MAPPING GRADE 6 SCIENCE INSTRUCTION

Concept: Watershed Ecology

PWC Objective: 6.7

The student will investigate and understand the natural processes and human interactions that affect watersheds systems. Key concepts include:

- the health of ecosystems and the abiotic factors of a watershed **(SOL 6.7a)**
- the location and structure of Virginia's regional watershed systems **(SOL 6.7b)**
- divides, tributaries, river systems, and river and stream processes **(SOL 6.7c)**
- wetlands **(SOL 6.7d)**
- estuaries **(SOL 6.7e)**
- major conservation, health, and safety issues associated with watersheds **(SOL 6.7f)**
- water monitoring and analysis using field equipment including hand-held technology **(SOL 6.7g)**

What Students Should Know (Critical Attributes)	**What Students Should Be Able To Do** (Essential Skills)
Essential Questions: • What are the conditions necessary for the health and abiotic factors of the watershed? • How can the location and structure of VA regional watershed system be described? • What are wetlands and estuaries? • What are the major conservation, health, and safety issues associated with watersheds? • How is water monitoring and analysis using field equipment useful for watershed conservation?	
Critical Attributes: 6.7 a An ecosystem is made up of the living community and the non-living factors that affect it. The health of an ecosystem is directly related to water quality. Abiotic factors include water supply, topography, landforms, geology, soils, sunlight, and air quality / O_2 availability. 6.7b A watershed is the land that water flows across or through on its way to a stream, lake, or wetland.	• Comprehend and apply basic terminology related to watersheds. • Use topographic maps to determine the location and size of Virginia's regional watershed systems. • Locate the local watershed and the rivers and streams associated with it.

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What Students Should Know (Critical Attributes)	**What Students Should Be Able To Do** (Essential Skills)
6.7c Areas of higher elevations, such as ridgelines or divides, separate watersheds. The three major regional watersheds systems in Virginia lead to the Chesapeake Bay, the North Carolina sounds, and the Gulf of Mexico (the Mississippi Watershed). River systems are made up of tributaries of smaller streams that join along their courses. Rivers and streams generally have wide flat, border areas, called flood plains, onto which water spills out at times of high flow.	• Describe an example of a wetland
6.7d Wetlands form the transition zone between dry land and bodies of water such as rivers, lakes, or bays. Both tidal and non-tidal wetlands perform important water quality functions including regulating runoff by storing flood waters; reducing erosion by slowing down runoff; maintaining water quality by filtering sediments, trapping nutrients and breaking down pollutants; and recharging groundwater. They also provide food and shelter for wildlife and fish and nesting and resting areas for migratory birds.	• Describe a wetland. • Propose ways to maintain water quality within a watershed. • Explain the factors that affect water quality in a watershed and how those factors can affect an ecosystem.
6.7e Estuaries perform important functions, such as providing habitat for many organisms and serving as nurseries for their young. The Chesapeake Bay is an estuary where fresh and salt water meet and are mixed by tides. It is the largest estuary in the contiguous United States and one of the most productive.	• Explain what an estuary is and why it is important to people.
6.7f Human activities can alter abiotic components and thus accelerate or decelerate natural processes. People can affect the rate of erosion (a natural process). Plowing cropland can cause erosion, while planting trees can prevent it. Flood protection/wetland loss is another example. 6.7g Water quality monitoring is the collection of water samples to analyze chemical and/or biological parameters. Simple parameters include pH, temperature, salinity, dissolved oxygen, turbidity, and the presence of macroinvertebrate organisms.	• Locate and critique a media article or editorial (print or electronic) concerning water use or water quality. Analyze and evaluate the science concepts involved. • Argue for and against commercially developing a parcel of land containing a large wetland area. Design and defend a land-use model that minimizes negative impact. • Measure, record, and analyze a variety of water quality indicators and describe what they mean.