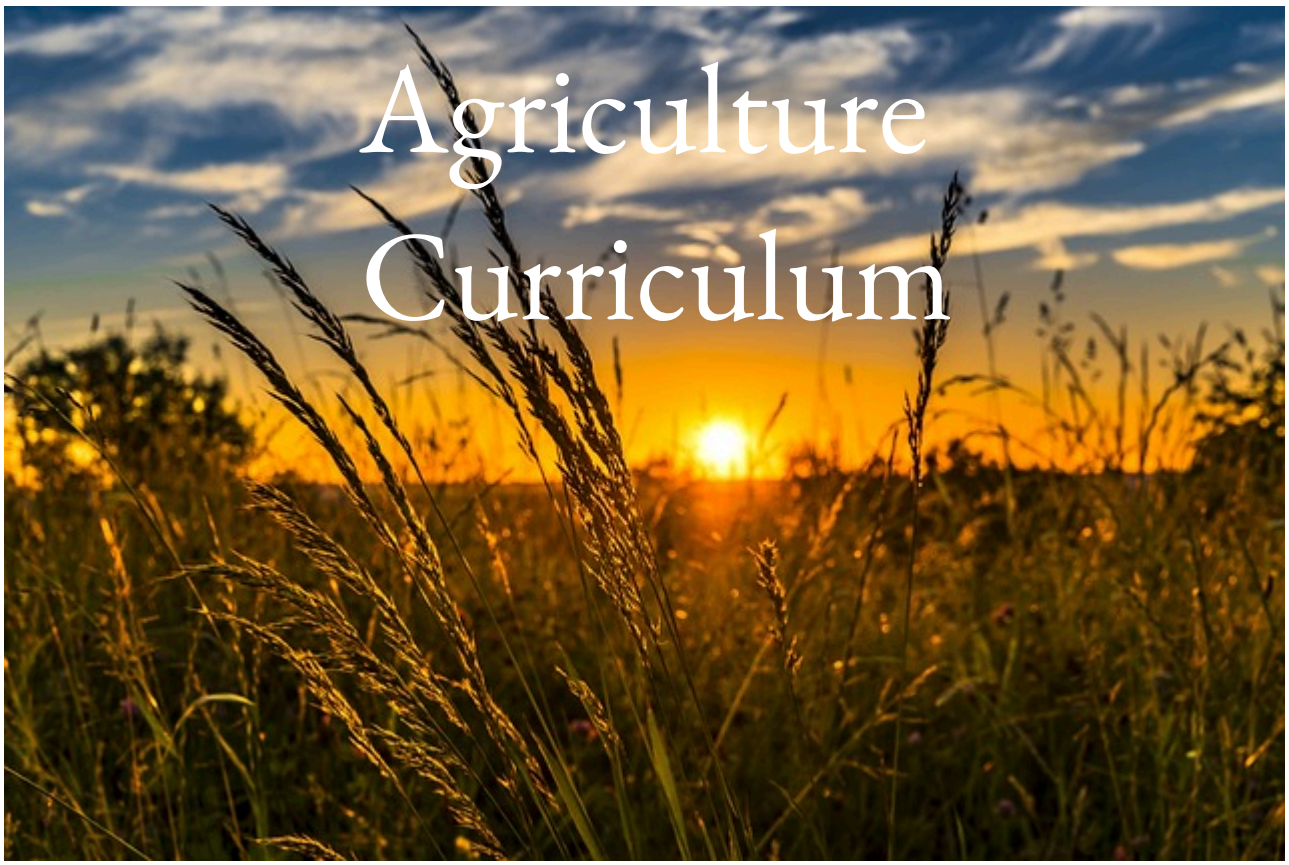
FORSYTH PUBLIC SCHOOLS



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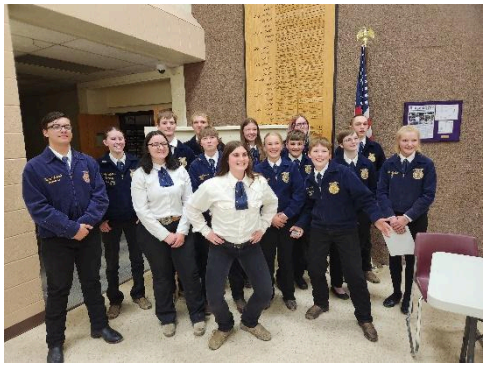

Based on the
Montana & National Standards
for
Agriculture, Food and Natural Resources

 2015

Adopted August 2023

AGRICULTURE CURRICULUM
REVISIONS 2023
Three Pathways

	Natural Resource Systems	Ag Mechanics & Construction	Agribusiness Systems
YEAR 1	**Introduction to Agriculture**	**Introduction to Agriculture**	**Computer Applications or Introduction to Agriculture**
YEAR 2	**Fundamentals of Natural Resources** ● Rangeland ● Animal Science ● Wildlife ● Fisheries ● Noxious Weeds ● Ecology ● Entomology ● Riparian/Waterbodies	**Fundamentals of Ag Mechanics & Construction** ● Electricity ● Basic Mechanics ● Welding ● Plumbing ● Woodworking	**Agribusiness Sales and Marketing** ● Customer Service ● Monetary transactions ● Sales and Service ● Ag Issues
YEAR 3	**Environmental Science** (Year 3 or 4) ● see science curriculum	**Ag Welding & Structures** ● OSHA Certification ● Welding with Oxyacetylene ● Welding with SMAW ● Welding with GMAW ● Welding with TiG ● Woodworking with softwoods ● Woodworking with hardwoods ● Woodworking with structures ● Automotive wiring ● Residential wiring ● Residential plumbing	**Agribusiness Management** ● Economic Principles ● Business Management ● Financial Management ● Retail Agribusiness ● Business Plan

YEAR 4	**Animal Systems & Plant Systems Semester of each** (Year 3 or 4)
	
	Animal Systems
	• Wildlife
	  o Reproduction
	  o Phylogeny
	• Livestock Systems & Feeding
	  o Muscling/Meats
	  o Reproduction
	  o Handling
	• BQA certification
	• Current Issue in Animal Systems
	
	Plant Systems
	• Soil interpretation
	• Plant identification
	• Growing methods
	• Plant nutrition
	• Grassland Condition
	• GIS/GPS
		Advanced Ag Mechanics & Construction
		• Welding Projects
		• Woodworking Projects
		• Construction Projects
		• Mechanical Projects
			Ag Leadership & Entrepreneurship
			• Personal Growth
			• Styles
			• Service
			• Chapter Management
			• Career Success

AGRICULTURE SCIENCES
Agri-Business Sales and Marketing
Grades 10 – 12
Agribusiness Systems Career Pathway

Prerequisite: Computer Applications or Introduction to Agriculture

(Numbering of objectives matches national standard numbers – thus not in 1, 2, 3 order.)

STRAND 3: AGRIBUSINESS SYSTEMS

STANDARD 1: Apply management planning principles in AFNR businesses.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.ABS.1.1	Agribusiness Management	**Apply micro- and macroeconomic principles to plan and manage inputs and outputs in an AFNR business.** 1b. Apply microeconomic principles to calculate values associated with different inputs and outputs in AFNR businesses (e.g., price, point of equilibrium, opportunity costs, marginal costs, etc.). 2b. Analyze and describe the relationship between AFNR business and industry outputs and domestic and global macroeconomic trends (e.g., Gross Domestic Product, national income, rate of growth, price levels, etc.).

HSAG.ABS.1.2	Agribusiness Management	**Read, interpret, evaluate and write statements of purpose to guide business goals, objectives and resource allocation.** 2b. Prepare short-term, intermediate and long-term goals and objectives that are consistent with the statements of purpose for an AFNR business.
HSAG.ABS.1.3	Agribusiness Management	**Devise and apply management skills to organize and run an AFNR business in an efficient, legal and ethical manner.** 1b. Analyze the effectiveness of different management skills used in an AFNR business. 3b. Analyze the importance of using ethical standards and develop methods to communicate ethical standards within AFNR businesses.
HSAG.ABS.1.4	Agribusiness Management	**Evaluate, develop and implement procedures used to recruit, train and retain productive human resources for AFNR businesses.** 1b. Create methods to describe specific positions and structures of an AFNR business to share with human resources (e.g., job descriptions, business information sheet, pamphlet, etc.).

STANDARD 2: Use record keeping to accomplish AFNR business objectives, manage budgets and comply with laws and regulations.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.ABS.2.1	Agribusiness Record Keeping	**Apply fundamental accounting principles, systems, tools and applicable laws and regulations to record, track and audit AFNR business transactions (e.g., accounts, debits, credits, assets, liabilities, equity, etc.).** 1b. Evaluate the implementation and appropriateness of accounting systems and procedures used for record keeping in AFNR businesses.
HSAG.ABS.2.2	Agribusiness Record Keeping	**Assemble, interpret and analyze financial information and reports to monitor AFNR business performance and support decision-making (e.g., income statements, balance sheets, cash-flow analysis, inventory reports, break-even analysis, return on investment, taxes, etc.).** 1b. Prepare and interpret financial reports to describe the performance of AFNR businesses (e.g., efficiency, profitability, net worth, financial ratios, working capital ratio, leverage, etc.). 2b. Use accounting information to prepare financial reports associated with inventory in AFNR businesses (e.g., cost of goods sold, margins on goods, etc.). 3b. Analyze and describe reporting requirements for different types of taxes paid by AFNR businesses (e.g., income, property, sales, employment, etc.).

STANDARD 3: Manage cash budgets, credit budgets and credit for an AFNR business using generally accepted accounting principles.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.ABS.3.1	Agribusiness Budgets	**Develop, assess and manage cash budgets to achieve AFNR business goals.** 1b. Examine and interpret cash budgets for AFNR businesses. 2b. Examine and identify strategies to manage components of cash budgets to minimize liabilities and maximize profit in AFNR businesses (e.g., delayed payment of expenses, prepayment of expenses, etc.).
HSAG.ABS.3.2	Agribusiness Budgets	**Analyze credit needs and manage credit budgets to achieve AFNR business goals.** 1b. Analyze AFNR business needs to determine the necessity of loans for business operation. 2b. Compare and contrast strategies to responsibly manage credit budgets in AFNR businesses.

STANDARD 4: Develop a business plan for an AFNR business.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.ABS.4.1	Agribusiness Business Plans	**Analyze characteristics and planning requirements associated with developing business plans for different types of AFNR businesses.** 1b. Classify the characteristics of successful entrepreneurs in AFNR businesses. 2b. Compare and contrast business plans for different types of ownership structures used in AFNR businesses. 3b. Analyze the information needed and strategies to obtain the information to complete an AFNR business plan (e.g., SMART goals and objectives, needs assessment, cash flow projection, etc.).
HSAG.ABS.4.2	Agribusiness	**Develop production and operational plans for an AFNR business.**

	Business Plans	1b. Compare and contrast the strengths and weaknesses of operational plans from different AFNR businesses to determine best practices.
HSAG.ABS. 4.3	Agribusiness Business Plans	**Identify and apply strategies to manage or mitigate risk.** 1b. Analyze risk management strategies for AFNR businesses (e.g., cash flow projection, analyze market trends, etc.).

STANDARD 5: Use sales and marketing principles to accomplish AFNR business objectives.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.ABS. 5.1	Agribusiness Sales & Marketing	**Analyze the role of markets, trade, competition and price in relations to an AFNR business sales and marketing plans.** 1b. Analyze and describe the role of trade and price in the market structure as it relates to AFNR businesses.
HSAG.ABS. 5.2	Agribusiness Sales & Marketing	**Assess and apply sales principles and skills to accomplish AFNR business objectives.** 1b. Apply the sales process to AFNR businesses and communicate ways of accomplishing the businesses' goals and objectives. 2b. Assess different customer reactions that could be encountered during different types of sales calls used in AFNR businesses and prepare an appropriate response (e.g., objections, competitor prices, competing products, post-sale service, complaints about product, etc.).
HSAG.ABS. 5.3	Agribusiness Sales & Marketing	**Assess marketing principles and develop marketing plans to accomplish AFNR business objectives.** 1b. Assess and select appropriate alternative marketing strategies (e.g. value-adding, branding, niche marketing, etc.). for AFNR businesses using established marketing principles. 2b. Compare and contrast the strategies of marketing for products and services used in AFNR businesses (e.g., direct marketing, commodities, etc.). 3b. Perform a market analysis to gather information for marketing plans for AFNR businesses (e.g., evaluation of competitors, customers, domestic and international policy, regulations and rules, standards, etc.).

AGRICULTURE SCIENCES
Advanced Agricultural Mechanics and Construction
Grades 11 & 12
Power, Structural and Technical Systems Career Pathway
Prerequisite: Fundamental of Ag Mechanics & Ag Welding & Structures
(Numbering of objectives matches national standard numbers – thus not in 1, 2, 3 order.)

STRAND 9: POWER, STRUCTURAL and TECHNICAL SYSTEMS

STANDARD 1: Apply physical science principles and engineering applications to solve problems and improve performance in AFNR power, structural and technical systems.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PST.1.2	Power, Structural & Technical Science Principals	**Apply physical science and engineering principles to design, implement and improve safe and efficient mechanical systems in AFNR situation.** 2c. Devise and document processes to safely implement and evaluate the safe use of AFNR related tools, machinery and equipment. 3c. Conduct a safety inspection of tools, machines and equipment used in different AFNR related mechanical systems.
HSAG.PST.1.3	Power, Structural & Technical Science Principals	**Apply physical science and engineering principles to metal fabrication using a variety of welding and cutting processes (e.g., SMAW, GMAW, GTAW, fuel-oxygen and plasma arc torch, etc.).** 1c. Evaluate the quality of metal fabrication procedures (e.g., SMAW, GMAW, GTAW, fuel-oxygen and plasma arc torch, etc.).

2c. Construct and/or repair metal structures and equipment using metal fabrication procedures.

STANDARD 2: Operate and maintain AFNR mechanical equipment and power systems.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PST.2.1	Power Structural & Technical Systems Operate & Maintain	**Perform preventative maintenance and scheduled service to maintain equipment, machinery and power units used in AFNR settings.** 1c. Devise a strategy to communicate to different audiences, preventative maintenance and service schedule for equipment, machinery and power units used in AFNR power, structural and technical systems. 2c. Assess and adjust equipment (e.g., belts and drives, chains, sprockets, etc.) and maintain fluid conveyance components (e.g., hoses, lines, nozzles, etc.) to ensure proper functioning.
HSAG.PST.2.2	Power Structural & Technical Systems Operate & Maintain	**Operate machinery and equipment while observing all safety precautions in AFNR settings.** 1c. Perform pre-operation inspections, start-up & shut-down procedures on equipment, machinery and power units as specified in owner's manuals. 2c. Adjust equipment, machinery and power units for safe and efficient operation in AFNR power, structural and technical systems.

STANDARD 3: Service and repair AFNR mechanical equipment and power systems.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PST.3.1	Power, Structural & Technical Service & Repair	**Troubleshoot, service and repair components of internal combustion engines using manufacturers' guidelines.** 1c. Evaluate service and repair needs for internal combustion engines using a variety of performance tests (e.g., manuals, computer-based diagnostics, etc.). 2c. Inspect, analyze and repair spark-and-compression internal combustion engines used in AFNR power, structural and technical systems.
HSAG.PST.3.2	Power, Structural & Technical Systems Service & Repair	**Service electrical systems and components of mechanical equipment and power systems using a variety of troubleshooting and/or diagnostic methods.** 1b. Assess the tools used to measure the basic units of electrical circuits in AFNR power, structural and technical systems, and perform the measurements. 2c. Conduct testing procedures to evaluate and repair malfunctioning electrical components and systems used in AFNR power, structural and technical systems.
HSAG.PST.3.3	Power, Structural & Technical Systems Service & Repair	**Utilize manufacturers' guidelines to diagnose and troubleshoot malfunctions in machinery, equipment and power source systems (e.g., hydraulic, pneumatic, transmission, steering, suspension, etc.).** 1c. Inspect, analyze and repair hydraulic and pneumatic system components used in AFNR power, structural and technical systems. 2c. Inspect, analyze and repair the components of power transmission systems used in AFNR power, structural and technical systems. 3c. Inspect, analyze and repair vehicle suspension and steering systems used in AFNR power, structural and technical systems.

STANDARD 4: Plan, build and maintain AFNR structures.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PST.4.1	Power, Structural and Technical Build & Maintain	**Create sketches and plans for AFNR structures.** 1c. Create sketches of an agricultural structure by applying principles of design. 2b. Construct plans for agricultural structures using current technology (e.g. drafting software, computer-aided design, etc.).

HSAG.PST.4.2	Power, Structural and Technical Build & Maintain	**Determine structural requirements, specifications and estimate costs for AFNR structures.** 1c. Create a project cost estimate, including materials, labor and management for an AFNR structure.
HSAG.PST.4.3	Power, Structural and Technical Build & Maintain	**Follow architectural and mechanical plans to construct, maintain and/or repair AFNR structures (e.g., material selection, site preparation and/or layout, plumbing, concrete/masonry, etc.).** 1c. Select materials for a project based upon an analysis of the project and the quality of the materials. 3c. Construct AFNR structures using wood and/or metal materials.

STANDARD 5: Use control, monitoring geospatial and other technologies in AFNR power, structural and technical systems.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PST.5.1	Power, Structural & Technical Technology	**Apply computer and other technologies (e.g., robotics, CNC, UAS,etc.) to solve problems and increase the efficiency of AFNR systems.** 1c. Solve problems and calculate changes in efficiency using computer technologies for AFNR systems.
HSAG.PST.5.2	Power, Structural & Technical Technology	**Prepare and/or use electrical drawings to design, install and troubleshoot electronic control systems in AFNR settings.** 2c. Troubleshoot electrical control system performance problems found in AFNR power, structural and technical systems.
HSAG.PST.5.3	Power, Structural & Technical	**Apply geospatial technologies to solve problems and increase the efficiency of AFNR systems.** 1c. Collect data and create maps utilizing geospatial technologies.

Technolog
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AGRICULTURE SCIENCES
Agribusiness Management
Grades 11 & 12
Agribusiness Systems Career Pathway
Prerequisite: Agribusiness Sales & Marketing
(Numbering of objectives matches national standard numbers – thus not in 1, 2, 3 order.)

STRAND 3: AGRIBUSINESS SYSTEMS

STANDARD 1: Apply management planning principles in AFNR businesses.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.ABS.1.1	Agribusiness Management	**Apply micro- and macroeconomic principles to plan and manage inputs and outputs in an AFNR business.** 1c. Create strategies to maximize the efficiency of AFNR business inputs and outputs using microeconomic principles. 2c. Analyze the impact of the current macroeconomic environment on decisions related to AFNR businesses.
HSAG.ABS.1.2	Agribusiness Management	**Read, interpret, evaluate and write statements of purpose to guide business goals, objectives and resource allocation.**
HSAG.ABS.1.3	Agribusiness Management	**Devise and apply management skills to organize and run an AFNR business in an efficient, legal and ethical manner.**

		2c. Evaluate AFNR business goals and objectives, then make revisions based on data and observations.
		1c. Devise strategies to improve the operation of AFNR businesses using management skills.
		3c. Design methods for AFNR businesses to implement ethical standards in management skills (e.g., management types, organizational structures, time management techniques, conducting business agreements, etc.).
HSAG.ABS. 1.4	Agribusiness Management	**Evaluate, develop and implement procedures used to recruit, train and retain productive human resources for AFNR businesses.** 1c. Establish and maintain appropriate records and reports on human resources in AFNR businesses (e.g., personal records, absenteeism record, payroll data, employee requests, etc.).

STANDARD 2: Use record keeping to accomplish AFNR business objectives, manage budgets and comply with laws and regulations.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.ABS. 2.1	Agribusiness Record Keeping	**Apply fundamental accounting principles, systems, tools and applicable laws and regulations to record, track and audit AFNR business transactions (e.g., accounts, debits, credits, assets, liabilities, equity, etc.).** 1c. Select appropriate accounting systems and develop accounting procedures to maintain records for AFNR businesses.
HSAG.ABS. 2.2	Agribusiness Record Keeping	**Assemble, interpret and analyze financial information and reports to monitor AFNR business performance and support decision-making (e.g., income statements, balance sheets, cash-flow analysis, inventory reports, break-even analysis, return on investment, taxes, etc.).** 1c. Recommend appropriate financial reports to assemble to support specific AFNR business decisions (e.g., evaluating efficiency, profitability, net worth, financial ratios, etc.). 2c. Create recommendations to improve management of inventory in AFNR businesses (e.g., maintaining optimal levels, calculating costs of carrying input and output inventory, supply chain management, etc.). 3c. Assemble financial information to prepare tax filings for AFNR businesses.

STANDARD 3: Manage cash budgets, credit budgets and credit for an AFNR business using generally accepted accounting principles.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.ABS.3.1	Agribusiness Budgets	**Develop, assess and manage cash budgets to achieve AFNR business goals.** 1c. Develop cash budgets for AFNR businesses. 2c. Predict the impact of management decisions on cash budgets in AFNR businesses.
HSAG.ABS.3.2	Agribusiness Budgets	**Analyze credit needs and manage credit budgets to achieve AFNR business goals.** 1c. Analyze and assemble the information needed to obtain credit for AFNR businesses. 2c. Analyze AFNR business needs and recommend appropriate uses of available credit budgets to meet goals.

STANDARD 4: Develop a business plan for an AFNR business.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.ABS.4.1	Agribusiness Business Plans	**Analyze characteristics and planning requirements associated with developing business plans for different types of AFNR businesses.** 1c. Demonstrate the application of entrepreneurial skills to conceptualize an AFNR business (e.g., idea generation, opportunity analysis, risk assessment, etc.). 2c. Generate conclusions about the successes and failures of AFNR businesses within the global economics system as related to the business ownership structure. 3c. Prepare a business plan for an AFNR business.
HSAG.ABS.4.2	Agribusiness Business Plans	**Develop production and operational plans for an AFNR business.** 1c. Make recommendations to improve operational plans for an AFNR business based on best practices.
HSAG.ABS.4.3	Agribusiness Business Plans	**Identify and apply strategies to manage or mitigate risk.** 1c. Determine methods to match risk management strategies to risk situations in an AFNR business.

STANDARD 5: Use sales and marketing principles to accomplish AFNR business objectives.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.ABS.5.1	Agribusiness Sales & Marketing	**Analyze the role of markets, trade, competition and price in relations to an AFNR business sales and marketing plans.** 1c. Evaluate and predict future trends for a specific AFNR product as related to markets, trade and price (e.g., corn, oil, wheat, etc.).
HSAG.ABS.5.2	Agribusiness Sales & Marketing	**Assess and apply sales principles and skills to accomplish AFNR business objectives.** 1c. Analyze the sales process of AFNR businesses and create methods to suggest improvements. 2c. Create strategies for developing plans for different types of sales calls used in AFNR businesses.
HSAG.ABS.5.3	Agribusiness Sales & Marketing	**Assess marketing principles and develop marketing plans to accomplish AFNR business objectives.** 1c. Deconstruct and analyze current AFNR marketing plans to determine the effectiveness of implementation of marketing principles and alternative marketing strategies. 2c. Devise plans to implement and evaluate marketing strategies for products and services used in AFNR businesses. 3b. Perform a market analysis to gather information for marketing plans for AFNR businesses (e.g., evaluation of competitors, customers, domestic and international policy, regulations and rules, standards, etc.).

AGRICULTURE SCIENCES
Animal & Plant Systems
Grades 11 & 12
Natural Resource Systems Career Pathway
Prerequisite: Fundamentals of Natural Resources
(Numbering of objectives matches national standard numbers – thus not in 1, 2, 3 order.)

STRAND 4: ANIMAL SYSTEMS

STANDARD 1: Analyze historic and current trends impacting the animal systems industry.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.AS.1.1	Animal Systems Trends	**Evaluate the development and implications of animal origin, domestication and distribution on production practices and the environment.** 1c. Evaluate the implications of animal adaptations on production practices and the environment.
HSAG.AS.1.2	Animal Systems Trends	**Assess and select animal production methods for use in animal systems based upon their effectiveness and impacts.** 1c. Evaluate the effectiveness of different production methods and defend the use of selected methods using data and evidence. 3c. Select and defend the use of a specific record management system based upon its effectiveness for a business related to animal systems.

		4c. Devise and evaluate plans to manage wildlife populations to achieve optimal ecological health.
HSAG.AS.1.3	Animal Systems Trends	**Analyze and apply laws and sustainable practices to animal agriculture from a global perspective.** 2c. Select, evaluate and defend the use of sustainable practices in animal agriculture.

STANDARD 2: Utilize best-practice protocols based upon animal behaviors for animal husbandry and welfare.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.AS.2.1	Animal Systems Husbandry	**Demonstrate management techniques that ensure animal welfare.** 1c. Implement and evaluate quality-assurance programs and procedures for animal production. 2c. Devise, implement and evaluate safety procedures and plans for working with animals by species using information based on animal behavior and responses.
HSAG.AS.2.2	Animal Systems Husbandry	**Analyze procedures to ensure that animal products are safe for consumption (e.g., use in food system, etc.).** 1c. Select, evaluate and defend the use of specific tools, technology or equipment used to perform animal husbandry and welfare tasks. 2c. Research and evaluate programs to assure the safety of animal products for consumption. 3c. Evaluate the effectiveness of animal and/or premise identification programs for a given species.

STANDARD 3: Design and provide proper animal nutrition to achieve desired outcomes for performance, development, reproduction and/or economic production.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.AS.3.1	Animal Systems Nutrition	**Analyze the nutritional needs of animals.** 1c. Assess nutritional needs for an individual animal based on its growth stage and production system.
HSAG.AS.3.2	Animal Systems Nutrition	**Analyze feed rations and assess if they meet the nutritional needs of animals.** 1c. Select appropriate feedstuffs for animals based on a variety of factors (e.g., economics, digestive system and nutritional needs, etc.).

		2c. Select and utilize animal feeds based on nutritional requirements, using rations for maximum nutrition and optimal economic production. 3c. Make and defend decisions regarding whether to use feed additives and growth promotants after researching and considering scientific evidence, production system needs and goals, and input from industry professionals.
HSAG.AS.3.3	Animal Systems Nutrition	**Utilize industry tools to make animal nutrition decisions.** 2c. Evaluate and summarize the potential impacts, positive and negative, of compliance and/or noncompliance with a feed label and feeding directions.

STANDARD 4: Apply principles of animal reproduction to achieve desired outcomes for performance, development and/or economic production.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.AS.4.1	Animal Systems Reproduction	**Evaluate animals for breeding readiness and soundness.** 1b. Analyze the functions of major organs in the male and female reproductive systems. 2c. Evaluate and select animals for reproductive readiness.
HSAG.AS.4.2	Animal Systems Reproduction	**Apply scientific principles to select and care for breeding animals.** 1c. Select and evaluate a breeding system based on the principles of genetics. 2c. Select and evaluate breeding animals and determine the probability of a given trait in their offspring. 4c. Create a plan to differentiate care of a species of breeding animals throughout their growth stages.
HSAG.AS.4.3	Animal Systems Reproduction	**Apply scientific principles to breed animals.** 1c. Select animal breeding methods based on reproductive and economic efficiency. 3b. Analyze the processes of major reproductive management practices, including estrous synchronization, superovulation, flushing and embryo transfer. 4c. Select and assess animal performance based on quantitative breeding values for specific characteristics.

STANDARD 5: Evaluate environmental factors affecting animal performance and implement procedures for enhancing performance and animal health.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.AS.5.1	Animal Systems Environmental Factors	**Design animal housing, equipment and handling facilities for the major systems of animal production.** 1b. Critique designs for an animal facility and prescribe alternative layouts and adjustments for the safe, sustainable and efficient use of the facility.
HSAG.AS.5.2	Animal Systems Environmental Factors	**Comply with government regulations and safety standards for facilities used in animal production.** 1b. Analyze animal facilities to determine if standards have been met.

STANDARD 6: Classify, evaluate and select animals based on anatomical and physiological characteristics.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.AS.6.1	Animal Systems Classify & Evaluate	**Classify animals according to taxonomic classification systems and use (e.g. agricultural, companion, etc.).** 1c. Assess taxonomic characteristics and classify animals according to the taxonomic classification system.
HSAG.AS.6.2	Animal Systems Classify & Evaluate	**Apply principles of comparative anatomy and physiology to uses within various animal systems.** 3c. Apply knowledge of anatomical and physiological characteristics of animals to make production and management decisions.
HSAG.AS.6.3	Animal Systems Classify & Evaluate	**Select and train animals for specific purposes and maximum performance based on anatomy and physiology.** 1c. Evaluate and select animals to maximize performance based on anatomical and physiological characteristics that affect health, growth and reproduction.

STANDARD 7: Apply principles of effective animal health care.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.AS.7.1	Animal Systems Health Care	**Design programs to prevent animal diseases, parasites and other disorders and ensure animal welfare.** 3b. Identify and describe common illnesses and disorders of animals based on symptoms and problems caused by wounds, diseases, parasites and physiological disorders.
HSAG.AS.7.2	Animal Systems Health Care	**Analyze biosecurity measures utilized to protect the welfare of animals on a local, state, national, and global level.** 1b. Analyze procedures at the local, state and national levels to ensure biosecurity of the animal industry.

STANDARD 8: Analyze environmental factors associated with animal production.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.AS.8.1	Animal Systems Production	**Design and implement methods to reduce the effects of animal production on the environment.** 1b. Assess the effectiveness of methods of reducing the effects of animal agriculture on the environment.
HSAG.AS.8.2	Animal Systems Production	**Evaluate the effects of environmental conditions on animals and create plans to ensure favorable environments for animals.** 1b. Critique the reliability and validity of evidence presented to support claims regarding the effects of environmental conditions on animal populations and performance (e.g., population changes, emerging species, extinction, etc.).

STRAND 5: ENVIRONMENTAL SERVICE

STANDARD 3: Develop proposed solutions to environmental issues, problems and applications using scientific principles of meteorology, soil science, hydrology, microbiology, chemistry and ecology.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.ESS.3.2	Environmental Service	**Apply soil science and hydrology principles to environmental service systems.**

	Issues & Problems	1b. Use a soil survey to determine the land capability classes for different parcels of land in an area. 2a. Research and describe the process of soil formation through weathering.
HSAG.ESS. 3.4	Environmental Service Issues & Problems	**Apply microbiology principles to environmental service systems.** 1a. Describe the microbial biodiversity found in soil and summarize the contribution of microbial biodiversity to the physical and chemical characteristics of soil.

STANDARD 5: Use tools, equipment, machinery and technology common to tasks in environmental service systems.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.ESS. 5.2	Environmental Service Technology	**Perform assessments of environmental conditions using equipment, machinery and technology.** 2b. Assess different measurements of soil quality (e.g., soil horizons, soil texture, organic matter, soil respiration, etc.) to determine their effectiveness and limitations. 4b. Assess different measurements of assessing ecological health (e.g., quadrat biodiversity assessments, transect surveys, population counts, detection of disease and invasive species, etc.) to determine their effectiveness and limitations.

STRAND 6: FOOD PRODUCTS and PROCESSING SYSTEMS

STANDARD 3: Select and process food products for storage, distribution and consumption.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.FPP.3.1	Food Products & Processing	**Outline procedures to assign quality and yield grades to food products according to industry standards.** 1c. Outline procedures to assign quality and yield grades to food products according to industry standards. 4c. Evaluate and grade food products from different classifications of food products.

STRAND 8: PLANT SYSTEMS

STANDARD 1: Develop and implement a crop management plan for a given production goals that accounts for environmental factors.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PS.1.1	Plant Systems Crop Management	**Determine the influence of environmental factors on plant growth.** 1c. Analyze plant responses to varied light color, intensity and duration and recommend modifications to light for desired plant growth. 3c. Analyze plant responses to water conditions and recommend modifications to water for desired plant growth.
HSAG.PS.1.2	Plant Systems Crop Management	**Prepare and manage growing media for use in plant systems.** 2b. Discuss how soil drainage and water-holding capacity can be improved.
HSAG.PS.1.3	Plant Systems Crop Management	**Develop and implement a fertilization plan for specific plants or crops.** 1b. Analyze the effects of nutrient deficiencies and symptoms and recognize environmental causes of nutrient deficiencies. 4b. Calculate the amount of fertilizer to be applied based on nutrient recommendation and fertilizer analysis. 5c. Devise a plan for soil management for a selected production method.

STANDARD 2: Apply principles of classification, plant anatomy, and plant physiology to plant production and management.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PS.2.1	Plant Systems Production & Management	**Classify plants according to taxonomic systems.** 2c. Identify and describe important plants to agricultural and ornamental plant systems by scientific names.

HSAG.PS.2.2	Plant Systems Production & Management	**Apply knowledge of plant anatomy and the functions of plant structures to activities associated with plant systems.** 3c. Evaluate the function of the xylem, phloem and cambium tissues and the impact on plant systems. 5b. Apply knowledge of flower structure to differentiate between the types of flowers and flower inflorescence (e.g., complete, incomplete, perfect, imperfect). 6b. Analyze and categorize the major types of seeds and fruit.
HSAG.PS.2.3	Plant Systems Production & Management	**Apply knowledge of plant physiology and energy conversion to plant systems.** 1c. Evaluate the impact of photosynthesis and the factors that affect it on plant management, culture and production problems.

STANDARD 3: Propagate, culture and harvest plants and plant products based on current industry standards.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PS.3.1	Plant Systems Industry Standards	**Demonstrate plant propagation techniques in plant system activities.** 5b. Compare and contrast the potential risks and advantages associated with genetically modified plants.
HSAG.PS.3.2	Plant Systems Industry Standards	**Develop and implement a management plan for plant production.** 4c. Prepare and implement a plant production schedule based on predicted environmental conditions and desired market target (e.g., having plants ready to market on a specific day such as Mother's Day, organic production, low maintenance landscape plants, etc.).
HSAG.PS.3.3	Plant Systems Industry Standards	**Develop and implement a plan for integrated pest management for plant production.** 1c. Devise solutions for plant pests, diseases and disorders.
HSAG.PS.3.4	Plant Systems Industry Standards	**Apply principles and practices of sustainable agriculture to plant production.** 2c. Select and defend the use of nationally/internationally grown or locally/ regionally grown for a production operation system.
HSAG.PS.3.5	Plant Systems Industry Standards	**Harvest, handle and store crops according to current industry standards.** 1b. Assess the stage of growth to determine crop maturity or marketability and demonstrate proper harvesting techniques.

STANDARD 4: Apply principles of design in plant systems to enhance an environment (e.g. floral, forest landscape, and farm).

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PS.4.1	Plant Systems Design	**Evaluating, identifying and preparing plants to enhance an environment.** 1c. Install plants according to a design plan that uses the proper plants based on the situation and environment.
HSAG.PS.4.2	Plant Systems Design	**Create designs using plants.** 1c. Analyze designs to identify use of design principles and elements.

AGRICULTURE SCIENCES
Fundamentals of Agricultural Mechanics and Construction
Grades 10 – 12
Power, Structural and Technical Systems Career Pathway
Prerequisite: Introduction to Agriculture
(Numbering of objectives matches national standard numbers – thus not in 1, 2, 3 order.)

STRAND 9: POWER, STRUCTURAL and TECHNICAL SYSTEMS

STANDARD 1: Apply physical science principles and engineering applications to solve problems and improve performance in AFNR power, structural and technical systems.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PST.1.1	Power, Structural & Technical Systems	**Apply physical science and engineering principles to assess and select energy sources for AFNR power structural and technical systems.** 2b. Calculate the costs of using renewable and nonrenewable energy sources in an AFNR enterprise or business.
HSAG.PST.1.2	Power, Structural & Technical Systems	**Apply physical science and engineering principles to design, implement and improve safe and efficient mechanical systems in AFNR situation.** 1b. Perform mathematical calculations to determine the mechanical advantage of simple machines in AFNR related mechanical systems. 2b. Calculate the maintenance and purchase cost of tools, machines and equipment used in AFNR. 3b. Select, maintain and demonstrate the proper use of tools, machines and equipment used in different AFNR related mechanical systems.
HSAG.PST.1.3	Power, Structural & Technical Systems	**Apply physical science and engineering principles to metal fabrication using a variety of welding and cutting processes (e.g., SMAW, GMAW, GTAW, fuel-oxygen and plasma arc torch, etc.).** 1b. Analyze the situation and determine the best welding and cutting process to be used in metal fabrication. 2b. Assess and select the proper electrode for use in various shielded metal arc welding situations.

STANDARD 2: Operate and maintain AFNR mechanical equipment and power systems.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PST.2.1	Power Structural &	**Perform preventative maintenance and scheduled service to maintain equipment, machinery and power units used in AFNR settings.**

	Technical Systems	1b. Develop a preventative maintenance schedule for equipment, machinery and power units used in AFNR power, structural and technical systems.
HSAG.PST.2.2	Power Structural & Technical Systems	**Operate machinery and equipment while observing all safety precautions in AFNR settings.** 1b. Analyze and calculate the cost of using equipment, machinery, and power units for AFNR power, structural and technical systems. 2b. Apply safety principles and applicable regulations to operate equipment, machinery and power units used in AFNR power, structural and technical systems.

STANDARD 3: Service and repair AFNR mechanical equipment and power systems.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PST.3.1	Power, Structural & Technical Systems	**Troubleshoot, service and repair components of internal combustion engines using manufacturers' guidelines.** 1b. Analyze and explain how the components of internal combustion engines interrelate during operation. 2b. Utilize technical manuals and diagnostic tools to determine service and repair needs of spark-and-compression internal combustion engines used in AFNR power, structural and technical systems.
HSAG.PST.3.2	Power, Structural & Technical Systems	**Service electrical systems and components of mechanical equipment and power systems using a variety of troubleshooting and/or diagnostic methods.** 1b. Assess the tools used to measure the basic units of electrical circuits in AFNR power, structural and technical systems, and perform the measurements. 2b. Analyze and interpret electrical system symbols and diagrams.

STANDARD 4: Plan, build and maintain AFNR structures.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PST.4.1	Power, Structural and Technical Systems	**Create sketches and plans for AFNR structures.** 1b. Apply scale measurement and dimension to develop sketches of agricultural structures. 2b. Construct plans for agricultural structures using current technology (e.g., drafting software, computer-aided design, etc.).
HSAG.PST.4.2	Power, Structural and Technical Systems	**Determine structural requirements, specifications and estimate costs for AFNR structures.** 1b. Analyze a project plan to prepare a bill of materials and an estimate of material costs.

HSAG.PST.4.3	Power, Structural and Technical Systems	**Follow architectural and mechanical plans to construct, maintain and/or repair AFNR structures (e.g., material selection, site preparation and/or layout, plumbing, concrete/masonry, etc.).** 1b. Analyze and assess samples of materials or products for quality and efficiency of workmanship.
HSAG.PST.4.4	Structural and Technical Systems	**Apply electrical wiring principles in AFNR structures.** 1a. Compare and contrast direct and alternating current. 2a. Distinguish electrical circuits and the components of each.

STANDARD 5: Use control, monitoring geospatial and other technologies in AFNR power, structural and technical systems.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PST.5.3	Power, Structural and Technical Systems	**Apply geospatial technologies to solve problems and increase the efficiency of AFNR systems.** 1b. Analyze and interpret trends in data collected utilizing geospatial technologies.

AGRICULTURE SCIENCES
Fundamentals of Natural Resources
Grades 10 – 12
Power, Structural and Technical Systems Career Pathway
Prerequisite: Introduction to Agriculture
(Numbering of objectives matches national standard numbers – thus not in 1, 2, 3 order.)

STRAND 5: ENVIRONMENTAL SERVICE SYSTEMS

STANDARD 3: Develop proposed solutions to environmental issues, problems and applications using scientific principles of meteorology, soil science, hydrology, microbiology, chemistry and ecology.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.ESS.3.2	Environmental Service Soils	**Apply soil science and hydrology principles to environmental service systems.** 1b. Use a soil survey to determine the land capability classes for different parcels of land in an area. 2a. Research and describe the process of soil formation through weathering.
HSAG.ESS.3.4	Environmental Service Soils	**Apply microbiology principles to environmental service systems.** 1a. Describe the microbial biodiversity found in soil and summarize the contribution of microbial biodiversity to the physical and chemical characteristics of soil.

STANDARD 5: Use tools, equipment, machinery and technology common to tasks in environmental service systems.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.ESS.5.2	Environmental Service Soils	**Perform assessments of environmental conditions using equipment, machinery and technology**. 2b. Assess different measurements of soil quality (e.g., soil horizons, soil texture, organic matter, soil respiration, etc.) to determine their effectiveness and limitations. 4b. Assess different measurements of assessing ecological health (e.g., quadrat biodiversity assessments, transect surveys, population counts, detection of disease and invasive species, etc.) to determine their effectiveness and limitations.

STRAND 7: NATURAL RESOURCE SYSTEMS

STANDARD 1: Plan and conduct natural resource management activities that apply logical, reasoned and scientifically based solutions to natural resource issues and goals.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.NRS.1.1	Natural Resource Systems Issues	**Apply methods of classification to examine natural resource availability and ecosystem function in a particular region.** 1b. Assess the characteristics of a natural resource to determine its classification. 2b. Analyze the interdependence of organisms within an ecosystem (e.g., food webs, niches, impact of keystone species, etc.) and assess the dependence of organisms on nonliving components (climate, geography, energy flow, nutrient cycling, etc.). 3b. Analyze how biodiversity develops through evolution, natural selection and adaptation; explain the importance of biodiversity to ecosystem function and availability of natural resources.
HSAG.NRS.1.2	Natural Resource Systems Issues	**Classify different types of natural resources in order to enable protection, conservation, enhancement and management in a particular geographical region.** 1b. Apply identification techniques to determine the species of a tree or woody plant. 2b. Apply identification techniques to determine the species of an herbaceous plant. 3b. Apply identification techniques to determine the species of wildlife or insect. 4b. Apply identification techniques to determine the species of an aquatic organism. 5b. Apply identification techniques to determine the types of non-living resources in an area. 6b. Apply procedures for conducting resource inventories and population studies.
HSAG.NRS.1.3	Natural Resource Systems Issues	**Apply ecological concepts and principles to atmospheric natural resource systems.** 2b. Analyze the impact that climate has on natural resources and debate how this impact has changed due to human activity.
HSAG.NRS.1.4	Natural Resource Systems Issues	**Apply ecological concepts and principles to aquatic natural resource systems.** 1b. Assess the function of watersheds and their effect on natural resources. 3b. Assess techniques used in the creation, enhancement and management of riparian zones and riparian buffers.

HSAG.NRS. 1.5	Natural Resource Systems Issues	**Apply ecological concepts and principles to terrestrial natural resource systems.** 1b. Analyze and summarize examples of stages of succession. 2b. Analyze and summarize examples of habitat disturbances and habitat resilience.
HSAG.NRS. 1.6	Natural Resource Systems Issues	**Apply ecological concepts and principles to living organisms in natural resource systems.** 1b. Analyze the factors that influence population density and population dispersion in natural resource systems. 2b. Analyze factors that influence the establishment and spread of invasive species and determine the appropriate steps to prevent or minimize the impact of invasive species.

STANDARD 2: Analyze the interrelationships between natural resources and humans.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.NRS. 2.1	Natural Resource Systems Interrelationships	**Examine and interpret the purpose, enforcement, impact and effectiveness of laws and agencies related to natural resource management, protection, enhancement and improvement (e.g., water regulations, game laws, historic preservation laws, environmental policy, etc.).** 2b. Analyze the specific purpose of agencies associated with natural resources systems.
HSAG.NRS. 2.2	Natural Resource Systems Interrelationships	**Assess the impact of human activities on the availability of natural resources.** 1b. Assess and explain how different kinds of human activity affect the use and availability of natural resources (i.e., agriculture, industry, transportation, etc.). 3b. Identify solutions to improve the sustainability of modern lifestyles.
HSAG.NRS. 2.3	Natural Resource Systems Interrelationships	**Analyze how modern perceptions of natural resource management, protection, enhancement and improvement change and develop over time.** 1b. Analyze how social considerations can affect the use and sustainability of natural resources.
HSAG.NRS. 2.4	Natural Resource Systems Interrelationships	**Examine and explain how economics affects the use of natural resources.** 2b. Assess the importance of the use of natural resources on local, state and national economies.

HSAG.NRS. 2.5	Natural Resource Systems Interrelationships	**Communicate information to the public regarding topics related to the management, protection, enhancement, and improvement of natural resources.** 1b. Assess the effectiveness of different methods for communicating natural resource messages.

STANDARD 3: Develop plans to ensure sustainable production and processing of natural resources.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.NRS. 3.1	Natural Resource Systems Production & Processing	**Sustainably produce, harvest, process and use natural resource products (e.g., forest products, wildlife, minerals, fossil fuels, shale oil, alternative energy, recreation, aquatic species, etc.)** 1b. Assess harvesting methods in regards to their economic value, environmental impact, and other factors. 7b. Assess different options for improving the sustainability of outdoor recreation based on its impact on natural resources and likelihood of acceptance.
HSAG.NRS. 3.2	Natural Resource Systems Production & Processing	**Demonstrate cartographic skills, tools and technologies to aid in developing, implementing and evaluating natural resource management plans.** 1b. Apply cartographic skills and tools and technologies (e.g., land surveys, geographic coordinate systems, etc.) to locate natural resources. 2b. Analyze an area's resources using GIS technologies.

STANDARD 4: Demonstrate responsible management procedures and techniques to protect, maintain, enhance, and improve natural resources.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.NRS. 4.1	Natural Resource Systems Management	**Demonstrate natural resource protection, maintenance, enhancement and improvement techniques.** 3b. Assess and apply methods of wildlife habitat improvement. 4b. Assess and apply methods of rangeland improvement.
HSAG.NRS. 4.2	Natural Resource Systems Management	**Diagnose plant and wildlife diseases and follow protocols to prevent their spread.** 1b. Analyze a plant disease based on its symptoms, identify if the disease needs to be reported to authorities and determine which authorities it should be reported to.

HSAG.NRS.4.3	Natural Resource Systems Management	**Prevent or manage introduction of ecologically harmful species in a particular region.** 1b. Analyze signs of insect infestation, identify if it needs to be reported to authorities and determine which authorities it should be reported to. 2b. Analyze signs of the spread of invasive species, identify if it needs to be reported to authorities and determine which authorities it should be reported to.
HSAG.NRS.4.4	Natural Resource Systems Management	**Manage fires in natural resource systems.** 1b. Assess and apply techniques used to fight wildfires, manage prescribed fires and ensure human safety.

AGRICULTURE SCIENCES
Introduction to Agriculture
Grades 9 - 12
(Numbering of objectives matches national standard numbers – thus not in 1, 2, 3 order.)

STRAND 1: CAREER READY PRACTICES

STANDARD 1: Act as a responsible and contributing citizen and employee.

Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.CRP.1.3	Career Ready Practices Citizenship through FFA	**Identify and act upon opportunities for professional and civic service at work and in the community.** 1a. Define and categorize opportunities for professional service at work and in the community (e.g., serve on committees, attend meetings, etc.). 1b. Assess available professional service opportunities at workplaces and in community (e.g., trainings, organizing events, etc.). 2a. Identify civic service opportunities in workplaces and the community (e.g., organizations, fundraising, etc.). 2b. Assess available civic service opportunities at workplaces and in the community (e.g., community events, attend meetings, etc.).

STRAND 2: CLUSTER SKILLS

STANDARD 1: Analyze how issues, trends, technologies and public policies impact systems in the Agriculture, Food & Natural Resources Career Cluster.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.CS.01.01	Cluster Skills	**Research, examine and discuss issues and trends that impact AFNR systems on local, state, national and global levels.**

	Issues & Trends	1b. Analyze and summarize AFNR issues and their impact on local, state, national and global levels.

STANDARD 2: Evaluate the nature and scope of the Agriculture, Food & Natural Resources Career cluster and the role of agriculture, food and natural resources (AFNR) in society and the economy.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.CS.02.02	Cluster Skills Role of Agriculture	**Examine the components of the AFNR systems and assess their impact on the local, state, national and global society and economy.** 1a. Identify and summarize the components within AFNR systems (e.g., Animal Systems: health, nutrition, genetics, etc.; Natural Resources Systems: soil, water, etc.). 1c. Devise and implement a strategy for explaining components of AFNR systems to audiences with limited knowledge. 2b. Assess how people within societies on local, state, national and global levels interact with AFNR systems on a daily, monthly or yearly basis. 3a. Examine and summarize the components of the agricultural economy (e.g., environmental, crops, livestock, etc.). 3b. Assess the economic impact of an AFNR system on a local, state, national and global level.

STRAND 5: ENVIRONMENTAL SERVICE SYSTEMS

STANDARD 3: Develop proposed solutions to environmental issues, problems and applications using scientific principles of meteorology, soil science, hydrology, microbiology, chemistry and ecology.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.ESS.3.2	Environmental Service Environmental Issues	**Apply soil science and hydrology principles to environmental service systems.** 1b. Use a soil survey to determine the land capability classes for different parcels of land in an area. 2a. Research and describe the process of soil formation through weathering.
HSAG.ESS.3.4	Environmental	**Apply microbiology principles to environmental service systems**.

	Service Environmental Issues	2a. Research and describe how microbial populations in an ecosystem affect carbon cycling.

STANDARD 5: Use tools, equipment, machinery and technology common to tasks in environmental service systems.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.ESS.5.2	Environmental Service Soils	**Perform assessments of environmental conditions using equipment, machinery and technology.** 2b. Assess different measurements of soil quality (e.g., soil horizons, soil texture, organic matter, soil respiration, etc.) to determine their effectiveness and limitations.

STRAND 8: PLANT SYSTEMS

STANDARD 1: Develop and implement a crop management plan for a given production goals that accounts for environmental factors.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PS.1.3	Plant Science Crop Management	**Develop and implement a fertilization plan for specific plants or crops.** 1a. Identify the essential nutrients for plant growth and development and their major functions (e.g., nitrogen, phosphorous, potassium, etc.). 4a. Identify fertilizer sources of essential plant nutrients; explain fertilizer formulations, including organic and inorganic; and describe different methods of fertilizer application.

STANDARD 2: Apply principles of classification, plant anatomy, and plant physiology to plant production and management.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PS.2.1	Plant Science	**Classify plants according to taxonomic systems.** 2a. Describe the morphological characteristics used to identify agricultural and herbaceous plants (e.g., life cycles, growth habit, plant use and as

	Plant Classification	monocotyledons or dicotyledons, woody, herbaceous, etc.). 2b. Identify and describe important plants to agricultural and ornamental plant systems by common names.
HSAG.PS.2.2	Plant Science Plant Classification	**Apply knowledge of plant anatomy and the functions of plant structures to activities associated with plant systems**. 2a. Identify and summarize the components, the types and the functions of plant roots. 3a. Identify and summarize the components and the functions of plant stems.

STANDARD 3: Propagate, culture and harvest plants and plant products based on current industry standards.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PS.3.2	Plant Science Industry Standards	**Develop and implement a management plan for plant production.** 4a. Observe and record environmental conditions during the germination, growth and development of a crop.

STANDARD 4: Apply principles of design in plant systems to enhance an environment (e.g. floral, forest landscape, and farm).

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PS.4.1	Plant Science Design	**Evaluating, identifying and preparing plants to enhance an environment.** 1a. Identify and categorize plants by their purpose (e.g., floral plants, landscape plants, house plants, etc.).

STRAND 9: POWER, STRUCTURAL and TECHNICAL SYSTEMS

STANDARD 1: Apply physical science principles and engineering applications to solve problems and improve performance in AFNR power, structural and technical systems.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PST.1.2	Power, Structural & Technical Science & Engineering	**Apply physical science and engineering principles to design, implement and improve safe and efficient mechanical systems in AFNR situations.** 1a. Compare and contrast applications of simple machines in AFNR related mechanical systems. 2a. Identify the tools, machines and equipment needed to construct and/or fabricate a project in AFNR. 3b. Select, maintain and demonstrate the proper use of tools, machines and equipment used in different AFNR related mechanical systems.
HSAG.PST.1.3	Power, Structural & Technical Science & Engineering	**Apply physical science and engineering principles to metal fabrication using a variety of welding and cutting processes (e.g., SMAW, GMAW, GTAW, fuel-oxygen and plasma arc torch, etc.).** 1a. Compare and contrast the principles and procedures of different welding and cutting processes (e.g., SMAW, GMAW, GTAW, fuel-oxygen and plasma arc torch, etc.). 2a. Compare and contrast the properties of different metals used in AFNR power, structural and technical systems (e.g., malleability, conductivity, optical properties, chemical composition, etc.).

STANDARD 2: Operate and maintain AFNR mechanical equipment and power systems.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PST.2.1	Power Structural	**Perform preventative maintenance and scheduled service to maintain equipment, machinery and power units used in AFNR settings.**

	& Technical Equipment	1a. Maintain the cleanliness and appearance of equipment, machinery and power units used in AFNR power, structural and technical systems to assure proper functionality.
HSAG.PST.2.2	Power Structural & Technical Equipment	**Operate and maintain AFNR mechanical equipment and power systems**. 2b. Apply safety principles and applicable regulations to operate equipment, machinery and power units used in AFNR power, structural and technical systems.

STANDARD 4: Plan, build and maintain AFNR structures.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PST.4.1	Power Structural & Technical Build & Maintain	**Create sketches and plans for AFNR structures.** 1b. Apply scale measurement and dimension to develop sketches of agricultural structures. 1c. Create sketches of an agricultural structure by applying principles of design. 2a. Read and interpret the parts and/or views of plans for agricultural structures.
HSAG.PST.4.2	Power Structural & Technical	**Determine structural requirements, specifications and estimate costs for AFNR structures.** 1b. Analyze a project plan to prepare a bill of materials and an estimate of material costs.
HSAG.PST.4.3	Power Structural & Technical Build & Maintain	**Follow architectural and mechanical plans to construct, maintain and/or repair AFNR structures (e.g., material selection, site preparation and/or layout, plumbing, concrete/masonry, etc.).** 1c. Select materials for a project based upon an analysis of the project and the quality of the materials. 3c. Construct AFNR structures using wood and/or metal materials.

AGRICULTURE SCIENCES
Junior High "Survey of Agriculture"
Semester Class

(Numbering of objectives matches national standard numbers – thus not in 1, 2, 3 order.)

STRAND 1: CAREER READY PRACTICES

STANDARD 1: Act as a responsible and contributing citizen and employee.

Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
JHAG.CRP.1.3	Career Ready Practices Citizenship Through FFA	**Identify and act upon opportunities for professional and civic service at work and in the community.** 1a. Define and categorize opportunities for professional service at work and in the community (e.g., serve on committees, attend meetings, etc.). 1b. Assess available professional service opportunities at workplaces and in community (e.g., trainings, organizing events, etc.). 2a. Identify civic service opportunities in workplaces and the community (e.g., organizations, fundraising, etc.). 2b. Assess available civic service opportunities at workplaces and in the community (e.g., community events, attend meetings, etc.).

STRAND 2: CLUSTER SKILLS

STANDARD 2: Evaluate the nature and scope of the Agriculture, Food & Natural Resources Career cluster and the role of agriculture, food and natural resources (AFNR) in society and the economy.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES

JHAG.CS.2.2	Cluster Skills Importance of Agriculture	**Examine the components of the AFNR systems and assess their impact on the local, state, national and global society and economy**. 1a. Identify and summarize the components within AFNR systems (e.g., Animal Systems: health, nutrition, genetics, etc.; Natural Resources Systems: soil, water, etc.). 1c. Devise and implement a strategy for explaining components of AFNR systems to audiences with limited knowledge. 2b. Assess how people within societies on local, state, national and global levels interact with AFNR systems on a daily, monthly or yearly basis. 3a. Examine and summarize the components of the agricultural economy (e.g., environmental, crops, livestock, etc.). 3b. Assess the economic impact of an AFNR system on a local, state, national and global level.

STRAND 5: ENVIRONMENTAL SERVICE SYSTEMS

STANDARD 3: Develop proposed solutions to environmental issues, problems and applications using scientific principles of meteorology, soil science, hydrology, microbiology, chemistry and ecology.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
JHAG.ESS.3.2	Environmental Service Soils	**Apply soil science and hydrology principles to environmental service systems**. 1b. Use a soil survey to determine the land capability classes for different parcels of land in an area.

STANDARD 5: Use tools, equipment, machinery and technology common to tasks in environmental service systems.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
JHAG.ESS.5.2	Environmental Service Soils	**Perform assessments of environmental conditions using equipment, machinery and technology.** 2b. Assess different measurements of soil quality (e.g., soil horizons, soil texture, organic matter, soil respiration, etc.) to determine their effectiveness and limitations.

STRAND 7: PLANT SYSTEMS

STANDARD 2: Apply principles of classification, plant anatomy, and plant physiology to plant production and management.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
JHAG.PS.2.1	Plant Systems Classification	**Classify plants according to taxonomic systems**. 2a. Describe the morphological characteristics used to identify agricultural and herbaceous plants (e.g., life cycles, growth habit, plant use and as monocotyledons or dicotyledons, woody, herbaceous, etc.). 2b. Identify and describe important plants to agricultural and ornamental plant systems by common names.
JHAG.PS.2.2	Plant Systems Classification	**Apply knowledge of plant anatomy and the functions of plant structures to activities associated with plant systems.** 2a. Identify and summarize the components, the types and the functions of plant roots. 3a. Identify and summarize the components and the functions of plant stems.

STRAND 8: POWER, STRUCTURAL and TECHNICAL SYSTEMS

STANDARD 1: Apply physical science principles and engineering applications to solve problems and improve performance in AFNR power, structural and technical systems.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
JHAG.PST.1.2	Power Structural & Technical Arc Welding Woodworking	**Apply physical science and engineering principles to design, implement and improve safe and efficient mechanical systems in AFNR situations.** 2a. Identify the tools, machines and equipment needed to construct and/or fabricate a project in AFNR. 3b. Select, maintain and demonstrate the proper use of tools, machines and equipment used in different AFNR related mechanical systems.
JHAG.PST.2.1	Power Structural & Technical Woodworking	**Perform preventative maintenance and scheduled service to maintain equipment, machinery and power units used in AFNR setting.** 1a. Maintain the cleanliness and appearance of equipment, machinery and power units used in AFNR power, structural and technical systems to assure proper functionality.
JHAG.PST.2.2	Power Structural & Technical Arc Welding Woodworking	**Operate machinery and equipment while observing all safety precautions in AFNR settings.** 2b. Apply safety principles and applicable regulations to operate equipment, machinery and power units used in AFNR power, structural and technical systems.

STANDARD 2: Operate and maintain AFNR mechanical equipment and power systems.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
JHAG.PST.2.1	Power Structural & Technical Woodworking	**Perform preventative maintenance and scheduled service to maintain equipment, machinery and power units used in AFNR setting.** 1a. Maintain the cleanliness and appearance of equipment, machinery and power units used in AFNR power, structural and technical systems to assure proper functionality.
JHAG.PST.2.2	Power Structural & Technical Arc Welding Woodworking	**Operate machinery and equipment while observing all safety precautions in AFNR settings.** 2b. Apply safety principles and applicable regulations to operate equipment, machinery and power units used in AFNR power, structural and technical systems.

STANDARD 4: Plan, build and maintain AFNR structures.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
JHAG.PST.4.1	Power Structural & Technical System Woodworking	**Create sketches and plans for AFNR structures.** 1b. Apply scale measurement and dimension to develop sketches of agricultural structures. 1c. Create sketches of an agricultural structure by applying principles of design. 2a. Read and interpret the parts and/or views of plans for agricultural structures.
JHAG.PST.4.2	Power Structural & Technical System Woodworking	**Determine structural requirements, specifications and estimate costs for AFNR structures.** 1b. Analyze a project plan to prepare a bill of materials and an estimate of material costs.
JHAG.PST.4.3	Power Structural & Technical System Woodworking	**Follow architectural and mechanical plans to construct, maintain and/or repair AFNR structures (e.g., material selection, site preparation and/or layout, plumbing, concrete/masonry, etc.)** 1c. Select materials for a project based upon an analysis of the project and the quality of the materials. 3c. Construct AFNR structures using wood and/or metal materials.

AGRICULTURE SCIENCES
Ag Leadership & Entrepreneurship
Grade 12
Agribusiness Systems Career Pathway

Prerequisite: Agribusiness Management or Instructor Approval

(Numbering of objectives matches national standard numbers – thus not in 1, 2, 3 order.)

STRAND 1: CAREER READY PRACTICES

STANDARD 1: Act as a responsible and contributing citizen and employee.

Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.CRP.1.1	Career Ready Practices Citizenship	**Model Personal responsibility in the workplace and community.** 1c. Evaluate past workplace and community situations and determine how personal responsibility positively or negatively impacted outcomes. 2c. Model personal responsibility in workplace and community situations.
HSAG.CRP.1.2	Career Ready Practices Citizenship	**Evaluate and consider the near-term and long-term impacts of personal and professional decisions on employers and community before taking action.** 1b. Assess the pros and cons of personal decisions based on their anticipated impact on self and others. 2b. Analyze the pros and cons of professional decisions based upon impact on employers and community.
HSAG.CRP.1.3	Career Ready Practices Citizenship	**Identify and act upon opportunities for professional and civic service at work and in the community.** 1c. Devise, implement, and evaluate strategies for involvement in professional service opportunities at work and in the community (e.g., coaching/mentorship, presentations at meetings, etc.). 2c. Devise, implement, and evaluate strategies for personal involvement in civic service at work and in the community (e.g., volunteer at food pantry, community clean-up, join organizations or committees, etc.).

STANDARD 2: Apply appropriate academic and technical skills.

Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.CRP.2.1	Career Ready Practices Technical Skills	**Use strategic thinking to connect and apply academic learning, knowledge and skills to solve problems in the workplace and community.** 1c. Apply academic knowledge and skills to solve problems in the workplace and reflect upon the results achieved. 2c. Apply academic knowledge and skills to solve problems in the community and reflect upon results achieved.
HSAG.CRP.2.2	Career Ready Practices Technical Skills	**Use strategic thinking to connect and apply technical concepts to solve problems in the workplace and community.** 1c. Apply technical concepts to solve problems in the workplace and reflect upon the results achieved. 2c. Apply technical concepts to solve problems in the community and reflect upon results achieved.

STANDARD 4: Communicate clearly, effectively and with reason.

Career-ready individuals understand communicate thoughts, ideas and action plans with clarity, whether using written, verbal and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.CRP.4.1	Career Ready Practices Communication	**Speak using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.** 1b. Analyze use of verbal and non-verbal communication strategies in workplace situations. 2b. Apply strategies for speaking with clarity, logic, purpose and professionalism in a variety of situations in formal and informal settings.
HSAG.CRP.4.2	Career Ready Practices Communication	**Produce clear, reasoned and coherent written and visual communication in formal and informal settings.** 2c. Compose clear and coherent written documents and visuals (e.g., agendas, audio-visuals, drafts, forms, etc.) that are adapted to the audience needs in both formal and informal settings.

HSAG.CRP.4.3	Career Ready Practices Communication	**Model active listening strategies when interacting with others in formal and informal settings.** 2c. Model active listening strategies in formal and informal settings.

STANDARD 6: Demonstrate creativity and innovation.

Career-ready individuals regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.CRP.6.1	Career Ready Practices Innovation	**Synthesize information, knowledge and experience to generate original ideas and challenge assumptions in the workplace and community.** 1b. Synthesize information, knowledge and experiences to generate ideas for workplace and community situations.
HSAG.CRP.6.2	Career Ready Practices Innovation	**Assess a variety of workplace and community situations to identify ways to add value and improve the efficiency of processes and procedures.** 2c. Construct and implement methods to improve workplace and community processes and procedures
HSAG.CRP.6.3	Career Ready Practices Innovation	**Create and execute a plan of action to act upon new ideas and introduce innovations to workplace and community organizations.** 1c. Design a plan of action to introduce a new idea or innovation into the workplace and community.

STANDARD 8: Utilize critical thinking to make sense of problems and persevere in solving them.

Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.CRP.8.1	Career Ready Practices Problem Solving	**Apply reason and logic to evaluate workplace and community situations from multiple perspectives.** 1b. Apply steps for critical thinking to a variety of workplace and community situations.

HSAG.CRP.8.2	Career Ready Practices Problem Solving	**Investigate, prioritize and select solutions to solve problems in the workplace and community.** 2c. Evaluate and select solutions with greatest potential for success to solve workplace and community problems.
HSAG.CRP.8.3	Career Ready Practices Problem Solving	**Establish plans to solve workplace and community problems and execute them with resiliency.** 2c. Implement and evaluate plans to solve workplace and community problems.

STANDARD 9: Model integrity, ethical leadership and effective management.

Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.CRP.9.1	Career Ready Practices Integrity & Ethics	**Model characteristics of ethical and e4ffective leaders in the workplace and community (e.g. integrity, self-awareness, self-regulation, etc.).** 2c. Model characteristics and actions of ethical and effective leaders in workplace and community situations (e.g., integrity, self-awareness, etc.).
HSAG.CRP.9.3	Career Ready Practices Integrity & Ethics	**Demonstrate behaviors that contribute to a positive morale and culture in the workplace and community (e.g., positively influencing others, effectively communicating, etc.).** 2c. Model respectful and purposeful behaviors that contribute to positive morale and culture in the workplace and community (e.g., effectively communicating, recognizing accomplishments of others, etc.).

STRAND 3: AGRIBUSINESS SYSTEMS

STANDARD 1: Apply management planning principles in AFNR businesses.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.ABS.1.2	Agribusiness Management	**Read, interpret, evaluate and write statements of purpose to guide business goals, objectives and resource allocation.** 2c. Evaluate AFNR business goals and objectives, then make revisions based on data and observations.
HSAG.ABS.1.3	Agribusiness Management	**Devise and apply management skills to organize and run an AFNR business in an efficient, legal and ethical manner.** 1c. Devise strategies to improve the operation of AFNR businesses using management skills.

HSAG.ABS. 1.4	Agribusiness Management	**Evaluate, develop and implement procedures used to recruit, train and retain productive human resources for AFNR businesses.** 1c. Establish and maintain appropriate records and reports on human resources in AFNR businesses (e.g., personal records, absenteeism record, payroll data, employee requests, etc.).

STANDARD 2: Use record keeping to accomplish AFNR business objectives, manage budgets and comply with laws and regulations.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.ABS. 2.1	Agribusiness Record Keeping	**Apply fundamental accounting principles, systems, tools and applicable laws and regulations to record, track and audit AFNR business transactions (e.g., accounts, debits, credits, assets, liabilities, equity, etc.).** 1c. Select appropriate accounting systems and develop accounting procedures to maintain records for AFNR businesses.
HSAG.ABS. 2.2	Agribusiness Record Keeping	**Assemble, interpret and analyze financial information and reports to monitor AFNR business performance and support decision-making (e.g., income statements, balance sheets, cash-flow analysis, inventory reports, break-even analysis, return on investment, taxes, etc.).** 1c. Recommend appropriate financial reports to assemble to support specific AFNR business decisions (e.g., evaluating efficiency, profitability, net worth, financial ratios, etc.).

STANDARD 4: Develop a business plan for an AFNR business.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.ABS. 4.1	Agribusiness Business Plans	**Analyze characteristics and planning requirements associated with developing business plans for different types of AFNR businesses.** 1c. Demonstrate the application of entrepreneurial skills to conceptualize an AFNR business (e.g., idea generation, opportunity analysis, risk assessment, etc.). 2c. Generate conclusions about the successes and failures of AFNR businesses within the global economics system as related to the business ownership structure. 3c. Prepare a business plan for an AFNR business.

STANDARD 5: Use sales and marketing principles to accomplish AFNR business objectives.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.ABS.5.3	Agribusiness Sales & Marketing	**Assess marketing principles and develop marketing plans to accomplish AFNR business objectives.** 1c. Deconstruct and analyze current AFNR marketing plans to determine the effectiveness of implementation of marketing principles and alternative marketing strategies. 2c. Devise plans to implement and evaluate marketing strategies for products and services used in AFNR businesses.

AGRICULTURE SCIENCES
Agriculture Welding and Structures
Grades 11 & 12
Power, Structural and Technical Systems Career Pathway

Prerequisite: Fundamentals of Ag Mechanics & Construction
or approval of Instructor

(Numbering of objectives matches national standard numbers – thus not in 1, 2, 3 order.)

STRAND 9: POWER, STRUCTURAL and TECHNICAL SYSTEMS

STANDARD 1: Apply physical science principles and engineering applications to solve problems and improve performance in AFNR power, structural and technical systems.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PST.1.2	Power, Structural & Technical Science & Engineering	**Apply physical science and engineering principles to design, implement and improve safe and efficient mechanical systems in AFNR situation.** 2c. Devise and document processes to safely implement and evaluate the safe use of AFNR related tools, machinery and equipment. 3c. Conduct a safety inspection of tools, machines and equipment used in different AFNR related mechanical systems.
HSAG.PST.1.3	Power, Structural & Technical Science & Engineering	**Apply physical science and engineering principles to metal fabrication using a variety of welding and cutting processes (e.g., SMAW, GMAW, GTAW, fuel-oxygen and plasma arc torch, etc.).** 1c. Evaluate the quality of metal fabrication procedures (e.g., SMAW, GMAW, GTAW, fuel-oxygen and plasma arc torch, etc.). 2c. Construct and/or repair metal structures and equipment using metal fabrication procedures.

STANDARD 2: Operate and maintain AFNR mechanical equipment and power systems.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PST.2.1	Power Structural & Technical	**Perform preventative maintenance and scheduled service to maintain equipment, machinery and power units used in AFNR settings.** 1b. Develop a preventative maintenance schedule for equipment, machinery and power units used in AFNR power, structural and technical systems.

	Operate & Maintain	
HSAG.PST.2.2	Power Structural & Technical Operate & Maintain	**Operate machinery and equipment while observing all safety precautions in AFNR settings.** 1c. Perform pre-operation inspections, start-up & shut-down procedures on equipment, machinery and power units as specified in owner's manuals. 2c. Adjust equipment, machinery and power units for safe and efficient operation in AFNR power, structural and technical systems.

STANDARD 4: Plan, build and maintain AFNR structures.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PST.4.1	Power, Structural & Technical Plan & Build	**Create sketches and plans for AFNR structures.** 1c. Create sketches of an agricultural structure by applying principles of design. 2b. Construct plans for agricultural structures using current technology (e.g., drafting software, computer-aided design, etc.).
HSAG.PST.4.2	Power, Structural & Technical Plan & Build	**Determine structural requirements, specifications and estimate costs for AFNR structures.** 1c. Create a project cost estimate, including materials, labor and management for an AFNR structure.
HSAG.PST.4.3	Power, Structural & Technical Plan & Build	**Follow architectural and mechanical plans to construct, maintain and/or repair AFNR structures (e.g., material selection, site preparation and/or layout, plumbing, concrete/masonry, etc.).** 1c. Select materials for a project based upon an analysis of the project and the quality of the materials. 3c. Construct AFNR structures using wood and/or metal materials. 4c. Install and/or repair pipes and plumbing equipment and fixtures in AFNR structures. 5c. Construct, maintain, and/or repair fencing, including wood, static wire, electrical wire and other fencing material.

STANDARD 5: Use control, monitoring geospatial and other technologies in AFNR power, structural and technical systems.

STANDARDS	STRAND	GOALS and PERFORMANCE OBJECTIVES
HSAG.PST.5.3	Power, Structural & Technical Technologies	**Apply geospatial technologies to solve problems and increase the efficiency of AFNR systems.** 1c. Collect data and create maps utilizing geospatial technologies.