Wildlife and Fisheries
Subject Code: 010745
Course & Unit Description

Course Description:

This course is designed for students to identify and demonstrate the concepts, theories, and ideas related to the conservation and management of fish and wildlife resources. The importance of learning the taxonomy, diversity and distribution of mammals, fish and other wildlife will be presented. Identifying those adaptations that make mammals, fish, and other wildlife unique, and particularly those adaptations that have made them so successful will be taught. The roles of fish, wildlife and mammals as ecological dominants along with their importance to ecosystem functioning will be discovered. Students will identify the different species and breeds of mammals, fish and wildlife using industry standards. Understanding health and nutrition will allow students to identify and manage habitats to ensure a sound and healthy population. Communicating the importance of fish and wildlife management using varying communication skills will be developed.

Unit: Safety
Students will use the tools and equipment needed for fish and wildlife safely while following posted guidelines.

Benchmark: 4.1 Safety Procedures
Level 1: Follow safety procedures in general situations with basic tools and equipment, evaluate work environment and seek assistance to rectify the problem
Level 2: Follow safety procedures in specific situations with specialized tools and equipment, evaluate situation and take corrective action

Indicators
4.1.01 Demonstrate knowledge of safety rules and regulations
4.1.02 Interpret safety signs and symbols
4.1.03 Model safe attitudes and behaviors (e.g., lifting, climbing)
4.1.04 Identify safety hazards and take corrective measures
4.1.05 Use safety equipment in accordance with established procedures
4.1.06 Follow established procedures for the administration of first aid and contact emergency medical personnel when necessary

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)

Unit: Equipment Operation and Maintenance
Students will perform basic maintenance on stationary and mobile power equipment. Students will demonstrate how to operate the machinery safely according to industry standards.

Benchmark: 4.2 Stationary and Mobile Equipment Maintenance
Level 1: Inspect and provide basic maintenance to basic machinery, instruments, stationary and mobile equipment and facility
Level 2: Inspect and maintain specialized machinery and equipment according to schedule

Indicators
4.2.01 Perform a machine condition inspection

4.2.02 Lubricate machinery and equipment
4.2.03 Ensure presence and function of safety systems and hardware
4.2.04 Service basic electrical systems (e.g., fuses and bulbs)
4.2.05 Perform machine adjustments (e.g., belts, clippers, drive chains)
4.2.06 Service filtration systems
4.2.07 Identify, select and maintain fluid levels
4.2.08 Maintain machinery, equipment, instruments and facility cleanliness, appearance, and safety
4.2.09 Inspect and maintain fluid conveyance and storage components (e.g., hoses and lines, valves, nozzles)
4.2.10 Conduct preventative maintenance and identify causes of malfunctions and failures
4.2.11 Calibrate metering, monitoring, and sensing equipment
4.2.13 Maintain lifting equipment (e.g., cranes, chains, slings)

Academic Standards

English: Use appropriate self-monitoring strategies for comprehension. (Reading Process C, 8-10; Reading Process C, 11-12)

Math: Apply mathematical knowledge and skills routinely in other content areas and practical situations. (Mathematical Processes B, 8-10)

Benchmark: 4.3 Equipment Operation

Level 1: Inspect and safely operate precalibrated equipment
Level 2: Inspect and safely operate specialized equipment with some limitations to adjustments and functions

Indicators

4.3.01 Follow manufacturer's recommended operating procedures and adjustment specifications
4.3.02 Describe function, limitations, and proper use of equipment, equipment controls and instrumentation
4.3.03 Perform pre-operation inspection and adjustments
4.3.04 Perform appropriate start-up, operating and shut-down procedures
4.3.05 Identify, select and exhibit the desired application of hand and power tools
4.3.06 Perform post-operating inspection and adjustments

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: Apply mathematical knowledge and skills routinely in other content areas and practical situations. (Mathematical Processes B, 8-10)

Unit: Mammal Identification

Students will identify, classify, and select mammals using breed and/or specie characteristics. Students will identify and care for habitats and ecosystems.

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
Level 2: Describe comprehensive care practices for animals and apply advanced management procedures to select, handle, mark, and manage environmental conditions

Indicators

1.3.01 Identify, classify, evaluate and select animal species and/or breeds

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: 5.14 Habitat Management and Restoration

Level 1: Monitor an area to determine what characteristics currently exist in a specific habitat
Level 2: Establish goals for remediating a specific habitat

Indicators

5.14.01 Identify properties and characteristics of habitats

Academic Standards

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

Math: Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis 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)

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: Waterfowl and Game Bird Identification

Using industry standards, students will identify and describe the care and management of waterfowl and game birds. Students will monitor and care for habitats and ecosystems.

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
Level 2: Describe comprehensive care practices for animals and apply advanced management procedures to select, handle, mark, and manage environmental conditions

Indicators

1.3.01 Identify, classify, evaluate and select animal species and/or breeds

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: 5.14 Habitat Management and Restoration

Level 1: Monitor an area to determine what characteristics currently exist in a specific habitat
Level 2: Establish goals for remediating a specific habitat

Indicators

5.14.01 Identify properties and characteristics of habitats

Academic Standards

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

Math: Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis 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)
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: Fish Identification

Using industry standards, students will identify fish and aquatic animals. Learners will identify and care for fish and aquatic habitats.

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
Level 2: Describe comprehensive care practices for animals and apply advanced management procedures to select, handle, mark, and manage environmental conditions

Indicators
1.3.01 Identify, classify, evaluate and select animal species and/or breeds

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: 5.14 Habitat Management and Restoration
Level 1: Monitor an area to determine what characteristics currently exist in a specific habitat
Level 2: Establish goals for remediating a specific habitat

Indicators
5.14.01 Identify properties and characteristics of habitats

Academic Standards
English: Use multiple resources to enhance comprehension of vocabulary. (Vocabulary F, 8-10; Vocabulary E, 11-12)
Math: Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis 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)
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: Plant Identification - food and cover

Students will identify and demonstrate knowledge of the materials needed for the production and management of plants.

Benchmark: 7.4 Plant Production and Management
Level 1: Manage growth of common types of plants
Level 2: Manage growth of specific types of plants using specialized equipment

Indicators
7.4.01 Identify and classify seeds and plants at all stages of growth
7.4.04 Identify and classify plants using taxonomy
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: Habitat Assessment and Management

Students will assess a habitat using technology available to develop a management plan. Students will identify factors of the ecosystem to implement their plan of management or restoration.

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
Level 2: Evaluate animal condition and implement treatment and maintenance options for species-specific diseases/disorders

Indicators
1.4.08 Monitor and evaluate the quality of an animal's habitat (natural or artificial) and implement corrective methods as needed

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: 4.11 Surveying and Mapping
Level 1: Interpret maps/topographic site plans
Level 2: Use surveying equipment to construct a basic site plan

Indicators
4.11.02 Read maps, topographic site plans, deeds and/or aerial/satellite imagery
4.11.03 Perform site measurements
4.11.04 Integrate map and surveying data in Geographic Information System (GIS) or Computer Aided Design (CAD)

Academic Standards
English: Use multiple resources to enhance comprehension of vocabulary. (Vocabulary F, 8-10; Vocabulary E, 11-12)
Math: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)
Social Studies: Use appropriate data sources and geographic tools to analyze and evaluate public policies. (Geography C, 11-12)

Benchmark: 5.14 Habitat Management and Restoration
Level 1: Monitor an area to determine what characteristics currently exist in a specific habitat
Level 2: Establish goals for remediating a specific habitat

Indicators
5.14.01 Identify properties and characteristics of habitats
5.14.02 Explain wetlands classification (e.g., swamp, marsh, bog, fen)
5.14.03 Explain the functions of wetlands, forests, grasslands, and other habitats
5.14.04 Describe the biotic components of different types of habitats
5.14.05 Delineate wetlands based on government standards
5.14.06 Explain impact of an increasing human population on habitats
5.14.07 Explain government's role in habitat restoration and conservation
5.14.08 Identify techniques used in habitat management, mitigation, enhancement and restoration programs
5.14.09 Survey and monitor species within a habitat

Academic Standards
English: Use multiple resources to enhance comprehension of vocabulary. (Vocabulary F, 8-10; Vocabulary E, 11-12)
Math: Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis 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)
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)

Benchmark: 5.3 Ecosystems
Level 1: Identify ecosystems and compare components of ecosystems
Level 2: Inventory and evaluate habitats of specific ecosystems

Indicators
5.3.04 Model positive environmental practices for sustainability of resources
5.3.05 Inventory and evaluate characteristics of different ecosystems (e.g., pond, stream, crop lands, open land, brush lands, grasslands, woodlands, wetlands)
5.3.06 Discuss restoration ecology and its role in repairing damaged landscapes
5.3.07 Identify and contrast biomes globally
5.3.08 Determine the factors that affect ecological succession
5.3.09 Determine the impact that native and non-native invasive species have on ecosystems

Academic Standards
Math: Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis F, 8-10)
Science: Explain that many processes occur in patterns within the Earth's systems. (Earth and Space Sciences B, 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: Population Management
Using industry standards, students will use identification tools to manage animal populations in a habitat. Students will follow all local, state, and federal guidelines to manage ecosystems and habitats.

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
Level 2: Describe comprehensive care practices for animals and apply advanced management procedures to select, handle, mark, and manage environmental conditions

Indicators
1.3.04 Apply and record animal identification procedures and requirements (e.g., tagging, tattooing, ear notching, banding, branding, painting, electronic microchip implanting)
1.3.05 Estimate carrying capacity of the environment and its impact on animal health
1.3.06 Explain predator/prey relationships (e.g., predator control, species propagation, invasive species control) and implement measures to control predators when necessary

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: 1.5 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
Level 2: Develop, implement and evaluate a reproduction and/or population management plan

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)

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: 3.10 Business Regulation, Law and Related Issues
Level 1: Identify and describe government regulations and societal issues related to a specific business enterprise or environmental project
Level 2: Determine the impact of government regulations and societal issues on an environmental project or the performance of a business enterprise

Indicators
3.10.02 Explain the purpose and impact of government regulations
3.10.03 Identify local, state and federal regulations relative to compliance
3.10.06 Identify governmental agencies and non-governmental organizations that impact agricultural/environmental issues
3.10.07 Research history, politics and policies related to issues
3.10.08 Assess the impact of issues affecting the industry and recommend solutions

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

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)

Benchmark: 3.11 Research and Analysis

Level 1: Conduct a study or survey, select descriptive statistics, create graphical displays and draw conclusions

Level 2: Conduct a problem-based study applying scientific methodology and using descriptive statistics to communicate and support predictions and conclusions

Indicators

3.11.01 Identify research problems and structure a statistical experiment, simulation or study related to the problem

3.11.02 Create a hypothesis and set the probability of acceptance based on review of valid literature

3.11.03 Establish and implement procedures for systematic collection, organization, and use of data

3.11.04 Select and apply sampling methods that appropriately represent the population to be studied

3.11.05 Create, interpret and use tabular and graphical displays and descriptive statistics to describe data

3.11.08 Draw conclusions based on observations and/or data analysis and disseminate information to interested parties

Academic Standards

English: Formulate open-ended research questions suitable for inquiry and investigation and adjust questions as necessary while research is conducted. (Research A, 8-10; Research A, 11-12)

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

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)

5.14 Habitat Management and Restoration

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

Level 2: Establish goals for remediating a specific habitat

Indicators

5.14.09 Survey and monitor species within a habitat

Academic Standards

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

Math: Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis 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)

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)

Benchmark: 5.3 Ecosystems
Level 1: Identify ecosystems and compare components of ecosystems
Level 2: Inventory and evaluate habitats of specific ecosystems

Indicators
5.3.04 Model positive environmental practices for sustainability of resources
5.3.09 Determine the impact that native and non-native invasive species have on ecosystems

Academic Standards
Math: Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis F, 8-10)
Science: Explain that many processes occur in patterns within the Earth's systems. (Earth and Space Sciences B, 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: Animal Care & Welfare - diseases, nutrition

After understanding animal nutrition, students will identify factors that will lead to a healthy population of wildlife in an ecosystem. Students will identify factors indicative of disease and implement strategies of control.

Benchmark: 1.1 Nutrition
Level 1: Analyze the nutritional content of a ration and administer it to animals
Level 2: Prepare/formulate and administer a ration and evaluate its effects on 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
1.1.06 Determine feed efficiency in relation to cost and availability of feeds
1.1.07 Formulate, prepare, and investigate rations and diets for production, specialty markets, and special diets (e.g., natural, organic, liver diet, heart diet, kidney diet)
1.1.08 Select and implement feeding and watering practices and systems for varying populations and purposes (e.g., reduce waste)
1.1.09 Evaluate/monitor performance of feeding systems and programs
1.1.10 Determine the ecological relationships between feed/agronomic production systems and feed quality

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)

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
Level 2: Describe comprehensive care practices for animals and apply advanced management procedures to select, handle, mark, and manage environmental conditions

Indicators
1.3.03 Describe and implement scientific concepts of animal welfare
1.3.07 Evaluate and perform animal care procedures during and following parturition (e.g., navel cord, afterbirth, colostrums, orphaned animals)
1.3.09 Perform sanitation and disinfection procedures for care and management of animal

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
Level 2: Evaluate animal condition and implement treatment and maintenance options for species-specific diseases/disorders

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
1.4.18 Explain zoonoses and communicable diseases common to humans and animals

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: 1.6 Animal Behaviors
Level 1: Observe an animal's natural tendencies and predict changes in behavior when the environment is changed
Level 2: Apply management practices to animals that result in desired behavioral change

Indicators
1.6.09 Handle and move animals (e.g., training, restraint, confinement) with regard for safety of animals and handlers

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

Benchmark: 3.10 Business Regulation, Law and Related Issues
Level 1: Identify and describe government regulations and societal issues related to a specific business enterprise or environmental project
Level 2: Determine the impact of government regulations and societal issues on an environmental project or the performance of a business enterprise

Indicators
3.10.07 Research history, politics and policies related to issues

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

3.12 Agrosecurity and Biosecurity
Level 1: Identify agrosecurity and biosecurity risks for an enterprise
Level 2: Implement a security plan addressing facility needs and tampering points

Indicators
3.12.02 Identify activities and biological agents that contribute to the risk of acquiring or preventing a specific disease
3.12.07 Screen and test animals and plant products for infectious agents or contamination
3.12.08 Use biocontainment practices (e.g., quarantine, eradicate) to manage pests and disease vectors

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

Unit: Water Habitat Management
Using industry standards, students will assess and monitor water quality for aquatic life. Students will use planning skills to implement a working management plan.

Benchmark: 5.2 Water
Level 1: Assess water quality using basic indicators
Level 2: Analyze and interpret the biological, chemical and physical properties of water quality

Indicators
5.2.01 Measure pH, dissolved oxygen (DO), biological oxygen demand (BOD), temperature and macroinvertebrate populations to determine water quality
5.2.02 Measure hardness, nitrogen, phosphorus, vegetation and physical characteristics of lentic and lotic waters to determine water quality
5.2.03 Explain the hydrological cycle (e.g., condensation, evaporation, transpiration) and how human activity impacts the cycle
5.2.04 Explain the biotic and abiotic factors affecting water quality
5.2.05 Monitor and analyze water quality and quantity
5.2.06 Explain the interactions between human activities and the earth's hydrosphere (e.g., septic systems, desalinization, point and nonpoint sources of pollution)
5.2.07 Implement practices to maintain or improve water quality

Academic Standards

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

Math: Apply various measurement scales to describe phenomena and solve problems. (Measurement 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)

Benchmark: 5.8 Water Use and Management (Hydrology)

Level 1: Identify sources of water (e.g., surface water, soil water, bedrock water, aquifer)
Level 2: Collect and interpret data for a localized water use and management plan

Indicators

5.8.01 Explain hydrology
5.8.07 Measure volumes of water (e.g., wells, ponds, run-off, waterways)
5.8.08 Control water (e.g., pumps, dams, retention ponds, drainage)
5.8.09 Control water (e.g., pumps, dams, retention ponds, drainage)

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 and compute various attributes, including length, angle measure, area, surface area and volume, to a specified level of precision. (Measurement E, 8-10)

Science: Describe how human activities can impact the status of natural systems. (Life Sciences G, 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: Public Relations

Using communication skills, students will facilitate presentations to local and community groups on the importance of wildlife and fishery management.

Benchmark: 3.7 Communication Skills

Level 1: Integrate a variety of communication techniques to gather and convey information to an individual or small group
Level 2: Conduct a business meeting using decision-making techniques

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
3.7.08 Develop reports and documents that organize information accurately and use formatting techniques for user friendliness
3.7.09 Select and use appropriate channel for workplace communication
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)