ILLINOIS LICENSURE TESTING SYSTEM

FIELD 215: AGRICULTURAL EDUCATION

TEST FRAMEWORK

January 2017

Effective beginning January 22, 2018

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Agricultural Education Programs
Agricultural Business
Plant Science and Agronomic and Horticultural Crops
Animal Science
Agricultural Mechanics
Soil and Natural Resources

SUBAREA I—AGRICULTURAL EDUCATION PROGRAMS

0001 Understand the foundations of work and the career development process.

For example:

- Demonstrate understanding of the history, organization, and future of work and how work relates to needs and functions of the economy and society.
- Apply knowledge of career development concepts, the relationship between work and learning, and career planning procedures.
- Identify career areas, career opportunities, and job specialties in agriculture and related fields.
- Demonstrate knowledge of educational and other prerequisites for agricultural occupations and workplace skill requirements.
- Demonstrate understanding of procedures for securing and maintaining employment in agriculture (e.g., résumé development, interviewing, internships, career planning).
- Identify sources of information related to agriculture and agricultural careers (e.g., journals, the Internet, agricultural professional organizations, career and technical education professional organizations).

0002 Apply principles for developing and implementing a comprehensive agricultural education program and organizing and managing facilities for agricultural education.

For example:

- Apply knowledge of the factors involved in developing and implementing a comprehensive agricultural education program that incorporates student, community, and industry interaction (e.g., effective use of agricultural advisory councils, agricultural literacy programs, partnerships with businesses and other constituent support groups).
- Identify appropriate references and resources used in agricultural education (e.g., agricultural education curriculum, Web sites, printed materials; agricultural education specialists).
- Demonstrate knowledge of professional organizations and strategies for developing a plan for continued personal and professional growth.
- Demonstrate understanding of student and industry needs in career and technical education and strategies for developing effective school-based education programs in agriculture.
- Apply knowledge for planning, organizing, and managing laboratories/technical facilities for instruction to meet diverse student needs.
- Demonstrate knowledge of safe practices related to agricultural education and laws and policies related to safety standards, healthy practices, and ergonomics.

0003 Understand how to plan, deliver, and evaluate instruction based on knowledge of the subject matter in the field of agriculture; student organizations; student, community, and industry needs; curriculum goals; and findings of educational research.

For example:

- Apply principles and techniques for planning, implementing, and assessing instruction that incorporates the pedagogy unique to agriculture and reflects understanding of curriculum goals related to the nature and development of the agricultural industry and career opportunities.
- Apply principles and techniques for creating effective learning environments and classroom activities that develop life/workplace skills for all students, including those with special needs.
- Demonstrate knowledge of educational research findings that justify teaching strategies.
- Demonstrate knowledge of scientific concepts and principles relevant to agriculture, including the scientific method of investigation, and apply strategies for directing student learning in the sciences.
- Demonstrate understanding of the rationale for integrating student organizations and activities into the curriculum (e.g., FFA, SAEs, CDEs).
- Identify the roles, characteristics, and activities of FFA and SAEs in agricultural education programs (e.g., leadership; student, chapter, and community activities; curriculum and career linked, individualized and student managed, documented using record keeping and analysis).
- Demonstrate knowledge of the principles of leadership and apply that knowledge through activities of the FFA organization (e.g., procedures related to planning and conducting student, chapter, and community development activities) and the advisory and supervisory roles of the agricultural education teacher.
- Apply knowledge of the agricultural education teacher's role in advising and assisting students in planning and implementing individual career experiences through experiential learning in planned, comprehensive SAEs.

0004 Understand the process of reading, and apply knowledge of strategies for promoting students' reading development in the agricultural education classroom.

For example:

- Demonstrate knowledge of the reading process, and apply knowledge of strategies for integrating the language arts into agricultural education instruction to support students' reading and concept development (e.g., providing purposeful opportunities for students to read, write about, and discuss content in order to improve their understanding).
- Apply knowledge of strategies that foster reading in the agricultural education classroom (e.g., incorporating relevant literature for adolescents in the curriculum; building and maintaining a classroom library; encouraging students' independent reading, research, and inquiry related to agricultural education).
- Demonstrate knowledge of the role of vocabulary knowledge in supporting students' reading comprehension and concept development, and apply knowledge of strategies for promoting students' discipline-specific vocabulary development (e.g., recognizing relationships between words, using context clues, consulting specialized reference materials).
- Apply knowledge of strategies for preparing students to read text effectively and for teaching and modeling the use of comprehension strategies, including strategies that promote close reading (e.g., breaking down complex sentences, monitoring for comprehension to correct confusions and misunderstandings that arise during reading).
- Apply knowledge of strategies for developing students' ability to comprehend and critically analyze discipline-specific texts, including using graphic organizers; analyzing and summarizing an author's argument, claims, evidence, and point of view; evaluating the credibility of sources; and synthesizing multiple sources of information presented in different media or formats.
- Apply knowledge of strategies for evaluating, selecting, modifying, and designing reading materials appropriate to the academic task and students' reading abilities (e.g., analyzing instructional materials in terms of readability, content, length, format, illustrations, and other pertinent factors).
- Apply knowledge of strategies for providing continuous monitoring of students' reading progress through observations, work samples, and various informal assessments and for differentiating agricultural education instruction to address all students' assessed reading needs.

SUBAREA II—AGRICULTURAL BUSINESS

0005 Understand agricultural business management principles and practices.

For example:

- Identify types of agricultural businesses and the characteristics, advantages, and disadvantages of various forms of business ownership.
- Apply procedures for managing an agricultural business (e.g., scheduling, forecasting, calculating production costs, and other activities).
- Analyze factors that affect decisions about financial planning and methods of cost-benefit analysis and risk assessment in agricultural businesses, including governmental policies.
- Apply basic financial management, accounting, and record-keeping procedures to agricultural operations (e.g., banking procedures, credit, insurance, budgeting, financial reporting).
- Analyze the role of new and emerging technologies in agricultural business operations.

0006 Understand agricultural business marketing principles and practices.

For example:

- Analyze factors involved in consumer purchasing decisions and apply strategies for effective sales and service in agricultural applications.
- Identify characteristics of various types of market outlets and apply strategies for pricing and marketing agricultural products (e.g., hedging, futures, direct marketing to consumers, cooperatives).
- Demonstrate knowledge of types, uses, and costs of advertising and design and merchandising strategies for product display.
- Evaluate the role of government agencies, programs, and regulations (e.g., labeling requirements) in agricultural marketing.
- Demonstrate understanding of the elements of the marketing mix (e.g., product, price, place, promotion) as applied to agricultural businesses.

0007 Understand the effects of economic factors and government policies on agriculture.

For example:

- Apply knowledge of economic principles (e.g., supply and demand, diminishing returns, competitive advantage, resource substitution) to agricultural business.
- Analyze factors (e.g., production costs, labor availability, interest rates, capital investment) that affect profit and loss in various agricultural operations.
- Recognize the role of international trade and interstate commerce in agricultural businesses in Illinois, including the role played by federal and state trade policies.
- Identify agricultural products commonly imported and exported and assess the economic impact of leading commodities.
- Identify the role of federal and state agencies in regulating agricultural business practices (e.g., regulations relating to safety, animal welfare, and environmental protection) and analyze the effects of government economic policies (e.g., crop subsidies, government-secured loans, tax policies) on agricultural businesses in Illinois.

SUBAREA III—PLANT SCIENCE AND AGRONOMIC AND HORTICULTURAL CROPS

0008 Understand anatomy, physiology, reproduction, and genetics of plants.

For example:

- Identify plant structures, organs, and organ systems and their functions and interactions.
- Demonstrate understanding of the processes of photosynthesis, respiration, and transpiration.
- Recognize environmental requirements for plant growth and development.
- Analyze the processes and apply the principles of sexual and asexual reproduction in plants.
- Demonstrate understanding of the applications of biotechnology in plant growth and reproduction.

0009 Understand characteristics, uses, production, and management of agronomic crops.

For example:

- Recognize types, characteristics, and uses of major agronomic crops, including major grain, oil, and forage crops grown in Illinois.
- Apply knowledge of production processes for agronomic crops, including environmental requirements of various crops and factors in managing growth (e.g., seedbed preparation, irrigation, tillage systems, rotation schedules, use of technology).
- Demonstrate knowledge of methods for harvesting and handling major types of agronomic crops and crop-product processing, including types of crop products.
- Apply procedures for identifying and controlling plant pests, pathogens, and weeds that affect agronomic crops, including integrated pest management methods and procedures for the safe storage, application, and disposal of pesticides.
- Demonstrate and apply knowledge of the methods used to ensure safety in the production of agronomic crops used for human consumption.

0010 Understand characteristics, uses, production, and management of horticultural crops.

For example:

- Demonstrate knowledge of the characteristics, propagation, harvest, and uses of various fruit and vegetable crops (e.g., types of plants; factors that affect growth; procedures for propagating, planting, and managing different types of fruits and vegetables; controlling pests and pathogens).
- Demonstrate knowledge of greenhouse and nursery management (e.g., facilities, tools, growth media, equipment, procedures), including characteristics and uses of various types of plants produced in greenhouses and nurseries.
- Demonstrate understanding of procedures for greenhouse and nursery production (e.g., seedbed preparation, seeding, propagating, transplanting, hardening, irrigation) and analyze factors that affect the growth of greenhouse and nursery crops (e.g., nutrients, soil, water, light, pests and pathogens).
- Apply basic concepts and principles of landscaping and turf management (e.g., landscape planning, design, construction, and maintenance) and characteristics and uses of landscape plants and grasses (e.g., plant varieties, selection of appropriate materials).
- Apply understanding of landscape and turf management tools and equipment and procedures for installing and caring for shrubs, turf, and other plants used in landscaping (e.g., soil preparation, irrigation, pest and weed control, appropriate levels of nutrients).
- Demonstrate understanding of principles and practices of floriculture and floristry (e.g., production and handling of cut flowers, materials used in floral arrangement, principles of floral design).
- Demonstrate and apply knowledge of the methods used to ensure safety in the production of horticultural crops used for human consumption.

SUBAREA IV—ANIMAL SCIENCE

0011 Understand types, characteristics, and uses of domesticated animals.

For example:

- Recognize types, breeds, characteristics, and uses of production and companion animals.
- Identify products derived from production animals and the uses of animal products in society.
- Demonstrate understanding of principles and procedures for evaluating production and companion animals.
- Demonstrate knowledge of procedures used in processing, grading, and packaging production animal products.

0012 Understand the anatomy, physiology, reproduction, and genetics of animals.

For example:

- Demonstrate knowledge of the major anatomical and physiological systems in production and companion animals.
- Demonstrate knowledge of underlying growth processes and stages of development in production and companion animals.
- Demonstrate knowledge of reproductive processes, methods, and procedures.
- Demonstrate understanding of the basic principles of genetics and the factors that influence breeding decisions.
- Demonstrate understanding of the applications of biotechnology in animal growth and reproduction.

0013 Understand principles and practices of animal production.

For example:

- Identify purposes and methods for production and management of production and companion animals (e.g., standard and alternative methods, care at different life stages, safe and humane treatment).
- Analyze factors that influence nutritional requirements for domesticated animals.
- Identify the uses of various feeds for specific species (e.g., composition, nutritional value, additives), apply procedures for the selection of appropriate feed and feeding schedules, and recognize symptoms of nutrient deficiencies.
- Analyze types, symptoms, causes, prevention, and treatment of common infectious and noninfectious diseases.
- Identify types and characteristics of facilities, tools, and equipment used to provide or maintain appropriate environments for the care and management of animals, including managing animal wastes and sanitation.
- Demonstrate and apply knowledge of the methods used to ensure safety in the production of animal products used for human consumption.

SUBAREA V—AGRICULTURAL MECHANICS

0014 Understand the uses, principles of operation, and maintenance of agricultural machinery and technology.

For example:

- Identify the types, characteristics, uses, and components of power equipment, machinery, and technological systems used in agricultural operations.
- Demonstrate understanding of principles and practices for operating and maintaining power equipment, small engines, and machinery in agricultural applications (e.g., regular maintenance, troubleshooting and diagnosing problems, repairing).
- Identify safety issues related to agricultural machinery and technology and apply knowledge of safe operating principles of machinery and technology used in agriculture.
- Analyze the role of new and emerging technologies in agricultural mechanics.

0015 Understand agricultural structures and construction processes.

For example:

- Demonstrate understanding of basic principles and techniques of woodworking and carpentry, masonry, plumbing, electrical work, and welding (e.g., types and characteristics of materials, material and tool selection for various applications, specific skills related to various types of construction).
- Identify functions, operating principles, and maintenance considerations for tools and equipment used in agricultural construction and repair.
- Apply techniques used to design, construct, repair, and maintain physical structures in agricultural operations, including emerging technologies.
- Identify safety issues related to construction and apply knowledge of safe operating principles of tools and equipment used in agricultural construction.
- Demonstrate understanding of basic principles, equipment, and applications of surveying to agriculture, including reading and evaluating legal land descriptions and performing acreage calculations.

SUBAREA VI—SOIL AND NATURAL RESOURCES

0016 Understand characteristics, components, and properties of soil.

For example:

- Identify soil components and composition and the physical and chemical properties of different types of soil.
- Recognize symptoms of soil deficiencies, apply procedures for testing soil, and interpret soil test results.
- Analyze the importance of major nutrients to plant growth and the use of fertilizers in plant production.

0017 Understand principles and practices of agricultural and natural resources management.

For example:

- Demonstrate understanding of ecological concepts and principles (e.g., ecosystem, niche, water and nutrient cycles, habitat, environmental services systems, biodiversity).
- Analyze the relationship between agricultural management practices and environmental sustainability (e.g., use of different production systems, waste management, use of pesticides, habitat changes, erosion).
- Demonstrate knowledge of principles and practices of conservation and their application to the use of natural resources (e.g., habitat preservation; water, soil, and air quality; fish and wildlife conservation; cover crops).
- Apply principles and practices of land management and issues related to land use (e.g., land classification, loss of farmland, erosion, salinization, land-management planning, policies).