AGRISCIENCE
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EMBEDDED SCIENCE 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 1 credit of high school science. This document is the result of a committee analysis completed in 2019.

AgriScience Standards	Science Standards	Reasoning/Rationale
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	**HS.P1U3.4 Chemistry** Obtain, evaluate, and communicate information about how the use of chemistry related technologies have had positive and negative ethical, social, economic, and/or political implications. **HS.E1U1.14 Earth and Space** Engage in argument from evidence about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. **PLUS HS+E.E1U3.9 Earth and Space** Construct an explanation, based on evidence, for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. **PLUS HS+E.E1U3.10 Earth and Space** Ask questions, define problems, and evaluate a solution to a complex problem, based on prioritized criteria and tradeoffs, that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. **PLUS HS+E.E1U3.11 Earth and Space** Develop and use a quantitative model to illustrate the relationship among Earth systems and the degree to which those relationships are being modified due to human activity.	Science standards embedded throughout units

Standards used in this Crosswalk: AZ Science 2018 and CTE AgriScience 2018

1.2 Investigate the economic importance of products obtained from agriculture (i.e., animals, plants, technology, mechanics, etc.)	**HS.P1U3.4 Chemistry** Obtain, evaluate, and communicate information about how the use of chemistry related technologies have had positive and negative ethical, social, economic, and/or political implications.	Sustainability
1.3 Examine how a stable agricultural sector supports a nation of food security		
1.4 Differentiate between agricultural imports and exports		
1.5 Examine the benefit of earning foreign exchange through the export of agricultural products		.
1.6 Investigate how the agriculture sector provides employment opportunities to the labor force		
AgriScience Standards	**Science Standards**	**Reasoning/Rationale**
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)	**HS.E1U1.14 Earth and Space** Engage in argument from evidence about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. **PLUS HS+E.E1U3.9 Earth and Space** Construct an explanation, based on evidence, for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. **PLUS HS+E.E1U3.10 Earth and Space** Ask questions, define problems, and evaluate a solution to a complex problem, based on prioritized criteria and tradeoffs, that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. **PLUS HS+E.E1U3.11 Earth and Space** Develop and use a quantitative model to illustrate the relationship among Earth systems and the degree to which those relationships are being modified due to human activity.	Science embedded throughout units Agriculture milestones studied through the years

	HS.L2U3.18 Life Science Obtain, evaluate, and communicate about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem. **HS.L4U1.27 Life Science** Obtain, evaluate, and communicate evidence that describes how changes in frequency of inherited traits in a population can lead to biological diversity.	
2.2 Describe the effects of genetic modification on agricultural production	**HS.L2U3.18 Life Science** Obtain, evaluate, and communicate about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem. **HS.L3U1.24 Life Science** Construct an explanation of how the process of sexual reproduction contributes to genetic variation. **HS.L3U3.26 Life Science** Engage in argument from evidence regarding the ethical, social, economic, and/or political implications of a current genetic technology. **HS.L4U1.27 Life Science** Obtain, evaluate, and communicate evidence that describes how changes in frequency of inherited traits in a population can lead to biological diversity.	GMOs: -Pros vs cons -Public perception -Approval process -Economic impact Biotechnology
2.3 Describe the effects of current farming methods on water resources, erosion, and soil fertility	**HS.E1U1.11 Earth and Space** Analyze and interpret data to determine how energy from the Sun affects weather patterns and climate. **HS.E1U1.12 Earth and Space** Develop and use models of the Earth that explains the role of energy and matter in Earth's constantly changing internal and external systems (geosphere, hydrosphere, atmosphere, biosphere). **HS.E1U1.14 Earth and Space** Engage in argument from evidence about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other.	Soils Unit (Erosion) Sustainability Water Unit Plant production

	PLUS HS+E.E1U3.9 Earth and Space Construct an explanation, based on evidence, for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. **PLUS HS+E.E1U3.10 Earth and Space** Ask questions, define problems, and evaluate a solution to a complex problem, based on prioritized criteria and tradeoffs, that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. **PLUS HS+E.E1U3.11 Earth and Space** Develop and use a quantitative model to illustrate the relationship among Earth systems and the degree to which those relationships are being modified due to human activity. **HS.L2U3.18 Life Science** Obtain, evaluate, and communicate about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem.	
2.4 Explain the effects of pesticides and fertilizers on water and the environment	**HS.E1U1.14 Earth and Space** Engage in argument from evidence about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. **PLUS HS+E.E1U3.9 Earth and Space** Construct an explanation, based on evidence, for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. **PLUS HS+E.E1U3.10 Earth and Space** Ask questions, define problems, and evaluate a solution to a complex problem, based on prioritized criteria and tradeoffs, that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.	Pesticide unit Integrated Pest Management (IPM)

	PLUS HS+E.E1U3.11 Earth and Space Develop and use a quantitative model to illustrate the relationship among Earth systems and the degree to which those relationships are being modified due to human activity. **HS.L2U3.18 Life Science** Obtain, evaluate, and communicate about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem.	
2.5 Explain how legislation affects agricultural production (i.e., environmental, workforce, marketing, trade, animal welfare, biosecurity, taxes, water, etc.)	**HS.P1U3.4 Chemistry** Obtain, evaluate, and communicate information about how the use of chemistry related technologies have had positive and negative ethical, social, economic, and/or political implications. **HS.P4U3.9 Physics** Engage in argument from evidence regarding the ethical, social, economic, and/or political benefits and liabilities of energy usage and transfer. **HS.E1U1.11 Earth and Space** Analyze and interpret data to determine how energy from the Sun affects weather patterns and climate. **HS.L2U3.18 Life Science** Obtain, evaluate, and communicate about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem. **HS.L1U3.23 Life Science** Obtain, evaluate, and communicate the ethical, social, economic and/or political implications of the detection and treatment of abnormal cell function. **HS.L3U3.26 Life Science** Engage in argument from evidence regarding the ethical, social, economic, and/or political implications of a current genetic technology.	Agricultural Issues (ethics)
2.6 Analyze the impact of biotechnology on production, processing, storage, and preparation of food, fiber, and pharmaceuticals	**HS.L2U3.18 Life Science** Obtain, evaluate, and communicate about the positive and negative ethical, social, economic, and political	Biotechnology

	implications of human activity on the biodiversity of an ecosystem. **HS.L1U3.23 Life Science** Obtain, evaluate, and communicate the ethical, social, economic and/or political implications of the detection and treatment of abnormal cell function. **HS.L3U1.24 Life Science** Construct an explanation of how the process of sexual reproduction contributes to genetic variation. **HS.L3U1.25 Life Science** Obtain, evaluate, and communicate information about the causes and implications of DNA mutation. **HS.L3U3.26 Life Science** Engage in argument from evidence regarding the ethical, social, economic, and/or political implications of a current genetic technology. **HS.L4U1.27 Life Science** Obtain, evaluate, and communicate evidence that describes how changes in frequency of inherited traits in a population can lead to biological diversity.	
2.7 Use scientific evidence to investigate controversial topics and make educated decisions (i.e., environmental issues, climate change, genetic engineering, soil degradation, etc.)	**HS.E1U1.11 Earth and Space** Analyze and interpret data to determine how energy from the Sun affects weather patterns and climate. **HS.E1U1.12 Earth and Space** Develop and use models of the Earth that explains the role of energy and matter in Earth's constantly changing internal and external systems (geosphere, hydrosphere, atmosphere, biosphere). **HS.E1U1.14 Earth and Space** Engage in argument from evidence about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. **PLUS HS+E.E1U3.9 Earth and Space** Construct an explanation, based on evidence, for how the availability of natural resources, occurrence of natural hazards, and	Environmental impact Agricultural issues Biotechnology

	changes in climate have influenced human activity. **PLUS HS+E.E1U3.10 Earth and Space** Ask questions, define problems, and evaluate a solution to a complex problem, based on prioritized criteria and tradeoffs, that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. **PLUS HS+E.E1U3.11 Earth and Space** Develop and use a quantitative model to illustrate the relationship among Earth systems and the degree to which those relationships are being modified due to human activity. **HS.L2U3.18 Life Science** Obtain, evaluate, and communicate about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem. **HS.L3U1.24 Life Science** Construct an explanation of how the process of sexual reproduction contributes to genetic variation. **HS.L3U1.25 Life Science** Obtain, evaluate, and communicate information about the causes and implications of DNA mutation. **HS.L3U3.26 Life Science** Engage in argument from evidence regarding the ethical, social, economic, and/or political implications of a current genetic technology. **HS.L4U1.27 Life Science** Obtain, evaluate, and communicate evidence that describes how changes in frequency of inherited traits in a population can lead to biological diversity. **HS.L4U1.28 Life Science** Gather, evaluate, and communicate multiple lines of empirical evidence to explain the mechanisms of biological evolution.	
2.8 Investigate the use of data to solve problems in agricultural systems (i.e., geographic, economic, demographic, etc.)	**HS.E1U1.12 Earth and Space** Develop and use models of the Earth that explains the role of energy and matter in Earth's	Sustainability Agricultural issues

	constantly changing internal and external systems (geosphere, hydrosphere, atmosphere, biosphere). **HS.E1U1.14 Earth and Space** Engage in argument from evidence about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. **PLUS HS+E.E1U3.9 Earth and Space** Construct an explanation, based on evidence, for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. **PLUS HS+E.E1U3.10 Earth and Space** Ask questions, define problems, and evaluate a solution to a complex problem, based on prioritized criteria and tradeoffs, that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. **PLUS HS+E.E1U3.11 Earth and Space** Develop and use a quantitative model to illustrate the relationship among Earth systems and the degree to which those relationships are being modified due to human activity. **HS.L2U3.18 Life Science** Obtain, evaluate, and communicate about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem.	
AgriScience Standards	**Science Standards**	**Reasoning/Rationale**
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	**HS.P1U3.4 Chemistry** Obtain, evaluate, and communicate information about how the use of chemistry related technologies have had positive and negative ethical, social, economic, and/or political implications. **HS.P4U3.9 Physics** Engage in argument from evidence regarding	Same Science standards used in all of CTE Standard 3.0

3.4 Evaluate appropriate resources for research 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 3.8 Generate data tables, charts, and graphs based on collected data 3.9 Analyze data, communicate results, conclusions, and propose further investigations	the ethical, social, economic, and/or political benefits and liabilities of energy usage and transfer. **HS.E1U1.11 Earth and Space** Analyze and interpret data to determine how energy from the Sun affects weather patterns and climate. **HS.E1U1.12 Earth and Space** Develop and use models of the Earth that explains the role of energy and matter in Earth's constantly changing internal and external systems (geosphere, hydrosphere, atmosphere, biosphere). **HS.E1U1.13 Earth and Space** Evaluate explanations and theories about the role of energy and matter in geologic changes over time. **HS.E1U1.14 Earth and Space** Engage in argument from evidence about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. **PLUS HS+E.E1U3.9 Earth and Space** Construct an explanation, based on evidence, for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. **PLUS HS+E.E1U3.10 Earth and Space** Ask questions, define problems, and evaluate a solution to a complex problem, based on prioritized criteria and tradeoffs, that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. **PLUS HS+E.E1U3.11 Earth and Space** Develop and use a quantitative model to illustrate the relationship among Earth systems and the degree to which those relationships are being modified due to human activity.	

	HS.L2U3.18 Life Science Obtain, evaluate, and communicate about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem. **HS.L2U1.19 Life Science** Develop and use models that show how changes in the transfer of matter and energy within an ecosystem and interactions between species may affect organisms and their environment. **HS.L1U1.20 Life Science** Ask questions and/or make predictions based on observations and evidence to demonstrate how cellular organization, structure, and function allow organisms to maintain homeostasis **PLUS HS+B.L1U1.4 Biology** Develop and use models to explain the interdependency and interactions between cellular organelles. **PLUS HS+B.L1U1.5 Biology** Analyze and interpret data that demonstrates the relationship between cellular function and the diversity of protein functions. **PLUS HS+B.L1U1.6 Biology** Develop and use models to show how transport mechanisms function in cells. **PLUS HS+B.L1U1.7 Biology** Develop and use models to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms (plant and animal). **HS.L1U1.21 Life Science** Obtain, evaluate, and communicate data showing the relationship of photosynthesis and cellular respiration; flow of energy and cycling of matter. **HS.L1U1.22 Life Science** Construct an explanation for how cellular division (mitosis) is the process by which organisms grow and maintain complex, interconnected systems.	

	HS.L1U3.23 Life Science Obtain, evaluate, and communicate the ethical, social, economic and/or political implications of the detection and treatment of abnormal cell function. **HS.L3U1.24 Life Science** Construct an explanation of how the process of sexual reproduction contributes to genetic variation. **HS.L3U1.25 Life Science** Obtain, evaluate, and communicate information about the causes and implications of DNA mutation. **HS.L3U3.26 Life Science** Engage in argument from evidence regarding the ethical, social, economic, and/or political implications of a current genetic technology. **HS.L4U1.27 Life Science** Obtain, evaluate, and communicate evidence that describes how changes in frequency of inherited traits in a population can lead to biological diversity. **HS.L4U1.28 Life Science** Gather, evaluate, and communicate multiple lines of empirical evidence to explain the mechanisms of biological evolution.	
AgriScience Standards	**Science Standards**	**Reasoning/Rationale**
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	**HS.P1U3.4 Chemistry** Obtain, evaluate, and communicate information about how the use of chemistry related technologies have had positive and negative ethical, social, economic, and/or political implications. **HS.E1U1.14 Earth and Space** Engage in argument from evidence about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. **PLUS HS+E.E1U3.9 Earth and Space** Construct an explanation, based on evidence, for how the availability of natural resources, occurrence of natural hazards, and	Sustainability

	changes in climate have influenced human activity. **PLUS HS+E.E1U3.10 Earth and Space** Ask questions, define problems, and evaluate a solution to a complex problem, based on prioritized criteria and tradeoffs, that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. **PLUS HS+E.E1U3.11 Earth and Space** Develop and use a quantitative model to illustrate the relationship among Earth systems and the degree to which those relationships are being modified due to human activity.	
4.2 Analyze the use of renewable energy sources in agriculture (i.e., wind, solar, biofuels, etc.)	**HS.P1U3.4 Chemistry** Obtain, evaluate, and communicate information about how the use of chemistry related technologies have had positive and negative ethical, social, economic, and/or political implications. **HS.P4U3.9 Physics** Engage in argument from evidence regarding the ethical, social, economic, and/or political benefits and liabilities of energy usage and transfer. **HS.E1U1.14 Earth and Space** Engage in argument from evidence about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. **PLUS HS+E.E1U3.9 Earth and Space** Construct an explanation, based on evidence, for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. **PLUS HS+E.E1U3.10 Earth and Space** Ask questions, define problems, and evaluate a solution to a complex problem, based on prioritized criteria and tradeoffs, that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well	Sustainability

	as possible social, cultural, and environmental impacts. **PLUS HS+E.E1U3.11 Earth and Space** Develop and use a quantitative model to illustrate the relationship among Earth systems and the degree to which those relationships are being modified due to human activity.	
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.)	**HS.E1U1.14 Earth and Space** Engage in argument from evidence about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. **PLUS HS+E.E1U3.9 Earth and Space** Construct an explanation, based on evidence, for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. **PLUS HS+E.E1U3.10 Earth and Space** Ask questions, define problems, and evaluate a solution to a complex problem, based on prioritized criteria and tradeoffs, that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. **PLUS HS+E.E1U3.11 Earth and Space** Develop and use a quantitative model to illustrate the relationship among Earth systems and the degree to which those relationships are being modified due to human activity. **HS.L2U3.18 Life Science** Obtain, evaluate, and communicate about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem.	Sustainability
4.4 Investigate how alternative production systems affect production and environment (i.e., aquaculture, vertical farming, GPS plotting, seed spacing, etc.)	**HS.E1U1.14 Earth and Space** Engage in argument from evidence about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other.	Sustainability Water Unit

	PLUS HS+E.E1U3.9 Earth and Space Construct an explanation, based on evidence, for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. **PLUS HS+E.E1U3.10 Earth and Space** Ask questions, define problems, and evaluate a solution to a complex problem, based on prioritized criteria and tradeoffs, that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. **PLUS HS+E.E1U3.11 Earth and Space** Develop and use a quantitative model to illustrate the relationship among Earth systems and the degree to which those relationships are being modified due to human activity.	
4.5 Identify municipal, industrial, and agricultural sources and uses of water	**HS.P1U3.4 Chemistry** Obtain, evaluate, and communicate information about how the use of chemistry related technologies have had positive and negative ethical, social, economic, and/or political implications. **HS.E1U1.11 Earth and Space** Analyze and interpret data to determine how energy from the Sun affects weather patterns and climate. **HS.E1U1.14 Earth and Space** Engage in argument from evidence about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. **PLUS HS+E.E1U3.9 Earth and Space** Construct an explanation, based on evidence, for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. **PLUS HS+E.E1U3.10 Earth and Space** Ask questions, define problems, and evaluate a solution to a complex problem, based on	Sustainability Water Unit Soil Unit

	prioritized criteria and tradeoffs, that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. **PLUS HS+E.E1U3.11 Earth and Space** Develop and use a quantitative model to illustrate the relationship among Earth systems and the degree to which those relationships are being modified due to human activity.	
4.6 Evaluate how agriculture manages water use, wastewater systems, and water recycling opportunities	**HS.P1U3.4 Chemistry** Obtain, evaluate, and communicate information about how the use of chemistry related technologies have had positive and negative ethical, social, economic, and/or political implications. **HS.P4U3.9 Physics** Engage in argument from evidence regarding the ethical, social, economic, and/or political benefits and liabilities of energy usage and transfer. **HS.E1U1.14 Earth and Space** Engage in argument from evidence about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. **PLUS HS+E.E1U3.9 Earth and Space** Construct an explanation, based on evidence, for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. **PLUS HS+E.E1U3.10 Earth and Space** Ask questions, define problems, and evaluate a solution to a complex problem, based on prioritized criteria and tradeoffs, that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. **PLUS HS+E.E1U3.11 Earth and Space** Develop and use a quantitative model to illustrate the relationship among Earth systems	Sustainability Water Unit Soil Unit

	and the degree to which those relationships are being modified due to human activity.	
4.7 Analyze environmental factors associated with animal and plant production including sanitation and economics	**HS.E1U1.11 Earth and Space** Analyze and interpret data to determine how energy from the Sun affects weather patterns and climate. **HS.E1U1.14 Earth and Space** Engage in argument from evidence about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. **PLUS HS+E.E1U3.9 Earth and Space** Construct an explanation, based on evidence, for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. **PLUS HS+E.E1U3.10 Earth and Space** Ask questions, define problems, and evaluate a solution to a complex problem, based on prioritized criteria and tradeoffs, that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. **PLUS HS+E.E1U3.11 Earth and Space** Develop and use a quantitative model to illustrate the relationship among Earth systems and the degree to which those relationships are being modified due to human activity. **HS.L2U3.18 Life Science** Obtain, evaluate, and communicate about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem. **HS.L4U1.28 Life Science** Gather, evaluate, and communicate multiple lines of empirical evidence to explain the mechanisms of biological evolution.	Sustainability Plant production Adaptation to local climate
4.8 Describe the effect of agriculture on the food web cycle, or the natural interconnection of food chains		

AgriScience Standards	Science Standards	Reasoning/Rationale
STANDARD 5.0 EXAMINE SOIL MANAGEMENT FOR PLANT AND ANIMAL PRODUCTION		
5.1 Describe formation, properties, texture, structure, and composition of soil	**HS.E1U1.12 Earth and Space** Develop and use models of the Earth that explains the role of energy and matter in Earth's constantly changing internal and external systems (geosphere, hydrosphere, atmosphere, biosphere). **HS.E1U1.13 Earth and Space** Evaluate explanations and theories about the role of energy and matter in geologic changes over time.	Soils Unit (formation)
5.2 Examine the relationship among soil characteristics, microflora, and environmental conditions	**HS.E1U1.12 Earth and Space** Develop and use models of the Earth that explains the role of energy and matter in Earth's constantly changing internal and external systems (geosphere, hydrosphere, atmosphere, biosphere). **HS.L2U3.18 Life Science** Obtain, evaluate, and communicate about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem. **HS.L2U1.19 Life Science** Develop and use models that show how changes in the transfer of matter and energy within an ecosystem and interactions between species may affect organisms and their environment.	Soils & Biodiversity
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	**HS.E1U1.12 Earth and Space** Develop and use models of the Earth that explains the role of energy and matter in Earth's constantly changing internal and external systems (geosphere, hydrosphere, atmosphere, biosphere). **HS.E1U1.13 Earth and Space** Evaluate explanations and theories about the role of energy and matter in geologic changes over time. **HS.E1U1.14 Earth and Space** Engage in argument from evidence about the availability of natural	Same Science standards used in CTE standards 5.3 - 5.5 Soils Unit

	resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. **PLUS HS+E.E1U3.9 Earth and Space** Construct an explanation, based on evidence, for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. **PLUS HS+E.E1U3.10 Earth and Space** Ask questions, define problems, and evaluate a solution to a complex problem, based on prioritized criteria and tradeoffs, that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. **PLUS HS+E.E1U3.11 Earth and Space** Develop and use a quantitative model to illustrate the relationship among Earth systems and the degree to which those relationships are being modified due to human activity.	
AgriScience Standards	**Science Standards**	**Reasoning/Rationale**
STANDARD 6.0 EXAMINE CELL BIOLOGY, STRUCTURES, AND PROCESSES		
6.1 Differentiate among cells, organelles, tissues, and organs' systems	**HS.L1U1.20 Life Science** Ask questions and/or make predictions based on observations and evidence to demonstrate how cellular organization, structure, and function allow organisms to maintain homeostasis. **PLUS HS+B.L1U1.4 Biology** Develop and use models to explain the interdependency and interactions between cellular organelles. **PLUS HS+B.L1U1.5 Biology** Analyze and interpret data that demonstrates the relationship between cellular function and the diversity of protein functions. **PLUS HS+B.L1U1.6 Biology** Develop and use models to show how transport mechanisms function in cells.	Cell Unit Cellular processes

	PLUS HS+B.L1U1.7 Biology Develop and use models to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms (plant and animal). **HS.L1U1.22 Life Science** Construct an explanation for how cellular division (mitosis) is the process by which organisms grow and maintain complex, interconnected systems.	
6.2 Describe the structure and function of DNA	**HS.L1U1.20 Life Science** Ask questions and/or make predictions based on observations and evidence to demonstrate how cellular organization, structure, and function allow organisms to maintain homeostasis. **PLUS HS+B.L1U1.4 Biology** Develop and use models to explain the interdependency and interactions between cellular organelles. **PLUS HS+B.L1U1.5 Biology** Analyze and interpret data that demonstrates the relationship between cellular function and the diversity of protein functions. **PLUS HS+B.L1U1.6 Biology** Develop and use models to show how transport mechanisms function in cells. **PLUS HS+B.L1U1.7 Biology** Develop and use models to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms (plant and animal). **HS.L1U1.22 Life Science** Construct an explanation for how cellular division (mitosis) is the process by which organisms grow and maintain complex, interconnected systems. **HS.L3U1.24 Life Science** Construct an explanation of how the process of sexual reproduction contributes to genetic variation. **HS.L4U1.27 Life Science** Obtain, evaluate, and communicate evidence that describes how	Cell Unit/ Cellular Processes DNA Unit Genetics

	changes in frequency of inherited traits in a population can lead to biological diversity.	
6.3 Describe the process of creating proteins from DNA	**HS.L1U1.20 Life Science** Ask questions and/or make predictions based on observations and evidence to demonstrate how cellular organization, structure, and function allow organisms to maintain homeostasis. **PLUS HS+B.L1U1.4 Biology** Develop and use models to explain the interdependency and interactions between cellular organelles. **PLUS HS+B.L1U1.5 Biology** Analyze and interpret data that demonstrates the relationship between cellular function and the diversity of protein functions. **PLUS HS+B.L1U1.6 Biology** Develop and use models to show how transport mechanisms function in cells. **PLUS HS+B.L1U1.7 Biology** Develop and use models to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms (plant and animal). **HS.L1U1.22 Life Science** Construct an explanation for how cellular division (mitosis) is the process by which organisms grow and maintain complex, interconnected systems. **HS.L3U1.24 Life Science** Construct an explanation of how the process of sexual reproduction contributes to genetic variation.	Cell Unit Genetics Unit DNA Unit/DNA synthesis
6.4 Describe cellular processes (i.e., osmosis, mitosis, phagocytosis, meiosis, diffusion, etc.)	**HS.L1U1.20 Life Science** Ask questions and/or make predictions based on observations and evidence to demonstrate how cellular organization, structure, and function allow organisms to maintain homeostasis. **PLUS HS+B.L1U1.4 Biology** Develop and use models to explain the interdependency and interactions between cellular organelles.	Cellular process Genetics Unit

	PLUS HS+B.L1U1.5 Biology Analyze and interpret data that demonstrates the relationship between cellular function and the diversity of protein functions. **PLUS HS+B.L1U1.6 Biology** Develop and use models to show how transport mechanisms function in cells. **PLUS HS+B.L1U1.7 Biology** Develop and use models to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms (plant and animal). **HS.L1U1.21 Life Science** Obtain, evaluate, and communicate data showing the relationship of photosynthesis and cellular respiration; flow of energy and cycling of matter. **HS.L1U1.22 Life Science** Construct an explanation for how cellular division (mitosis) is the process by which organisms grow and maintain complex, interconnected systems. **HS.L1U3.23 Life Science** Obtain, evaluate, and communicate the ethical, social, economic and/or political implications of the detection and treatment of abnormal cell function. **HS.L3U1.24 Life Science** Construct an explanation of how the process of sexual reproduction contributes to genetic variation.	
6.5 Examine the molecular basis of heredity and resulting genetic diversity	**HS.L1U3.23 Life Science** Obtain, evaluate, and communicate the ethical, social, economic and/or political implications of the detection and treatment of abnormal cell function. **HS.L3U1.24 Life Science** Construct an explanation of how the process of sexual reproduction contributes to genetic variation. **HS.L3U1.25 Life Science** Obtain, evaluate, and communicate information about the causes and implications of DNA mutation. **HS.L3U3.26 Life Science** Engage in argument from evidence	Genetics

	regarding the ethical, social, economic, and/or political implications of a current genetic technology. **HS.L4U1.27 Life Science** Obtain, evaluate, and communicate evidence that describes how changes in frequency of inherited traits in a population can lead to biological diversity. **HS.L4U1.28 Life Science** Gather, evaluate, and communicate multiple lines of empirical evidence to explain the mechanisms of biological evolution.	
6.6 Define the essential macromolecules of life science (i.e., carbohydrates, proteins, lipids, nucleic acids, etc.)		

AgriScience Standards	Science Standards	Reasoning/Rationale
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	**PLUS HS+B.L1U1.7 Biology** Develop and use models to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms (plant and animal).	Classification
7.3 Describe basic factors in plant growth (e.g., light, water, climate, temperature, and nutrients)	**HS.L2U1.19 Life Science** Develop and use models that show how changes in the transfer of matter and energy within an ecosystem and interactions between species may affect organisms and their environment. **HS.L1U1.20 Life Science** Ask questions and/or make predictions based on observations and evidence to demonstrate how cellular organization, structure, and function allow organisms to maintain homeostasis. **PLUS HS+B.L1U1.4 Biology** Develop and use models to explain the interdependency and interactions between cellular organelles. **PLUS HS+B.L1U1.5 Biology** Analyze and interpret data that	Plant growth and production

	demonstrates the relationship between cellular function and the diversity of protein functions. **PLUS HS+B.L1U1.6 Biology** Develop and use models to show how transport mechanisms function in cells. **PLUS HS+B.L1U1.7 Biology** Develop and use models to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms (plant and animal). **HS.L1U1.21 Life Science** Obtain, evaluate, and communicate data showing the relationship of photosynthesis and cellular respiration; flow of energy and cycling of matter.	
7.4 Apply knowledge of plant physiology and energy conversion to plant systems (e.g., photosynthesis, respiration, and transpiration)	**HS.L2U1.19 Life Science** Develop and use models that show how changes in the transfer of matter and energy within an ecosystem and interactions between species may affect organisms and their environment. **HS.L1U1.21 Life Science** Obtain, evaluate, and communicate data showing the relationship of photosynthesis and cellular respiration; flow of energy and cycling of matter.	Plant physiology (photosynthesis and respiration) Plant growth
7.5 Describe plant life cycle stages (i.e., germination, root growth, pollination, fruit development, etc.)	**HS.L2U1.19 Life Science** Develop and use models that show how changes in the transfer of matter and energy within an ecosystem and interactions between species may affect organisms and their environment.	Classification Unit
7.6 Demonstrate plant germination, growth, and development	**HS.L1U1.21 Life Science** Obtain, evaluate, and communicate data showing the relationship of photosynthesis and cellular respiration; flow of energy and cycling of matter.	Plant 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.)	**HS.E1U1.11 Earth and Space** Analyze and interpret data to determine how energy from the Sun affects weather patterns and climate. **HS.L2U1.19 Life Science** Develop and use models that show how changes in the transfer of matter	Plant growth, development, and production Greenhouse management

	and energy within an ecosystem and interactions between species may affect organisms and their environment. **HS.L1U1.21 Life Science** Obtain, evaluate, and communicate data showing the relationship of photosynthesis and cellular respiration; flow of energy and cycling of matter.	
AgriScience Standards	**Science Standards**	**Reasoning/Rationale**
STANDARD 8.0 DEMONSTRATE CONCEPTS OF PLANT MANAGEMENT		
8.1 Analyze the nutritional needs of plants	**HS.L2U1.19 Life Science** Develop and use models that show how changes in the transfer of matter and energy within an ecosystem and interactions between species may affect organisms and their environment. **HS.L1U1.21 Life Science** Obtain, evaluate, and communicate data showing the relationship of photosynthesis and cellular respiration; flow of energy and cycling of matter.	Plant Nutrient Unit
8.2 Research common nutrient deficiency symptoms and treatment options (i.e., fertilizers, soil amendments, crop rotation, etc.)	**HS.P1U3.4 Chemistry** Obtain, evaluate, and communicate information about how the use of chemistry related technologies have had positive and negative ethical, social, economic, and/or political implications. **HS.L1U3.23 Life Science** Obtain, evaluate, and communicate the ethical, social, economic and/or political implications of the detection and treatment of abnormal cell function.	Plant nutrition and diseases
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.)	**HS.P1U3.4 Chemistry** Obtain, evaluate, and communicate information about how the use of chemistry related technologies have had positive and negative ethical, social, economic, and/or political implications. **HS.L1U1.20 Life Science** Ask questions and/or make predictions based on observations and evidence to demonstrate how	Plant growth and production soils

	cellular organization, structure, and function allow organisms to maintain homeostasis. **PLUS HS+B.L1U1.4 Biology** Develop and use models to explain the interdependency and interactions between cellular organelles. **PLUS HS+B.L1U1.5 Biology** Analyze and interpret data that demonstrates the relationship between cellular function and the diversity of protein functions. **PLUS HS+B.L1U1.6 Biology** Develop and use models to show how transport mechanisms function in cells. **PLUS HS+B.L1U1.7 Biology** Develop and use models to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms (plant and animal).	
8.5 Implement a fertilization plan for specific plants or crops	**HS.P1U3.4 Chemistry** Obtain, evaluate, and communicate information about how the use of chemistry related technologies have had positive and negative ethical, social, economic, and/or political implications.	Plant nutrition
8.6 Investigate methods for sexual reproduction of plants (i.e., cross-pollination, scarification, stratification, etc.)	**HS.L3U1.24 Life Science** Construct an explanation of how the process of sexual reproduction contributes to genetic variation. **HS.L3U1.24 Life Science** Construct an explanation of how the process of sexual reproduction contributes to genetic variation. **HS.L3U3.26 Life Science** Engage in argument from evidence regarding the ethical, social, economic, and/or political implications of a current genetic technology. **HS.L4U1.2 Life Science** Obtain, evaluate, and communicate evidence that describes how changes in frequency of inherited traits in a population can lead to biological diversity.	Plant sexual reproduction
8.7 Investigate methods for asexual reproduction of plants (i.e., propagation, grafting, layering,	**HS.L1U1.22 Life Science** Construct an explanation for how cellular division (mitosis) is the	Propagation Tissue Culture

tissue culture, plant hormones, etc.)	process by which organisms grow and maintain complex, interconnected systems. **HS.L1U3.23 Life Science** Obtain, evaluate, and communicate the ethical, social, economic and/or political implications of the detection and treatment of abnormal cell function. **HS.L3U1.25 Life Science** Obtain, evaluate, and communicate information about the causes and implications of DNA mutation. **HS.L3U3.26 Life Science** Engage in argument from evidence regarding the ethical, social, economic, and/or political implications of a current genetic technology. **HS.L4U1.27 Life Science** Obtain, evaluate, and communicate evidence that describes how changes in frequency of inherited traits in a population can lead to biological diversity.	Biotech/Plant Asexual reproduction Plant reproduction
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	**HS.E1U1.14 Earth and Space** Engage in argument from evidence about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. **PLUS HS+E.E1U3.9 Earth and Space** Construct an explanation, based on evidence, for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. **PLUS HS+E.E1U3.10 Earth and Space** Ask questions, define problems, and evaluate a solution to a complex problem, based on prioritized criteria and tradeoffs, that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well	Plant production plan

	as possible social, cultural, and environmental impacts. **PLUS HS+E.E1U3.11 Earth and Space** Develop and use a quantitative model to illustrate the relationship among Earth systems and the degree to which those relationships are being modified due to human activity. **HS.L2U1.19 Life Science** Develop and use models that show how changes in the transfer of matter and energy within an ecosystem and interactions between species may affect organisms and their environment. **HS.L1U3.23 Life Science** Obtain, evaluate, and communicate the ethical, social, economic and/or political implications of the detection and treatment of abnormal cell function. **HS.L3U1.24 Life Science** Construct an explanation of how the process of sexual reproduction contributes to genetic variation. **HS.L3U3.26 Life Science** Engage in argument from evidence regarding the ethical, social, economic, and/or political implications of a current genetic technology. **HS.L4U1.28 Life Science** Gather, evaluate, and communicate multiple lines of empirical evidence to explain the mechanisms of biological evolution.	
AgriScience Standards	**Science Standards**	**Reasoning/Rationale**
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)	**HS.L1U1.20 Life Science** Ask questions and/or make predictions based on observations and evidence to demonstrate how cellular organization, structure, and function allow organisms to maintain homeostasis **PLUS HS+B.L1U1.4 Biology** Develop and use models to explain the interdependency and interactions between cellular organelles. **PLUS HS+B.L1U1.5 Biology** Analyze and interpret data that demonstrates the relationship between cellular function and the diversity of protein functions. **PLUS HS+B.L1U1.6 Biology** Develop and use models to show how transport mechanisms function in cells. **PLUS HS+B.L1U1.7 Biology** Develop and use models to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms (plant and animal).	Animal anatomy
9.6 Describe a livestock animal's digestive system (i.e., avian, modified digestion, ruminant, etc.)	**HS.L1U1.20 Life Science** Ask questions and/or make predictions based on observations and evidence to demonstrate how cellular organization, structure, and function allow organisms to maintain homeostasis. **PLUS HS+B.L1U1.4 Biology** Develop and use models to explain the interdependency and interactions between cellular organelles. **PLUS HS+B.L1U1.5 Biology** Analyze and interpret data that demonstrates the relationship between cellular function and the diversity of protein functions. **PLUS HS+B.L1U1.6 Biology** Develop and use models to show how transport mechanisms function in cells. **PLUS HS+B.L1U1.7 Biology** Develop and use models to	Animal anatomy/nutrition Cellular processes/nutrition (digestion)

	illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms (plant and animal). **HS.L1U1.21 Life Science** Obtain, evaluate, and communicate data showing the relationship of photosynthesis and cellular respiration; flow of energy and cycling of matter.	
9.7 Describe the basic principles of animal welfare (e.g., appropriate environment, facilities, food, healthcare, proper handling, and water)	**HS.L1U1.20 – Life Science** Ask questions and/or make predictions based on observations and evidence to demonstrate how cellular organization, structure, and function allow organisms to maintain homeostasis. **PLUS HS+B.L1U1.4** – Develop and use models to explain the interdependency and interactions between cellular organelles. **PLUS HS+B.L1U1.5** – Analyze and interpret data that demonstrates the relationship between cellular function and the diversity of protein functions. **PLUS HS+B.L1U1.6 Biology** Develop and use models to show how transport mechanisms function in cells. **PLUS HS+B.L1U1.7 Biology** Develop and use models to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms (plant and animal).	Animal welfare (homeostasis)

AgriScience Standards	Science Standards	Reasoning/Rationale
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	**HS.P1U3.4 Chemistry** Obtain, evaluate, and communicate information about how the use of chemistry related technologies have had positive and negative ethical, social, economic, and/or political implications.	Animal nutrition
10.6 Analyze feed rations to meet the nutritional needs of animals	No specific Science standard identified.	
10.7 Develop a plan to treat animal ailments	**HS.L1U3.23 Life Science** Obtain, evaluate, and communicate the ethical, social, economic and/or political implications of the detection and treatment of abnormal cell function.	Animal diseases
10.8 Differentiate among animal selection, reproduction, breeding, and genetics	**HS.L1U3.23 Life Science** Obtain, evaluate, and communicate the ethical, social, economic and/or political implications of the detection and treatment of abnormal cell function. **HS.L3U1.24 Life Science** Construct an explanation of how the process of sexual reproduction contributes to genetic variation. **HS.L3U1.25 Life Science** Obtain, evaluate, and communicate information about the causes and implications of DNA mutation. **HS.L3U3.26 Life Science** Engage in argument from evidence regarding the ethical, social, economic, and/or political implications of a current genetic technology. **HS.L4U1.27 Life Science** Obtain, evaluate, and communicate evidence that describes how changes in frequency of inherited traits in a population can lead to biological diversity.	Animal selection and reproduction Animal genetics
10.9 Demonstrate animal selection based on reproduction, breeding, and genetics		
10.10 Explore how animals are evaluated for breeding readiness and soundness	**HS.L4U1.27 Life Science** Obtain, evaluate, and communicate evidence that describes how changes in frequency of inherited traits in a population can lead to biological diversity.	Animal reproduction Animal production plan

	HS.L4U1.28 Life Science Gather, evaluate, and communicate multiple lines of empirical evidence to explain the mechanisms of biological evolution.	
10.11 Create a sustainable reproduction management plan	**HS.E1U1.14 Earth and Space** Engage in argument from evidence about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. **PLUS HS+E.E1U3.9 Earth and Space** Construct an explanation, based on evidence, for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. **PLUS HS+E.E1U3.10 Earth and Space** Ask questions, define problems, and evaluate a solution to a complex problem, based on prioritized criteria and tradeoffs, that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. **PLUS HS+E.E1U3.11 Earth and Space** Develop and use a quantitative model to illustrate the relationship among Earth systems and the degree to which those relationships are being modified due to human activity. **HS.L1U3.23 Life Science** Obtain, evaluate, and communicate the ethical, social, economic and/or political implications of the detection and treatment of abnormal cell function. **HS.L3U1.24 Life Science** Construct an explanation of how the process of sexual reproduction contributes to genetic variation. **HS.L3U3.26 Life Science** Engage in argument from evidence regarding the ethical, social, economic, and/or political implications of a current genetic technology.	Animal production 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 protocol	**HS.L3U3.26 Life Science** Engage in argument from evidence regarding the ethical, social, economic, and/or political implications of a current genetic technology.	Animal management/disease prevention
AgriScience Standards	**Science Standards**	**Reasoning/Rationale**
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	**HS.L2U3.18 Life Science** Obtain, evaluate, and communicate about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem. **HS.L2U1.19 Life Science** Develop and use models that show how changes in the transfer of matter and energy within an ecosystem and interactions between species may affect organisms and their environment.	IPM – beneficials
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	**HS.P1U3.4 Chemistry** Obtain, evaluate, and communicate information about how the use of chemistry related technologies have had positive and negative ethical, social, economic, and/or political implications.	IPM
11.7 Apply pesticides safely according to good manufacturing practices (GMPs)	**HS.P1U3.4 Chemistry** Obtain, evaluate, and communicate information about how the use of chemistry related technologies have had positive and negative ethical, social, economic, and/or political implications.	IPM

	HS.L2U3.18 Life Science Obtain, evaluate, and communicate about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem.	
AgriScience Standards	**Science Standards**	**Reasoning/Rationale**
STANDARD 12.0 EXAMINE FOOD SAFETY AND PROCESSING PRACTICES		
12.1 Investigate government agencies that impact agriculture and food production		
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		
AgriScience Standards	**Science Standards**	**Reasoning/Rationale**
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		

AgriScience Standards	Science Standards	Reasoning/Rationale
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.)		

AgriScience Standards	Science Standards	Reasoning/Rationale
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.)		
15.2 Differentiate between macro- and micro-economics		
15.3 Identify financial records important to business management		

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.]	.	
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		
15.8 Identify methods of obtaining capital resources		
15.9 Explain the purposes and structures of contracts, leases, deeds, and insurance policies		
15.10 Compare types of markets and influence factors (i.e., commodity markets, foreign markets, competition, etc.)		
15.11 Identify methods of managing risk		
15.12 Describe the purpose and importance of marketing		
15.13 Develop a marketing plan		
15.14 Create a business plan		
AgriScience Standards	**Science Standards**	**Reasoning/Rationale**
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		