



Watershed Address (GIS)

Explore watersheds and how human impacts to the environment affect water quality

Overview: Using the EPA Water Geoviewer (GIS) students will locate their watersheds and explain how human impacts to the environment affect water quality.

Lesson Characteristics:

Use the table below for lesson planning purposes:

Grade	9-12
Time Required	1 hour
Key Science Practices	
Key Concepts/Terms	Watersheds Mapping/GIS Land Cover Types
Setting	Indoors
Materials	Computer with internet connection

Next Generation Science Standards:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts

Other Standards

Learning Objectives

Students will...

Explain their personal connection to the Potomac River watershed by tracing the waterways from their location to the Potomac.

Explain how humans interact with the land and how different surfaces affect water quality.

Preparation:

Students should already be familiar with features of web mapping applications including legends, zooming, panning, popup windows, etc.

Students should also be familiar with impervious surfaces and watersheds.

Background Information:

A geographic information system (GIS) is a computer system for displaying geographic data to help individuals and organizations better understand spatial patterns and relationships. It is a commonly used tool in the field of environmental management.

Hydrologic units are drainage areas that are delineated so as to nest into a multi-level hierarchical drainage system. Hydrologic unit boundaries do not always surround a complete watershed but may delineate truncated portions of a larger watershed—for example, the mid-stem of a larger stream or river along with the tributaries in that area. Hydrologic units are generally synonymous with watersheds when their boundaries include all the source area contributing surface water to a single defined outlet point.

Vocabulary:

Term	Definition
GIS	Acronym that stands for Geographic Information System. GIS is a system or tool for displaying and analyzing data related to positions on Earth’s surface.
Hydrologic Unit	A hydrologic unit is a drainage area delineated to nest in a multi-level, hierarchical drainage system. Its boundaries are defined by hydrographic and topographic criteria that delineate an area of land upstream from a specific point on a river, stream or similar surface waters.
Impaired Water	When water is contaminated by pollutants, the water bodies are considered impaired.
Impervious Surface	Artificial structures—such as pavements that are covered by water-resistant materials such as asphalt, concrete, brick, stone—and rooftops. Soils compacted by urban development are also highly impervious.
Mouth	The place where a river enters a lake, larger river, or the ocean is called its mouth. Also called an outlet.
Watershed	An area of land that contains streams and rivers that all drain into a single larger body of water, such as a larger river, a lake or an ocean.

Procedure:

Follow the steps in the table below to conduct the activity.

Sentences in bold are suggestions for what an educator might say to students.

Items in italics are possible student answers to questions.

Step	Action
5E's: Engage Learning Cycle: Invitation	
1	Write your home or school address. Identify each component of the address from largest to smallest political division: country, state, county, city, street, house. Much like your home address, you have a watershed address from a large geographic area to a small one.
5 E's: Explore Learning Cycle: Exploration	
2	What are some ways humans use the land in your neighborhood/town? <i>Farming, factories, homes, and shopping areas.</i> How can these uses affect water quality? <i>Storm water carries pollutants from land into the nearest waterway. They will have a worse effect if impervious surfaces are present. The pollutants can affect water bodies downstream.</i>
5 E's: Explain Learning Cycle: Concept Invention	
3	Watch video.
5 E's: Elaborate Learning Cycle: Application	
4	Have students complete data sheet and discussion questions.
5 E's: Evaluate Learning Cycle: Reflection	
5	Have students research one type of non-point source pollution and a best management practice to prevent it.