

Missouri Educator Gateway Assessments

FIELD 015: AGRICULTURE TEST FRAMEWORK

January 2014

DRAFT

Content Domain	Range of Competencies	Approximate Percentage of Test Score
I. Agricultural Leadership	0001–0003	20%
II. Plant and Soil Science	0004–0005	20%
III. Animal Science	0006–0007	20%
IV. Agricultural Mechanics	0008–0009	15%
V. Agricultural Business	0010–0011	15%
VI. Natural Resources and Food Science	0012–0013	10%

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TEST FRAMEWORK
FIELD 015: AGRICULTURE

AGRICULTURAL LEADERSHIP

0001 Understand core principles of agricultural education.

For example:

- 1.1 Demonstrate knowledge of the history, rationale, and methods of agricultural education.
- 1.2 Demonstrate knowledge of the importance and scope of the agriculture industry.
- 1.3 Apply knowledge of core concepts in English language arts and mathematics and their applications in agricultural education.
- 1.4 Apply knowledge of information technology and its use in agriculture.
- 1.5 Demonstrate knowledge of research and new and emerging trends and technologies in agriculture.
- 1.6 Demonstrate knowledge of social, political, legal, and ethical issues in agriculture.
- 1.7 Demonstrate knowledge of safety practices in agricultural education.

0002 Understand the role of leadership in agricultural education.

For example:

- 2.1 Demonstrate knowledge of principles of agricultural leadership and communication (e.g., public speaking, parliamentary procedures).
- 2.2 Demonstrate knowledge of the total agricultural program model (e.g., instructional, experiential, student organizations).
- 2.3 Demonstrate knowledge of strategies for providing and assessing agriculture instruction.
- 2.4 Demonstrate knowledge of student organizations, including the role of faculty advisors.
- 2.5 Apply knowledge of types and characteristics of supervised agricultural experiences.
- 2.6 Apply strategies for working with local advisory committees and promoting agricultural literacy and agricultural education.
- 2.7 Demonstrate knowledge of facilities management and strategies for planning and managing activities in the laboratory and the field.

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0003 Understand careers and career development in agriculture.

For example:

- 3.1 Identify career opportunities in the agriculture industry.
- 3.2 Apply knowledge of sources of information about agriculture careers.
- 3.3 Apply knowledge of strategies for self-assessment, self-improvement, career exploration, and college and career readiness.
- 3.4 Apply knowledge of skills related to career planning, job searching, and job acquisition.

PLANT AND SOIL SCIENCE

0004 Understand the biology of plants.

For example:

- 4.1 Demonstrate knowledge of plant classification and characteristics and uses of various species of plants, including nursery plants and major crops.
- 4.2 Demonstrate knowledge of the structure and function of cells, tissues, and systems of plants.
- 4.3 Analyze physiological processes in plants, including photosynthesis, respiration, transpiration, and transport.
- 4.4 Demonstrate knowledge of processes of plant growth and factors that affect growth.
- 4.5 Apply knowledge of plant genetics and reproduction.
- 4.6 Apply knowledge of how plants use nutrients and of how to recognize, prevent, and treat nutrient deficiencies in crops.

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0005 Understand soils and crop production.

For example:

- 5.1 Demonstrate knowledge of the formation of soil, the classification and characteristics of soil, and how soil relates to plant growth.
- 5.2 Demonstrate knowledge of soil management practices and methods of soil conservation and erosion control.
- 5.3 Apply knowledge of characteristics and uses of different types of fertilizers and other components of plant growth systems.
- 5.4 Demonstrate knowledge of types of weeds, diseases, and insect pests and methods for their control.
- 5.5 Identify types and characteristics of crop production practices (e.g., monoculture, hydroponics) in the field and the greenhouse.
- 5.6 Demonstrate knowledge of the basic principles of horticulture.
- 5.7 Apply knowledge of safe practices in crop production (e.g., chemical application, accident prevention).

ANIMAL SCIENCE

0006 Understand the biology of animals.

For example:

- 6.1 Demonstrate knowledge of characteristics and uses of various species (e.g., horses, cattle, swine, dogs, rabbits, poultry) and breeds of animals.
- 6.2 Demonstrate knowledge of the anatomy and physiology of animals.
- 6.3 Demonstrate knowledge of underlying growth processes and stages of growth in animals.
- 6.4 Apply knowledge of principles of animal genetics and selective breeding in animal production.
- 6.5 Analyze principles of animal reproduction and their application to breeding practices used in animal production.
- 6.6 Demonstrate knowledge of principles of and procedures for evaluating and selecting animals.

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0007 Understand animal production.

For example:

- 7.1 Demonstrate knowledge of standard and alternative methods for animal production and management (e.g., large animals, specialty animals, aquaculture).
- 7.2 Apply knowledge of animal nutrition and feeding practices.
- 7.3 Apply knowledge of types and causes of common animal diseases and parasites and methods for their prevention, treatment, and control.
- 7.4 Apply knowledge of principles and practices for caring for, safely handling, housing, and maintaining animals.
- 7.5 Apply knowledge of effects of animal production systems on the environment and strategies and practices for minimizing environmental damage and sustaining the environment.

AGRICULTURAL MECHANICS

0008 Understand mechanical systems in agriculture.

For example:

- 8.1 Apply knowledge of a variety of mechanical systems (e.g., gears, levers, pulleys) and machines used in agriculture.
- 8.2 Apply knowledge of the operation of the internal combustion engine, including small engines.
- 8.3 Apply knowledge of hydraulic systems and electrical systems.
- 8.4 Demonstrate knowledge of characteristics of alternative energy systems in agriculture.
- 8.5 Demonstrate knowledge of principles, tools, and methods for servicing, maintaining, and repairing mechanical equipment.
- 8.6 Demonstrate knowledge of the safe and proper use of agricultural equipment.

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0009 Understand construction systems in agriculture.

For example:

- 9.1 Demonstrate knowledge of characteristics of structures used in agriculture.
- 9.2 Apply knowledge of tools and materials used in planning and constructing agricultural structures.
- 9.3 Apply knowledge of basic carpentry, plumbing, electrical, and metalworking skills.
- 9.4 Demonstrate knowledge of characteristics of water control and irrigation systems.
- 9.5 Demonstrate knowledge of methods for managing facilities, including greenhouses and other structures used in agriculture.

AGRICULTURAL BUSINESS

0010 Understand business management in agriculture.

For example:

- 10.1 Demonstrate knowledge of characteristics and purposes of different types of business organizations (e.g., partnerships, cooperatives).
- 10.2 Apply knowledge of entrepreneurship and strategies for starting and managing an agricultural business.
- 10.3 Apply knowledge of economic principles and concepts (e.g., supply, demand) and their application to agricultural business.
- 10.4 Apply knowledge of principles of finance, banking, and risk analysis in agricultural business.
- 10.5 Demonstrate knowledge of procedures and practices for accounting, record keeping, and information management in agricultural business.

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0011 Understand agricultural marketing.

For example:

- 11.1 Apply marketing strategies (e.g., market segmentation) and steps (e.g., developing a marketing plan, identifying target markets) in marketing agricultural products.
- 11.2 Demonstrate knowledge of the diversity of agricultural products and services.
- 11.3 Apply knowledge of the development of agricultural products, the value-added concept, and the distribution of agricultural products and services.
- 11.4 Apply basic principles of product pricing and promotion to agricultural products and services.
- 11.5 Demonstrate knowledge of global issues affecting agriculture.
- 11.6 Demonstrate knowledge of consumer behavior and the selling process.

NATURAL RESOURCES AND FOOD SCIENCE

0012 Understand natural resource management.

For example:

- 12.1 Demonstrate knowledge of basic ecological principles (e.g., niche, ecosystem, water and nutrient cycles) and their application to agriculture (e.g., land use, watershed management).
- 12.2 Analyze the effects of agriculture on the environment and the advantages and disadvantages of different production systems (e.g., sustainable agriculture, monoculture).
- 12.3 Demonstrate knowledge of proper management of agricultural waste products and chemicals and practices used to protect soil, air, and water quality.
- 12.4 Demonstrate knowledge of types, characteristics, and uses of renewable and nonrenewable natural resources and principles and methods for their conservation and sustainable management.
- 12.5 Demonstrate knowledge of fundamental principles of forestry.

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0013 Understand food science.

For example:

- 13.1 Apply knowledge of chemical and physical properties of food, composition and nutritional value of various foods and food groups, and essential nutrients in the human diet.
- 13.2 Demonstrate knowledge of types of microbes and hazardous substances commonly responsible for contamination of food products.
- 13.3 Demonstrate knowledge of consumer issues related to food safety and strategies for risk assessment with respect to food.
- 13.4 Demonstrate knowledge of procedures for processing meat, eggs, dairy, grains, fruits, vegetables, and other food products.
- 13.5 Demonstrate knowledge of practices for ensuring food safety in producing, processing, handling, and distributing food.