

AGRISCIENCE TECHNOLOGY I

#01021

Description

Agriscience Technology courses integrate biological and technological concepts with principles of agriculture. Courses are designed in sequences to provide experiences in the subject matter. Units are selected to develop knowledge and skills pertaining to nutrition, reproduction, diseases, breeding, genetics, anatomy, and physiology in animals and plants. Genetic engineering, biotechnology, plant propagation techniques, agricultural production technologies, marketing technologies, aquaculture, animal health, and small animal care are examples of units that may be taught.

These courses integrate leadership and supervised agricultural experience programs. Career opportunities and educational preparation are examined. Learning activities are varied with classroom, laboratory and field experiences.

Note: These courses can be taught for Agricultural Education credit only.

Grade 9-12

½ or 1 credit

Max Credit = 1

Standard 1	AGRICULTURE, FOOD, & NATURAL RESOURCES (AFNR) CLUSTER SKILLS	
Topic 1.1	<i>Analyze how issues, trends, technologies, and public policies impact systems in the Agriculture, Food, & Natural Resources Career Cluster.</i>	
Student Competencies		
	1.1.1	RESEARCH, EXAMINE, AND DISCUSS ISSUES AND TRENDS THAT IMPACT AFNR SYSTEMS ON LOCAL, STATE, NATIONAL, AND GLOBAL LEVELS.
	1.1.1.1	Examine historical and current data to identify issues impacting AFNR systems.
	1.1.1.2	Research and summarize trends impacting AFNR systems.
	1.1.2	EXAMINE TECHNOLOGIES AND ANALYZE THEIR IMPACT ON AFNR SYSTEMS.
	1.1.2.1	Research technologies used in AFNR systems.
	1.1.2.2	Compare and contrast AFNR systems before and after the integration of technology.
	1.1.3	IDENTIFY PUBLIC POLICIES AND EXAMINE THEIR IMPACT ON AFNR SYSTEMS.
	1.1.3.1	Summarize public policies affecting AFNR systems.
	1.1.3.2	Identify influential historical and current public policies that impact AFNR systems.
Topic 1.2	<i>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.</i>	
Student Competencies		
	1.2.1	RESEARCH AND USE GEOGRAPHIC AND ECONOMIC DATA TO SOLVE PROBLEMS IN AFNR SYSTEMS.
	1.2.1.1	Research and describe different types of geographic data used in AFNR systems.
	1.2.1.2	Identify and examine economic data related to AFNR systems (e.g., commodity markets, food marketing, food, and nutritional assistance programs, etc.).
	1.2.2	EXAMINE THE COMPONENTS OF THE AFNR SYSTEMS AND ASSESS THEIR IMPACT ON THE LOCAL, STATE, NATIONAL, AND GLOBAL SOCIETY AND ECONOMY.
	1.2.2.1	Identify and summarize the components within AFNR systems (e.g., Animal Systems: health, nutrition, genetics, etc.; Natural Resources Systems: soil, water, etc.).
	1.2.2.2	Define and summarize societies on local, state, national, and global levels and describe how they relate to AFNR systems.
	1.2.2.3	Examine and summarize the components of the agricultural economy (e.g., environmental, crops, livestock, etc.).

Topic 1.3	<i>Examine and summarize the importance of health, safety, and environmental management systems in AFNR workplaces.</i>	
	Student Competencies	
	1.3.1	IDENTIFY AND EXPLAIN THE IMPLICATIONS OF REQUIRED REGULATIONS TO MAINTAIN AND IMPROVE SAFETY, HEALTH, AND ENVIRONMENTAL MANAGEMENT SYSTEMS.
	1.3.1.1	Research and explain the implications of regulatory, safety, and health standards on AFNR systems (e.g., SDS, bioterrorism, etc.)
	1.3.1.2	Summarize the importance of safety, health, and environmental management in the workplace.
	1.3.1.3	Execute health, safety, and environmental procedures to comply with regulatory and safety standards.
	1.3.2	DEVELOP AND IMPLEMENT A PLAN TO MAINTAIN AND IMPROVE HEALTH, SAFETY, AND ENVIRONMENTAL COMPLIANCE AND PERFORMANCE.
	1.3.2.1	Research and identify components required in health and safety performance plans.
	1.3.2.2	Examine and categorize examples of environmental compliance plans from AFNR workplace.
	1.3.2.3	Analyze the effectiveness of health and safety performance plans of an AFNR workplace.
	1.3.3	APPLY HEALTH AND SAFETY PRACTICES TO AFNR WORKPLACES.
	1.3.3.1	Research and summarize the purposes and objectives of health and safety policies and procedures relevant to AFNR careers.
	1.3.3.2	Identify emergency response procedures for health and safety issues at AFNR workplaces.
	1.3.3.3	Examine and categorize examples of how to avoid health or safety risks in AFNR workplaces.
	1.3.4	USE APPROPRIATE PROTECTIVE EQUIPMENT AND DEMONSTRATE SAFE AND PROPER USE OF AFNR TOOLS AND EQUIPMENT.
	1.3.4.1	Identify and differentiate the appropriate protective equipment for the safe use and operation of specific tools and equipment (e.g. PPE, etc.).
	1.3.4.2	Identify standard tools, equipment and safety procedures related to AFNR tasks.
	1.3.4.3	Read and interpret operating instructions related to operation, storage and maintenance of tools and equipment related AFNR tasks.
	1.3.4.4	Analyze and demonstrate adherence to protective equipment requirements when using various AFNR tools and equipment.
Topic 1.4	<i>Demonstrate stewardship of natural resources in AFNR activities.</i>	
	Student Competencies	
	1.4.1	IDENTIFY AND IMPLEMENT PRACTICES TO STEWARD NATURAL RESOURCES IN DIFFERENT AFNR SYSTEMS.
	1.4.1.1	Define stewardship of natural resources and distinguish how it connects to AFNR systems.
	1.4.1.2	Read and interpret the definition of sustainability and summarize how it relates to AFNR activities.

	1.4.2	ASSESS AND EXPLAIN THE NATURAL RESOURCE RELATED TRENDS, TECHNOLOGIES, AND POLICIES THAT IMPACT AFNR SYSTEMS.	
		1.4.2.1	Research and examine historical and current natural resources trends and technologies.
		1.4.2.2	Research and summarize influential historical and current natural resources policies that impact AFNR systems.
Topic 1.5	<i>Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food, & Natural Resources career pathways.</i>		
	Student Competencies		
	1.5.1	EVALUATE AND IMPLEMENT THE STEPS AND REQUIREMENTS TO PURSUE A CAREER OPPORTUNITY IN EACH OF THE AFNR CAREER PATHWAYS (E.G., GOALS, DEGREES, CERTIFICATIONS, RESUMES, COVER LETTER, PORTFOLIOS, INTERVIEWS, ETC.).	
		1.5.1.1	Identify and summarize the steps to pursue a career in an AFNR pathway (e.g., self-assessment, set goals, etc.).
		1.5.1.2	Examine the educational, training, and experiential requirements to pursue a career in an AFNR pathway (e.g., degrees, certifications, training, internships, etc.).
	1.5.2	EXAMINE AND CHOOSE CAREER OPPORTUNITIES THAT ARE MATCHED TO PERSONAL SKILLS, TALENTS, AND CAREER GOALS IN AN AFNR PATHWAY OF INTEREST.	
		1.5.2.1	Examine and categorize careers in each of the AFNR pathways.
		1.5.2.2	Research and describe careers in each of the AFNR pathways and choose potential careers connecting to personal interests and skills.
Topic 1.6	<i>Analyze the interaction among AFNR systems in the production, processing, and management of food, fiber, and fuel and the sustainable use of natural resources.</i>		
	Student Competencies		
	1.6.1	EXAMINE AND EXPLAIN FOUNDATIONAL CYCLES AND SYSTEMS OF AFNR.	
		1.6.1.1	Research and explain the foundational cycles in AFNR (e.g., water cycle, nutrient cycle, carbon cycle, etc.).
		1.6.1.2	Examine and describe examples of systems within AFNR (e.g., sustainability, gate-to-plate, etc.).
	1.6.2	ANALYZE AND EXPLAIN THE CONNECTION AND RELATIONSHIPS BETWEEN DIFFERENT AFNR SYSTEMS ON A NATIONAL AND GLOBAL LEVEL.	
		1.6.2.1	Summarize how AFNR systems connect and relate on a national and global level (e.g., soil, water, economic, etc.).
		1.6.2.2	Examine and summarize changes that happen in AFNR systems on a national and global level (e.g., using less irrigation water, reduction of inputs, etc.).

Standard 3	ANIMAL SYSTEMS	
Topic 3.1	<i>Analyze historic and current trends impacting the animal systems industry.</i>	
Student Competencies		
	3.1.1	EVALUATE THE DEVELOPMENT AND IMPLICATIONS OF ANIMAL ORIGIN, DOMESTICATION, AND DISTRIBUTION ON PRODUCTION PRACTICES AND THE ENVIRONMENT.
	3.1.1.1	Identify and summarize the origin, significance, distribution, and domestication of different animal species.
	3.1.1.2	Research and summarize major components of animal systems (e.g., livestock, companion animal, etc.).
	3.1.2	ASSESS AND SELECT ANIMAL PRODUCTION METHODS FOR USE IN ANIMAL SYSTEMS BASED UPON THEIR EFFECTIVENESS AND IMPACTS.
	3.1.2.1	Identify and categorize terms and methods related to animal production (e.g., sustainable, conventional, humanely raised, natural, organic, etc.).
	3.1.2.2	Research and examine marketing methods for animal products and services (e.g., conventional, niche markets, locally grown, etc.).
	3.1.2.3	Summarize the types, purposes, and characteristics of effective record keeping and documentation practices for animal systems enterprises (e.g., managing records for animal identification, feeding, breeding, treatment, income/expense, etc.).
	3.1.2.4	Identify and summarize wildlife management methods.
Topic 3.2	<i>Utilize best-practice protocols based upon animal behaviors for animal husbandry and welfare.</i>	
Student Competencies		
	3.2.2	ANALYZE PROCEDURES TO ENSURE THAT ANIMAL PRODUCTS ARE SAFE FOR CONSUMPTION (E.G., USE IN FOOD SYSTEM, ETC.).
	3.2.2.1	Identify and categorize tools, technology and equipment used in animal husbandry and welfare to help provide an abundant and safe food supply.
	3.2.2.2	Research and summarize animal production practices that may pose health risks.
	3.2.2.3	Identify and describe animal tracking systems used in animal systems (e.g., livestock, companion animal, exotics, etc.).
	3.2.2.4	Utilize tools, technology, and equipment to perform animal husbandry and welfare tasks.
	3.2.2.5	Analyze consumer concerns with animal production practices relative to human health.
	3.2.2.6	Analyze and summarize the impact of animal trace-back capabilities on producers and consumers.

Topic 3.5	<i>Evaluate environmental factors affecting animal performance and implement procedures for enhancing performance and animal health.</i>	
	Student Competencies	
3.5.1	DESIGN ANIMAL HOUSING, EQUIPMENT, AND HANDLING FACILITIES FOR THE MAJOR SYSTEMS OF ANIMAL PRODUCTION.	
	3.5.1.1	Differentiate between the types of facilities needed to house and produce animal species safely and efficiently.
	3.5.1.2	Identify and summarize equipment, technology, and handling facility procedures used in modern animal production (e.g., climate control devices, sensors, automation, etc.).
3.5.2	COMPLY WITH GOVERNMENT REGULATIONS AND SAFETY STANDARDS FOR FACILITIES USED IN ANIMAL PRODUCTION.	
	3.5.2.1	Identify and summarize the general standards that must be met in facilities for animal production (e.g., environmental, zoning, construction, etc.).
	3.5.2.2	Distinguish between the types of laws and regulations pertaining to animal systems.
Topic 3.6	<i>Classify, evaluate, and select animals based on anatomical and physiological characteristics.</i>	
	Student Competencies	
3.6.1	CLASSIFY ANIMALS ACCORDING TO TAXONOMIC CLASSIFICATION SYSTEMS AND USE (E.G. AGRICULTURAL, COMPANION, ETC.).	
	3.6.1.1	Explain the importance of the binomial nomenclature system for classifying animals.
	3.6.1.2	Compare and contrast major uses of different animal species (e.g., agricultural, companion, etc.).
	3.6.1.3	Identify and summarize common classification terms utilized in animal systems (e.g., external and internal body parts, maturity, mature male, immature female, animal products, breeds, etc.).
3.6.3	SELECT AND TRAIN ANIMALS FOR SPECIFIC PURPOSES AND MAXIMUM PERFORMANCE BASED ON ANATOMY AND PHYSIOLOGY.	
	3.6.3.1	Identify and summarize how an animal's health can be affected by anatomical and physiological disorders.
	3.6.3.2	Evaluate an animal against its optimal anatomical and physiological characteristics.
	3.6.3.3	Research and summarize the use of products and by-products derived from animals.
	3.6.3.4	Compare and contrast desirable anatomical and physiological characteristics of animals within and between species.
	3.6.3.5	Compare and contrast procedures to sustainably and efficiently develop an animal to reach its highest performance potential with respect to its anatomical and physiological characteristics.

Topic 3.8	Analyze environmental factors associated with animal production.	
	Student Competencies	
	3.8.1	DESIGN AND IMPLEMENT METHODS TO REDUCE THE EFFECTS OF ANIMAL PRODUCTION ON THE ENVIRONMENT.
	3.8.1.1	Identify and summarize the effects of animal agriculture on the environment (e.g., waste disposal, carbon footprint, air quality, environmental efficiencies, etc.).
	3.8.2	EVALUATE THE EFFECTS OF ENVIRONMENTAL CONDITIONS ON ANIMALS AND CREATE PLANS TO ENSURE FAVORABLE ENVIRONMENTS FOR ANIMALS.
	3.8.2.1	Research and summarize environmental conditions that impact animals (e.g., weather, sources of water, food resources, etc.).
	3.8.2.2	Identify and summarize methods for ensuring optimal environmental conditions for animals.
	3.8.2.3	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.).

Standard 5	ENVIRONMENTAL SERVICE SYSTEMS	
Topic 5.1	Use analytical procedures and instruments to manage environmental service systems.	
	Student Competencies	
	5.1.1	ANALYZE AND INTERPRET LABORATORY AND FIELD SAMPLES IN ENVIRONMENTAL SERVICE SYSTEMS.
	5.1.1.1	Identify sample types and sampling techniques used to collect laboratory and field data.
	5.1.1.2	Identify methods of statistical analysis commonly used in research (e.g., mean, standard deviation, standard error, error bars, etc.).
	5.1.1.3	Determine the appropriate sampling techniques needed to generate data.
	5.1.2	PROPERLY UTILIZE SCIENTIFIC INSTRUMENTS IN ENVIRONMENTAL MONITORING SITUATIONS (E.G., LABORATORY EQUIPMENT, ENVIRONMENTAL MONITORING INSTRUMENTS, ETC.).
	5.1.2.1	Identify basic laboratory equipment and explain their uses.
	5.1.2.2	Identify basic environmental monitoring instruments and explain their uses.
	5.1.2.3	Demonstrate the proper use and maintenance of basic laboratory equipment.
	5.1.2.4	Demonstrate the proper use and maintenance of environmental monitoring instruments.

Topic 5.2	<i>Evaluate the impact of public policies and regulations on environmental service system operations.</i>	
	Student Competencies	
	5.2.1	INTERPRET AND EVALUATE THE IMPACT OF LAWS, AGENCIES, POLICIES, AND PRACTICES AFFECTING ENVIRONMENTAL SERVICE SYSTEMS.
	5.2.1.1	Distinguish between the types of laws associated with environmental service systems.
	5.2.1.2	Distinguish between the types of government agencies (i.e., local, state, and federal) associated with environmental service systems.
	5.2.1.3	Research policies, practices and initiatives common in business and advocacy groups associated with environmental service systems (e.g., zero-waste, LEED-certified, locally-grown, etc.).
	5.2.1.4	Analyze the structure of laws associated with environmental service systems.
	5.2.2	COMPARE AND CONTRAST THE IMPACT OF CURRENT TRENDS ON REGULATION OF ENVIRONMENTAL SERVICE SYSTEMS (E.G., CLIMATE CHANGE, POPULATION GROWTH, INTERNATIONAL TRADE, ETC.).
	5.2.2.1	Research and categorize the purpose, implementation, and impact of greenhouse gas emission policies (e.g., cap-and-trade, emission offsetting, zero-emissions, carbon-neutrality, carbon sequestration, etc.).
	5.2.2.2	Research the impact of environmental service systems regulations on international trade.
	5.2.2.3	Examine and summarize the impact that population growth has on environmental service systems.
	5.2.2.4	Research current policies related to fracking and shale oil gas.
	5.2.3	EXAMINE AND SUMMARIZE THE IMPACT OF PUBLIC PERCEPTIONS AND SOCIAL MOVEMENTS ON THE REGULATION OF ENVIRONMENTAL SERVICE SYSTEMS.
	5.2.3.1	Research and summarize how the perception and regulation of environmental service systems has changed over time.
	5.2.3.2	Examine how social views and movements (e.g., zero-waste philosophy, carbon footprints, recycling, etc.) have affected the implementation and need for regulation of environmental service systems.
	5.2.3.3	Analyze and summarize specific changes to perceptions and regulations of environmental service systems and their impact on reducing the ecological, economical, and sociological impact.
	5.2.3.4	Assess the effectiveness of specific social movements related to regulation of environmental service systems.
Topic 5.3	<i>Develop proposed solutions to environmental issues, problems, and applications using scientific principles of meteorology, soil science, hydrology, microbiology, chemistry, and ecology.</i>	
	Student Competencies	
	5.3.1	APPLY METEOROLOGY PRINCIPLES TO ENVIRONMENTAL SERVICE SYSTEMS.
	5.3.1.1	Distinguish between the different components and structural layers of the earth's atmosphere.
	5.3.1.2	Analyze how meteorological conditions influence air quality.
	5.3.1.3	Research climate change and summarize evidence that climate change is occurring.

	5.3.1.4	Examine and summarize factors that affect the earth's balance of energy.
	5.3.2	APPLY SOIL SCIENCE AND HYDROLOGY PRINCIPLES TO ENVIRONMENTAL SERVICE SYSTEMS.
	5.3.2.1	Differentiate and distinguish land uses, capability factors, and land capability classes.
	5.3.2.2	Research and describe the process of soil formation through weathering.
	5.3.2.3	Examine and explain how the physical qualities of the soil influence the infiltration and percolation of water.
	5.3.2.4	Summarize environmental hazards associated with groundwater supplies.
	5.3.3	APPLY CHEMISTRY PRINCIPLES TO ENVIRONMENTAL SERVICE SYSTEMS.
	5.3.3.1	Examine and summarize how chemistry affects soil structure and function (e.g., pH, cation-exchange capacity, filtration capability, flooding likelihood, etc.).
	5.3.3.2	Examine and summarize how chemistry affects water quality and function (e.g., oxygen saturation, pH, biomagnification, etc.).
	5.3.3.3	Examine and summarize how chemistry affects air quality and function (e.g., heat retention, formation of smog and acid rain, etc.).
	5.3.3.4	Examine and summarize the relationship between water and soil chemistry and the formation of different kinds of wetlands (e.g., fens, peat bogs, potholes, etc.).
	5.3.4	APPLY MICROBIOLOGY PRINCIPLES TO ENVIRONMENTAL SERVICE SYSTEMS.
	5.3.4.1	Describe the microbial biodiversity found in soil and summarize the contribution of microbial biodiversity to the physical and chemical characteristics of soil.
	5.3.4.2	Research and describe how microbial populations in an ecosystem affect carbon cycling.
	5.3.4.3	Examine and explain the role that microbes play in wastewater treatment.
	5.3.4.4	Research the purposes of bioassay tests and describe potential applications for environmental service systems.
	5.3.4.5	Assess how the activities of microorganisms in soil affect environmental service systems and ecosystem biodiversity.
Topic 5.4	<i>Demonstrate the operation of environmental service systems (e.g., pollution control, water treatment, wastewater treatment, solid waste management, and energy conservation).</i>	
	Student Competencies	
	5.4.1	USE POLLUTION CONTROL MEASURES TO MAINTAIN A SAFE FACILITY AND ENVIRONMENT.
	5.4.1.1	Identify and distinguish types of pollution and distinguish between point source and nonpoint source pollution.
	5.4.1.2	Research ways in which pollution can be managed and prevented and propose solutions to meet the needs of local systems.
	5.4.2	MANAGE SAFE DISPOSAL OF ALL CATEGORIES OF SOLID WASTE IN ENVIRONMENTAL SERVICE SYSTEMS.
	5.4.2.1	Compare and contrast different types of solid waste and options for treating solid waste.

	5.4.2.2	Examine and describe the components of disposing waste in sanitary landfills.
	5.4.2.3	Research and summarize the benefits and processes of composting.
	5.4.2.4	Examine and describe the importance and potential impact of recycling.
5.4.3	APPLY TECHNIQUES TO ENSURE A SAFE SUPPLY OF DRINKING WATER AND ADEQUATE TREATMENT OF WASTEWATER ACCORDING TO APPLICABLE RULES AND REGULATIONS.	
	5.4.3.1	Categorize chemical and physical properties of drinking water.
	5.4.3.2	Research methods commonly used to treat wastewater and septic waste.
	5.4.3.3	Analyze and document all steps in the public drinking water treatment process according to applicable standards.
	5.4.3.4	Analyze and document the steps necessary to ensure that wastewater and septic waste can be safely released into the environment.
Topic 5.5	<i>Use tools, equipment, machinery, & technology common to tasks in environmental service systems.</i>	
	Student Competencies	
5.5.2	PERFORM ASSESSMENTS OF ENVIRONMENTAL CONDITIONS USING EQUIPMENT, MACHINERY, AND TECHNOLOGY.	
	5.5.2.1	Research and summarize methods used to determine water quality (e.g., dissolved oxygen, chemical tests, macroinvertebrates, etc.) and determine if a source of water has been contaminated.
	5.5.2.2	Research and summarize methods and tools used to measure soil health and determine if an area of land has been contaminated (e.g., soil probes, core monolith, soil fertility tests, etc.).
	5.5.2.3	Research and summarize methods and tools used to determine air quality and determine if pollution is present (e.g., CO2 probe, particulate matter sampler, etc.).
	5.5.2.4	Research and summarize methods used to determine ecological health and determine if an ecosystem is threatened (e.g., quadrat analysis, bioindicators, mark-recapture, etc.).

Standard 7	NATURAL RESOURCE SYSTEMS	
Topic 7.1	<i>Plan and conduct natural resource management activities that apply logical, reasoned, and scientifically based solutions to natural resource issues and goals.</i>	
	Student Competencies	
7.1.1	APPLY METHODS OF CLASSIFICATION TO EXAMINE NATURAL RESOURCE AVAILABILITY AND ECOSYSTEM FUNCTION IN A PARTICULAR REGION.	
	7.1.1.1	Summarize and classify the different kinds of natural resources using common classification schemes (e.g., living vs. non-living, renewable vs. nonrenewable, native vs. introduced, etc.).
	7.1.1.2	Summarize the components that comprise all ecosystems.
	7.1.1.3	Summarize and classify different kinds of living species based on evolutionary traits.

	7.1.1.4	Assess the characteristics of a natural resource to determine its classification.
	7.1.2	CLASSIFY DIFFERENT TYPES OF NATURAL RESOURCES IN ORDER TO ENABLE PROTECTION, CONSERVATION, ENHANCEMENT, AND MANAGEMENT IN A PARTICULAR GEOGRAPHICAL REGION.
	7.1.2.1	Research and examine the characteristics used to identify trees and woody plants.
	7.1.2.2	Research and examine the characteristics used to identify herbaceous plants.
	7.1.2.3	Research and examine the characteristics used to identify wildlife and insects.
	7.1.2.4	Research and examine the characteristics used to identify aquatic species.
	7.1.2.5	Research and examine the characteristics used to identify non-living resources (e.g., soil types, climate, geography, etc.).
	7.1.2.6	Research the purpose and value of resource inventories and population studies.
	7.1.2.7	Apply identification techniques to determine the species of a tree or woody plant.
	7.1.2.8	Apply identification techniques to determine the species of an herbaceous plant.
	7.1.2.9	Apply identification techniques to determine the species of wildlife or insect.
	7.1.2.10	Apply identification techniques to determine the species of an aquatic organism.
	7.1.2.11	Apply identification techniques to determine the types of non-living resources in an area.
	7.1.3	APPLY ECOLOGICAL CONCEPTS AND PRINCIPLES TO ATMOSPHERIC NATURAL RESOURCE SYSTEMS.
	7.1.3.1	Classify different kinds of biogeochemical cycles and the role they play in natural resources systems.
	7.1.3.2	Research and summarize how climate factors influence natural resource systems.
	7.1.3.3	Assess the role that the atmosphere plays in the regulation of biogeochemical cycles.
	7.1.3.4	Analyze the impact that climate has on natural resources and debate how this impact has changed due to human activity.
	7.1.4	APPLY ECOLOGICAL CONCEPTS AND PRINCIPLES TO AQUATIC NATURAL RESOURCE SYSTEMS.
	7.1.4.1	Summarize the roles and properties of watersheds.
	7.1.4.2	Examine and describe the importance of groundwater and surface water to natural resources.
	7.1.4.3	Compare and contrast riparian zones and riparian buffers based on their function.
	7.1.4.4	Assess the function of watersheds and their effect on natural resources.
	7.1.5	APPLY ECOLOGICAL CONCEPTS AND PRINCIPLES TO TERRESTRIAL NATURAL RESOURCE SYSTEMS.
	7.1.5.1	Research and describe the stages of ecological succession.
	7.1.5.2	Compare and contrast the impact of habitat disturbances and habitat resilience.
	7.1.5.3	Compare and contrast techniques associated with sustainable forestry (e.g., timber stand improvement, diversity improvement, reforestation, etc.).
	7.1.5.4	Compare and contrast techniques associated with soil management (e.g., soil survey and interpretation, erosion control, etc.).

	7.1.6	APPLY ECOLOGICAL CONCEPTS AND PRINCIPLES TO LIVING ORGANISMS IN NATURAL RESOURCE SYSTEMS.
	7.1.6.1	Differentiate between population ecology, population density, and population dispersion and describe the importance of these concepts to natural resource systems.
	7.1.6.2	Research and summarize examples of invasive species.
	7.1.6.3	Analyze the factors that influence population density and population dispersion in natural resource systems.
	7.1.6.4	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.
Topic 7.2	<i>Analyze the interrelationships between natural resources and humans.</i>	
	Student Competencies	
	7.2.1	EXAMINE & INTERPRET THE PURPOSE, ENFORCEMENT, IMPACT, & EFFECTIVENESS OF LAWS & AGENCIES RELATED TO NATURAL RESOURCE MANAGEMENT, PROTECTION, ENHANCEMENT, & IMPROVEMENT (E.G., WATER REGULATIONS, GAME LAWS, HISTORIC PRESERVATION LAWS, ENVIRONMENTAL POLICY, ETC.).
	7.2.1.1	Distinguish between the types of laws associated with natural resources systems.
	7.2.1.2	Distinguish between the types of agencies associated with natural resources systems.
	7.2.1.3	Analyze the structure of laws associated with natural resources systems.
	7.2.1.4	Analyze the specific purpose of agencies associated with natural resources systems.
	7.2.2	ASSESS THE IMPACT OF HUMAN ACTIVITIES ON THE AVAILABILITY OF NATURAL RESOURCES.
	7.2.2.1	Summarize the relationship between natural resources, ecosystems, and human activity.
	7.2.2.2	Categorize the primary causes of extinction of living species due to human activity (e.g., overharvesting, habitat loss, invasive species, pollution, etc.).
	7.2.2.3	Examine and describe the manner in which modern lifestyles are related to the depletion of natural resources.
	7.2.2.4	Assess and explain how different kinds of human activity affect the use and availability of natural resources (i.e., agriculture, industry, transportation, etc.).
	7.2.2.5	Assess causes of extinction and describe how those causes related to loss of biodiversity.
	7.2.2.6	Identify solutions to improve the sustainability of modern lifestyles.
	7.2.3	ANALYZE HOW MODERN PERCEPTIONS OF NATURAL RESOURCE MANAGEMENT, PROTECTION, ENHANCEMENT, & IMPROVEMENT CHANGE & DEVELOP OVER TIME.
	7.2.3.1	Summarize and categorize the different social considerations in regards to the use of natural resources (e.g., public vs. private, laws and regulations, economics, green technology, etc.).

	7.2.3.2	Research and assess how historical figures played a prominent role in shaping how natural resources are viewed and used today (e.g., Aldo Leopold, Teddy Roosevelt, John Muir, Rachel Carson, Gaylord Nelson, etc.).
	7.2.3.3	Research how technology has affected the use and views of natural resources.
	7.2.3.4	Analyze how social considerations can affect the use and sustainability of natural resources.

Standard 8	PLANT SYSTEMS	
Topic 8.1	<i>Develop and implement a crop management plan for a given production goal that accounts for environmental factors.</i>	
	Student Competencies	
	8.1.1	DETERMINE THE INFLUENCE OF ENVIRONMENTAL FACTORS ON PLANT GROWTH.
	8.1.1.1	Identify and summarize the three measurements of light – color, intensity, and duration – that affect plant growth.
	8.1.1.2	Identify and summarize the effects of air and temperature on plant metabolism and growth.
	8.1.1.3	Identify and summarize the effects of water quality on plant growth (e.g., pH, dissolved solids, etc.).
	8.1.1.4	Analyze and describe plant responses to light color, intensity, and duration.
	8.1.2	PREPARE AND MANAGE GROWING MEDIA FOR USE IN PLANT SYSTEMS.
	8.1.2.1	Identify the major components of growing media and describe how growing media support plant growth.
	8.1.2.2	Identify the categories of soil water.
	8.1.2.3	Describe the physical and chemical characteristics of growing media and explain the influence they have on plant growth.
	8.1.3	DEVELOP AND IMPLEMENT A FERTILIZATION PLAN FOR SPECIFIC PLANTS OR CROPS.
	8.1.3.1	Identify the essential nutrients for plant growth and development and their major functions (e.g., nitrogen, phosphorous, potassium, etc.).
	8.1.3.2	Discuss the influence of pH and cation exchange capacity on the availability of nutrients.
Topic 8.2	<i>Apply principles of classification, plant anatomy, and plant physiology to plant production and management.</i>	
	Student Competencies	
	8.2.1	CLASSIFY PLANTS ACCORDING TO TAXONOMIC SYSTEMS.
	8.2.1.1	Identify and summarize systems used to classify plants based on specific characteristics.
	8.2.1.2	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.).
	8.2.1.3	Compare and contrast the hierarchical classification of agricultural and ornamental plants.

	8.2.1.4	Identify and describe important plants to agricultural and ornamental plant systems by common names.
	8.2.2	APPLY KNOWLEDGE OF PLANT ANATOMY AND THE FUNCTIONS OF PLANT STRUCTURES TO ACTIVITIES ASSOCIATED WITH PLANT SYSTEMS.
	8.2.2.1	Identify structures in a typical plant cell and summarize the function of plant cell organelles.
	8.2.2.2	Identify and summarize the components, the types, and the functions of plant roots.
	8.2.2.3	Identify and summarize the components and the functions of plant stems.
	8.2.2.4	Research and summarize leaf morphology and the functions of leaves.
	8.2.2.5	Identify and summarize the components of a flower, the functions of a flower, and the functions of flower components.
	8.2.2.6	Identify and summarize the functions and components of seeds and fruit.
	8.2.3	APPLY KNOWLEDGE OF PLANT PHYSIOLOGY AND ENERGY CONVERSION TO PLANT SYSTEMS.
	8.2.3.1	Summarize the importance of photosynthesis to plant life on earth and the process of photosynthesis, including the types (c3, c4, Cam), its stages (e.g., light-dependent and light independent reactions), and its products and byproducts.
	8.2.3.2	Summarize the stages of cellular respiration including their products and byproducts.
	8.2.3.3	Summarize primary growth and the role of the apical meristem.
	8.2.3.4	Identify and categorize the five groups of naturally occurring plant hormones and synthetic plant growth regulators.

Career Ready Practices (CRP)

CRP 1	Act as a responsible and contributing citizen and employee.
CRP 2	Apply appropriate academic and technical skills.
CRP 3	Attend to personal health and financial well-being.
CRP 4	Communicate clearly, effectively, and with reason.
CRP 5	Consider the environmental, social, and economic impacts of decisions.
CRP 6	Demonstrate creativity and innovation.
CRP 7	Employ valid and reliable research strategies.
CRP 8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP 9	Model integrity, ethical leadership, and effective management.
CRP 10	Plan education and career path aligned to personal goals.
CRP 11	Use technology to enhance productivity.
CRP 12	Work productively in teams while using cultural/global competence.

OTHER

1	FFA Student Handbook/Leadership	
	1.1	Explain aims and purposes of FFA.
	1.2	Explain importance of FFA as part of the Agriculture Education program.
	1.3	Memorize FFA motto and creed.
	1.4	Describe history of FFA.
	1.5	Describe opportunities available to FFA members.
	1.6	Define leadership.
	1.7	Explain the importance of effective leadership in agriculture.
2	Supervised Agricultural Experience (SAE)	
	2.1	Define SAE.
	2.2	Explain importance of SAE as part of the Agriculture Education program.
	2.3	Explain different types of SAEs (e.g. entrepreneur, placement, experimental research, non-experimental research, exploratory, directed activities, and improvement).
	2.4	Identify basic record book functions (e.g. goal setting, plan of action, leadership in FFA, community involvement).
	2.5	Explain goal setting.
	2.6	Write goals.