Agriculture, Food and Natural Resources
Subject Code: 010005
Course & Unit Descriptions

Course Description:
This course will teach students how to work in groups and develop their leadership abilities through hands on activities. Students will use the opportunities the FFA provide for growth and build upon their interpersonal skills. Students will use the animal science unit to promote proper animal husbandry and production to make sound decisions as a producer and consumer. Students will explain and demonstrate the basics in plant production and harvesting in helping make sound decisions as a consumer and producer.

Unit: Team Building/Leadership

Students will learn techniques that will allow them to work in groups and share leadership skills. Students will use presentation etiquette and foster positive working relationships with their peers.

Benchmark: 3.7 Communication Skills
Level 1: Integrate a variety of communication techniques to gather and convey information to an individual or small group

Indicators
3.7.01 Apply techniques to participate in/facilitate a group discussion
3.7.02 Apply active listening strategies
3.7.03 Develop and deliver formal and informal presentations
3.7.10 Practice etiquette when using communication techniques

Academic Standards
English: Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly. (Writing Applications C, 11-12)
Math: Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (Algebra D, 8-10)
Social Studies: Evaluate the reliability and credibility of sources. (Social Studies Skills and Methods A, 9 -10)

Benchmark: 3.9 Emotional Intelligence
Level 1: Exhibit desirable personal and professional appearance, attitudes, behaviors, and work habits

Indicators
3.9.02 Identify how individual actions impact others
3.9.04 Describe and exhibit appropriate ethical behavior
3.9.05 Accept and use constructive feedback to improve work habits
3.9.08 Foster positive working relationships

Academic Standards
English: Use a variety of strategies to enhance listening comprehension. (Communication A, 8-10; Communication A, 11-12)
Social Studies: Analyze how issues may be viewed differently by various cultural groups. (People in Societies A, 11-12)

Unit: FFA

Students will demonstrate how FFA can make a positive influence in leadership skills. Students will lead group discussions as well as demonstrate the professionalism needed to foster positive working relationships.

Benchmark: 3.7 Communication Skills
Level 1: Integrate a variety of communication techniques to gather and convey information to an individual or small group

Indicators
3.7.01 Apply techniques to participate in/facilitate a group discussion
3.7.02 Apply active listening strategies
3.7.03 Develop and deliver formal and informal presentations
3.7.04 Articulate ideas and impact audience through verbal and nonverbal communication
3.7.05 Communicate directions in an organized manner appropriate to the audience
3.7.07 Extract relevant, valid information from materials and cite sources of information

Academic Standards
English: Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly. (Writing Applications C, 11-12)
Math: Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (Algebra D, 8-10)
Social Studies: Evaluate the reliability and credibility of sources. (Social Studies Skills and Methods A, 9 -10)

Benchmark: 3.8 Business Leadership
Level 1: Determine appropriate leadership style for a specific situation and apply to the situation

Indicators
3.8.01 Identify the purpose of leadership, the ethical dimensions of leadership and the relationship between leaders and team members
3.8.02 Identify leadership styles and traits of leaders
3.8.03 Identify the impact of individual differences and different situations on the practice of leadership
3.8.05 Participate in and lead a small group with an interdependent task
3.8.11 Develop relationships with peer groups, support services, and professional organizations

Academic Standards
English: Use a variety of strategies to enhance listening comprehension. (Communication A, 8-10; Communication A, 11-12)
Math: Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner. (Mathematical Processes H, 8-10)
Social Studies: Critique data and information to determine the adequacy of support for conclusions. Social Studies Skills and Methods B, 11-12)

Benchmark: 3.9 Emotional Intelligence
Level 1: Exhibit desirable personal and professional appearance, attitudes, behaviors, and work habits

Indicators
3.9.03 Manage personal emotions, behavior and appearance to maintain professionalism
3.9.06 Employ appropriate coping skills to prevent/handle workplace conflicts
3.9.08 Foster positive working relationships

Academic Standards

English: Use a variety of strategies to enhance listening comprehension. (Communication A, 8-10; Communication A, 11-12)

Social Studies: Analyze how issues may be viewed differently by various cultural groups. (People in Societies A, 11-12)

Unit: Parliamentary Law

Students will demonstrate the proper use of Robert's Rules of Order. Students will properly lead and participate in a meeting using the correct laws required along with demonstrating communication skills.

Benchmark: 3.7 Communication Skills

Level 1: Integrate a variety of communication techniques to gather and convey information to an individual or small group

Indicators

3.7.06 Use consensus-building techniques, including parliamentary procedure, to make decisions and compile summary of meeting minutes, conclusions, and next steps

3.7.10 Practice etiquette when using communication techniques

Academic Standards

English: Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly. (Writing Applications C, 11-12)

Math: Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (Algebra D, 8-10)

Social Studies: Evaluate the reliability and credibility of sources. (Social Studies Skills and Methods A, 9 -10)

Benchmark: 3.8 Business Leadership

Level 1: Determine appropriate leadership style for a specific situation and apply to the situation

Indicators

3.8.05 Participate in and lead a small group with an interdependent task

3.8.11 Develop relationships with peer groups, support services, and professional organizations

Academic Standards

English: Use a variety of strategies to enhance listening comprehension. (Communication A, 8-10; Communication A, 11-12)

Math: Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner. (Mathematical Processes H, 8-10)

Social Studies: Critique data and information to determine the adequacy of support for conclusions. (Social Studies Skills and Methods B, 11-12)

Unit: Body Functions

Students will identify and describe the functions of an animal's body systems.

Benchmark: 1.2 Body Systems

Level 1: Differentiate the functions of body systems

Indicators

1.2.01 Identify external anatomical parts and functions

1.2.02 Identify the anatomy and describe the physiology of the digestive systems

1.2.03 Identify the anatomy and describe the physiology of the nervous systems
1.2.04 Identify the anatomy and describe the physiology of the skeletal systems
1.2.05 Identify the anatomy and describe the physiology of the musculature systems
1.2.06 Identify the anatomy and describe the physiology of the circulatory systems
1.2.08 Identify the anatomy and describe the physiology of the respiratory systems
1.2.09 Identify the anatomy and describe the physiology of the urinary systems
1.2.11 Identify the anatomy and describe the physiology of the endocrine systems
1.2.14 Compare and contrast variations of systems among species and their adaptive values

Academic Standards

English: Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)

Unit: Animal Nutrition

Students will demonstrate a working knowledge of animal nutrition. Students will identify different components of an animal's feed and how it impacts the animal's growth and nutritional requirements.

Benchmark: 1.1 Nutrition

Level 1: Analyze the nutritional content of a ration and administer it to animals

Indicators

1.1.01 Identify types, composition, quality and compatibility of feeds, feed additives, and feed byproducts
1.1.02 Determine the role of nutrients and the nutritional requirements (matter and energy) for different life processes of the animal (e.g., maintenance/homeostasis, growth, reproduction, lactation)
1.1.03 Analyze nutritional content and quality of feeds (e.g., fiber, sodium, proteins, carbohydrates, lipids)
1.1.04 Identify and treat major nutrient deficiency and toxicity symptoms
1.1.05 Describe possible toxins, pathogens and contaminants found in feedstuffs (biological and nonbiological) and their impact on animals

Academic Standards

English: Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)
Math: Write and solve real-world, multi-step problems involving money, elapsed time and temperature, and verify reasonableness of solutions. (Measurement F, 8-10)
Science: Describe the finite nature of Earth's resources and those human activities that can conserve or deplete Earth's resources. (Earth and Space Sciences D, 9-10)

Unit: Animal Reproduction

Students will identify the differences between male and female reproductive systems. Students will identify the different breeding methods available and demonstrate their knowledge of basic genetics.

Benchmark: 1.2 Body Systems

Level 1: Differentiate the functions of body systems

Indicators

1.2.10 Identify the anatomy and describe the physiology of the male and female reproductive systems

Academic Standards

English: Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)

Benchmark: 1.5 Population Management

Level 1: Differentiate reproductive processes across species and determine the extent to which breeding programs can be implemented for an intended purpose or outcome

Indicators

1.5.01 Determine the factors that influence estrus, gestation and parturition and employ appropriate management practices

1.5.02 Evaluate and employ breeding methods (e.g., artificial insemination, embryo transfer, natural selection, selective breeding, invitro fertilization)

1.5.03 Practice ethical/responsible animal population management (e.g., spay, neuter, euthanasia, birth control, relocation, reintroduction, hunting)

1.5.04 Manipulate an animal's reproductive processes (e.g., sex-sorted semen, birth control, heat synchronization, nutritional flushing)

1.5.05 Select and implement reproductive management practices (e.g., male to female ratios, fertility, soundness for breeding, age and weight for breeding and timing, other requirements for breed and species integrity) and monitor embryos/fetuses

Academic Standards

Math: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)

Science: Describe how human activities can impact the status of natural systems. (Life Sciences G, 9 -10)

Benchmark: 2.3 Genetics

Level 1: Use mono-and di-hybrid crosses to predict genotype and phenotype

Indicators

2.3.01 Predict and explain offspring genotypes and phenotypes using Mendel's Laws and Punnett Square

2.3.07 Discuss alternative types of gene expression (e.g., sex-limited, sex-linked, partial dominance, epistatic, pleiotropic).

Academic Standards

English: Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)

Math: Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis F, 8-10)

Science: Explain the genetic mechanisms and molecular basis of inheritance. (Life Sciences C, 9-10)

Unit: Animal Health and Quality Assurance

Students will demonstrate their knowledge of animal care and husbandry. Students will identify different breeds among species, proper nutrition and feeding, routes of administering medication, and forms of identification. Students will identify and troubleshoot the areas needed to provide proper animal welfare.

Benchmark: 1.3 Care and Management
Level 1: Describe the fundamental care and management practices for animals and select, handle, mark, manage environmental conditions, and provide general care for a limited number of animals or animal species

Indicators
1.3.01 Identify, classify, evaluate and select animal species and/or breeds
1.3.02 Recognize and determine the biotic and abiotic factors that impact the animals' environment (e.g., air, ventilation)
1.3.03 Describe and implement scientific concepts of animal welfare
1.3.04 Apply and record animal identification procedures and requirements (e.g., tagging, tattooing, ear notching, banding, branding, painting, electronic microchip implanting)
1.3.08 Identify, evaluate and perform general animal care/welfare procedures based on animal's use, species and life stage (e.g., weaning, dehorning, castrating, trimming hooves, milking, weighing, grooming, dental cleaning, dental floating, nail trimming)

Academic Standards
Math: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)
Science: Explain the structure and function of ecosystems and relate how ecosystems change over time. (Life Sciences F, 9-10)

Benchmark: 1.4 Animal Health
Level 1: Identify prevalent diseases/disorders across animal groups and implement treatment and maintenance options to remedy an animal's health and welfare

Indicators
1.4.01 Evaluate general condition of animal using diagnostic methods (e.g., visual exam, physical exam, vital signs)
1.4.02 Describe diseases/disorders and their symptoms that are caused by microorganisms, parasites, genetic defects and environmental factors
1.4.03 Identify signs of pain, distress, disease and allergic reactions
1.4.12 Describe the routes of administration for medications (e.g., intranasal, oral, IV, subQ, IM) and the process of drug absorption, distribution, metabolism, withdrawal and excretion
1.4.13 Calculate pharmaceutical dosages/mixtures, administer drug treatments and monitor potential problems associated with incorrect administration and common adverse effects

Academic Standards
English: Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)
Math: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)
Science: Explain the characteristics of life as indicated by cellular processes and describe the process of cell division and development. (Life Sciences B, 9-10)

Benchmark: 3.1 Marketing
Level 1: Promote a product or service using basic strategies for packaging, display and publicity.

Indicators:
3.1.11 Evaluate the benefits of commodity check-off programs.

Academic Standards
English: Evaluate the usefulness and credibility of data and sources and synthesize information from multiple sources. (Research C, 11-12)

Math: Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (Patterns, Functions and Algebra D, 8-10)
Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner. (Mathematical Processes H, 8-10)

Social Studies: Analyze how scarcity of productive resources affects supply, demand, inflation and economic choices. (Economics A, 11-12)
Critique data and information to determine the adequacy of support for conclusions. (Social Studies Skills and Methods B, 11-12)

Unit: Supervised Agricultural Experiences and Record Keeping

Students will use technology such as word processors, databases, spreadsheets, and electronic mail to maintain accurate business records.

Benchmark: 3.1 Marketing
Level 1: Promote a product or service using basic strategies for packaging, display and publicity.

Indicators
3.1.05 Set prices using supply and demand curves and commodity and non-commodity pricing.

3.1.10 Identify and evaluate purchase options (e.g., finance options, lease, cash, rental).

Academic Standards
English: Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly. (Writing Applications C, 11-12)
Compile, organize and evaluate information, take notes and summarize findings. (Research B, 11-12)
Evaluate the usefulness and credibility of data and sources and synthesize information from multiple sources. (Research C, 11-12)

Math: Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner. (Mathematical Processes H, 8-10)

Social Studies: Analyze how scarcity of productive resources affects supply, demand, inflation and economic choices. (Economics A, 11-12)
Critique data and information to determine the adequacy of support for conclusions. (Social Studies Skills and Methods B, 11-12)

Benchmark: 3.3 Management

Level 1: Select and organize resources to develop a product or a service to be rendered.

Indicators:
3.3.4 Identify the organizational structures of businesses.

Academic Standards
English: Analyze the features and structures of documents and critique them for their effectiveness. (Reading Applications: Informational, Technical and Persuasive Text A, 11-12) Evaluate the usefulness and credibility of data and sources and synthesize information from multiple sources. (Research C, 11-12)

Math: Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis and Probability F, 8-10)

Social Studies: Identify factors which inhibit or spur economic growth and cause expansions or recessions. (Economics B, 11-12)

Benchmark: 3.6 Information Management
Level 1: Select and use a computer and computer application for a specific purpose

Indicators
3.6.01 Utilize technology to maintain and monitor business records
3.6.02 Conduct research using the Internet
3.6.03 Create and utilize documents using word processors, spreadsheets, databases and electronic mail
3.6.06 Utilize personal information management/productivity applications

Academic Standards
English: Prepare writing for publication that follows an appropriate format and uses a variety of techniques to enhance the final product. (Writing Process F, 11-12)
Math: Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (Algebra D, 8-10)

Benchmark: 3.4 Finance
Level 1: Budget and monitor an enterprise's income and expenses.

Indicators:
3.4.5 Budget resources (e.g., capital, human, financial, time).
3.4.8 Maintain financial records, and interpret and analyze financial statements.
3.4.11 Forecast future budgetary needs.

Academic Standards
English: Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). (Reading Process B, 8-10; Reading Process B, 11-12)
Math: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number, Number Sense and Operations G, 8-10)
Write and solve real-world, multi-step problems involving money, elapsed time and temperature, and verify reasonableness of solutions. (Measurement F, 8-10)
Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (Patterns, Functions and Algebra D, 8-10)
Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis and Probability F, 8-10)
Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data Analysis and Probability A, 11-12)
Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner. (Mathematical Processes H, 8-10)
Social Studies: Analyze how scarcity of productive resources affects supply, demand, inflation and economic choices. (Economics A, 11-12)
Explain the use of a budget in making personal economic decisions and planning for the future. (Economics E, 11-12)
Critique data and information to determine the adequacy of support for conclusions. (Social Studies Skills and Methods B, 11-12)

Benchmark: 3.11 Research and Analysis
Level 1: Conduct a study or survey, select descriptive statistics, create graphical displays, and draw conclusions.

Indicators:
3.11.1 Identify research problems, and structure a statistical experiment, simulation or study related to the problem.

Academic Standards
English: Formulate open-ended research questions suitable for investigation and adjust questions as necessary while research is conducted. (Research A, 8-10)
Formulate open-ended research questions suitable for inquiry and investigation and adjust questions as necessary while research is conducted. (Research A, 11-12)
Compile, organize and evaluate information, take notes and summarize findings. (Research B, 11-12)
Communicate findings, reporting on the substance and processes orally, visually and in writing or through multimedia. (Research E, 8-10; Research E, 11-12)
Math: Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (Patterns, Functions and Algebra D, 8-10)
Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis and Probability F, 8-10)
Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators. (Data Analysis and Probability A, 11-12)
Use descriptive statistics to analyze and summarize data, including measures of center, dispersion, correlation and variability. (Data Analysis and Probability B, 11-12)
Design and perform a statistical experiment, simulation or study; collect and interpret data; and use descriptive statistics to communicate and support predictions and conclusions. (Data Analysis and Probability C, 11-12)
Communicate mathematical ideas orally and in writing with a clear purpose and appropriate for a specific audience. (Mathematical Processes I, 11-12)
Science: Participate in and apply the processes of scientific investigation to create models and to design, conduct, evaluate and communicate the results of these investigations. (Scientific Inquiry A, 9-10)
Make appropriate choices when designing and participating in scientific investigations by using cognitive and manipulative skills when collecting data and formulating conclusions from the data. (Scientific Inquiry A, 11-12)

Benchmark: 4.1 Safety Procedures
Level 1: Follow safety procedures in general situations with basic tools and equipment, evaluate the work environment, and seek assistance to rectify the problem.

Indicators:
4.1.1 Demonstrate knowledge of safety rules and regulations.

Academic Standards
English: Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). (Reading Process B, 8-10; Reading Process B, 11-12)
Use appropriate self-monitoring strategies for comprehension. (Reading Process C, 8-10; Reading Process C, 11-12)

Unit: Plant Structures and Taxonomy

Students will identify the different parts and uses of plant structures and tissues along with their characteristics.

Benchmark: 7.4 Plant Production and Management
Level 1: Manage growth of common types of plants

Indicators
7.4.02 Identify plant anatomical structures and tissues (e.g., roots, stems, flowers, leaves, fruits, seeds)
7.4.13 Identify characteristics (e.g., visual appeal, quality, test weights, final usage) of grains, seeds, vegetables, fruits, and ornamental plants

Academic Standards
English: Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)
Math: Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis F, 8-10)
Science: Explain the flow of energy and the cycling of matter through biological and ecological systems (cellular, organismal and ecological). (Life Sciences D, 9-10)

Unit: Plant Physiology and Reproduction

Students will understand plant nutrition and nutrient deficiencies. Students will explain photosynthesis and other physiological functions of the plant. Students will identify the uses of fertilizers and their application. Students will identify the different reproductive parts of a plant and their uses. Students will demonstrate proper planting and propagation methods.

Benchmark: 7.1 Plant Nutrition
Level 1: Select and apply macronutrients, using basic application methods, and recognize the effect on plants and environment

Indicators
7.1.02 Describe the functions of macronutrients and micronutrients
7.1.03 Determine nutrient requirements for food-grade, non-food-grade and organic plants
7.1.04 Identify symptoms and causes of plant nutrient deficiencies
7.1.10 Interpret fertilizer labels

Academic Standards
English: Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)
Math: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)
Science: Explain the structure and function of ecosystems and relate how ecosystems change over time. (Life Sciences F, 9-10)

Benchmark: 7.2 Plant Reproduction
Level 1: Select and apply basic methods for propagating common types of plants

Indicators
7.2.01 Identify reproductive anatomy of plants and describe their physiological functions
7.2.05 Select and use methods of asexual plant propagation for desired traits (e.g., grafting, layering, cuttings, cloning)
7.2.06 Compare and contrast variations of plant reproductive systems among plant species and their adaptive and non-adaptive values

Academic Standards

English: Use multiple resources to enhance comprehension of vocabulary. (Vocabulary F, 8-10; Vocabulary E, 11-12)

Science: Explain the structure and function of ecosystems and relate how ecosystems change over time. (Life Sciences F, 9-10)

Benchmark: 7.4 Plant Production and Management

Level 1: Manage growth of common types of plants

Indicators

7.4.03 Describe physiological functions of plants (e.g., photosynthesis, respiration, transpiration, absorption)

7.4.08 Evaluate and implement transplanting practices

7.4.09 Evaluate/select and prepare soil/media for planting

Academic Standards

English: Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)

Math: Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis F, 8-10)

Science: Explain the flow of energy and the cycling of matter through biological and ecological systems (cellular, organismal and ecological). (Life Sciences D, 9-10)

Benchmark: 5.1 Soils

Level 1: Determine and analyze the physical, biological and chemical properties of soils and other plant growing media.

Indicators:

5.1.1 Classify soil types based on composition (e.g., aggregate size, organic matter, texture).

Academic Standards

English: Use multiple resources to enhance comprehension of vocabulary. (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
Compile, organize and evaluate information, take notes and summarize findings. (Research B, 11-12)

Science: Describe the finite nature of Earth's resources and those human activities that can conserve or deplete Earth's resources. (Earth and Space Sciences D, 9-10)
Explain that humans are an integral part of the Earth's system and the choices humans make today impact natural systems in the future. (Earth and Space Sciences C, 11-12)
Describe how human activities can impact the status of natural systems. (Life Sciences G, 9-10)
Explain how human choices today will affect the quality and quantity of life on earth. (Life Sciences F, 11-12)
Participate in and apply the processes of scientific investigation to create models and to design, conduct, evaluate and communicate the results of these investigations. (Scientific Inquiry A, 9-10)

Social Studies: Use appropriate data sources and geographic tools to analyze and evaluate public policies. (Geography C, 11-12)

Benchmark: 5.2 Water

Level 1: Assess water quality using basic indicators.

Indicators:

5.2.3 Explain the hydrological cycle (e.g., condensation, evaporation, transpiration) and how human activity impacts the cycle.

Academic Standards

English: Use multiple resources to enhance comprehension of vocabulary. (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Acquisition of Vocabulary D, 11-12)

Math: Apply various measurement scales to describe phenomena and solve problems. (Measurement B, 11-12)
Apply mathematical knowledge and skills routinely in other content areas and practical situations. (Mathematical Processes B, 8-10)

Science: Describe the finite nature of Earth's resources and those human activities that can conserve or deplete Earth's resources. (Earth and Space Sciences D, 9-10)
Explain that humans are an integral part of the Earth's system and the choices humans make today impact natural systems in the future. (Earth and Space Sciences C, 11-12)
Explain the structure and function of ecosystems and relate how ecosystems change over time. (Life Sciences F, 9-10)
Describe the identifiable physical properties of substances (e.g., color, hardness, conductivity, density, concentration and ductility). Explain how changes in these properties can occur without changing the chemical nature of the substance. (Physical Sciences C, 9-10)
Make appropriate choices when designing and participating in scientific investigations by using cognitive and manipulative skills when collecting data and formulating conclusions from the data. (Scientific Inquiry A, 11-12)

Benchmark: 5.3 Ecosystems

Level 1: Identify ecosystems, and compare the components of ecosystems.

Indicators:

5.3.1 Explain and illustrate basic ecological principles and cycles (e.g., nitrogen cycle, food web, energy pyramid).

Academic Standards

Science: Explain the flow of energy and the cycling of matter through biological and ecological systems (cellular, organismal and ecological). (Life Sciences D, 9-10)
Describe how human activities can impact the status of natural systems. (Life Sciences G, 9-10)
Explain the interconnectedness of the components of a natural system. (Life Sciences E, 11-12)

Unit: Crop Production

Students will demonstrate and identify different crop plants at all stages of growth and maturity. Students will prepare soil for planting, cultivating, and harvesting. Students will apply knowledge in harvesting, storing, and marketing crop products.

Benchmark: 7.4 Plant Production and Management

Level 1: Manage growth of common types of plants

Indicators

7.4.1 Identify and classify seeds and plants at all stages of growth

7.4.2 Identify plant anatomical structures and tissues (e.g., roots, stems, flowers, leaves, fruits, seeds).

7.4.04 Identify and classify plants using taxonomy.

7.4.7 Evaluate and demonstrate planting practices (e.g., population rate, germination, seed vigor, inoculation, seed and plant treatments, cuttings and pot in pot, type of planter).
7.4.13 Identify characteristics (e.g., visual appeal, quality, test weights, final usage) of grains, seeds, vegetables, fruits, and ornamental plants

Academic Standards

English: Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)
Math: Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis F, 8-10)
Science: Explain the flow of energy and the cycling of matter through biological and ecological systems (cellular, organismal and ecological). (Life Sciences D, 9-10)

Benchmark: 7.5 Harvesting, Handling and Storage

Level 1: Harvest, handle and store plants and plant products

Indicators

7.5.01 Determine crop maturity

Academic Standards

Math: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)

Benchmark: 5.14 Habitat Management and Restoration

Level 1: Monitor an area to determine what characteristics currently exist in a specific habitat.

Indicators:

5.14.8 Identify techniques used in habitat management, mitigation, enhancement and restoration programs.

Academic Standards

English: Use multiple resources to enhance comprehension of vocabulary. (Acquisition of Vocabulary F, 8-10; Acquisition of Vocabulary E, 11-12)
Math: Design and perform a statistical experiment, simulation or study; collect and interpret data; and use descriptive statistics to communicate and support predictions and conclusions. (Data Analysis and Probability C, 11-12)
Science: Describe the finite nature of Earth's resources and those human activities that can conserve or deplete Earth's resources. (Earth and Space Sciences D, 9-10)
Explain how humans are connected to and impact natural systems. (Life Sciences B, 11-12)
Explain how human choices today will affect the quality and quantity of life on earth. (Life Sciences F, 11-12)
Explain how societal issues and considerations affect the progress of science and technology. (Scientific Ways of Knowing C, 11-12)
Social Studies: *Critique data and information to determine the adequacy of support for conclusions.* (Social Studies Skills and Methods B, 11-12)

Unit: Pest Management

Students will identify the different types of pests that can affect a field or production crop. Students will analyze and calculate the damage that can be done with and without treatment.

Benchmark: 7.3 Pest Management

Level 1: Identify common types of plant pests and apply basic pest management control methods

Indicators
7.3.01 Identify and classify plant pests (i.e., insects, pathogens, weeds, diseases, animals)
7.3.03 Analyze and calculate economic threshold of pest damage

Academic Standards

English:	Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)
Math:	Find, use and interpret measures of center and spread, such as mean and quartiles, and use those measures to compare and draw conclusions about sets of data. (Data Analysis D, 8-10)
Science:	Explain the structure and function of ecosystems and relate how ecosystems change over time. (Life Sciences F, 9-10)
Social Studies:	Evaluate the consequences of geographic and environmental changes resulting from governmental policies and human modifications to the physical environment. (Geography B, 11-12)

Unit: Food Science

Learners apply principles of biology, chemistry and physics to the research and development, production, processing, and distribution of food products meeting quality assurance standards in a system that is safe and secure.

Benchmark: 6.4 Food Product Development
Level 1: Modify an existing food product using bench-top methods, and develop a package design.

Indicators:
6.4.3 Manipulate ingredients to reach a desired product goal.
6.4.7 Develop a food product label according to industry standards.

Academic Standards

Math:	Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis and Probability F, 8-10) Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner. (Mathematical Processes H, 8-10)
Science:	Explain the ways in which the processes of technological design respond to the needs of society. (Science and Technology A, 9-10)