

<p>Grade, Subject/Course: Aquatic Resources</p>	
<p>Unit: The Water (Hydrologic) Cycle</p>	<p><input checked="" type="checkbox"/> Essential <input type="checkbox"/> Important <input type="checkbox"/> Compact</p>
<p>Big Idea: Water affects our daily lives in many ways.</p>	
<p>AFNR (Agriculture, Food, & Natural Resources) National Content Standards):</p> <ul style="list-style-type: none"> ● ESS.03.02.05b - Analyze how the interaction between different levels of water affects its flow and availability. ● NRS.01.01.01b - Assess the characteristics of a natural resource (Watersheds) ● NRS.01.04.01b - Assess the function of watersheds and their effect on natural resources. ● ESS.03.02.06c - Evaluate and select strategies for wetland/watershed preservation and restoration. ● NRS.02.02.02c - Devise a strategy for preventing the loss of species and biodiversity in a watershed 	<p>Interdisciplinary Standards (if applicable):</p>
<p>Essential Questions:</p> <ul style="list-style-type: none"> ● How does water circulate around the earth? ● What is a watershed? ● What properties of water make it a unique substance? ● How do I rely on water to improve my life? 	<p>Understandings: Students will know that...</p> <ul style="list-style-type: none"> ● Water moves and changes as it “cycles” around the earth. ● Water collects/flows from high ridges to low areas and collects in the low areas. ● Water is always moving and changing form/state (Solid, Liquid, Gas). ● Water affects all life on earth. ● Water is unique from all other substances on earth. ● Water has specific properties that allow it to support life. (Adhesion, Cohesion, Surface Tension, etc.) ● Humans use water in many ways. (Drinking, Cleaning, Transport, Recreation, etc.)
<p>Knowledge:</p> <ul style="list-style-type: none"> ● Water moves and changes as it “cycles” around the earth. ● Water collects/flows from high ridges to low areas and collects in the low areas. ● Water is always moving and changing form/state (Solid, Liquid, Gas). ● Water affects all life on earth. ● Water is unique from all other substances on earth. ● Water has specific properties that allow it to support life. (Adhesion, Cohesion, Surface Tension, etc.) ● Humans use water in many ways. (Drinking, Cleaning, 	<p>Do/Skills: Students will be able to...</p> <ul style="list-style-type: none"> ● Identify and explain the parts of the water cycle. ● Identify the six major watersheds in Pennsylvania. ● List the parts of a watershed and its boundaries. ● Explain how human activity affects watersheds. ● Identify and explain the unique properties of water. ● Create a plan for conserving/protecting a local watershed.

Transport, Recreation, etc.)	
<u>Vocabulary:</u> <ul style="list-style-type: none"> ○ Water Cycle ○ Evaporation ○ Condensation ○ Precipitation ○ Run-off ○ Filtration/Percolation ○ Groundwater ○ Watershed ○ Adhesion/Cohesion ○ Capillary Action ○ Surface Tension 	<u>Core Resources:</u> Aquatics textbooks, PA road maps, Chromebook/laptop, colored pencils, construction/poster paper, teacher-generated materials
<u>Common Assessment(s):</u> <ul style="list-style-type: none"> ● Quiz/Test ● End of Unit Exam ● Textbook Guides ● Labs/Experiments ● End of Unit Project 	<u>Supplemental Resources:</u> Beakers, test tubes, pipettes, cotton, wax paper, aluminum foil, Ziploc bags, potting soil, various kinds of water (tap, pond, distilled, etc)

Elizabethtown Area School District Curriculum Guide

Date Adopted: November 26, 2024

<u>Grade, Subject/Course:</u> Aquatic Resources	
<u>Unit:</u> Creek, Stream, River - Anatomy, Relationships, and Flow	<u> X </u> Essential <u> </u> Important <u> </u> Compact
<u>Big Idea:</u> Creeks, Streams, and Rivers are all related but yet different.	
<u>AFNR (Agriculture, Food, & Natural Resources) National Content Standards:</u> ESS.03.02.06b - Analyze the importance of roles played by wetlands (watersheds) in regard to water availability, prevention of flooding, and other factors. ESS.03.05.02a - Examine & Explain the role played by habitats on environmental services.	<u>Interdisciplinary Standards (if applicable):</u>
<u>Essential Questions:</u>	<u>Understandings:</u>

<ul style="list-style-type: none"> • What is the difference between a creek, stream, and river? • What are the parts of a stream? • How does streamflow affect water quality? • How do stream characteristics affect the species that live there? • What are the major streams/rivers in PA? 	<p>Students will know that...</p> <ul style="list-style-type: none"> • Creeks, Streams, and Rivers are both similar and different. • Streams have specific parts. Ex. bed, pools, runs, eddies, etc. • Stream characteristics affect their flow and the species that live within them. • Human activity can alter the flow/characteristics of the stream. • PA has 85,000 miles of streams.
<p><u>Knowledge:</u></p> <ul style="list-style-type: none"> • Creeks, Streams, and Rivers are both similar and different. • Streams have specific parts. Ex. bed, pools, runs, eddies, etc. • Stream characteristics affect their flow and the species that live within them. • Human activity can alter the flow/characteristics of the stream. • PA has 85,000 miles of streams. 	<p><u>Do/Skills:</u></p> <p>Students will be able to...</p> <ul style="list-style-type: none"> • Distinguish between creeks, streams, and rivers. • Identify and explain the parts of a stream. • Identify the major streams of PA using a road map. • Explain how human activity can impact stream quality/flow (+ and -) • Analyze PA streams and identify aquatic species that may live there.
<p><u>Vocabulary:</u></p> <ul style="list-style-type: none"> • Creek, River, Stream • Confluence • Tributary • Pool, Glide, Run, Riffle, Eddy • Meander • Bed, Wetted Perimeter, Channel • Nick Point • Gauging Station 	<p><u>Core Resources:</u></p> <p>Aquatics textbooks, PA road maps, Chromebook/laptop, colored pencils, construction/poster paper, teacher-generated materials</p>
<p><u>Common Assessment(s):</u></p> <ul style="list-style-type: none"> • Quiz/Test • End of Unit Exam • Textbook Guides • Labs/Experiments • End of Unit Project 	<p><u>Supplemental Resources:</u></p> <p>PA Fish & Boat Stream Maps</p>

<p>Grade, Subject/Course: Aquatics Resources</p>	
<p>Unit: The Aquaculture Industry</p>	<p><input checked="" type="checkbox"/> Essential <input type="checkbox"/> Important <input type="checkbox"/> Compact</p>
<p>Big Idea: Aquaculture is a unique way of providing food and resources for all people.</p>	
<p><u>AFNR (Agriculture, Food, & Natural Resources) National Content Standards:</u> FPP.03.01.01a - Summarize characteristics of quality & yield grades of food products. FPP.03.03.03b - Explain how market demand for food products influences the distribution of food products. FPP.04.02.01b - Analyze significant changes & trends in the food products/processing industry. NRS.02.03.03c - Predict how future technology may affect the use & views of natural resources. NRS.03.01.08b - Apply techniques used to acquire aquatic species for their environmental, economic, and social sustainability.</p>	<p><u>Interdisciplinary Standards (if applicable):</u></p>
<p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> ● How has Aquaculture changed over the years? ● What are the types of Aquaculture systems? ● What is the size and scope of Aquaculture in the US? ● What are the current consumption trends for Aquaculture products? 	<p><u>Understandings:</u> Students will know that...</p> <ul style="list-style-type: none"> ● Aquaculture is an evolving business. ● Aquaculture has changed with technology. ● Aquaculture can produce a variety of foods/products. Ex. fish, watercress, etc. ● Aquaculture can produce food where traditional agriculture can not. Ex. cities, buildings, ponds, lakes, ect. ● Consumption of Aquaculture foods/products is trending up. ● There are several ways aquaculture foods can be grown/produced. Ex. Circulating Systems, Flow-through systems. etc.
<p><u>Knowledge:</u></p> <ul style="list-style-type: none"> ● Aquaculture is an evolving business. ● Aquaculture has changed with technology. ● Aquaculture can produce a variety of foods/products. Ex. fish, watercress, etc. ● Aquaculture can produce food where traditional agriculture can not. Ex. cities, buildings, ponds, lakes, ect. ● Consumption of Aquaculture foods/products is trending up. ● There are several ways aquaculture foods can be grown/produced. Ex. Circulating Systems, Flow-through systems. etc. 	<p><u>Do/Skills:</u> Students will be able to...</p> <ul style="list-style-type: none"> ● Explain how Aquaculture has changed with modern technology. ● Identify the most common types of Aquaculture systems. ● Analyze the need for Aquaculture in feeding growing populations. ● Analyze consumption trends for various Aquaculture foods. ● Operate/Manage the school’s recirculating Aquaculture System on a daily basis.

<p><u>Vocabulary:</u></p> <ul style="list-style-type: none"> ● Aquaculture ● Captured/Cultured Aquafoods ● Monoculture/Polyculture ● Closed System ● Circulating System ● Raceway ● Aquaculture Stock 	<p><u>Core Resources:</u></p> <p>Aquatics textbooks, Chromebook/laptop, colored pencils, construction/poster paper, teacher-generated materials</p>
<p><u>Common Assessment(s):</u></p> <ul style="list-style-type: none"> ● Quiz/Test ● End of Unit Exam ● Textbook Guides ● Labs/Experiments ● End of Unit Project 	<p><u>Supplemental Resources:</u></p> <p>School’s recirculating Aquaculture system in the Aquatics Lab, System manuals/guidebooks.</p>

Elizabethtown Area School District Curriculum Guide

Date Adopted: November 26, 2024

<p><u>Grade, Subject/Course:</u> Aquatic Resources</p>	
<p><u>Unit:</u> The Aquatic Environment</p>	<p><u> X </u> Essential <u> </u> Important <u> </u> Compact</p>
<p><u>Big Idea:</u> Water must be managed to provide the best environment for Aquatic species.</p>	
<p><u>AFNR (Agriculture, Food, & Natural Resources) National Content Standards:</u> NRS.04.01.01b - Assess & Explain indicators of the biological health of a stream. NRS.04.01.01c - Create an enhancement plan for a stream. ESS.01.01.01c - Collect and prepare samples using appropriate collection techniques. ESS.03.03.02b - Analyze the water chemistry of a sample. ESS.03.04.03b - Assess the impact of wastewater treatment. ESS.04.01.01a - Identify and distinguish the types of pollution and distinguish between point and nonpoint source pollution.</p>	<p><u>Interdisciplinary Standards (if applicable):</u></p>

<p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> ● What are the factors of water quality? ● What are the types of water pollution? ● What are the best sources of water for aquaculture? ● How do we test and analyze water quality? ● What are the BMPs (Best Management Practices) for maintaining water quality? ● What math calculations are essential to managing the Aquatic environment? 	<p><u>Understandings:</u></p> <p>Students will know that...</p> <ul style="list-style-type: none"> ● Water has specific factors that indicate its quality and ability to support life. ● There are two sources of water pollution - Point and Nonpoint. ● Water pollution can be caused by many substances. ● Water quality must be tested and analyzed regularly. ● The way we manage our water/Aquaculture systems can affect the water quality. (Riparian zones/buffers and wastewater treatment) ● Basic math (add, subtract, multiply, divide) plays a major role in managing the aquatic environment.
<p><u>Knowledge:</u></p> <ul style="list-style-type: none"> ● Water has specific factors that indicate its quality and ability to support life. ● There are two sources of water pollution - Point and Nonpoint. ● Water pollution can be caused by many substances. ● Water quality must be tested and analyzed regularly. ● The way we manage our water/Aquaculture systems can affect the water quality. ● Basic math (add, subtract, multiply, divide) plays a major role in managing the aquatic environment. 	<p><u>Do/Skills:</u></p> <p>Students will be able to...</p> <ul style="list-style-type: none"> ● Identify and describe the specific factors that indicate water quality. ● Identify and distinguish between the different sources/types of water pollution. ● Collect and test water for factors that would indicate its quality. Ex. Nitrogen, Ammonia, pH, Temperature, Turbidity, Etc. ● Suggest management practices to improve/maintain water quality in specific situations, including the use of riparian zones and wastewater treatment. ● Use basic math to calculate water volume, area, and rate of flow. ● Use the results of water testing and calculations to determine treatment to improve water quality.
<p><u>Vocabulary:</u></p> <ul style="list-style-type: none"> ● Water Quality ● Point/Nonpoint Source Pollution ● Water pH ● Turbidity ● Salinity ● Acidity/Alkalinity ● Secchi Disk ● Water Volume, Area, Flow Rate 	<p><u>Core Resources:</u></p> <p>Aquatics textbooks, Chromebook/laptop, colored pencils, construction/poster paper.</p>
<p><u>Common Assessment(s):</u></p> <ul style="list-style-type: none"> ● Quiz/Test ● End of Unit Exam ● Textbook Guides ● Labs/Experiments ● End of Unit Project 	<p><u>Supplemental Resources:</u></p> <p>Water testing kits, meter sticks, ping-pong balls, Tape Measure, Water Samples,</p>

<p>Grade, Subject/Course: Aquatic Resources</p>	
<p>Unit: Fish Biology and Management</p>	<p><input checked="" type="checkbox"/> Essential <input type="checkbox"/> Important <input type="checkbox"/> Compact</p>
<p>Big Idea: Fish have anatomy and physical adaptations that help them survive in an aquatic environment.</p>	
<p>AFNR (Agriculture, Food, & Natural Resources) National Content Standards: AS.03.01.02b - Correlate a species’s nutritional needs to feedstuffs that could meet those needs. AS.03.01.01c - Assess the nutritional needs of an animal based on its growth stage and production system. AS.06.02.03b - Compare and contrast animal cells, tissues, organs, body systems, and functions among animal species. AS.01.01.01c - Evaluate the implications of animal adaptations on production practices and the environment.</p>	<p>Interdisciplinary Standards (if applicable):</p>
<p>Essential Questions:</p> <ul style="list-style-type: none"> ● What physical adaptations help fish survive in the water? ● How are fish classified? ● What are the habitat requirements for fish and other aquatic species? ● How do fish reproduce? (Life cycle) ● How can science improve fish species (Hybrids)? ● What are the requirements for fish growth (nutrition)? ● How do we care for fish in a controlled environment? ● How do we raise Channel Catfish for food production? ● How do we raise Rainbow Trout for release into local streams? 	<p>Understandings:</p> <p>Students will know that...</p> <ul style="list-style-type: none"> ● Fish have unique adaptations that help them thrive in an aquatic environment. ● Fish have organs different from other animals. (Gills, 2 Chamber Heart, Swim Bladder, Fins, Etc.) ● Fish have specific habitat requirements for life. (Ex. Trout need cold, oxygen-rich water) ● The life cycle of fish has multiple stages. ● Crossbreeding can produce different fish species that are more hardy. ● Fish have specific growth requirements. Ex. Nutrition - plant eaters vs. meat eaters. ● Fish in a controlled environment (tank, raceway, etc.) must be cared for and managed just like any livestock species.

<p><u>Knowledge:</u></p> <ul style="list-style-type: none"> ● Fish have unique adaptations that help them thrive in an aquatic environment. ● Fish have organs different from other animals. (Gills, 2 Chamber Heart, Swim Bladder, Fins, Etc.) ● Fish have specific habitat requirements for life. (Ex. Trout need cold, oxygen-rich water) ● The life cycle of fish has multiple stages. ● Crossbreeding can produce different fish species that are more hardy. ● Fish have specific growth requirements. Ex. Nutrition - plant eaters vs. meat eaters. ● Fish in a controlled environment (tank, raceway, etc.) must be cared for and managed just like any livestock species. 	<p><u>Do/Skills:</u></p> <p>Students will be able to...</p> <ul style="list-style-type: none"> ● Identify the external and internal anatomy of several fish species. ● Dissect a Bluegill to observe its external and internal anatomy. ● Identify and describe the habitat requirements for several fish species. ● Place in the correct order the stages of the Brook Trout life cycle. ● Explain the hybridization of various fish species. ● Develop fish management plans for Channel Catfish and Rainbow Trout based on their growth requirements. ● Manage and care for Channel Catfish and Rainbow Trout in a recirculating aquaculture system in the Aquatics Lab. ● Weigh and measure fish on a monthly basis to chart growth.
<p><u>Vocabulary:</u></p> <ul style="list-style-type: none"> ● Fins ● Swim Bladder ● Pyloric Ceca ● Lateral Line ● Hybrid Vigor ● Redd ● Fingerling, Aelvin, Fry ● Average Daily Gain 	<p><u>Core Resources:</u></p> <p>Aquatics textbooks, Chromebook/laptop, colored pencils, construction/poster paper, teacher-created materials.</p>
<p><u>Common Assessment(s):</u></p> <ul style="list-style-type: none"> ● Quiz/Test ● End of Unit Exam ● Textbook Guides ● Labs/Experiments ● End of Unit Project 	<p><u>Supplemental Resources:</u></p> <p>Pennsylvania Fishes, PA Fish & Boat posters and materials, Trout In The Classroom materials, dissecting trays/kits, fish scales, fish processing board/tray, fish tanks and filters (Aquatics Lab).</p>

<p>Grade, Subject/Course: Aquatic Resources</p>	
<p>Unit: PA Aquatic Species (In-Depth Study)</p>	<p><input checked="" type="checkbox"/> Essential <input type="checkbox"/> Important <input type="checkbox"/> Compact</p>
<p>Big Idea: Pennsylvania has a diverse amount of aquatic species.</p>	
<p>AFNR (Agriculture, Food, & Natural Resources) National Content Standards): NRS.01.01.01b - Assess the characteristics of a natural resource to determine its classification. NRS.01.02.04a - Research and examine the characteristics used to identify aquatic species. Nrs.01.02.04b - Apply identification techniques to determine the species of an aquatic organism. NRS.01.06.02a - Research and summarize examples of invasive species. NRS.03.01.08a - Categorize aquatic species used for commercial and recreational purposes.</p>	<p>Interdisciplinary Standards (if applicable):</p>
<p>Essential Questions:</p> <ul style="list-style-type: none"> ● How do we identify the common fishes of PA? ● What habitats are unique to the common fishes of PA? ● How do we identify the common amphibians of PA? ● What habitats are unique to the common amphibians of PA? ● How do we identify the common reptiles of PA? ● What habitats are unique to the common reptiles of PA? ● How do we protect the aquatic species of PA? ● What is required to fish in PA? (License, tackle, etc.) ● How do I participate in the PA FFA Aquatics CDE? 	<p>Understandings: Students will know that...</p> <ul style="list-style-type: none"> ● The aquatic species in PA have unique characteristics/features that help us to identify them. ● The aquatic species in PA have specific habitat requirements and determine where they are found/grow in the state. ● Lizards, Salamanders, and Skinks are different. ● Frogs and Toads are different. ● Ways to protect aquatic species in PA. ● PA fishing regulations and requirements. ● The component of the PA FFA Aquatics CDE and how to participate.
<p>Knowledge:</p> <ul style="list-style-type: none"> ● The aquatic species in PA have unique characteristics/features that help us to identify them. ● The aquatic species in PA have specific habitat requirements and determine where they are found/grow in the state. ● Lizards, Salamanders, and Skinks are different. ● Frogs and Toads are different. ● Ways to protect aquatic species in PA. ● PA fishing regulations and requirements. ● The component of the PA FFA Aquatics CDE and how to participate. 	<p>Do/Skills: Students will be able to...</p> <ul style="list-style-type: none"> ● Identify Coldwater, Cool/Warmwater, Panfish, and Migratory fish found in PA by photograph and actual models. ● Identify common amphibians found in PA by photograph and actual models. ● Identify common snakes and turtles found in PA by photograph and actual models. ● Describe the habitats required for various aquatic species in PA. ● Develop management plans for protecting “endangered” aquatic species found in PA. ● Use the PA Fish & Boat Commission website to determine seasons and creel limits for PA aquatic species.

	<ul style="list-style-type: none"> ● Explain the procedure for purchasing a fishing license as well as rules and regulations governing fishing in PA. ● Participate in local FFA Aquatic CDE events.
<p><u>Vocabulary:</u></p> <ul style="list-style-type: none"> ● Bag/Creel Limit ● Live Bait ● Artificial Bait ● Catch and Release 	<p><u>Core Resources:</u></p> <p>Aquatics textbooks, Chromebook/laptop, colored pencils, construction/poster paper, teacher-created materials.</p>
<p><u>Common Assessment(s):</u></p> <ul style="list-style-type: none"> ● Quiz/Test ● End of Unit Exam ● Textbook Guides ● Species Notes ● Species Poster Activities/Guides ● Labs/Experiments ● End of Unit Project 	<p><u>Supplemental Resources:</u></p> <p>Pennsylvania Fishes, Pennsylvania Amphibians & Reptiles, Identifying the Common Fishes of Pennsylvania, PA Fish & Boat Website, PA Fish & Boat posters.</p>