

**TExES® Agriculture, Food and Natural Resources 6–12
 Curriculum Crosswalk**

Required Course Numbers											
Test Content Categories											
Domain I – Foundations of Agricultural Education											
Competency 001: <i>The teacher understands the foundations of agricultural education.</i>											
A. Understands the philosophy and goals of agricultural education.											
B. Recognizes the scope of agriculture and its effects on society (e.g., impact on global trends, international impact and contributions).											
C. Identifies historical events, recent developments and major areas of research in agriculture and natural resource utilization.											
D. Knows the concepts and terms used in agriculture and agricultural education and the sources of information about agriculture, agricultural education and agricultural careers.											
E. Knows the characteristics and functions of agricultural education advisory committees, how to organize and work effectively with these committees and how to encourage student, community and industry involvement in agricultural education programs.											

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F. Understands the use of scientific principles, methods (e.g., hypothesis versus theory, verification processes, solving problems), measurements and calculations (e.g., algebra, geometry, statistical analysis) in agriculture and agricultural education.											
G. Collects, organizes, displays and analyzes data according to an orderly plan, using data, tables, graphs, narrative descriptions or other methods as appropriate.											
H. Understands the legal and ethical issues related to agricultural education (e.g., ethical treatment of animals, liability for accidental injury).											
I. Understands the basic functions, types, characteristics and tools associated with maps (e.g., scale, direction, elevation, coordinates) and their significance to agricultural industries.											
Competency 002: <i>The teacher understands and applies procedures and practices to ensure the safety of all students in the classroom and laboratory.</i>											
A. Applies procedures for selecting and maintaining equipment, materials and technology used in the agricultural classroom and lab.											
B. Applies strategies for instructing students in the proper and safe use of materials, tools and instruments and for monitoring student behavior in the agricultural classroom and lab.											

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C. Understands personal and occupational safety practices, including basic first aid, and appropriate practices for preventing and responding to accidents in the agricultural classroom and lab.											
D. Identifies potential hazards in the agricultural classroom and lab.											
E. Applies strategies for incorporating safety training into the agricultural education program and for developing and implementing safety plans for the agricultural classroom and lab.											
F. Identifies procedures for the proper use, storage and disposal of hazardous materials (e.g., chemicals, petroleum products, biological waste products) used in the agricultural classroom and lab.											
G. Identifies sources of safety-related information (e.g., Safety Data Sheet (SDS), formerly known as Material Safety Data Sheet (MSDS), emergency response procedures) and federal, state and local agencies, laws and regulations concerned with maintaining safety in the agricultural classroom and lab.											

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Competency 003: <i>The teacher understands how to advise and assist students in career planning and development and how to promote student development through supervised agricultural experiences (SAEs).</i>											
A. Identifies career development and entrepreneurship opportunities in the field of agriculture/agribusiness and the knowledge and skills necessary for various careers in agriculture.											
B. Understands employers' expectations, appropriate work habits, good citizenship skills, and personal characteristics necessary for a successful career in modern agriculture.											
C. Applies strategies for assisting students in career planning and development and in applying for, obtaining, and maintaining employment in agriculture and related fields.											
D. Identifies the goals and purposes of SAEs; the relationships among the agricultural classroom, lab, field, and SAEs; and the characteristics of different types of SAEs (e.g., cooperative education, entrepreneurship, mentoring).											
E. Understands the legal and ethical issues related to SAEs (e.g., child labor laws, validation issues, complaint and appeal processes).											

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F. Applies strategies for coordinating SAEs; assisting students in planning, implementing, and managing their SAEs; and maintaining accurate records, assessing student progress, and evaluating the effectiveness of SAEs.											
Competency 004: <i>The teacher understands how to promote student growth through student leadership development organizations.</i>											
A. Knows the characteristics, functions and organizational structures of student leadership development organizations (e.g., FFA).											
B. Applies strategies for developing a basic program of activities for a student development organization.											
C. Applies democratic principles and parliamentary procedure to conduct effective meetings of a student leadership development organization.											
D. Understands the roles and responsibilities that advisors have in these organizations and the strategies for encouraging students.											
E. Applies strategies for planning, organizing and conducting career development events (CDEs) and leadership development events (LDEs).											
F. Understands how to help students develop communication and presentation skills (e.g., verbal, nonverbal, listening), interview skills and the ability to prepare and present portfolios and work samples.											

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Domain II – Agribusiness and Economics											
Competency 005: <i>The teacher understands agricultural entrepreneurship, business management and ethical issues in agricultural businesses.</i>											
A. Analyzes the role of entrepreneurship in agriculture, methods of entrepreneurial planning, and key factors for successful entrepreneurship.											
B. Identifies the distinguishing characteristics and purposes of different types of organizational structures in agricultural businesses.											
C. Identifies the steps in establishing an agricultural business, the components of a business plan, and the decision-making and problem-solving methods of agricultural businesses.											
D. Understands the basic principles and methods of financial management; the types, characteristics, and purposes of budgets and record-keeping systems used in agricultural businesses; and the sources from which to obtain loans and capital (e.g., private, institutional, government).											
E. Understands the use of computer hardware and software applications (e.g., spreadsheet, database, communication) in agriculture-related tasks.											

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F. Applies strategies for managing a diverse workforce (e.g., training and supervising personnel, fostering teamwork) and for ensuring respect for diversity in the workplace.											
G. Identifies agriculture-related government agencies and applies knowledge of work-related and business-related ethics to decision making in agricultural businesses.											
Competency 006: <i>The teacher understands the application of economic and marketing principles to agricultural enterprises.</i>											
A. Understands key economic principles (e.g., risk, supply and demand, value-added) in agricultural business and how to apply knowledge of economic principles to business-related decision making.											
B. Identifies the factors that influence the pricing and sale of agricultural goods and services.											
C. Identifies the factors (e.g., socioeconomic status, culture, age, gender) that influence consumer behavior.											
D. Understands and applies strategies for marketing agricultural products.											
E. Understands the major global trends in food and fiber production, processing, distribution and demand.											
F. Recognizes the impact of world markets on U.S. and Texas agriculture.											

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Domain III – Plant and Soil Science											
Competency 007: <i>The teacher understands and applies principles of soil science.</i>											
A. Knows the nature and properties of soil, the processes of soil formation (e.g., chemical and physical weathering) and the importance of various soil constituents for plant growth.											
B. Identifies the components of soil, the physical and chemical properties of different soils and the methods of soil classification.											
C. Understands the importance of soil conservation, the methods of soil conservation and the mechanical practices that reduce soil erosion.											
D. Identifies the characteristics, advantages, and disadvantages of various methods of tillage and seedbed preparation.											
E. Applies knowledge of procedures for performing and interpreting basic soil tests (e.g., nutrient, organic content, pH) and for evaluating the suitability of different types of soil for the production of various crops.											
F. Applies knowledge of different types and formulations of fertilizers and other soil treatments.											
G. Understands methods and procedures for improving the quality of soil (e.g., fertilizers, lime and organic matter, mulching).											

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Competency 008: <i>The teacher understands basic plant classification, morphology, physiology and genetics.</i>											
A. Recognizes the structures and functions of plant parts (e.g., flowers, leaves, roots, stems) and how they differ among plant species.											
B. Understands plant classification and identifies distinguishing features of major plant groups (e.g., monocots, dicots).											
C. Understands the basic physiological processes in plants (e.g., photosynthesis, respiration, transpiration, transport of nutrients).											
D. Understands the effects of various environmental factors (e.g., soil characteristics, light intensity, day length, temperature) on plant growth and development.											
E. Knows the basic processes of plant reproduction, the principles of plant genetics and the methods used in the sexual and asexual propagation of plants.											
F. Applies knowledge of the principles, methods and techniques of selective breeding and hybridization of plants.											
Competency 009: <i>The teacher understands basic crop production and management.</i>											
A. Identifies the types, characteristics and uses of major economic crops grown in Texas.											

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B. Understands the basic principles of plant production and management (e.g., soil preparation, water management, crop rotation).											
C. Knows the basic principles and methods of disease, insect and weed control (e.g., integrated pest management, chemical control, biological control) and the safe handling of pest management materials.											
D. Demonstrates basic knowledge of common nutrient deficiencies, diseases, weeds and insect pests that affect crops.											
Competency 010: <i>The teacher understands horticulture, floriculture and hydroponics.</i>											
A. Knows the basic methods for managing greenhouse and nursery environments (e.g., controlling temperature, moisture, humidity, pests).											
B. Applies the basic procedures and techniques for propagating, transplanting, growing and maintaining greenhouse and nursery plants.											
C. Understands the basic principles of landscape design and management and procedures and techniques for planning, establishing and maintaining landscapes.											
D. Understands the basic history and principles of floral design and techniques for preparing, handling and storing flowers and decorative plants.											
E. Interprets, evaluates and analyzes floral designs, portfolios and work samples.											

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F. Understands the basic principles and procedures for production of aquatic plants.											
Domain IV – Animal Science											
Competency 011: <i>The teacher understands the basic animal classification, anatomy, physiology and genetics of various animals such as cattle, horses, swine, poultry and companion animals.</i>											
A. Identifies the basic characteristics and uses of various breeds and types of animals of major economic importance in the United States.											
B. Knows the basic anatomy of major organs and organ systems (e.g., respiratory, digestive, skeletal, muscular) in various animals (ruminant and nonruminant).											
C. Understands the basic physiological processes (e.g., digestion, respiration, circulation) in various animals (ruminant and nonruminant).											
D. Knows the stages of growth and development in various animals.											
E. Understands the basic health issues and trends in the consumption of animal products in Texas and the United States.											
F. Understands the basic principles of genetics and their application to animal reproduction and selective breeding.											

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Competency 012: <i>The teacher understands animal production and management of various animals such as cattle, horses, swine, poultry and companion animals.</i>											
A. Demonstrates general knowledge of animal management practices (e.g., immunizing, taking vital signs, restraining, medicating, performing common surgical procedures).											
B. Recognizes normal and abnormal behaviors in various animals and their relationship to animal management.											
C. Understands the care and safe handling of animals throughout the life cycle and the current historical, legal and ethical considerations in animal production, management and welfare.											
D. Understands the basic nutritional requirements of animals (ruminant and nonruminant) and applies knowledge of animal nutrition (e.g., sources of nutrients, classes of feed, feed additives, analysis, organic molecules in relation to feed) and feeding practices (e.g., formulating rations, issues of feed quality, feeding schedules).											
E. Recognizes common diseases, parasites and genetic disorders of animals and is aware of methods for treatment, control and prevention.											
F. Knows the basic principles of animal reproduction and selective breeding and applies principles of genetics (e.g., EPDs, progeny data, trait selection) to the selective breeding of animals.											

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G. Applies basic knowledge of natural and artificial animal breeding practices (e.g., controlling mating, artificial insemination) and current technologies used in animal reproduction (e.g., embryo transfer).											
H. Evaluates breeding animals using various data (e.g., performance testing, production records, progeny testing, visual appraisal).											
I. Understands the basic principles and procedures for animal aquaculture.											
<i>Competency 013: The teacher understands the facilities required for various animals such as cattle, horses, swine, poultry and companion animals, and the procedures for selecting animals and processing animal products.</i>											
A. Identifies the different types, characteristics and purposes of animal facilities (e.g., barns, feedlots).											
B. Identifies the appropriate environmental conditions (e.g., lighting, temperature, humidity) for housing various animals and methods of environmental control.											
C. Understands the environmental issues associated with animal facilities and the basic procedures for managing animal waste and maintaining sanitation.											
D. Knows the guidelines for evaluating, purchasing, selling and culling individual animals and how to use relevant information databases in making these decisions.											

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E. Identifies the basic sanitation procedures for handling, processing and packaging edible animal products.											
Domain V — Agricultural Mechanics, Engineering and Technology											
<i>Competency 014: The teacher understands and applies mechanical principles and power technology in agriculture.</i>											
A. Understands and applies the basic safety procedures related to agricultural mechanics and technologies.											
B. Identifies and uses personal safety equipment and identifies hazards and safety needs in the home and the workplace.											
C. Understands the basic terms and principles related to simple machines, force, work, power and electricity (e.g., volts, watts, amperes) as they apply to agriculture.											
D. Understands the design, components, functions and basic principles of operation of internal combustion engines, hydraulic systems and related power systems used in agriculture.											
E. Identifies and selects common tools, machinery and equipment used in agriculture and demonstrates knowledge of their proper inspection, maintenance and storage (e.g., animal science, plant science, soil science, veterinary science).											
F. Demonstrates knowledge of the safe and proper operation of agricultural tools, machinery and equipment.											

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Competency 015: <i>The teacher understands agricultural construction and metal fabrication.</i>											
A. Applies safety regulations, policies, procedures and equipment to the construction of agricultural structures, enclosures and related systems.											
B. Applies knowledge of basic procedures for planning the construction of agricultural structures and enclosures (e.g., locating and surveying sites, using maps and plans, estimating materials and costs, eco-friendly methods, calculating bills of materials).											
C. Applies knowledge of basic construction principles, techniques, methods, tools and materials (e.g., carpentry, concrete, plumbing, wiring) to construct agricultural structures and enclosures.											
D. Identifies commonly used metals and their properties and uses in agriculture and basic principles and techniques for cutting, shaping and joining metal for agricultural applications.											
E. Knows the principles and techniques for safely performing basic metalworking procedures (e.g., cutting, filing, shaping, drilling, soldering, welding).											
F. Understands the design, components and operation of electric circuits, motors, sensors and control devices and the basic wiring procedures used in agriculture.											

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G. Demonstrates knowledge of basic plumbing methods, tools and materials and of heating and cooling, water supply and sanitation systems.											
Competency 016: <i>The teacher understands technology and the use of computers and related technologies in agricultural production and management.</i>											
A. Identifies the basic applications of biotechnology in agriculture (e.g., cold tolerance, herbicide resistance).											
B. Identifies the basic principles of cell biology and tissue culture.											
C. Demonstrates an understanding of basic laboratory techniques used in biotechnology and applies basic principles of DNA fingerprinting to genome mapping and marker-assisted selection and identification of crops and livestock.											
D. Demonstrates an awareness of social, economic, environmental, ethical and legal issues in biotechnology.											
E. Knows how to use and access digital technology in agricultural record keeping (e.g., production records, breeding records, nutrient management, Internet resources).											
F. Recognizes the use of technological systems in agricultural sciences (e.g., the Global Positioning System [GPS], Geographic Information Systems [GIS], remote sensing).											

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G. Applies appropriate technologies to agricultural production and management (e.g., measuring crop yields, monitoring and controlling the greenhouse environment and irrigation systems, monitoring production of milk and eggs, formulating rations, using chip implants for identification).											
Domain VI — Natural Resources and Environmental Science											
<i>Competency 017: The teacher understands ecological principles, natural resources and the impact of agriculture on the environment.</i>											
A. Understands basic ecological principles and concepts (e.g., habitat, carrying capacity, ecological succession, mapping natural resource distribution).											
B. Applies basic knowledge of environmental systems (e.g., atmosphere, weather, climate) and cycles (e.g., carbon cycle, water cycle, stream classification).											
C. Identifies the types of renewable and nonrenewable natural resources.											
D. Identifies the effects of natural resource availability on agriculture and the environment (e.g., effects of geographic distribution of natural resources and fossil fuel extraction and recovery).											
E. Applies knowledge of methods of conservation (e.g., energy efficiency, use of alternative fuels, recycling, runoff control, erosion control).											

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F. Analyzes the interdependence of agriculture and the environment (e.g., sustainable agriculture, effects of agriculture on land, air and water; effects of environmental degradation on agricultural production; implementation of green technology; management of watersheds and riparian zones, natural catastrophic events and man-made effects).											
G. Demonstrates knowledge of the advantages and disadvantages of alternative energy sources (e.g., wind, solar, geothermal areas, biomass) that stem from or impact agriculture, food and natural resources.											
Competency 018: <i>The teacher understands the principles of ecosystem management.</i>											
A. Understands the basic principles and methods related to land, water and air management and the sustainable use of resources (e.g., types of pollution, point and nonpoint pollution, pollution management strategies).											
B. Identifies the laws, regulations and ethical issues relating to the use, abuse and management of ecosystems and natural resources (e.g., use restrictions, landowner property rights, stewardship).											

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C. Understands the types (e.g., cultivated land, rangeland, forest land, wetland), characteristics and management of agricultural ecosystems (e.g., population studies, sample plots and points, resource inventory) and develops and applies basic environmental management plans for managing these systems.											
D. Applies basic principles and methods of agricultural recreation management (e.g., forest, wildlife, fisheries, ecology management).											
E. Analyzes the importance of habitat conservation, wildlife management and sustainable resources.											
F. Applies knowledge of the causes of soil erosion and methods of preventing and reversing soil erosion.											
G. Demonstrates awareness of the responsibilities of government agencies and public service organizations in relation to environmental conservation and management (e.g., United States Department of Agriculture, watershed management, underground water districts, boards of conservation, Environmental Protection Agency, Texas Commission on Environmental Quality, Texas Parks and Wildlife).											
H. Understands and recognizes the historical and current impact of wildlife laws and regulations.											

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Domain VII — Food Science and Processing											
Competency 019: <i>The teacher understands the processing, packaging, quality analysis and marketing of food and its by-products.</i>											
A. Understands and analyzes the global, environmental and financial trends and issues in food and fiber production regarding inspection, processing, distribution, research and demand.											
B. Demonstrates knowledge of identifying, grading, storing, processing, packaging and quality analysis of edible plant products and their by-products (e.g., fruits, nuts, vegetables, grains), including process value-added methods (e.g., waxing, peeling, washing, preserving, packing).											
C. Knows the basic principles of livestock harvesting, including preparation and grading of carcasses and identifying and processing wholesale and retail cuts (e.g., fabrication and process value-added methods).											
D. Knows the basic regulations and procedures for identifying, inspecting, grading, packaging, preserving, storing and labeling edible animal products (e.g., dairy products, eggs, fish).											

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E. Identifies the major industry organizations, groups and agencies and how they regulate the food products and processing industry (e.g., country-of-origin labeling, nutrition labeling, government regulations, laws, inspections).											
Competency 020: <i>The teacher understands issues affecting the food science industry, including biotechnology, employment, safety, the environment and animal welfare.</i>											
A. Describes the importance of the Hazard Analysis and Critical Control Point (HACCP) system in the processing of food.											
B. Demonstrates knowledge of selecting, harvesting, processing and classifying food products for storage and transportation.											
C. Demonstrates familiarity with the safety principles and recommended equipment for facility management practices.											
D. Understands the basic terms and principles associated with food science and food technology (e.g., nutritive value, food groups, RDA).											
E. Identifies and implements insect, rodent and biohazard control.											
F. Identifies basic sanitation procedures for handling, processing and packaging.											
G. Understands the relationship between food science and biotechnology.											
H. Recognizes animal welfare issues in the preharvesting process.											