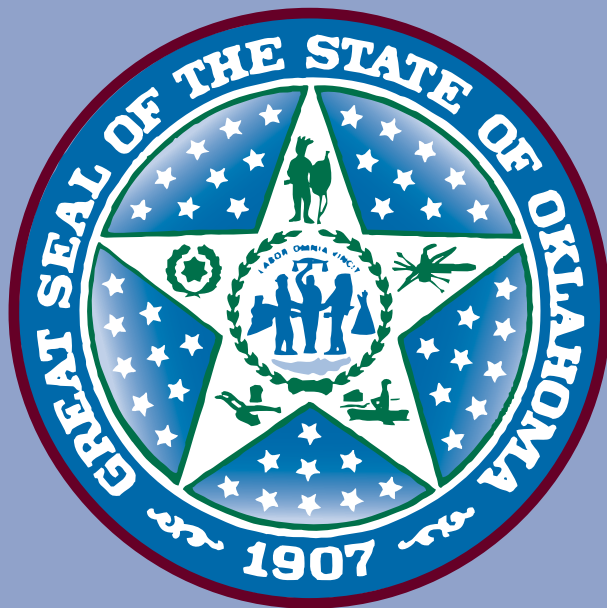


Certification Examinations for Oklahoma Educators™

Oklahoma Subject Area Tests™

STUDY GUIDE

042 Agricultural Education



Oklahoma Commission
for Teacher Preparation

OK-SG-FLD042-03

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STUDY GUIDE INTRODUCTION AND GENERAL INFORMATION ABOUT THE CERTIFICATION EXAMINATIONS FOR OKLAHOMA EDUCATORS

The first two sections of the study guide are available in a separate PDF file. Click the link below to view or print these sections.

[Study Guide Introduction and General Information About the Certification Examinations for Oklahoma Educators](#)



FIELD-SPECIFIC INFORMATION

- Test Competencies
 - Practice Test Questions and Answers
-

INTRODUCTION

This section includes a list of the test competencies, as well as a set of practice selected-response (multiple-choice) questions and one or more practice constructed-response assignments (if applicable), for the test field included in this study guide.

Test Competencies

The test competencies are broad, conceptual statements that reflect the subject-matter skills, knowledge, and understanding an entry-level educator needs to teach effectively in Oklahoma public schools. The list of test competencies for each test field represents the **only** source of information about what a specific test will cover and therefore should be reviewed carefully.

The descriptive statements that follow the competencies are included to provide examples of possible content covered by each competency. These descriptive statements are neither exhaustive nor exclusionary.

Practice Test Questions

The practice selected-response questions included in this section are designed to give you an introduction to the nature of the questions included in this OSAT test field. The practice test questions represent the various types of questions you may expect to see on an actual test; however, they are **not** designed to provide diagnostic information to help you identify specific areas of individual strengths and weaknesses or to predict your performance on the test as a whole.

To help you prepare for your OSAT, each practice selected-response question in this section is preceded by the competency it measures and followed by a brief explanation of the correct response. On the actual test, the competencies, correct responses, and explanations will **not** be given.

When you are finished with the practice test questions, you may wish to go back and review the entire list of test competencies and descriptive statements for your test field.

TEST COMPETENCIES: AGRICULTURAL EDUCATION

SUBAREAS:

- I. Agricultural Business, Marketing, and Communication
- II. Animal Science
- III. Plant and Soil Science
- IV. Agricultural Power and Technology
- V. Natural Resources

SUBAREA I—AGRICULTURAL BUSINESS, MARKETING, AND COMMUNICATION

Competency 0001

Understand financial management and decision making in agricultural business.

The following topics are examples of content that may be covered under this competency.

Apply basic accounting and recordkeeping procedures (e.g., procedures for tracking and maintaining inventory, determining net worth, managing cash flow, maintaining ledgers and journals) and procedures for managing personal finance (e.g., calculating interest, managing checking accounts, filing tax returns).

Analyze standard banking procedures related to agricultural business and the types and characteristics of credit available to agricultural business.

Identify types of insurance (e.g., life, health, accident, business, employment) and their characteristics (e.g., losses covered, benefits, sources).

Evaluate factors affecting decisions about financial planning and management in agricultural business settings.

Competency 0002

Understand agricultural business management practices.

The following topics are examples of content that may be covered under this competency.

Identify types of business structures (e.g., corporations, cooperatives, sole proprietorships) and their characteristics.

Apply procedures for budgeting, scheduling, forecasting market conditions, calculating production costs, and supervising personnel.

Apply principles and procedures related to keeping accurate business records.

Identify state and federal regulations governing agricultural business practices (e.g., regulations relating to safety, animal welfare, environmental protection).

Competency 0003

Understand principles and procedures related to purchasing, marketing, and merchandising in agricultural business.

The following topics are examples of content that may be covered under this competency.

Evaluate factors involved in making purchasing decisions.

Analyze marketing strategies for agricultural products (e.g., hedging, contracting, selecting an appropriate market outlet, setting prices).

Apply principles of design and merchandising in creating merchandise displays.

Analyze the role and influence of government agencies, programs, and regulations related to agricultural marketing (including labeling requirements).

Competency 0004

Understand the role of computers and technology in agricultural business.

The following topics are examples of content that may be covered under this competency.

Evaluate the importance of technology to the production, processing, and marketing of agricultural products (including the capabilities and limitations of technology).

Identify types and characteristics of computer hardware and software used in various aspects of agricultural business.

Identify common applications of computer technology in agriculture.

Analyze the use of on-line services and telecommunication in agricultural business.

Competency 0005

Understand agricultural business in Oklahoma and the world.

The following topics are examples of content that may be covered under this competency.

Analyze principles of supply and demand, diminishing returns, comparative advantage, and resource substitution.

Identify the characteristics of Oklahoma agriculture (including traditional crop enterprises).

Assess the economic impact of international agribusiness on national and Oklahoma economies (e.g., the impact of leading commodities, the importance of foreign trade, the effects of international trade agreements on agricultural business in Oklahoma).

Analyze the role of federal and state agencies (e.g., USDA, EPA) in regulating agricultural business practices and the role of government in international agribusiness.

Competency 0006

Understand agricultural education as a profession.

The following topics are examples of content that may be covered under this competency.

Demonstrate knowledge of the history and goals of agricultural education.

Evaluate the role of the agriculture teacher in school, in the community, and in industry and the ethics, values, and responsibilities of the agricultural educator.

Assess the influence of agriculture industry issues and initiatives on agricultural education, and legislation, regulations, and policies that affect agricultural education.

Recognize the importance and methods of staying abreast of the current knowledge base of the discipline.

Competency 0007

Understand the role of communication skills and leadership skills in agriculture.

The following topics are examples of content that may be covered under this competency.

Identify important components of the philosophy of the FFA, important events in the history of the FFA, and the role of the FFA in agricultural education (including the role of the FFA in developing leadership qualities).

Apply the rules of basic parliamentary procedure.

Apply effective oral and written communication skills.

Analyze principles and procedures for promoting teamwork, motivation, and leadership skills.

SUBAREA II—ANIMAL SCIENCE

Competency 0008

Understand domestic animals and their uses in society.

The following topics are examples of content that may be covered under this competency.

Identify breeds of beef and dairy cattle, swine, sheep, horses, and poultry (including distinguishing characteristics and origin).

Identify products derived from domestic animals and the uses of domestic animals in society.

Apply principles and procedures for evaluating and selecting livestock, poultry, and carcasses (e.g., genotype, phenotype, market classification).

Analyze procedures for the ethical management and treatment of domestic animals (e.g., handling, medication, marketing) and factors and issues related to food safety and the adulteration of food (e.g., sanitation, food storage and handling, proper use of dyes and drugs).

Competency 0009

Understand environmental and facilities management.

The following topics are examples of content that may be covered under this competency.

Analyze the concept of a sustainable environment.

Identify environmental needs (e.g., range requirements, temperature control, appropriate housing) of beef and dairy cattle, swine, sheep, horses, and poultry.

Identify types and characteristics of facilities, tools, and equipment used to provide or maintain appropriate environments for domestic animals.

Identify the effects of domestic animals on the environment (e.g., effects of grazing, use of water resources).

Competency 0010

Understand the anatomy and physiology of animals.

The following topics are examples of content that may be covered under this competency.

Identify major organs and systems, their functions, and their interrelationships in beef and dairy cattle, swine, sheep, horses, and poultry.

Analyze the physiology of organs and systems in beef and dairy cattle, swine, sheep, horses, and poultry.

Apply principles of animal anatomy and physiology to the care of domestic animals (e.g., the relationship of the digestive system to nutrition and feeding practices, the relationship of the reproductive system to practices during parturition).

Competency 0011

Apply knowledge of animal reproduction and genetics in domestic animals.

The following topics are examples of content that may be covered under this competency.

Analyze breeding methods and procedures and factors that influence breeding decisions (e.g., phenotype) in domestic animals.

Analyze basic principles of inheritance and genetics (e.g., Mendelian genetics; the genetic basis of animal selection; the function of genes, chromosomes, and DNA).

Analyze processes of meiosis and fertilization.

Apply procedures for the care of animals during pregnancy and parturition.

Competency 0012

Analyze nutritional requirements of domestic animals.

The following topics are examples of content that may be covered under this competency.

Evaluate factors influencing nutritional requirements and feeding options in domestic animals.

Identify sources and functions of animal nutrients and symptoms of nutrient deficiencies.

Analyze the composition, classification, and nutritional value of various types of feed.

Analyze uses of various feeds for specific species, and types, functions, and effects of feed additives.

Competency 0013

Understand practices for handling domestic animals and maintaining their health.

The following topics are examples of content that may be covered under this competency.

Analyze principles and procedures for the safe and humane handling of livestock and poultry.

Identify purposes and methods of castrating, dehorning, branding, marking, ear notching, tagging, tattooing, docking, and medicating livestock.

Identify characteristics of healthy and unhealthy animals.

Identify types and causes of common infectious and noninfectious diseases in domestic animals; types, symptoms, effects, and life cycles of internal and external parasites; and methods for preventing and treating diseases and parasites.

SUBAREA III—PLANT AND SOIL SCIENCE

Competency 0014

Understand characteristics, components, and properties of soil.

The following topics are examples of content that may be covered under this competency.

Identify types of soil and their characteristics.

Analyze the composition and components of soil.

Apply procedures for testing soil, interpreting and using soil tests, and improving the ability of soil to support plant growth.

Evaluate factors affecting the ability of soil to support plant growth and the role of soil in plant production.

Competency 0015

Understand plant anatomy and physiology.

The following topics are examples of content that may be covered under this competency.

Identify plant structures, organs, and systems and their functions and processes.

Analyze the processes and products of photosynthesis, respiration, and transpiration and requirements for plant growth and development.

Analyze processes of sexual and asexual reproduction.

Apply principles of plant breeding, hybridization, genetics, and grafting.

Competency 0016

Understand soil treatments and growing media.

The following topics are examples of content that may be covered under this competency.

Analyze the use of fertilizers in plant production (e.g., differences between organic and inorganic fertilizers; the importance of nitrogen, phosphorus, and potassium to plant growth and development; procedures for the safe handling, application, and disposal of fertilizers).

Apply skills in interpreting symptoms of and remedies for soil deficiencies.

Apply procedures for adjusting soil pH and pasteurizing soil.

Identify types, components, characteristics, and uses of growing media and mixtures of soil, mineral matter, and organic matter.

Competency 0017

Apply methods and procedures for protecting and caring for plants.

The following topics are examples of content that may be covered under this competency.

Identify types and characteristics of plants, crops, and seed varieties.

Analyze the growth requirements of plants (e.g., requirements for soil, water, light, and nutrients; effects of temperature, hardiness zones, humidity).

Apply procedures for propagating, transplanting, and hardening plants and for determining appropriate planting and rotation schedules.

Analyze procedures related to the identification and control of plant pests, pathologies, and weeds (e.g., methods of controlling plant diseases and pests; characteristics of integrated pest management; procedures for the safe handling, application, and disposal of pesticides and herbicides; identification of pollutants that are harmful to plants and their symptoms and effects).

Competency 0018

Apply principles of land management and irrigation.

The following topics are examples of content that may be covered under this competency.

Apply factors and procedures related to land management planning.

Analyze procedures for selecting and using tillage and irrigation equipment (including selecting an irrigation system) and factors affecting decisions about irrigation, drainage, tillage, and crop rotation practices.

Identify causes and characteristics of various kinds of erosion and procedures for controlling soil erosion.

Evaluate the role of government agencies and public service organizations in land management.

Competency 0019

Understand environmental and food safety issues related to plant and soil science.

The following topics are examples of content that may be covered under this competency.

Analyze issues related to land use and water use.

Analyze procedures for conserving soil and water and for controlling runoff.

Analyze safety issues and societal concerns related to food products (e.g., genetically manipulated crops, irradiated food, pesticide residues).

SUBAREA IV—AGRICULTURAL POWER AND TECHNOLOGY

Competency 0020

Apply procedures related to measurement and drafting.

The following topics are examples of content that may be covered under this competency.

Apply skills used in reading and using measuring instruments.

Interpret notations and symbols commonly used in drafting.

Perform mathematical calculations related to measurement and drafting.

Apply basic principles of surveying and procedures for creating and interpreting working drawings.

Competency 0021

Understand small engines and power equipment.

The following topics are examples of content that may be covered under this competency.

Identify types and characteristics of small engines and power equipment.

Identify the uses, components, principles of operation, and maintenance procedures of small engines and power equipment.

Competency 0022

Apply construction principles and techniques.

The following topics are examples of content that may be covered under this competency.

Apply basic principles of woodworking and carpentry, masonry, plumbing, and electrical work.

Apply basic principles of metalworking and welding.

Identify operating principles related to power tools and machinery used in agricultural construction.

Apply techniques used to construct, repair, and maintain physical structures in agriculture.

Competency 0023

Understand safety principles and practices in agriculture.

The following topics are examples of content that may be covered under this competency.

Identify safety procedures related to the care and use of equipment and machinery in agriculture.

Evaluate the importance of proper maintenance schedules and procedures in ensuring safety.

SUBAREA V—NATURAL RESOURCES

Competency 0024

Understand the relationships among agriculture, the environment, and society.

The following topics are examples of content that may be covered under this competency.

Analyze the importance of soil, water, forests, and wildlife as natural resources.

Analyze the relationship between agriculture (including forestry) and the environment.

Evaluate the effects of various agricultural practices on the environment.

Evaluate economic factors related to environmental practices in agriculture and the role of government and society in regulating and monitoring agriculture and agricultural practices.

Competency 0025

Understand renewable and nonrenewable resources.

The following topics are examples of content that may be covered under this competency.

Identify types of natural resources and their characteristics.

Evaluate the importance and uses of natural resources (e.g., forestry products, mineral resources, energy resources) in agriculture and the effects of the availability of natural resources on agriculture.

Analyze issues related to available reserves and usage patterns of natural resources (e.g., diversion of water for agricultural purposes) and problems associated with the depletion of natural resources.

Analyze the effects of agricultural practices and procedures on water and other natural resources.

Competency 0026

Understand the role of forest and range management in protecting habitats and species.

The following topics are examples of content that may be covered under this competency.

Identify characteristics and components of ecological niches, communities, and ecosystems.

Analyze the dependence of species on specific habitats and the interrelationships among climate, weather, habitats, and species.

Analyze the effects of forestry and range practices on the environment, the role of forestry and range management in preserving habitats and protecting the environment, and current issues related to habitat protection.

Competency 0027

Understand the concept of multiple-use management.

The following topics are examples of content that may be covered under this competency.

Evaluate the role and importance of multiple-use management.

Analyze procedures for facilitating multiple-use management (e.g., timber, mining, grazing, recreation) in forests, rangelands, and wetlands.

PRACTICE TEST QUESTIONS AND ANSWERS: AGRICULTURAL EDUCATION

Practice Selected-Response Questions

Competency 0002

Understand agricultural business management practices.

1. The owner of a large produce farm expects this year's harvest to be delayed by two or more weeks due to unusual spring weather. It will be most important for the owner to determine quickly the effect this delay will have on:
 - A. work force scheduling.
 - B. herbicide needs.
 - C. crop storage space.
 - D. rotation schedules.

Correct Response: A. Harvest on a produce farm is a labor-intensive activity of short duration. At harvest, a large produce farm needs to hire a significant number of additional workers to assist with handling, packaging, and transporting the produce to the market or processor. Because the harvest work must take place within a short period of time, these workers are likely to be temporary help and must be scheduled well in advance. Without quick action, any delay in the expected arrival of harvest could result in cost overruns due to idle labor or the loss of the crop due to the unavailability of labor.

Competency 0012

Analyze nutritional requirements of domestic animals.

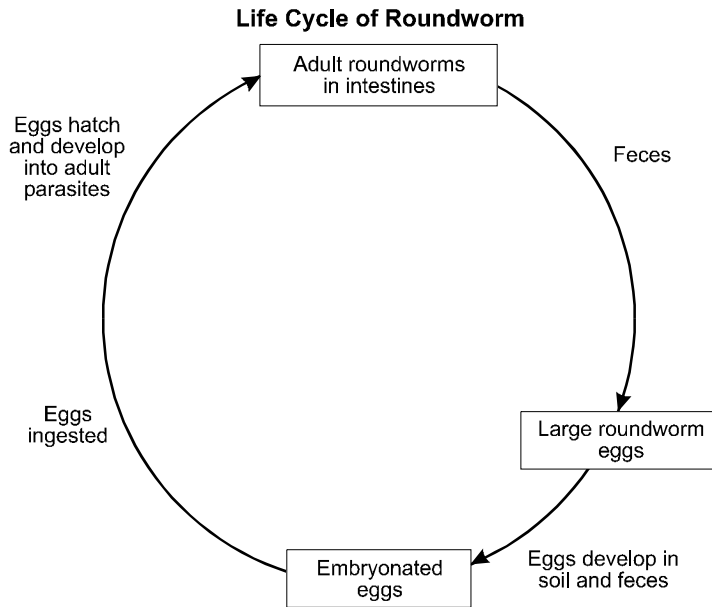
3. As part of a balanced ration for hogs, soybean meal is often used as a supplement to corn primarily to:
- A. provide a source of carbohydrates.
 - B. correct the amino acid deficiencies of corn.
 - C. serve as a vitamin supplement.
 - D. provide the extra roughage that hogs require.

Correct Response: B. Although corn is an excellent source of carbohydrates, it lacks a number of amino acids required to produce the complete proteins that are necessary for the normal development of bones and muscles. The amino acids found in soybean meal complement those found in corn, so that a diet that includes yellow corn and soybean meal combined in the proper proportions will satisfy a hog's requirements for all the essential amino acids except methionine.

Competency 0013

Understand practices for handling domestic animals and maintaining their health.

4. Use the diagram below to answer the question that follows.



Based on the diagram above, which of the following management practices would likely be the most effective and practical way to minimize parasite infestation in a herd that is fed on pasture?

- A. dividing the herd into several smaller groups
- B. frequently rotating the herd to new pastures
- C. adding antibiotics to the diet
- D. removing the feces on a regular schedule

Correct Response: B. According to the diagram, the eggs of this roundworm are deposited in the soil through the feces of infected animals. These eggs may then be ingested by grazing livestock. For this life cycle to continue, the eggs must be ingested while they are still viable. In an area where roundworm infestation is a problem, pasture rotation, which temporarily removes the livestock from the pasture, can be an effective and practical tool in disrupting the roundworm life cycle, as it separates the livestock from the roundworm eggs, so viable roundworm eggs are not ingested and the roundworm's life cycle is interrupted.

Competency 0014

Understand characteristics, components, and properties of soil.

5. Plants at a nursery show symptoms of magnesium deficiency despite soil treatments high in this mineral. Which of the following provides the likely explanation for the continued deficiency?
- A. The plants have a disease that prevents magnesium uptake.
 - B. Excessive drainage is allowing magnesium to leach from the soil.
 - C. The magnesium in the soil treatment is not in a useful form.
 - D. Improper pH is causing magnesium to be chelated.

Correct Response: D. Improper pH in a soil can cause magnesium ions to form chelates. Chelates are formed when metals such as magnesium become strongly bonded with organic soil particles. The chelated compounds, in this case magnesium, render the metal unavailable for use as a plant nutrient.

Competency 0016

Understand soil treatments and growing media.

6. A producer would like to improve the water-conserving ability of the soil on the farm's cropland. Which of the following steps would be most effective in achieving this goal?
- A. installing an irrigation system
 - B. increasing the amount of chemical fertilizers used
 - C. adding organic matter to the soil
 - D. tilling the soil more thoroughly and frequently

Correct Response: C. In addition to supplying nutrients to growing plants, organic matter, such as clay, is able to absorb and hold large amounts of water. In the case of a soil that tends to dry out quickly, the addition of organic matter, often in the form of animal or green manure, slows the rate at which water drains downward out of the reach of plants or evaporates from the soil surface. This means that the water is available to the growing crop plants for a longer period of time and may reduce the amount of irrigation that is necessary.

Competency 0017

Apply methods and procedures for protecting and caring for plants.

7. A greenhouse is operated using principles of integrated pest management. Which of the following would likely be one of the operating principles of this greenhouse?
- A. The use of all pesticides is prohibited within the greenhouse.
 - B. Plant pests are allowed to exist as long as their numbers are below the economic threshold.
 - C. All plants must be grown without the use of chemical fertilizers.
 - D. Nonnative plant species are grown to minimize pest populations.

Correct Response: B. Integrated pest management uses a combination of physical, chemical, and biological methods to keep pest populations at an acceptable level. The goal of integrated pest management is not to destroy all pests, but to prevent their causing significant injury to the crop. A greenhouse operated according to principles of integrated pest management would carefully monitor pest populations, intervening to control them only when their numbers became unacceptably high.

Competency 0019

Understand environmental and food safety issues related to plant and soil science.

8. Faced with limited water supplies and rising water costs, a fruit grower would like to select an irrigation method that minimizes nonproductive water loss. Which of the following irrigation methods would best achieve this goal?
- A. flood irrigation
 - B. sprinkler irrigation
 - C. drip irrigation
 - D. furrow irrigation

Correct Response: C. In drip irrigation, water is delivered to plants under very low pressure by means of plastic tubing. The water trickles from strategically spaced openings in the tubing. This slow but constant delivery of water reduces water loss from evaporation and runoff. Drip irrigation is used most commonly on crops that are widely spaced, such as fruit trees.

Competency 0021

Understand small engines and power equipment.

9. A large compressor that is operated by a four-stroke engine is used for spraying in an orchard. Which of the following precautions should be taken to prevent an accidental explosion of the compressor?
- A. Regularly clean and inspect the pressure-release valve, and replace if necessary.
 - B. Frequently inspect the air hose for leaks, and repair if necessary.
 - C. Perform regular tuneups on the compressor's engine.
 - D. Periodically adjust belts and pulleys, and replace any that are worn.

Correct Response: A. A large compressor operated by a four-stroke engine can generate enough pressure to burst the holding tank. A pressure-release valve is a device that reduces pressure by releasing air when the pressure exceeds safe levels. Normal usage of the compressor can result in wear, along with corrosion and the accumulation of residue in the pressure valve. To avoid malfunction, the valve should be inspected and cleaned on a regular basis.

Competency 0027

Understand the concept of multiple-use management.

10. Which of the following forestry practices is most appropriate for a wilderness area that is adopting a policy of multiple-use management?
- A. Remove restrictions on campfires to encourage use by campers and backpackers.
 - B. Prohibit all commercial use of the land to better protect the environment.
 - C. Encourage a diversity of tree species rather than just those that are financially important.
 - D. Restrict motorized vehicles from the area to encourage recreational use.

Correct Response: C. Multiple-use management refers to the concept of encouraging a diversity of uses within wilderness areas, including commercial and recreational uses. A wilderness area can accommodate a wider variety of uses if it contains a wider variety of habitats. One way to encourage diversity within the wilderness area is to encourage a diversity of tree species.

**CERTIFICATION EXAMINATIONS FOR OKLAHOMA EDUCATORS
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