PLACE®

STUDY GUIDE

40 Agriculture and Renewable Natural Resources

Program for Licensing Assessments for Colorado Educators®

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PART 1: GENERAL INFORMATION ABOUT THE PLACE® AND TEST PREPARATION

Part 1 of this study guide is contained in a separate PDF file. Click the link below to view or print this section:

General Information About the PLACE and Test Preparation

PART 2: FIELD-SPECIFIC INFORMATION

TEST FIELD 40: AGRICULTURE AND RENEWABLE NATURAL RESOURCES

INTRODUCTION

This section includes a list of the test objectives, immediately followed by a set of practice multiple-choice questions. For test areas that include a performance assessment (Basic Skills, all languages other than English, Special Education Specialist: Visually Impaired), one or more practice performance assignments (as applicable) will also be included.

TEST OBJECTIVES. As noted earlier, the test objectives are broad, conceptual statements that reflect the knowledge, skills, and understanding an entry-level educator needs to teach effectively in a Colorado classroom. The list of test objectives represents the **only** source of information about what a specific test will cover.

PRACTICE MULTIPLE-CHOICE QUESTIONS. The practice multiple-choice questions included in this section are designed to give you an introduction to the nature of the questions included on the PLACE test. The practice questions represent the various types of multiple-choice 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.

When you answer the practice multiple-choice questions, you may wish to use the answer key to check your answers. To help you identify how the test objectives are measured, the objective statement to which each multiple-choice question corresponds is listed in the answer key. When you are finished with the practice questions, you may wish to go back and review the entire list of test objectives and descriptive statements for your test area.

TEST FIELD 40: AGRICULTURE AND RENEWABLE NATURAL RESOURCES

Agricultural Business Management and Resource Economics
Agricultural Mechanical Technology
Horticulture
Environmental and Natural Resources
Animal Science
Plant and Soil Science
Agricultural Communication, Leadership, and Career Development

AGRICULTURAL BUSINESS MANAGEMENT AND RESOURCE ECONOMICS

Understand agricultural economics and policy.

Includes basic principles of agricultural economics (e.g., supply and demand) and the relationship between agricultural economics and policy; the influence of various factors (e.g., social pressures, trade) on agricultural policy; state and federal policies and laws related to agriculture; and the effects of these policies and laws on agricultural practices and decision making in Colorado.

Understand agricultural business management practices.

Includes characteristics and purposes of business plans for agricultural operations; procedures for scheduling, budgeting, market forecasting, and calculating production costs; factors and skills involved in supervising and scheduling personnel; the use and interpretation of basic statistics; the importance of and methods for keeping accurate business records; applications of computers and other technology to agricultural business management; and state and federal regulations that govern agricultural business practices (e.g., handling and storage of pesticides, wages, workplace conditions).

Understand financial management practices.

Includes basic accounting and recordkeeping procedures; records necessary for employees and for tax purposes; types, characteristics, sources, and costs of credit; the roles of banks and standard banking procedures in relation to agricultural business; types, characteristics, and purposes of insurance; factors that affect financial planning and management decisions in agricultural business settings; and applications of computers and other technology to financial management practices.

Understand agricultural marketing principles and procedures.

Includes types and characteristics of domestic and international market outlets and marketing strategies for agricultural products and services (e.g., cooperatives); factors involved in and procedures for setting prices; methods of advertising agricultural products and services; principles of selling and providing service; applications of computers and other technology to agricultural marketing; and government agencies, programs, and regulations related to agricultural marketing.

Understand natural resource economics and policy.

Includes basic principles of natural resource economics and the relationship between natural resource economics and policy; the influence of various factors on environmental and natural resource policy; issues related to natural resources in Colorado (e.g., water use, land use and development, air quality); state and federal policies and laws related to natural resources; and the effects of these policies and laws on natural resource management and decision making in Colorado.

AGRICULTURAL MECHANICAL TECHNOLOGY

Understand mechanization and power transmission in agricultural systems.

Includes basic operating principles of agricultural machinery and power equipment; diagnostic and troubleshooting techniques; and maintenance and repair procedures.

Apply measurement, drawing, and surveying techniques and skills.

Includes types, characteristics, and uses of measurement instruments; mathematical calculations related to measurement, design, and surveying; development and interpretation of working drawings; and basic surveying techniques.

Understand equipment and technology related to irrigation systems and soil conservation practices.

Includes basic principles of installation, operation, and maintenance for various types of irrigation and drainage systems; and operating and maintenance procedures for tillage equipment.

Understand construction and maintenance principles and techniques.

Includes basic principles of carpentry, masonry, plumbing, electrical work, metalworking, and welding; tools, machinery, and other technology used in agricultural construction and maintenance and their operating principles; and techniques used to construct, repair, and maintain physical structures.

Apply safety practices in the use of agricultural tools, equipment, systems, and processes.

Includes safety procedures related to the care and use of equipment and machinery in agriculture; strategies and practices to promote safety in agriculture; the importance of proper maintenance in ensuring safety; and agencies, laws, and regulations that govern safety in agricultural settings.

HORTICULTURE

Understand greenhouse and nursery management principles and practices.

Includes characteristics of greenhouse and nursery facilities; methods of regulating climate and other physical conditions; types and characteristics of horticultural growing media; greenhouse and nursery equipment and tools; methods of planting, propagating, maintaining, and harvesting horticultural plants; types and characteristics of common pests and diseases of greenhouse and nursery plants; pest management procedures; and procedures for the proper use and handling of fertilizers and pesticides in greenhouses and nurseries.

Understand turf management principles and practices.

Includes types and characteristics of grasses; factors that affect the selection of turf; methods of turf production; procedures for preparing an area for seeding or turf installation; turf maintenance practices; turf management tools and equipment and their uses; signs and symptoms of common turf pests and diseases; pest management procedures; and procedures for the proper application of fertilizers and pesticides to turf.

Understand landscape design and ornamental horticulture principles and practices.

Includes basic principles of landscape planning, design, construction, and maintenance; types and characteristics of ornamental plants; factors that influence the selection of ornamental plants for given purposes; methods of transplanting and maintaining ornamental plants; landscaping and horticultural tools and equipment and their uses; common pests and diseases of ornamental plants and methods of control; and procedures for the proper application of fertilizers and pesticides in landscape settings.

Understand floriculture principles and practices.

Includes practices related to the production of cut flowers and flowering plants; factors that affect the development and blooming of flowers; methods of preparing, caring for, and handling flowers; tools and equipment used in floriculture; common pests and diseases of flowering plants and methods of control; and procedures for the proper application of fertilizers and pesticides in floriculture.

ENVIRONMENTAL AND NATURAL RESOURCES

Understand fishery and wildlife biology.

Includes types and characteristics of important fish and wildlife species in Colorado; biological and ecological requirements of these species; common pests and diseases of fish and wildlife species; principles and methods of monitoring and managing fish and wildlife populations; and natural and human factors that affect fish and wildlife populations.

Understand forestry principles and practices.

Includes the environmental and economic importance of forests (e.g., wildlife habitat, watersheds, recreation); basic concepts and principles of forest ecology; soil and hydrologic characteristics of forests; principles and practices of forest management; silviculture practices; common pests and diseases and their control; characteristics of various harvesting techniques; the effects of forestry practices on the environment; and important tree species and forest products in Colorado.

Understand principles and practices of natural resources and environmental management.

Includes types and characteristics of important natural resources in Colorado; water management principles and practices and factors that influence water management decisions; the relationships among environmental and natural resources, agriculture, and society; the role of sustainable practices in natural resources and environmental management; and principles of multiple-use management and procedures for facilitating multiple use (e.g., grazing, recreation, mining) in various locations (e.g., rangelands, forests).

ANIMAL SCIENCE

Understand livestock, their products, and their uses.

Includes breeds of beef and dairy cattle, sheep, swine, poultry, and horses; products derived from livestock; uses of livestock; procedures and criteria for evaluating live animals and carcasses; and processing and food safety practices.

Understand the anatomy, physiology, and reproduction of animals.

Includes body systems and their components, functions, and interrelationships; physiological processes; the relationship between anatomical structures and physiological processes; the biology of reproduction in livestock; breeding methods; and the application of knowledge about anatomy, physiology, and genetics to the care, selection, and processing of animals.

Understand principles and practices of animal production management.

Includes principles and procedures for the safe and ethical handling of livestock; nutritional requirements of livestock; types and characteristics of feed and feed additives; the selection of appropriate feed and feeding schedules; purposes and methods of various animal production practices, such as dehorning, castrating, marking, docking, and medicating; procedures for the care of animals during pregnancy and parturition; common diseases and parasites of livestock, their symptoms, and methods for preventing and treating them; and the interpretation and use of data in making animal production management decisions.

Understand environmental and facilities management in animal production.

Includes environmental requirements of livestock (e.g., range requirements, temperature control); facilities, equipment, tools, technology, and practices used to provide and maintain appropriate conditions for livestock; and methods for maintaining sanitary conditions and managing waste.

PLANT AND SOIL SCIENCE

Understand the anatomy, physiology, and reproduction of plants.

Includes plant structures, organs, and systems and their functions and processes; the processes of photosynthesis, respiration, and transpiration and their relationship to plant growth; the effects of environmental factors (e.g., temperature, humidity) on plant growth; the biology of reproduction and genetics in plants; and methods of breeding and asexually propagating plants.

Understand principles and practices of plant production management.

Includes types and characteristics of plants, crops, and seeds; the uses and products of various plants; requirements for the growth and development of various plants; considerations in selecting plants, crops, and seeds; principles and methods of propagating, transplanting, hardening, and growing plants; the determination of planting, harvesting, and crop rotation schedules; harvesting methods; types, characteristics, and symptoms of common plant pests, diseases, and weeds and methods of controlling them; procedures for the proper application and handling of fertilizers and pesticides in plant production; equipment, tools, and technology used to grow, harvest, and process crops; and the interpretation and use of data in making plant production management decisions.

Understand principles of soil science.

Includes classifications, characteristics, and components of soil; soil testing methods and the interpretation and use of soil test results; effects of physical, chemical, and biological factors on soil; factors that affect the ability of soil to support plant growth; types and characteristics of fertilizers and other soil treatments; and methods for improving the ability of soil to support plant growth.

Understand principles of land management, tillage, and irrigation.

Includes land classification criteria; appropriate uses of various land classes; causes and characteristics of erosion and procedures for controlling erosion; land management planning procedures and factors that influence them; principles and methods of soil and water conservation; the selection and use of tillage, irrigation, and drainage methods; and factors that influence decisions about tillage, irrigation, drainage, and rotation practices.

AGRICULTURAL COMMUNICATION, LEADERSHIP, AND CAREER DEVELOPMENT

Understand principles of agricultural communications.

Includes purposes of agricultural communications; methods of communicating in agriculture (e.g., mass communication, public speaking) and their characteristics and applications; technical writing principles; applications of computers and other technology to agricultural communications; and considerations in communicating with diverse populations.

Identify the characteristics and functions of career and technical student organizations.

Includes the purposes of the organizations for secondary students (e.g., FFA) and for adults (e.g., Young Farmers); the role and responsibilities of the advisor; and organizational management including, but not limited to, parliamentary procedure, leadership, awards and recognition programs, and community service programs.

Identify the characteristics and functions of supervised agricultural experience programs.

Includes types of supervised agricultural experience programs, and program records and their characteristics.

Understand the role and functions of advisory committees.

Includes the purpose, selection, and effective use of advisory committees to enhance secondary instruction and community relations.

Identify career opportunities and requirements in agriculture.

Includes career areas, opportunities, job titles, and prerequisites for career areas in agriculture; and procedures for securing and maintaining employment in agriculture.

Practice Questions: Agriculture and Renewable Natural Resources

1. A federal trade agreement that reduces or eliminates the tariffs on imports of certain agricultural products that are also produced in the United States is most likely to have which of the following effects?

   A. reducing consumer demand for the products

   B. increasing the production costs for domestic producers

   C. lowering the profits of domestic producers

   D. increasing the prices consumers pay for the products

2. Which of the following statements best summarizes the general policy regarding water rights for streams and aquifers in Colorado?

   A. All actual and potential users of water from a source have the right to equal amounts.

   B. First users have priority to underground water sources, but all users have equal rights to surface sources.

   C. The first person to appropriate water from a source and put it to use has first right to the water.

   D. The user with the greatest need, as determined by a water court, has first right to the water.

3. A mechanic performs a compression test on each of the cylinders of a gasoline engine. The pressure in one cylinder is much lower than normal, so the mechanic places a little oil in that cylinder and repeats the test. This time the pressure reading is close to normal. These results best support which of the following conclusions?

   A. The cylinder head is cracked.

   B. The piston is not advancing fully into the cylinder.

   C. The intake or exhaust valve is stuck open.

   D. The cylinder or rings are excessively worn.

4. A pump that supplies water to a sprinkler irrigation system has begun to operate at a reduced pressure, and it sometimes loses its prime, despite an adequate water supply. Which of the following actions is most appropriate to take in this situation?

   A. Check the intake line for air leaks.

   B. Replace the pump impellers.

   C. Check the outlet line for clogs.

   D. Replace the pump motor.

5. Control of which of the following pairs of factors is generally most critical in timing the bloom of a crop of flowering plants, such as poinsettias, to meet a marketing target date?

   A. humidity and air circulation

   B. growing medium composition and watering frequency

   C. light and temperature

   D. fertilizer concentration and frequency of application

6. The most significant current threat to rainbow trout populations in Colorado is posed by:

   A. environmental pollutants.

   B. competition from other fish species.

   C. reduced stream flow.

   D. whirling disease.

7. Which of the following is the primary reason why operations that produce feeder pigs or calves often use cross-breeding rather than purebreeding?

   A. Crossbreeding generally is less expensive and labor intensive than purebreeding.

   B. Crossbred offspring generally are more easy to handle and manage than purebred offspring.

   C. Crossbreeding generally results in more uniformity among offspring than purebreeding.

   D. Crossbred offspring generally are more vigorous and productive than purebred offspring.

8. Which of the following practices is used to prevent the introduction of disease into a swine confinement building?

   A. recirculating the air from the building to prevent pathogens from entering with outside air

   B. fumigating the building on a regular basis

   C. requiring people to dip their shoes in a disinfectant solution prior to entering the building

   D. treating the water used in the waterers with chlorine

9. Which of the following factors is most important to consider when determining the ideal time to harvest grain crops?

   A. protein content of the grain

   B. height of the plants

   C. moisture content of the grain

   D. grain size

10. A soil with which of the following compositions will have the highest water-holding capacity?

    A. 75% sand, 25% silt

    B. 50% sand, 25% silt, 25% clay

    C. 75% silt, 25% clay

    D. 50% sand, 50% silt

11. A primary goal of both the FFA and the National Young Farmer Educational Association (NYFEA) is to:

    A. lobby for changes in public policy related to agriculture education.

    B. encourage innovation and risk taking by members.

    C. improve working conditions and pay in the agriculture industry.

    D. develop leadership skills among members.

12. John is operating a lawn care business as part of a supervised agricultural experience program. As part of his record-keeping system, he records every financial transaction in a journal. The next step in his system should be to periodically transfer this information to a:

    A. general ledger.

    B. financial statement.

    C. monthly budget.

    D. cash flow summary.

Answer Key: Agriculture and Renewable Natural Resources

Question Number	Correct Response	Objective
1.	**C**	Understand agricultural economics and policy.
2.	**C**	Understand natural resource economics and policy.
3.	**D**	Understand mechanization and power transmission in agricultural systems.
4.	**A**	Understand equipment and technology related to irrigation systems and soil conservation practices.
5.	**C**	Understand floriculture principles and practices.
6.	**D**	Understand fishery and wildlife biology.
7.	**D**	Understand the anatomy, physiology, and reproduction of animals.
8.	**C**	Understand environmental and facilities management in animal production.
9.	**C**	Understand principles and practices of plant production management.
10.	**C**	Understand principles of soil science.
11.	**D**	Identify the characteristics and functions of career and technical student organizations.
12.	**A**	Identify the characteristics and functions of supervised agricultural experience programs.