AGRISCIENCE 01.0000.00
TECHNICAL STANDARDS

An Industry Technical Standards Validation Committee reviewed and validated these standards on June 9, 2026. The Arizona Career and Technical Education Quality Commission, the validating authority for the Arizona Skills Standards Assessment System, reviewed these standards on November 2, 2026.

Note: Arizona's Professional Skills are taught as an integral part of the Agriscience program.

The Technical Skills Assessment for Agriscience is available SY2027-2028.

Note: In this document i.e. explains or clarifies the content and e.g. provides examples of the content that must be taught.

STANDARD 1.0 EXAMINE THE NATURE, SCOPE, AND ROLE OF AGRICULTURE IN SOCIETY AND THE ECONOMY

1.1 Investigate the impact of the agricultural industry on population, food, health, energy, and the environment

1.2 Investigate the economic importance of products obtained from agriculture (i.e., animals, plants, technology, mechanics, etc.)

1.3 Examine how a stable agricultural sector supports local and national food security

1.4 Differentiate between agricultural imports and exports

1.5 Examine the benefits of earning foreign exchange through the export of agricultural products

1.6 Investigate employment opportunities the agricultural sector provides to the labor force

STANDARD 2.0 EXAMINE THE IMPACT OF TRENDS, TECHNOLOGIES, AND POLICIES ON AGRICULTURE

2.1 Identify the major milestones and technological advancements in agriculture and their impact on society (e.g., advances in mechanization, high-quality seed, selective breeding, improved resource management, and higher quality and quantity of food)

2.2 Describe genetic modification and the pros and cons in agricultural production

2.3 Describe the effects of current farming methods on water resources, erosion, and soil fertility

2.4 Explain the effects of pesticides and fertilizers on water and the environment

2.5 Explain how legislation affects agricultural production (i.e., environment, workforce, marketing, trade, human and animal welfare, biosecurity, taxes, etc.)

2.6 Analyze the impact of biotechnology on production, processing, storage, and preparation of food, fiber, and pharmaceuticals

2.7 Use scientific evidence to investigate controversial topics and make educated decisions (i.e., environmental issues, climate change, genetic engineering, soil degradation, etc.)

2.8 Investigate the use of data to solve problems in agricultural systems (i.e., geographic, economic, demographic, etc.)

STANDARD 3.0 ANALYZE THE RELATIONSHIP BETWEEN ARIZONA'S AGRICULTURE AND MINING INDUSTRIES

3.1 Explain the role of mining in supporting modern agricultural production

3.2 Identify mined materials used throughout crop and livestock production (e.g., fertilizers, soil amendments, mineral supplements, water and irrigation systems, energy systems, agricultural infrastructure, equipment, and transportation)

3.3 Analyze how the availability and cost of mined materials influence agricultural production, operational costs, supply chains, and food prices

3.4 Evaluate how agriculture and mining contribute to Arizona's economy through responsible natural resource management, environmental stewardship, and sustainable practices

3.5 Explore career opportunities within Arizona's agriculture and mining industries

STANDARD 4.0 EXAMINE SCIENTIFIC PROCESSES USED IN AGRICULTURE

4.1 Identify research methods used in agriculture

4.2 Describe and demonstrate the scientific process

4.3 Formulate predictions, questions, and hypotheses

4.4 Evaluate appropriate resources for research

4.5 Demonstrate safe practices in the laboratory, classroom, and workplace settings

4.6 Design a scientific investigation involving clearly defined variables, controls, and research methods

4.7 Document observations, notes, sketches, questions, and ideas during an investigation

4.8 Generate data tables, charts, and graphs based on collected data

4.9 Interpret data to draw conclusions and recommend further research and practice

STANDARD 5.0 EXAMINE THE INTERCONNECTION BETWEEN THE NATURAL ENVIRONMENT AND AGRICULTURAL PRODUCTION AND SUSTAINABILITY

5.1 Define and identify sustainability practices within agriculture, food, and natural resources

5.2 Identify agricultural products that can be converted into alternative energy sources

5.3 Analyze the use of renewable energy sources in agriculture (i.e., wind, solar, biofuels, etc.)

5.4 Compare and contrast production practices regarding efficiency, sustainability, financial viability, and economic feasibility (i.e., organic, naturally raised systems, conventional agricultural production, etc.)

5.5 Investigate how alternative production systems affect production and the environment (i.e., aquaculture, vertical farming, GPS plotting, seed spacing, etc.)

5.6 Identify municipal, industrial, and agricultural sources and uses of water

5.7 Evaluate how agriculture manages water usage, wastewater systems, water recycling, and groundwater recharge opportunities

5.8 Analyze environmental, sanitation, and economic factors associated with animal and plant production

5.9 Describe the effects of agriculture on the food web cycle, or the natural interconnection of food chains

STANDARD 6.0 EXAMINE SOIL MANAGEMENT FOR PLANT AND ANIMAL PRODUCTION

6.1 Describe the formation, properties, texture, structure, and composition of soil

6.2 Examine the relationship among soil characteristics, microflora, and environmental conditions as related to soil health

6.3 Analyze methods to control soil erosion

6.4 Analyze slope, erosion, and water movement in determining land capability, land use, and agricultural production

6.5 Formulate appropriate soil management practices on various sites

STANDARD 7.0 EXAMINE CELL BIOLOGY, STRUCTURES, AND PROCESSES

7.1 Differentiate among cells, organelles, tissues, organ systems, and organisms

7.2 Describe the structure and function of DNA

7.3 Describe the process of creating proteins from DNA

7.4 Describe cellular processes (i.e., osmosis, mitosis, phagocytosis, meiosis, diffusion, etc.)

7.5 Examine the molecular basis of heredity and resulting genetic diversity

7.6 Define the essential macromolecules of life science (i.e., carbohydrates, proteins, lipids, nucleic acids, etc.)

STANDARD 8.0 ANALYZE PLANT SCIENCE PRINCIPLES

8.1 Describe plant anatomy and the functions of plant structures (e.g., root, stem, leaf, and flower)

8.2 Classify plants according to taxonomic systems, use, structure, and life span

8.3 Describe basic factors in plant growth (e.g., light, water, climate, temperature, and nutrients)

8.4 Apply knowledge of plant physiology and energy conversion to plant systems (e.g., photosynthesis, respiration, and transpiration)

8.5 Describe plant life cycle stages (i.e., germination, root growth, pollination, fruit development, seed preservation, etc.)

8.6 Demonstrate plant germination, growth, and development

8.7 Investigate changes in growing conditions and the impact on plant growth and development (i.e., light, gravity, wind, touch, water, heat, etc.)

STANDARD 9.0 DEMONSTRATE CONCEPTS OF PLANT MANAGEMENT

9.1 Analyze the nutritional needs of plants

9.2 Research common nutrient deficiency symptoms and treatment options (i.e., fertilizer, soil management, crop rotation, etc.)

9.3 Prepare growing media for use in plant systems (i.e., soil, soil amendments, compost, water, vermiculite, coconut coir, etc.)

9.4 Analyze soil conditions to make nutritional decisions (i.e., pH meter, soil test kits, soil probes, etc.)

9.5 Implement a fertilization plan for specific plants or crops

9.6 Investigate methods for sexual reproduction of plants (i.e., cross-pollination, scarification, stratification, etc.)

9.7 Investigate methods for asexual reproduction of plants (i.e., propagation, grafting, layering, tissue culture, plant hormones, etc.)

9.8 Demonstrate plant propagation techniques (e.g., sexual and asexual)

9.9 Describe techniques to harvest, handle, and store crops according to current industry standards

9.10 Create a sustainable management plan for plant production (e.g., crop, range, and a controlled environment)

STANDARD 10.0 ANALYZE ANIMAL SCIENCE PRINCIPLES

10.1 Use common terminology related to animal science and production practices (i.e., gender, age, dehorning, castration, identification, tail docking, etc.)

10.2 Classify animals according to taxonomic classification systems and use (e.g., agricultural and companion)

10.3 Differentiate between large stock, small stock, and companion animals

10.4 Explain basic anatomy and external parts of production and companion animals

10.5 Apply principles of comparative anatomy and physiology in animal systems (e.g., circulatory, endocrine, immune, integumentary, musculoskeletal, nervous, reproductive, respiratory, and urinary)

10.6 Describe a livestock animal's digestive system (i.e., avian, modified digestion, ruminant, etc.)

10.7 Describe the basic principles of animal management (e.g., appropriate environment, facilities, food, healthcare, proper handling, and water)

STANDARD 11.0 DEMONSTRATE CONCEPTS OF ANIMAL MANAGEMENT

11.1 Recognize animal behaviors to facilitate working with animals safely

11.2 Investigate the nature and properties of food, fiber, and by-products from animals

11.3 Differentiate between major wholesale and retail meat cuts of beef, pork, lamb, and poultry and compare the value of various meat cuts

11.4 Explore the use of alternative livestock in animal agriculture (i.e., antelope, elk, buffalo, alpacas, ostrich, deer, etc.)

11.5 Analyze the nutritional roles and needs of animals

11.6 Design balanced feed rations to meet the nutritional needs of animals

11.7 Identify potential animal health ailments

11.8 Develop a plan to treat animal health ailments

11.9 Differentiate among animal selection, reproduction, breeding, and genetics

11.10 Demonstrate animal selection based on reproduction, breeding, and genetics

11.11 Explore how to evaluate animals for breeding readiness and soundness

11.12 Create a sustainable reproduction management plan

11.13 Demonstrate proper methods to clean and disinfect animal equipment and facilities

11.14 Demonstrate proper use of animal medications following established withdrawal procedures

STANDARD 12.0 ANALYZE PRINCIPLES OF INTEGRATED PEST MANAGEMENT (IPM) IN PLANT AND ANIMAL SYSTEMS

12.1 Identify pests and signs of pest damage (i.e., parasites, rodents, weeds, insects, etc.)

12.2 Identify pest control methods used to manage pest damage (i.e., cultural, mechanical, biological, chemical, etc.)

12.3 Evaluate the economic impact of pests on production

12.4 Discuss biosecurity practices used to protect animal welfare at the local, state, national, and global levels

12.5 Read and interpret pesticide labels

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12.6 Investigate safe pesticide application practices

12.7 Apply pesticide safely according to good manufacturing practices (GMPs)

STANDARD 13.0 EXAMINE FOOD SAFETY AND PROCESSING PRACTICES

13.1 Investigate federal, state, and local government agencies that impact agriculture and food production

13.2 Interpret food product labels

13.3 Evaluate food processing best practices (i.e., HACCP, quality assurance, food safety standards, etc.)

13.4 Develop a plan to prevent foodborne illness in agricultural products

STANDARD 14.0 APPLY PRACTICES AND PROCEDURES FOR PLANNING, BUILDING, AND MAINTAINING STRUCTURES

14.1 Identify legal land descriptions, zoning regulations, and land use requirements when planning facilities and structures

14.2 Investigate techniques used to survey land

14.3 Create sketches and plans for structures

14.4 Determine structural requirements, specifications, and estimate costs for structures (i.e., bill of materials)

14.5 Follow architectural and mechanical plans to construct, maintain, and/or repair agricultural structures (i.e., material selection, site preparation and/or layout, plumbing, concrete/masonry, electrical wiring, wood fabrication, etc.)

14.6 Design animal, plant, and mechanical facilities including functional equipment

14.7 Manage basic facility maintenance, installation, and repair

STANDARD 15.0 DEMONSTRATE THE OPERATION OF TOOLS, EQUIPMENT, AND INSTRUMENTS

15.1 Demonstrate safe operating procedures as recommended by the manufacturer's instructions

15.2 Use service manuals to perform preventive maintenance and determine scheduled service requirements for tools, equipment, and instruments, including small engines

15.3 Maintain hand tools and power equipment (i.e., hand saws, power saws, welders, leaf blowers, etc.)

15.4 Demonstrate a variety of metal fabrication, welding, soldering, cutting, and finishing processes (i.e., SMAW, GMAW, GTAW, oxy-fuel, plasma arc torch, etc.)

15.5 Demonstrate a variety of wood fabrication and finishing processes

15.6 Service electrical systems and components of mechanical equipment and power systems using a variety of troubleshooting and/or diagnostic methods

15.7 Utilize manufacturers' guidelines to diagnose, troubleshoot, and repair machinery, equipment, and power source systems (i.e., hydraulic, pneumatic, transmission, steering, suspension, etc.)

STANDARD 16.0 DEMONSTRATE AGRIBUSINESS MANAGEMENT, FINANCE, AND MARKETING SKILLS

16.1 Define basic business terminology (i.e., entrepreneurship/placement, capital, budget, solvent, management, assets, liability, economics, etc.)

16.2 Differentiate between macroeconomics and microeconomics

16.3 Identify financial records important to business management

16.4 Use management software and information technology [i.e., spreadsheets, databases, presentation software, record-keeping software, electronic record book, Agricultural Experience Tracker (AET), etc.]

16.5 Analyze business records and record-keeping procedures

16.6 Identify tax structures of agricultural businesses (i.e., property tax, intangible taxes, income taxes, etc.)

16.7 Apply the decision-making process to budgeting issues

16.8 Identify methods of obtaining capital resources including strategic partnerships and programs

16.9 Explain the purposes and structures of contracts, leases, deeds, and insurance policies

16.10 Compare types of markets and influencing factors (i.e., commodity markets, foreign markets, competition, etc.)

16.11 Identify methods of managing risk

16.12 Describe the purpose and importance of marketing

16.13 Develop a marketing plan

16.14 Develop a sustainable business plan

STANDARD 17.0 EXAMINE TECHNOLOGY TOOLS AND SYSTEMS USED TO ACCESS, MANAGE, INTEGRATE, AND CREATE INFORMATION AND SOLVE PROBLEMS

17.1 Use industry-relevant software and applications

17.2 Use collaborative and virtual meeting software

17.3 Analyze the benefits and limitations of emerging technology [i.e., geospatial technology, online mapping systems, drones, robotics, artificial intelligence (AI), etc.]

17.4 Utilize precision agriculture software and tools to plan, solve problems, and increase efficiency [i.e., LabQuest, programmable logic controller (PLC), geospatial technology, geographic information system (GIS), computer numerical control (CNC), unmanned aircraft system (UAS), artificial intelligence (AI), etc.]