



# TEST SUMMARY AND FRAMEWORK

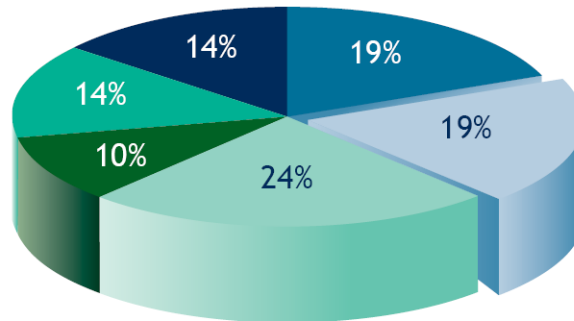
## TEST SUMMARY

### AGRICULTURE EDUCATION

The Washington Educator Skills Tests—Endorsements™ (WEST-E™) are designed to measure a candidate’s knowledge of the subject-area content contained in the test framework for each field. All WEST-E tests are fully aligned with the state’s teacher endorsement competencies and, as applicable, the Essential Academic Learning Requirements.

This test summary describes general testing information as well as the approximate percentage of the total test score derived from each content domain. The test framework, organized by content domain, contains the objectives that define the content for the test.

<b>Test Format</b>	Multiple-choice questions
<b>Number of Questions</b>	Approximately 110
<b>Test Session</b>	2 hours, 15 minutes (does not include 15-minute tutorial)
<b>Passing Score</b>	240 (scores are calculated in a range from 100 to 300)
<b>Test Code</b>	037



Key	Approximate Percentage of Test	Content Domain	Range of Objectives
	19%	Foundations of Agricultural Education	0001-0004
	19%	Animal Science	0005-0008
	24%	Plant and Soil Science	0009-0013
	10%	Agricultural Technology	0014-0015
	14%	Natural Resources and Environmental Science	0016-0018
	14%	Agricultural Business	0019-0021



# TEST FRAMEWORK

## AGRICULTURE EDUCATION

### FOUNDATIONS OF AGRICULTURAL EDUCATION

#### **0001 Demonstrate an understanding of the Career and Technical Education program.**

For example:

- identifying characteristics and requirements of the Career and Technical Education course approval and reapproval process
- recognizing the role of Tech Prep articulation in facilitating the transition from high school to postsecondary programs
- identifying business, industry, and OSPI-approved safety and health standards
- identifying the purposes of professional organizations in Career and Technical Education fields and the benefits of participation in these organizations
- recognizing the role of Career and Technical Education advisory committees

#### **0002 Demonstrate an understanding of the integrated program approach and career development in agricultural education.**

For example:

- recognizing the importance of integrating classroom and laboratory learning with FFA, SAE, and CDEs in a comprehensive agricultural education program
- identifying goals and purposes of the SAE, the components of a successful SAE program, and the types and characteristics of different types of SAE
- applying strategies for coordinating SAEs and assisting students in planning, selecting, managing, and assessing their SAEs
- applying scientific and research principles and concepts and laboratory skills in the context of agriculture and agricultural education
- identifying the knowledge, skills, and educational requirements for various agricultural careers
- applying procedures for creating a résumé, completing a job application, and participating in a job interview



**0003 Demonstrate an understanding of the history of agricultural science and FFA, and the role of FFA in agricultural education.**

For example:

- identifying important events and individuals in the history of agricultural science and FFA
- identifying the mission and goals (e.g., facilitating personal growth and career success; assisting students in developing skills in the areas of leadership, communication, and citizenship) of FFA
- identifying the organizational structure of FFA, the roles of officers in an FFA chapter, and the roles and responsibilities of FFA advisors in ensuring the success of an FFA chapter
- identifying effective strategies for developing a Program of Activities (POA) for an FFA chapter

**0004 Demonstrate an understanding of procedures for ensuring safety in the agricultural classroom, laboratory, SAE, and FFA.**

For example:

- identifying equipment and procedures for ensuring and maintaining a safe work environment in the agricultural classroom, laboratory, SAE, FFA, and other agricultural settings
- identifying procedures for the appropriate and safe use of agricultural tools, equipment, and materials
- recognizing procedures for the safe use, storage, and disposal of hazardous materials
- identifying sources of safety-related information



## ANIMAL SCIENCE

### 0005 Demonstrate an understanding of the classification, anatomy, and physiology of animals.

For example:

- identifying species and breeds of agricultural animals and their characteristics
- identifying anatomical and physiological characteristics of agricultural animals including growth processes and stages
- recognizing relationships between the anatomy and physiology of various species of animals and their nutritional requirements
- applying principles for evaluating and selecting agricultural animals

### 0006 Demonstrate an understanding of animal production and management.

For example:

- identifying types and characteristics of various animal production systems (e.g., swine, beef cattle, dairy, egg, poultry, wool, fish)
- recognizing safe, humane, and effective practices for managing and handling agricultural animals
- identifying sources and functions of animal nutrients, symptoms of nutrient deficiencies, and the composition, classification, and nutritional value of various types of feed and feed additives
- identifying types, symptoms, and life cycles of common parasites that attack agricultural animals in Washington State and methods for their prevention, treatment, and control
- identifying types, causes, and symptoms of common infectious and noninfectious diseases that affect agricultural animals in Washington State and methods for their prevention, treatment, and control



**0007 Demonstrate an understanding of animal genetics and reproduction and principles of genetic engineering and biotechnology.**

For example:

- applying basic principles of Mendelian genetics to explain inheritance of traits in selective breeding of animals
- recognizing characteristics and purposes of various types (e.g., crossbreeding, linebreeding) of animal breeding systems
- recognizing characteristics, advantages, and disadvantages of various methods (e.g., embryo transfer, artificial insemination) of animal breeding
- identifying effective, safe, and humane practices for the care of animals during gestation and parturition
- identifying purposes, principles, and techniques of biotechnology and genetic engineering in animal production

**0008 Demonstrate an understanding of environmental and facilities management in animal production systems.**

For example:

- identifying types, characteristics, and purposes of animal facilities (e.g., barns, feedlots, confinement housing, aquaculture facilities) and environmental needs (e.g., temperature, lighting, ventilation) of agricultural animals
- applying procedures for managing waste (e.g., manure, carcasses) and maintaining sanitation in animal production systems
- identifying procedures for ensuring that animals are housed and cared for in a legal and ethical manner
- applying knowledge of principles and methods for processing, preserving, storing, grading, and inspecting animal products (e.g., meat, eggs, milk, fiber), including issues related to consumer food safety



## PLANT AND SOIL SCIENCE

### 0009 Demonstrate an understanding of soil science.

For example:

- identifying processes by which soil forms; the classification, properties, composition, and characteristics of soil; and the relationship of these characteristics to plant growth or land use
- applying procedures and techniques for performing and interpreting soil tests and for determining the suitability of soils for specific crops or land use
- identifying characteristics and uses of different types (e.g., organic, inorganic), formulations (e.g., NPK), and forms (e.g., liquid, granular) of fertilizers, soil amendments (e.g., lime, organic matter), and other components of plant growth systems
- identifying characteristics, purposes, advantages, and disadvantages of various soil management and conservation practices (e.g., tillage, crop rotation, drainage) in crop production

### 0010 Demonstrate an understanding of the classification, anatomy, and physiology of plants.

For example:

- identifying major plant groups (e.g., monocots, dicots) and their characteristics
- identifying types (e.g., forage, grain, tree, vine, vegetable, oil, fiber), varieties, characteristics, and uses of agriculturally important crops grown in Washington State
- identifying the structure and functions of plant cells, structures, organs, and systems
- identifying physiological processes in plants (e.g., photosynthesis, respiration, transpiration, transportation of nutrients and water)
- identifying processes related to plant growth and factors that affect plant growth (e.g., water, light, temperature)

### 0011 Demonstrate an understanding of plant genetics, reproduction, and propagation.

For example:

- applying principles of plant genetics, selective breeding, and hybridization to crop production
- identifying structures and processes involved in asexual and sexual reproduction of plants
- applying methods and techniques of plant propagation (e.g., seeds, grafting, division, micropropagation)
- applying principles of biotechnology and bioengineering to plant production



**0012 Demonstrate an understanding of crop production and management.**

For example:

- applying crop management methods and practices (e.g., preparing seedbeds, rotating crops, planting, scheduling, fertilizing, mulching, irrigating, pruning, grazing) used in the production of crops in Washington State
- identifying the role of various nutrients in plant growth and how to recognize, prevent, and treat nutrient deficiencies in crops
- identifying characteristics of plant pests, diseases, and weeds and methods for their prevention and control (e.g., integrated pest management, pesticides, herbicides, cultivation, mulching, biological control)
- applying knowledge of principles, techniques, skills, and equipment used in harvesting, handling, processing, storing, preserving, and transporting crops grown in Washington State
- recognizing goals, principles, and methods of precision farming and applications of recent technological innovations (e.g., Geographic Information Systems [GIS], Global Positioning Systems [GPS], remote sensing, Variable Rate Technology [VRT], laser-guided tillage) to crop production and management

**0013 Demonstrate an understanding of horticultural practices, principles, and methods of greenhouse, nursery, and landscape management, and principles of landscape design.**

For example:

- identifying types, varieties, characteristics, and uses of greenhouse, nursery, and landscape plants (e.g., trees, shrubs, flowers, bedding plants, potted plants, turf) grown in Washington State
- identifying types, characteristics, and uses of facilities, materials, tools, equipment, and growing media used in the production of greenhouse and nursery crops
- applying methods for selecting, scheduling, propagating, planting, fertilizing, irrigating, harvesting, and transporting greenhouse, nursery, and landscape crops, and methods for managing and controlling the greenhouse and nursery environments
- identifying common pests, weeds, and diseases in greenhouses, nurseries, and landscapes and methods for controlling them
- applying methods for designing, planning, constructing, and maintaining landscapes



## AGRICULTURAL TECHNOLOGY

### **0014 Demonstrate an understanding of operation and maintenance of power equipment and engines used in agriculture.**

For example:

- identifying types (e.g., tractors, combines, discs, balers), characteristics, components, and uses of power equipment employed in agricultural production
- identifying types (e.g., diesel, two-cycle, four-cycle), characteristics, and components of internal combustion engines
- applying procedures for maintaining, troubleshooting, and repairing power equipment and engines used in agriculture
- identifying principles and practices for the safe use of power equipment employed in agricultural production
- identifying types, characteristics, components, operating principles, and uses of hydraulic and electrical power systems

### **0015 Demonstrate an understanding of materials and techniques used in agricultural metal fabrication, construction, and water control systems.**

For example:

- applying planning and measurement skills to agricultural metal fabrication and construction projects
- identifying types and characteristics of materials, tools, and equipment used in metal fabrication and agricultural construction
- applying skills to efficiently and safely perform metal fabrication and construction procedures
- applying construction principles, skills, and techniques to the design and building of agricultural structures
- identifying types, characteristics, components, and uses of water control and irrigation systems





## NATURAL RESOURCES AND ENVIRONMENTAL SCIENCE

### 0016 Demonstrate an understanding of ecological principles and their relationship to agriculture and the environment.

For example:

- identifying basic ecological principles and concepts (e.g., niche, ecosystem, trophic level) and their application to agriculture
- recognizing interactions among plant communities, animal communities, and environmental factors (e.g., climate, weather, habitat)
- identifying characteristics and components of energy, water, and nutrient cycles and the relevance of these cycles to agriculture
- recognizing principles of ecological succession and their application to agriculture

### 0017 Demonstrate an understanding of relationships between agriculture and the environment.

- recognizing the potential effects of agriculture on the environment
- recognizing the advantages and disadvantages of different types of agricultural practices (e.g., conservation tillage) and production systems (e.g., organic agriculture, monoculture, sustainable agriculture)
- identifying practices and procedures used to manage agricultural waste products and chemicals and to protect soil, air, and water quality
- identifying ethical and legal issues related to agriculture and the environment and roles of government agencies and private organizations



**0018 Demonstrate an understanding of natural resource management.**

For example:

- identifying types, characteristics, and uses of renewable and nonrenewable natural resources (e.g., energy, soil, water, wildlife, habitat) and methods for the sustainable use of resources
- applying principles and methods of soil and water conservation management (e.g., erosion control, water reclamation)
- identifying causes of habitat loss and reduction of biodiversity, strategies for maintaining and replacing wildlife habitat, and principles and methods used in wildlife management
- identifying types, characteristics, and uses of forests and rangelands and their importance to the environment and the economy
- applying principles and methods for managing forests and rangelands and maintaining their health (e.g., disease, fire, and pest control; reforestation strategies; harvest methods)
- applying field skills used in natural resource conservation and management (e.g., analyzing field data, using Global Positioning Systems [GPS], reading maps and aerial photographs)



## AGRICULTURAL BUSINESS

### 0019 Demonstrate an understanding of agricultural business management and entrepreneurship.

For example:

- identifying the role of entrepreneurship in agricultural business and procedures for starting a business (e.g., conducting market research, developing a business plan, obtaining financing)
- identifying business management functions (e.g., planning, organizing, directing, controlling) and types and characteristics of business organizations (e.g., corporations, cooperatives, sole proprietorships, limited liability corporations)
- applying financial management (e.g., budgeting, obtaining credit), accounting (e.g., creating a balance sheet, managing cash flow), and risk management (e.g., obtaining insurance, forward contracting, diversifying production) procedures in an agricultural business
- applying principles and practices of human resource management in an agricultural business
- identifying methods and procedures for employing computer technology for record keeping, decision making, communication, and office management in an agricultural business
- recognizing work-related and business-related ethical issues and government agencies, laws, and regulations (e.g., environmental, food safety) that affect agricultural businesses

### 0020 Demonstrate an understanding of principles of economics and their role in agricultural business.

For example:

- identifying types and characteristics of competitive systems (e.g., oligopoly, monopoly) and the role of the open, competitive market in the United States
- identifying basic economic concepts (e.g., risk, supply and demand, elasticity, equilibrium, opportunity cost, law of diminishing returns) and their relationship to agricultural business
- recognizing factors that influence world markets for agricultural products
- recognizing the effects of U.S. government policies (e.g., subsidies, tariffs) and international agreements (e.g., GATT, NAFTA) on U.S. agriculture



**0021 Demonstrate knowledge of agricultural marketing and sales.**

For example:

- identifying strategies for marketing agricultural products and services (e.g., identifying target markets, developing marketing plans)
- identifying factors that influence the pricing and sale of agricultural goods and services
- identifying types, characteristics, and uses of marketing and sales and product promotions
- recognizing proper sales techniques and principles and strategies for selling agricultural products and services