What's Your Watershed?

Science Enhanced Lesson — Grade 6

ALEXANDRIA renew ENTERPRISES®

VIRGINIA AMERICAN WATER

TOPIC

Watersheds

OUR WORLD, OUR RESPONSIBILITY

6.1 The student will demonstrate an understanding of scientific and engineering practices by (a.) interpreting, analyzing, and evaluating data

- use data to evaluare and refine design solutions

6.1 The student will demonstrate an understanding of scientific and engineering practices by (e.) developing and using models.

- use develop, and revise models to predict and explain phenomena

6.1 The student will demonstrate an understanding of scientific and engineering practices by (f.) obtaining, evaluating, and communicating information

- read scientific texts, including those adapted for classroom use, to obtain scientific and/or technical information

6.6 The student will investigate and understand that water has unique physical properties and has a role in the natural and human-made environment. Key ideas include (f) water is important for agriculture, power generation, and public health.

6.8 The student will investigate and understand that land and water have roles in watershed systems. Key ideas include (a.) a watershed is composed of the land that drains into a body of water; (b) Virginia is composed of multiple watershed systems which have specific features; and (d) natural processes, human activities, and biotic and abiotic factors influence the health of the watershed system.

6.9 The student will investigate and understand that humans impact the environment and individuals can influence public policy decisions related to energy and the environment. Key ideas include (a) natural resources are important to protect and maintain.

EARTH SCIENCE

ES.8 The student will investigate and understand that freshwater resources influence and are influenced by geologic processes and human activity. Key ideas include (c.) weather and human usage affect freshwater resources, including water locations, quality, and supply; and (d) stream processes and dynamics affect the watershed systems in Virginia, including the Chesapeake Bay and its tributaries.

BACKGROUND INFORMATION

A watershed is an area of land from which all surface and groundwater flows from higher elevations downhill to a common body of water such as a stream, river or ocean. Communities rely on water found in watersheds, like the Potomac River, for things like drinking water and recreation.

Understanding the importance of watersheds, their location and their health is vital for proper water protection and distribution. Organizations like AlexRenew and Virginia American Water pay close attention to the condition of local waterways and do their part to protect the community's resources. In this lesson, students will learn about watersheds, the ones they live in and how their actions impact water quality.

Reference the "What You Need to Know About Watersheds" handout for more background information.

MATERIALS FOR TEACHER

- Handout: "What You Need to Know About Watersheds"
- Computer
- Projector
- Access to Internet
- Optional: Roll of Masking Tape or painters Tape (only needed if conducting optional display)

MATERIALS FOR STUDENTS

- Handout: "What You Need to Know About Watersheds" (student version)
- "My Watershed" handout
- 2-3 pieces of paper, thick paper like construction paper works best*
- 1 Drinking Straw
- Scissor
- Tape/Elmer's Glue
- 1 Marker

**You can encourage students to get creative and use upcycled or recycled material instead of construction paper. Newspaper, magazines, cut gallon jugs and recycled class handouts are just a few possible replacement materials.*

VOCABULARY

Watershed, ground water, surface water, elevation

AVAILABLE HANDOUTS

- What You Need to Know About Watersheds (teacher guide)
- What You Need to Know About Watersheds (student version)
- My Watershed

STUDENT/TEACHER ACTIONS

TEACHER ACTIVITY INTRODUCTION:

1. Start this lesson by asking students if anyone can describe or define a watershed.
2. Gather some responses from the students.
3. Distribute the "What You Need to Know About Watersheds" handout to students.
4. Tell students that today they are going to learn about watersheds.
5. Share that as you review some basic information about watersheds, they need to fill in the blanks on their "What You Need to Know About Watersheds" handout. They can use the word bank as a guide.
6. Start at the top of the handout.
7. Share with students that a watershed is an area of land from which all surface and groundwater flows from higher elevations downhill to a common body of water such as a stream, river or ocean.
8. Using the teacher guide version of the handout, work your way through statements 1-5 with the students.
9. After sharing the answer to statement 5, ask if the students know the watershed their school is located in. Gather responses.
10. Then ask if any of the students know the watershed they live in. Gather responses.
11. Share with the students that you are going to pull up a map to help the class identify/confirm the watershed the school is located in. Students will also be able to identify/confirm the watershed they live in by looking at the same map.
12. A good online resource to help identify whatersheds is:

- http://www.virginiaplaces.org/watersheds/3wsheds.html

13. After looking at the watershed map, have the students complete statements 6 and 7 on their handout.
14. After students fill in the watershed names on their handout, complete questions 8-10 on the handout.
15. After completing question 10, ask students to share some of the things in your school's watershed that could impact the water quality of your local water resources, such as land use or local developments.
16. Return to the classroom for the remainder of the lesson.

TEACHER ACTIVITY INSTRUCTION:

1. Distribute the "My Watershed" handout to the students.
2. Share with the students that some people take the term "watershed" literally and think it is a shed that holds water!
3. Share that while the students now know a watershed isn't a physical structure or building, they are going to build a shed to represent the watersheds around their home.
4. Share that before construction can begin, the students need to understand what the design features on their shed are going to represent.
5. Have the students reference the "My Watershed" handout.
6. After reviewing the handout, have each student research the bodies of water surrounding their home, so they can label the design features on their shed models. Students will need access to the Internet to complete the "My Watershed" handout.
7. Students may want to use one of the following resources to complete their handout:

- Google Maps
- https://virginia.hometownlocator.com/features/physical,class,stream,scfips,51059.cfm
- https://www.dgif.virginia.gov/fishing/trout/area-maps
- https://www.usgs.gov/products/maps/overview

8. Once the handout is complete, give students approximately 15 minutes to construct and label a watershed model using the provided supplies.
9. Tell students the model will resemble an actual shed. They need to build a structure with a base, roof, gutter, downspout and drainage pipe. They can use their completed handout to correctly label each design feature.
10. After all sheds are constructed and labeled, you can display so students can view one another's designs.
11. Optional display: Using masking tape or painters tape, create a large map of the local watersheds on the classroom floor, lab floor or open display area like the hallway or gymnasium. You can write the name of each watershed on the tape. Have students place their designed sheds on the outlined water map in the area they live. By doing this, the class can see heavily populated areas. You can discuss the impact the population may have on local waterways. If displayed in a common area for other students to see, you can create signage to explain what the students are looking at.

TEACHER ACTIVITY CONCLUSION:

- Share with students that while all roofs on their watershed models are made of similar material, the roof on an actual shed can be made of many things. It can be made of metal, shingles, rubber, vegetation, etc.
- Ask the students how the different surfaces of a roof can impact the speed water flows from a roof to a gutter? Students should mention that water will flow faster over some surfaces (e.g. metal) vs. another (e.g. vegetation).
- Similarly, the makeup of land that water flows over in a watershed can impact the speed of water's flow. For example, if a student lives in a heavily developed neighborhood, water will flow quickly over pavement. If water flows over a farm or a forested area, it will flow slower.
- Ask the students to think about what water picks up as it flows over different surfaces. Take some answers from the class.
- Ask the students to think about things that people do in neighborhoods that could directly impact the quality of water flowing over the land. Take some answers from the class.
- Remind students that human actions impact the quality of water found in watersheds.
- Remind students that we all need to do our part to protect watersheds because we rely on the water in them for things like drinking water, agriculture and recreation.
- Encourage students to think of one action they can do differently to protect their watershed.

ASSESSMENT

QUESTIONS

- What is a watershed?
- Why are watersheds important?
- What organizations manage the flow of water to and from watersheds?
- How do human actions impact a watershed?

JOURNAL/WRITING PROMPT

- Imagine that the watershed you are living in is heavily developed and the water quality of its streams is poor. Write about the actions people in your neighborhood can take to improve your local waterways.
- Describe the journey water may take over a vegetated surface vs. a paved surface.

EXTENSIONS AND CONNECTIONS

- Give the following assignment to students:
  - Research the watershed around their home. Research can be done by physically traveling around the area or pulling up maps of the area. As they research the watershed, they should make note of key landmarks, waterways and potential factors that could impact the water quality in their watershed.
  - Have students build in a diorama representing their local watershed and the findings from their research
  - Note: If dioramas are built, please contact AlexRenew and Virginia American Water. There may be an opportunity to display the dioramas at a community event.
- Have students agree on one or two actions the school can take to protect the watershed the school is located in. Have the class or the entire school sign a pledge.
- Conduct a clean-up at a local watershed.
- Research the water quality issues with Chesapeake Bay and the actions taken to improve it.
- Invite someone from Virginia American Water to come in and speak about their grant program for protecting watersheds. The class could possibly agree on a project and apply for the grant.

STRATEGIES FOR DIFFERENTIATION

- Print a large map of all local watersheds. Have students write their name on a sticker dot and place the sticker dot on the map where they live. Have students highlight the flow of water from their neighborhood to Chesapeake Bay.
- Build one model as a class of all local watersheds.
- Instead of building a model, draw a shed and label accordingly.