



AGRISCIENCE 01.0000.00

EMBEDDED ECONOMIC CREDIT CROSSWALK

The AgriScience program has been recognized by the Arizona State Board of Career and Technical Education (CTE) as being eligible for consideration by local governing boards to grant 0.5 credits of Social Studies: Economics. The information is the result of a committee analysis completed in 2019.

Note: AZ High School Economics Standards are highlighted.

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

1.1	Investigate the impact of the agricultural industry on population, food, energy, and environment
	Economics HS.E2.1 Explain how scarcity results in economic decisions and evaluate their impact on individuals, institutions, and societies. HS.E3.1 Explain how buyers and sellers interact to create markets and market structures. HS.E4.1 Use economic data to analyze the health of a national economy.
	Rationale: Study the impact of agriculture on the global economy and allocation of limited resources. Understand the influence of Consumer Price Index, business cycle, and inflation.
1.2	Investigate the economic importance of products obtained from agriculture (i.e., animals, plants, technology, mechanics, etc.)
	Economics HS.E2.1 Explain how scarcity results in economic decisions and evaluate their impact on individuals, institutions, and societies. HS.E3.1 Explain how buyers and sellers interact to create markets and market structures. HS.E5.3 Explain why nations chose to trade and how it is regulated. HS.E5.4 Explain how national economies influence trade.
	Rationale: Study the economic impact of Arizona agriculture production (i.e., commodities, specialization, absolute and comparative advantage products, etc.). Investigate agricultural labor laws.
1.3	Examine how a stable agricultural sector supports a nation of food security
	Economics HS.E2.1 Explain how scarcity results in economic decisions and evaluate their impact on individuals, institutions, and societies. HS.E4.1 Use economic data to analyze the health of a national economy. HS.E5.2 Evaluate how interdependence impacts individuals, institutions, and societies.
	Rationale: Investigate economic indicators of comparative and absolute advantage. Review the economic benefits of agriculture sustainability and imports and exports. Explain how industrialization impacts agriculture. Study how globalization and world aid organizations support agriculture in developing countries.
1.4	Differentiate between agricultural imports and exports
	Economics HS.E5.1 Evaluate the advantages and disadvantages of global trade. HS.E5.2 Evaluate how interdependence impacts individuals, institutions, and societies. HS.E5.3 Explain why nations chose to trade and how it is regulated. HS.E5.4 Explain how national economies influence trade.
	Rationale: Study the advantages and disadvantages of imports and exports. Discuss the World Trade Organization and how embargos, tariffs, and trade barriers play a role in economy.
1.5	Examine the benefit of earning foreign exchange through the export of agricultural products
	Economics HS.E5.1 Evaluate the advantages and disadvantages of global trade. HS.E5.2 Evaluate how interdependence impacts individuals, institutions, and societies. HS.E5.3 Explain why nations chose to trade and how it is regulated. HS.E5.4 Explain how national economies influence trade.
	Rationale: Investigate the Gross Domestic Product (GDP) of agricultural exports and foreign exchange rates as related to comparative and absolute advantage. Study the economic advantages and disadvantages of imports and exports and how free trade, tariffs, and trade embargos impact cost.
1.6	Investigate how the agriculture sector provides employment opportunities to the labor force
	Economics HS.E4.1 Use economic data to analyze the health of a national economy.
	Rationale: Review unemployment rates and labor statistics.

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

2.1	Identify the major milestones and technological advancements on agriculture and the impact to society (e.g., advances in mechanization, quality seed and selective breeding, improved resource management, and higher quantity of food)
	Economics HS.E3.4 Explain the distinct types of business organizations and analyze the role of innovation and entrepreneurship in a market economy. HS.E4.4 Explain the effect of advancements in technology and training on economic growth and standards of living.
	Rationale: Study the history of agriculture including resource management improvements and production efficiency.
2.2	Describe the effects of genetic modification on 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., environmental, workforce, marketing, trade, animal welfare, biosecurity, taxes, water, etc.)
	Economics HS.E3.3 Evaluate the role of government in regulating marketplaces. HS.E4.2 Evaluate the economic conditions that lead to fiscal and monetary policy choices and explain their impact on households and businesses. HS.E4.3 Explain the roles of institutions in a market economy.
	Rationale: Discuss governmental regulation and issues (i.e., animal welfare, water rights, private property rights, etc.). Review marketing, labeling laws, taxes and trade agreements in agriculture.
2.6	Analyze the impact of biotechnology on production, processing, storage, and preparation of food, fiber, and pharmaceuticals
	Economics HS.E4.4 Explain the effect of advancements in technology and training on economic growth and standards of living.
	Rationale: Study the impact of FDA regulations on biotechnology.
2.7	Use scientific evidence to investigate controversial topics and make educated decisions (i.e., environmental issues, climate change, genetic engineering, soil degradation, etc.)
	Economics HS.SP3.2 Gather relevant information from multiple sources representing a wide range of views while using origin, authority, structure, context, and corroborative value of the source to guide the selection. HS.SP3.8 Present arguments and explanations that feature ideas and perspectives on issues and topics to reach a range of audiences and venues using print, oral, and digital technologies.
	Rationale: Gather evidence and information from multiple sources to construct an argument using evidence with agricultural issues.
2.8	Investigate the use of data to solve problems in agricultural systems (i.e., geographic, economic, demographic, etc.)
	Economics HS.E2.3 Use cost-benefit analysis and/or marginal analysis to evaluate an economic issue. HS.E4.1 Use economic data to analyze the health of a national economy. HS.E4.4 Explain the effect of advancements in technology and training on economic growth and standards of living. HS.SP3.2 Gather relevant information from multiple sources representing a wide range of views while using origin, authority, structure, context, and corroborative value of the source to guide the selection. HS.SP3.6 Construct and present arguments using precise and knowledgeable claims, with evidence from multiple sources, while acknowledging counterclaims and evidentiary weaknesses.
	Rationale: Investigate urban and rural agricultural problems (i.e., population density, economic issues, GDP, subsidies, Farm Bill, etc.). Gather evidence and information from multiple sources to construct an argument using evidence with agricultural issues.
STANDARD 3.0 EXAMINE THE USE OF SCIENTIFIC PROCESSES USED IN AGRICULTURE	
3.1	Identify research methods used in agriculture
3.2	Describe and demonstrate the scientific process
3.3	Formulate predictions, questions, and hypotheses
	Economics HS.SP3.7 Construct and present explanations using sound reasoning, correct sequence (linear and non-linear) examples, and details with significant and pertinent information and data, while acknowledging the strengths and weaknesses of the explanation. HS.SP3.8 Present arguments and explanations that feature ideas and perspectives on issues and topics to reach a range of audiences and venues using print, oral, and digital technologies.
	Rationale: Construct an agricultural argument using evidence and present researched arguments.
3.4	Evaluate appropriate resources for research
	Economics HS.SP4.4 Compare the central arguments in secondary works on related topics in multiple media. Critique the central arguments in secondary works on related topics in multiple media in terms of their accuracy and relevance HS.SP3.4 Evaluate the credibility of a source by examining how experts value the source.

	Rationale: Evaluate credible research resources.
3.5	Demonstrate safe practices in the laboratory, classroom, and work situations
3.6	Design and conduct scientific investigations
3.7	Record observations, notes, sketches, questions, and ideas during an investigation
	Economics HS.SP3.7 Construct and present explanations using sound reasoning, correct sequence (linear and non-linear) examples, and details with significant and pertinent information and data, while acknowledging the strengths and weaknesses of the explanation. HS.SP3.8 Present arguments and explanations that feature ideas and perspectives on issues and topics to reach a range of audiences and venues using print, oral, and digital technologies.
	Rationale: Experimental design.
3.8	Generate data tables, charts, and graphs based on collected data
	Economics HS.SP3.7 Construct and present explanations using sound reasoning, correct sequence (linear and non-linear) examples, and details with significant and pertinent information and data, while acknowledging the strengths and weaknesses of the explanation. HS.SP3.8 Present arguments and explanations that feature ideas and perspectives on issues and topics to reach a range of audiences and venues using print, oral, and digital technologies.
	Rationale: Experimental design.
3.9	Analyze data, communicate results, conclusions, and propose further investigations
	Economics HS.SP3.7 Construct and present explanations using sound reasoning, correct sequence (linear and non-linear) examples, and details with significant and pertinent information and data, while acknowledging the strengths and weaknesses of the explanation. HS.SP3.8 Present arguments and explanations that feature ideas and perspectives on issues and topics to reach a range of audiences and venues using print, oral, and digital technologies.
	Rationale: Experimental design.
STANDARD 4.0 EXAMINE THE RELATIONSHIP OF THE ENVIRONMENT TO AGRICULTURE PRODUCTION AND SUSTAINABILITY	
4.1	Identify agricultural products that can be converted to alternative energy sources
4.2	Analyze the use of renewable energy sources in agriculture (i.e., wind, solar, biofuels, etc.)
	Economics HS.E1.1 Evaluate how and why people make choices to improve their economic well-being.
	Rationale: Investigate renewable energy as an alternative source.
4.3	Compare and contrast production practices with regard to efficiency, sustainability, and economic viability (i.e., organic, naturally raised systems, conventional agricultural production, etc.)
	Economic HS.E1.1 Evaluate how and why people make choices to improve their economic well-being. HS.E2.2 Analyze how incentives influence economic choices for individuals, institutions, and societies. HS.E2.3 Use cost-benefit analysis and/or marginal analysis to evaluate an economic issue. HS.E4.4 Explain the effect of advancements in technology and training on economic growth and standards of living.
	Rationale: Understand the pros and cons of organic, naturally raised, and conventional production (i.e., efficiency, sustainability, economic viability, etc.).
4.4	Investigate how alternative production systems affect production and environment (i.e., aquaculture, vertical farming, GPS plotting, seed spacing, etc.)
	Economics HS.E1.1 Evaluate how and why people make choices to improve their economic well-being. HS.E2.3 Use cost-benefit analysis and/or marginal analysis to evaluate an economic issue.
	Rationale: Study the effects of aquaculture, vertical farming, GPS plotting, and seed spacing. Understand the pros and cons of organic, naturally raised, and conventional production (i.e., efficiency, sustainability, economic viability, etc.).
4.5	Identify municipal, industrial, and agricultural sources and uses of water
4.6	Evaluate how agriculture manages water use, wastewater systems, and water recycling opportunities
4.7	Analyze environmental factors associated with animal and plant production including sanitation and economics
4.8	Describe the effect of agriculture on the food web cycle, or the natural interconnection of food chains
STANDARD 5.0 EXAMINE SOIL MANAGEMENT FOR PLANT AND ANIMAL PRODUCTION	
5.1	Describe formation, properties, texture, structure, and composition of soil
5.2	Examine the relationship among soil characteristics, microflora, and environmental conditions
5.3	Analyze methods to control soil erosion
5.4	Analyze slope, erosion, and water movement in determining land capability, land use, and agricultural production

5.5	Formulate appropriate soil management practices on various sites
STANDARD 6.0 EXAMINE CELL BIOLOGY, STRUCTURES, AND PROCESSES	
6.1	Differentiate among cells, organelles, tissues, and organs' systems
6.2	Describe the structure and function of DNA
6.3	Describe the process of creating proteins from DNA
6.4	Describe cellular processes (i.e., osmosis, mitosis, phagocytosis, meiosis, diffusion, etc.)
6.5	Examine the molecular basis of heredity and resulting genetic diversity
6.6	Define the essential macromolecules of life science (i.e., carbohydrates, proteins, lipids, nucleic acids, etc.)
STANDARD 7.0 ANALYZE PLANT SCIENCE PRINCIPLES	
7.1	Describe plant anatomy and the functions of plant structures (e.g., root, stem, leaf, and flower)
7.2	Classify plants according to taxonomic systems, use, structure, and life span
7.3	Describe basic factors in plant growth (e.g., light, water, climate, temperature, and nutrients)
7.4	Apply knowledge of plant physiology and energy conversion to plant systems (e.g., photosynthesis, respiration, and transpiration)
7.5	Describe plant life cycle stages (i.e., germination, root growth, pollination, fruit development, etc.)
7.6	Demonstrate plant germination, growth, and development
7.7	Investigate changes in growing conditions and the impact on plant growth and development (i.e., light, gravity, touch, water, heat, etc.)
STANDARD 8.0 DEMONSTRATE CONCEPTS OF PLANT MANAGEMENT	
8.1	Analyze the nutritional needs of plants
8.2	Research common nutrient deficiency symptoms and treatment options (i.e., fertilizers, soil amendments, crop rotation, etc.)
8.3	Prepare grow media for use in plant systems (i.e., soil, water, vermiculite, coconut core, etc.)
8.4	Analyze soil conditions to make nutritional decisions (i.e., pH meter, soil test kits, soil probes, etc.)
8.5	Implement a fertilization plan for specific plants or crops
8.6	Investigate methods for sexual reproduction of plants (i.e., cross-pollination, scarification, stratification, etc.)
8.7	Investigate methods for asexual reproduction of plants (i.e., propagation, grafting, layering, tissue culture, plant hormones, etc.)
8.8	Demonstrate plant propagation techniques (e.g., sexual and asexual)
8.9	Describe techniques to harvest, handle, and store crops according to current industry standards
8.10	Create a sustainable management plan for plant production
STANDARD 9.0 ANALYZE ANIMAL SCIENCE PRINCIPLES	
9.1	Define common terminology related to animal science and production practices (i.e., gender, age, dehorning, castration, identification, tail docking, etc.)
9.2	Classify animals according to taxonomic classification systems and use (e.g., agricultural and companion)
9.3	Differentiate among large stock, small stock, and companion animals
9.4	Explain basic anatomy and external parts of production animals
9.5	Apply principles of comparative anatomy and physiology to use within animal systems (e.g., circulatory, endocrine, immune, integumentary, musculoskeletal, nervous, reproductive, respiratory, and urinary)
9.6	Describe a livestock animal's digestive system (i.e., avian, modified digestion, ruminant, etc.)
9.7	Describe the basic principles of animal welfare (e.g., appropriate environment, facilities, food, healthcare, proper handling, and water)
STANDARD 10.0 DEMONSTRATE CONCEPTS OF ANIMAL MANAGEMENT	
10.1	Recognize animal behaviors to facilitate safely working with animals
10.2	Investigate the nature and properties of food, fiber, and by-products from animals
10.3	Differentiate between major wholesale/retail meat cuts of beef, pork, lamb, and poultry and compare the value of various meat cuts
10.4	Explore the use of alternative livestock in animal agriculture (i.e., antelope, elk, buffalo, alpacas, ostrich, deer, etc.)
10.5	Analyze the nutritional roles and needs of animals

10.6	Analyze feed rations to meet the nutritional needs of animals
10.7	Develop a plan to treat animal ailments
10.8	Differentiate among animal selection, reproduction, breeding, and genetics
10.9	Demonstrate animal selection based on reproduction, breeding, and genetics
10.10	Explore how animals are evaluated for breeding readiness and soundness
10.11	Create a sustainable reproduction management plan
10.12	Demonstrate proper methods to clean and disinfect animal equipment and facilities
10.13	Demonstrate proper use of animal medications following established withdrawal protocols
STANDARD 11.0 ANALYZE PRINCIPLES OF INTEGRATED PEST MANAGEMENT (IPM) IN PLANT AND ANIMAL SYSTEMS	
11.1	Identify pests and signs of pest damage (i.e., parasites, rodents, weeds, insects, etc.)
11.2	Identify pest control methods used to manage pest damage (i.e., cultural, mechanical, biological, chemical, etc.)
11.3	Evaluate economic impact of pests on production
	Economics HS.E3.2 Evaluate how numerous factors and conditions influence market prices.
	Rationale: Study production loss and possibilities curve to identify the economic threshold and marginal utility.
11.4	Discuss biosecurity measures utilized to protect the welfare of animals on a local, state, national, and global level
11.5	Read and interpret pesticide labels
11.6	Investigate safe pesticide application practices
11.7	Apply pesticides safely according to good manufacturing practices (GMPs)
STANDARD 12.0 EXAMINE FOOD SAFETY AND PROCESSING PRACTICES	
12.1	Investigate government agencies that impact agriculture and food production
	Economics HS.E3.3 Evaluate the role of government in regulating marketplaces. HS.E4.3 Explain the roles of institutions in a market economy.
	Rationale: Investigate the role of government agencies (i.e., FDA, EPA, USDA, APHIS, Homeland Security, CDC, FSIS, OSHA, etc.)
12.2	Analyze food product labels
12.3	Evaluate food processing best practices (i.e., HACCP, quality assurance, food safety standards, etc.)
12.4	Develop a plan to prevent foodborne illness in agricultural products
STANDARD 13.0 APPLY PRACTICES AND PROCEDURES FOR PLANNING, BUILDING, AND MAINTAINING STRUCTURES	
13.1	Identify legal land descriptions
13.2	Investigate techniques used to survey land
13.3	Create sketches and plans for structures
13.4	Determine structural requirements, specifications, and estimate costs for structures (i.e., bill of materials)
13.5	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.)
13.6	Design animal, plant, and mechanical facilities including equipment
13.7	Manage basic facility maintenance, installation, or repair
STANDARD 14.0 DEMONSTRATE OPERATION OF TOOLS, EQUIPMENT, AND INSTRUMENTS	
14.1	Demonstrate safe operating instructions and procedures as recommended by the manufacturer
14.2	Utilize service manuals to perform preventative maintenance and determine scheduled service on tools, equipment, and instruments, including small engines
14.3	Maintain hand tools and power equipment (i.e., hand saws, power saws, welders, leaf blowers, etc.)
14.4	Demonstrate a variety of metal fabrication, welding, soldering, cutting, and finishing processes (i.e., SMAW, GMAW, GTAW, fuel-oxygen, plasma arc torch, etc.)
14.5	Demonstrate a variety of wood fabrication and finishing processes
14.6	Service electrical systems and components of mechanical equipment and power systems using a variety of troubleshooting and/or diagnostic methods
14.7	Utilize manufacturers' guidelines to diagnose, troubleshoot, and repair machinery, equipment, and power source systems (i.e., hydraulic, pneumatic, transmission, steering, suspension, etc.)

STANDARD 15.0 DEMONSTRATE AGRIBUSINESS MANAGEMENT, FINANCE, AND MARKETING SKILLS	
15.1	Define basic business terminology (i.e., entrepreneurship/placement, capital, budget, solvent, management, assets, liability, economics, etc.)
	Economics HS.E2.1 Explain how scarcity results in economic decisions and evaluate their impact on individuals, institutions, and societies. HS.E3.4 Explain the distinct types of business organizations and analyze the role of innovation and entrepreneurship in a market economy.
	Rationale: Investigate business types and terminology. Identify the relationship between factors of production and opportunity cost.
15.2	Differentiate between macro- and micro-economics
	Economics HS.E2.1 Explain how scarcity results in economic decisions and evaluate their impact on individuals, institutions, and societies. HS.E3.1 Explain how buyers and sellers interact to create markets and market structures. HS.E4.2 Evaluate the economic conditions that lead to fiscal and monetary policy choices and explain their impact on households and businesses.
	Rationale: Study how supply and demand impact cost. Investigate the role of the Federal Reserve and fiscal and monetary policies.
15.3	Identify financial records important to business management
	Economics HS.E1.2 Analyze the factors that influence how and why people make budgeting and saving choices. HS.E1.4 Compare the cost and benefits of several types of investments.
	Rationale: Review 50/20/30 Rule for budgeting strategies. Understand how financial records, balance sheets, and inventory can drive business decisions.
15.4	Use management software and information technology [i.e., spreadsheets, databases, presentation software, record-keeping software, electronic record book, agriculture experience tracker (AET), etc.]
	Economics HS.E4.4 Explain the effect of advancements in technology and training on economic growth and standards of living.
	Rationale: Demonstrate AET and recordkeeping technology.
15.5	Analyze business records and record-keeping procedures
15.6	Identify tax structure of agricultural business (i.e., property tax, intangible taxes, income taxes, etc.)
15.7	Apply the decision-making process for budgeting issues
	Economics HS.E1.1 Evaluate how and why people make choices to improve their economic well-being. HS.E1.2 Analyze the factors that influence how and why people make budgeting and saving choices. HS.E1.3 Evaluate the cost and benefits of using credit HS.E1.4 Compare the cost and benefits of several types of investments. HS.E2.1 Explain how scarcity results in economic decisions and evaluate their impact on individuals, institutions, and societies. HS.E3.2 Evaluate how numerous factors and conditions influence market prices.
	Rationale: Explain scarcity, wants and needs, and diminishing rates of return. Understand business financial management (i.e., stocks, commodities, real estate, bank accounts, money market, mutual funds, retirement funds, etc.). Understand how AET financial records, risk analysis, and Supervised Agricultural Experience (SAE) benefit businesses.
15.8	Identify methods of obtaining capital resources
	Economics HS.E1.3 Evaluate the cost and benefits of using credit HS.E1.4 Compare the cost and benefits of several types of investments.
	Rationale: Investigate grants, loans, and subsidies used to obtain capital resources. Understand loan fees, interest rates, and credit scores. Review the 5 Cs of credit.
15.9	Explain the purposes and structures of contracts, leases, deeds, and insurance policies
	Economics HS.E1.4 Compare the cost and benefits of several types of investments. HS.E1.5 Evaluate the ways insurance may minimize personal financial risk.
	Rationale: Discuss insurance types (i.e., car, life, crop, personal injury, liability, etc.) and risk management.
15.10	Compare types of markets and influence factors (i.e., commodity markets, foreign markets, competition, etc.)
	Economics HS.E2.1 Explain how scarcity results in economic decisions and evaluate their impact on individuals, institutions, and societies. HS.E3.1 Explain how buyers and sellers interact to create markets and market structures.
	Rationale: Investigate economic systems (i.e., command, mixed, free market, etc.) including commodities, competition, and foreign markets. Discuss economic forecast accuracy.
15.11	Identify methods of managing risk

	Economics HS.E1.3 Evaluate the cost and benefits of using credit HS.E1.5 Evaluate the ways insurance may minimize personal financial risk.
	Rationale: Study how to manage risk (i.e., avoidance reduction, transfer, retention, etc.)
15.12	Describe the purpose and importance of marketing
	Economics HS.E2.2 Analyze how incentives influence economic choices for individuals, institutions, and societies.
	Rationale: Review the role of marketing communications.
15.13	Develop a marketing plan
	Economics HS.E2.2 Analyze how incentives influence economic choices for individuals, institutions, and societies.
	Rationale: Use primary research to create a marketing plan.
15.14	Create a business plan
	Economics HS.E1.3 Evaluate the cost and benefits of using credit HS.E2.2 Analyze how incentives influence economic choices for individuals, institutions, and societies. HS.E3.2 Evaluate how numerous factors and conditions influence market prices. HS.E3.4 Explain the distinct types of business organizations and analyze the role of innovation and entrepreneurship in a market economy.
	Rationale: Create a business plan using Agricultural Experience Tracker and SAE planning. Develop profit vs. loss business forecast.
STANDARD 16.0 EXAMINE TECHNOLOGY TOOLS AND SYSTEMS USED TO ACCESS, MANAGE, INTEGRATE, AND CREATE INFORMATION AND SOLVE PROBLEMS	
16.1	Use industry-relevant software and internet applications
16.2	Use collaborative and virtual meeting software
16.3	Analyze the benefits and limitations of emerging technology such as geospatial, online mapping systems, drones, and robotics
16.4	Explain the benefits of computer-based and mobile application equipment
16.5	Apply computer and other technologies to solve problems and increase efficiency [i.e., LabQuest, programmable logic controller (PLC), Geospatial Information System (GIS), Computer numeric control (CNC), Unmanned aircraft system (UAS), etc.]