by poor air quality?
- What groups/individuals are involved in improving air quality?
- How does poor air quality negatively affect ecosystems?

## Task Number 47

### Determine the economic importance of forestry.

#### Definition

Determination should be made by

- defining the term *silviculture*
- listing products and benefits obtained from forestlands
- describing the composition of Virginia's forests and their ownership (i.e., public, private).

## Process/Skill Questions

- What products come from Virginia forests?
- How does forestry affect your local community?

## Task Number 48

### Explain the basic types, parts, and growth processes of trees.

#### Definition

Explanation should include

- naming the major categories of trees (i.e., evergreen, deciduous)
- naming the main parts of a tree
- explaining how a tree forms annual rings.

## Process/Skill Questions

- What are the differences between evergreen and deciduous tree species?
- How can the age of a tree be determined?

## Task Number 49

### Identify Virginia forest trees.

#### Definition

Identification should include

- identifying common species by leaf, bark, growth patterns, and other characteristics
- identifying the parts of a leaf.

### **Process/Skill Questions**

- Why should we learn about the trees that grow in our state?
- Why do different trees grow in different places?
- What part of a tree can you use to help identify it?
- What are five common species of trees in Virginia?

## **Task Number 50**

### **Explore forest wildlife.**

#### **Definition**

Exploration may include

- defining *wildlife* and *habitat*
- identifying endangered and threatened species
- describing various identification techniques
- explaining population control.

### **Process/Skill Questions**

- How does the extinction of a species affect an ecosystem?
- Why is population control important to the maintenance of ecosystems?
- What are some examples of endangered animals? Of extinct animals?
- What actions or policies are in place to protect endangered wildlife species?
- What are some examples of population-control measures?

## **Exploring Research in Agriculture**

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### **Task Number 51**

### **Explain the importance of agricultural research.**

#### **Definition**

Explanation should include

- listing the reasons why agricultural research is important
- listing the benefits from agricultural research
- identifying the steps in solving a research problem.

### **Process/Skill Questions**

- Why is agricultural research important?
- How has agricultural research impacted your daily life?

## **Task Number 52**

### **Identify agricultural research in animal science.**

#### **Definition**

Identification should include a description of significant developments in animal science research.

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

- What current research is being conducted regarding animals?
- What advancements have been made because of animal research?

## **Task Number 53**

### **Identify agricultural research in plant science.**

#### **Definition**

Identification should include a description of significant developments in plant science research.

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

- What are examples of how plant research has changed plant and crop production?
- What additional research is needed in plant science?

## **Task Number 54**

### **Identify research in agricultural engineering technology.**

#### **Definition**

Identification should include a description of significant developments in agricultural engineering technology.

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



- What agricultural inventions have had significant effects on agriculture? What are the benefits to society?
- What agricultural advances help the small farmer?
- How has agricultural engineering technology changed production in agriculture?

## Exploring Plant Science

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### Task Number 55

#### **Determine the economic importance of agricultural and horticultural crops.**

##### **Definition**

Determination should be made by

- listing the reasons crops are important, including food and ornamental crops
- listing major crop commodities
- describing the contributions made by U.S. agriculture to the world food supply
- identifying the economic contributions of cut flower and bedding plant production.

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

- How does agriculture affect Virginia's economy?
- What crop commodities are important in your locality? In Virginia?
- How has the increase of farmers markets affected Virginia's agricultural industry?

### Task Number 56

#### **Describe the life processes of plants.**

##### **Definition**

Description should include

- explanation of plant growth requirements (e.g., macro- and micro-nutrients, growing media, water, light, air)
- explanation of the process of photosynthesis using the formula for photosynthesis
- explanation of the process of respiration using the formula for respiration
- explanation of the process of transpiration.

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

- How do plants bring value to people?
- What is the difference between photosynthesis and respiration?
- What macronutrients are essential for optimal plant growth?
- How does growing media affect plant growth?

## **Task Number 57**

### **Explain methods of plant reproduction and transplanting.**

#### **Definition**

Explanation should include

- distinguishing between sexual and asexual reproduction
- preparing a stem cutting from a houseplant
- planting and caring for seeds and seedlings
- describing the process of transplanting
- preparing a plant label with name, variety, and date.

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

- How can plants be grown without using seeds?
- What conditions are ideal for encouraging a cutting to root?
- What are the steps in performing a stem cutting?
- What factors affect germination?
- Why is it important to properly plant or transplant a plant?
- Why would you need to transplant?
- What does “root-bound” mean in plants? How can it be prevented and resolved?

## **Task Number 58**

### **Demonstrate proper watering and fertilization of plants.**

#### **Definition**

Demonstration should include

- identifying the two basic forms of fertilizer
- listing the representative nutrients in a fertilizer container
- describing the basic procedure for watering a plant.

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

- What does fertilizer aid in plant growth?
- What factors determine the water requirements for a plant?
- What are the signs that a plant has received adequate watering?
- What do the three numbers on a fertilizer bag represent (e.g., 20-10-20)?

## **Task Number 59**

### **Identify plants.**

#### **Definition**

Identification should include

- common houseplants, fruit, vegetable, nursery and landscaping plants
- differences between annuals and perennials.

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

- What is the relationship between wildflowers and cultivated flowers?
- Why is it important to distinguish one type of plant from another?
- What is an annual? A perennial?
- What characteristics or methods can be used to identify plants?

## **Task Number 60**

### **Explain the use of hydroponics and aquaponics in growing plants.**

#### **Definition**

Explanation should include

- describing the working operation of a hydroponics unit and an aquaponics unit
- listing advantages of growing plants hydroponically and aquaponically
- listing general facts about soilless farming
- listing the major nutrient requirements for hydroponics and aquaponics.

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

- What plants grow best using hydroponics?
- What advantages and disadvantages are there to soilless production?

## **Exploring Animal Science**

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### **Task Number 61**

#### **Determine the importance of animals to agriculture.**

## Definition

Determination should be made by

- defining *animal science*
- identifying major uses of animals (i.e., service, companionship, work, food)
- identifying products provided by animals (i.e., dairy, meat, fiber)
- identifying terms associated with the animal industry.

## Process/Skill Questions

- How are animals used in agriculture?
- Who is in charge of enforcing laws and regulations that ensure humane treatment of animals?
- What livestock/production animals are important to your local agricultural community?
- How is bee production utilized in agriculture?
- What does the term "free range" mean, as related to the meat animal industry?
- How can milk qualify to be labeled organic?
- What new dairy products are on the market?
- What is aquaculture? How does aquaculture production differ from traditional livestock production?
- What animals are best suited for aquaculture production?
- What health issues are related to farm-raised fish?
- What is the difference between the types of milk (e.g., whole, two-percent, skim)?

## Task Number 62

### Explain the importance of animal evaluation.

#### Definition

Explanation should include

- discussion of the importance of animal evaluation
- identification of the main ways to evaluate animals
- determination of the selection differences for market and breeding animals.

#### Process/Skill Questions

- What characteristics would make one animal more desirable than another?
- How does animal evaluation affect breeding choices?

## Task Number 63

### Identify breeds of animals.

#### Definition

Identification should include naming and describing species of

- companion animals
- bovine
- ovine
- caprine
- equine
- porcine
- avian.

### **Process/Skill Questions**

- What are the best places to find a companion animal?
- Are pet stores reputable places to buy animals? Explain your answer.
- What are the common names for bovine, ovine, caprine, equine, porcine, avian animals?
- What animals are considered within the avian classification?
- What are the two major divisions within bovine animals?

## **Task Number 64**

### **Identify basic practices for the care of animals.**

#### **Definition**

Identification should include a description of the basic practices for care of animals. Basic needs as well as species-specific requirements may be identified, including

- water
- air
- food
- shelter
- bedding
- fencing
- grooming.

### **Process/Skill Questions**

- What are the four basic needs for all living things necessary for survival?
- What bedding materials are potentially dangerous for small animals?
- What are the health benefits of grooming?
- Why is fresh water so important?
- How do you determine how much to feed your animal?

## **Task Number 65**

### **Describe new technologies in animal science.**

#### **Definition**

Description should include identification of new

- trends in animal reproduction
- trends in management
- methods for processing products
- techniques used to market products.

### **Process/Skill Questions**

- What are the pros and cons of
  - engineered hormones reintroduced into cows to increase milk production
  - engineered hormones reintroduced into pigs to produce leaner meat
  - farm-raised fish, using growth hormones that result in earlier market-ready fish?
- How have new technologies in animal science affected your everyday life?

## **Task Number 66**

### **Describe ethical concerns related to animal welfare.**

#### **Definition**

Description should include

- differences between animal welfare and animal rights
- laws passed to govern animal usage
- major issues concerning animal welfare (e.g., agriculture literacy, sensationalism).

### **Process/Skill Questions**

- What concerns are there with regard to animal production?
- What humane agricultural practices are used to produce meat for consumers?

## **Developing Agricultural Mechanical Skills**

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## **Task Number 67**

### **Identify laboratory procedures and policies.**

#### **Definition**

Identification should include

- explaining the policies and procedures required for participation in laboratory activities

- demonstrating an understanding and adherence to the policies and procedures.

### **Process/Skill Questions**

- How can your conduct influence others in the laboratory?
- Why are laboratory procedures in place?

## **Task Number 68**

### **Identify safety practices and procedures.**

#### **Definition**

Identification should include

- explaining basic laboratory safety practices
- demonstrating basic laboratory safety through written and performance testing
- demonstrating safe laboratory practices throughout the duration in the laboratory/shop setting.

Note: See Virginia Tech's [Agricultural Education Laboratory Safety Guide for Agricultural Mechanics](#).

### **Process/Skill Questions**

- What are the potential negative effects of abusing a safety rule only once?
- Why is laboratory safety important for all individuals in the room/area?
- What should you do if a visitor is in the room and unaware of laboratory safety procedures?

## **Task Number 69**

### **Interpret simple plans.**

#### **Definition**

Interpreting should include

- explaining the importance of drawing a plan
- defining basic terminology related to a plan drawing
- determining the material needed to construct a project
- sketching a simple project.

### **Process/Skill Questions**

- What is the bill of materials for this project?
- Why are plans important to draw or interpret prior to construction?
- What does it mean for an object to be drawn to scale?

## **Task Number 70**

### **Use basic hand tools for woodworking.**

#### **Definition**

Use should include

- classifying tools
- demonstrating the proper use of selected hand tools.

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

- What tools do you use?
  - What is the difference between a rasp and file?
  - How do hammers vary for the specific job needed?
  - How do you determine the proper screwdriver needed for a particular job?
- 

## **Task Number 71**

### **Perform woodworking skills.**

#### **Definition**

Performance should include

- practicing basic safety
- identifying tools used in class
- interpreting plans
- measuring, cutting, drilling, and sanding wood.

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

- What must be done prior to cutting or drilling the wood?
  - How do you determine the best tool to use for a job?
  - Why are accurate measurements so important?
  - How is the coarseness of sandpaper determined? What would be good finishing sandpaper?
- 

## **Task Number 72**

### **Use measuring tools.**



## **Definition**

Use should include

- identifying common measuring devices used in woodworking and laboratory experiments
- selecting the proper tool(s) for given assignments
- explaining the difference between direct and indirect measuring devices
- using various measuring devices to determine depth, volume, mass, and length to one-sixteenth inch.

## **Process/Skill Questions**

- What might be the consequences of measuring incorrectly in terms of time, money, quality of work, and desired results?
  - What is the difference between standard and metric measurements as it relates to woodworking?
  - What are different tools in the laboratory that provide measurements?
- 

## **Task Number 73**

### **Use wood fasteners.**

#### **Definition**

Selection and use should include

- defining basic terminology associated with wood fasteners
- identifying common fasteners in woodworking
- selecting correct wood fasteners for a job.

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

- What is the importance of selecting the correct wood fastener for a specific job?
  - How do you select a fastener for a specific job?
- 

## **Task Number 74**

### **Finish and preserve wood.**

#### **Definition**

Finishing and preserving should include

- identifying and conducting steps necessary to prepare wood for finishing
- selecting and applying finishes

- selecting and using proper sandpaper.

## Process/Skill Questions

- What options do you have for varnish/polyurethane finishes? What are the differences in the amount of shine?
- How do you determine which grit of sandpaper to use?
- What is the difference between oil-based and water-based stains and varnishes?

## SOL Correlation by Task

31	Identify the role of supervised agricultural experiences (SAEs) in agricultural education.	English: 7.4, 7.6
32	Participate in an SAE.	English: 7.4, 7.6
33	Identify the benefits and responsibilities of FFA membership.	English: 7.6, 7.9 History and Social Science: USII.1
34	Describe leadership characteristics and opportunities as they relate to agriculture and FFA.	English: 7.6 History and Social Science: CE.1, USII.1
35	Apply for an FFA degree and/or an agricultural proficiency award.	English: 7.6
36	Identify class rules, safety precautions, and procedures.	History and Social Science: CE.4
37	Identify topics associated with agriculture, agriscience, and agribusiness.	English: 7.4, 7.6, 7.9 History and Social Science: WG.2, WG.3, WG.4
38	Explain the importance of agriculture to Virginia, the United States, and the world.	English: 7.6, 7.9 History and Social Science: CE.11, USII.2, WG.2, WG.3, WG.4
39	Describe the relationship of agriculture to other segments of society.	English: 7.6 History and Social Science: CE.11, CE.12, CE.14, USI.5, USII.2
40	Describe natural resources.	English: 7.6 History and Social Science: WG.4 Science: ES.6
41	Identify conservation measures.	English: 7.4, 7.6, 7.9 History and Social Science: CE.1, USII.1 Science: LS.6

42	Identify soil compositions.	English: 7.6 Science: ES.8
43	Explain factors affecting soil erosion.	English: 7.4, 7.6 Science: ES.8
44	Describe soil erosion control measures.	English: 7.6 Science: ES.8
45	Explore water quality.	English: 7.4, 7.6, 7.8 History and Social Science: WG.1, WG.2, WG.7 Science: ES.8
46	Explain human impact on air quality.	English: 7.4, 7.6, 7.7 History and Social Science: WG.7 Science: ES.11, LS.11
47	Determine the economic importance of forestry.	English: 7.4, 7.6, 7.7 History and Social Science: CE.12, WG.3, WG.16
48	Explain the basic types, parts, and growth processes of trees.	English: 7.6 Science: LS.4, LS.5
49	Identify Virginia forest trees.	English: 7.6 Science: LS.4
50	Explore forest wildlife.	English: 7.4, 7.6, 7.8 Science: LS.6
51	Explain the importance of agricultural research.	English: 7.6, 7.7 Science: LS.1
52	Identify agricultural research in animal science.	English: 7.6, 7.7
53	Identify agricultural research in plant science.	English: 7.6, 7.7 Science: LS.1
54	Identify research in agricultural engineering technology.	English: 7.6, 7.7
55	Determine the economic importance of agricultural and horticultural crops.	English: 7.6, 7.7 History and Social Science: CE.12
56	Describe the life processes of plants.	English: 7.6, 7.7 Science: LS.5
57	Explain methods of plant reproduction and transplanting.	English: 7.6, 7.7

		Science: LS.12
58	Demonstrate proper watering and fertilization of plants.	English: 7.6, 7.7
59	Identify plants.	English: 7.6, 7.7 Science: LS.1, LS.4
60	Explain the use of hydroponics and aquaponics in growing plants.	English: 7.6, 7.7 Science: LS.4
61	Determine the importance of animals to agriculture.	English: 7.4, 7.6, 7.7
62	Explain the importance of animal evaluation.	English: 7.6, 7.7
63	Identify breeds of animals.	English: 7.4, 7.6, 7.7 History and Social Science: CE.13, CE.14
64	Identify basic practices for the care of animals.	English: 7.6, 7.7
65	Describe new technologies in animal science.	English: 7.6, 7.7 History and Social Science: USII.9
66	Describe ethical concerns related to animal welfare.	English: 7.6, 7.7 History and Social Science: CE.3, CE.4
67	Identify laboratory procedures and policies.	English: 7.6, 7.7
68	Identify safety practices and procedures.	English: 7.6, 7.7, 7.9
69	Interpret simple plans.	English: 7.4, 7.6, 7.7, 7.9 Mathematics: 8.7, 8.9, 8.10
70	Use basic hand tools for woodworking.	
71	Perform woodworking skills.	
72	Use measuring tools.	
73	Use wood fasteners.	
74	Finish and preserve wood.	

## 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](#).

The following middle school guide is available for this course: [Virginia Middle School Agriscience FFA Career Development Events](#).

# 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>