

Aquatic Environmental Science Scope & Sequence

Days	Unit	Standard(s)/Outcome(s)	Essential/Guiding Questions
3-4	Introduction to Aquatic Ecosystems	<p>Define fundamental ecology terminology.</p> <p>Develop and implement a scientifically based ecology project that benefits the local community.</p>	<p>What is the difference between aquatic and terrestrial ecosystems?</p> <p>How can humans positively impact aquatic ecosystems in Maryland?</p>
6	Factors of an Ecosystem <ul style="list-style-type: none"> ● Abiotic factors ● Aquatic habitats ● Adaptations ● Energy transfer ● Food chains and webs ● Aquatic communities 	<p>Analyze how various abiotic factors delineate aquatic habitats.</p> <p>Analyze the effects of altering the abiotic factors of an aquatic habitat.</p> <p>Describe plant and animal adaptations for living in various environments.</p> <p>Explain how energy is transferred in the environment.</p> <p>Construct food chains and food webs.</p>	<p>How are aquatic ecosystems organized?</p> <p>How could changes to the abiotic factors in an aquarium affect that aquatic habitat?</p> <p>How is energy transferred in aquatic ecosystems?</p>

		Describe how abiotic factors play a role in the aquatic biotic community	
6	Properties of Water <ul style="list-style-type: none"> ● Temperature and basic properties ● Chemicals dissolved in water ● Variation of water temperature ● Turbidity ● Light transmission and photosynthesis ● Water depth and related factors ● Hydrologic cycle ● Watershed 	<p>Explain water's ability to support organisms.</p> <p>Explain how dissolved chemicals in water affect living organisms.</p> <p>Compare water temperatures from one body of water to another, and within a single body of water.</p> <p>Explain the importance of light transmission to photosynthesis.</p>	<p>How do factors of water affect biotic and abiotic factors in aquatic ecosystems?</p> <p>How does turbidity affect the process of photosynthesis?</p>
7	Groundwater <ul style="list-style-type: none"> ● Water table ● Water in soil and rock ● Wetlands and hydrology ● Filtering pollution ● Percolation, porosity, 	<p>Model the components of a water table, including saturated and unsaturated zones, capillary fringe, recharge, and relation to</p>	<p>How is water held in soil and rock?</p> <p>How does groundwater impact aquatic ecosystems?</p>

	<ul style="list-style-type: none"> ● permeability ● Runoff ● Types of pollution that affect groundwater ● Saltwater intrusion and the water table 	<p>surface water.</p> <p>Describe how water is held in soil and rock.</p>	
3	<p>Lakes and Ponds</p> <ul style="list-style-type: none"> ● Stratification ● Eutrophication ● Human impact on eutrophication 	<p>Model the temperature stratification and turnover of lakes and ponds.</p>	<p>How do humans impact eutrophication?</p> <p>Why is pH important to organisms in an aquatic ecosystem?</p>
10	<p>Flowing Water</p> <ul style="list-style-type: none"> ● Major county stream and tributaries ● Stream structure ● Importance of water from streams ● Physical factors of streams ● Stream analysis ● Stream communities ● Calculating biotic index and stream health ● Forest buffer 	<p>Identify and determine from topographic maps the following fundamentals of stream structure, and relate this structure to the problems of stream pollution.</p> <p>Distinguish between various physical factors on a freshwater stream</p> <p>Analyze a stream and determine the concentrations of various chemicals</p> <p>Calculate the biotic index of the stream and explain its connection to stream health.</p>	<p>How is a topographical map useful in predicting possible sources of pollution in a watershed?</p> <p>How does stream pollution affect wildlife habitats?</p> <p>Why are stream assessments useful?</p> <p>How do we test for water quality?</p> <p>What does the biotic index tell us about the health of a stream?</p>

		Describe how a forested buffer zone improves stream health.	How can forested buffer zones improve stream health?
9-10	Chesapeake Bay and Wetlands <ul style="list-style-type: none"> ● Characteristics of an estuary ● Geologic history of the Chesapeake Bay ● Abiotic factors and communities ● Interdependent relationships in the Chesapeake Bay ● Underwater grass communities ● Impact of human population over 200 years ● Wetland conservation and development decisions ● Habitat destruction ● Economic resources ● Population dynamics ● Native species management ● Invasive species 	<p>Identify the characteristics of an estuary.</p> <p>Describe the geological history of the Chesapeake Bay.</p> <p>Compare and contrast drainage basins in the mountainous region, the Piedmont plateau and the Atlantic coastal plain.</p>	<p>What are the characteristics of estuaries?</p> <p>How do humans impact the Chesapeake Bay?</p> <p>Why are wetlands important?</p>