

WHAT IS A WATERSHED?

7TH-
10TH

OBJECTIVES

- Create a watershed model.
- Describe how topography impacts water's movement through a watershed.

BACKGROUND INFORMATION

A watershed is an area of land from which all rainfall drains into a common location such as a stream, pond, lake, river, wetland, or estuary. A watershed can consist of varying scales. The Colorado River Drainage Basin is a very large watershed spanning from the Rocky Mountains all the way to Mexico. Large watersheds are often called basins and contain several small watersheds. Watersheds can also be very small, such as the rainfall that drains off a landscape and into a small farm pond. The topography of the land surrounding a watershed plays an important role in how quickly the watershed is depleted and recharged.

MATERIALS

- Aluminum Foil
- Desk
- Water
- Topographic Map of your Region
- Science Notebook
- Internet Access

ANTICIPATORY SET

Write the following question on the board for your students to contemplate when they arrive for class. Encourage group discussion.

"How does a river's water level rise if it does not rain directly on the river?"

You will want to revisit this question at the end of the lesson to ensure they learned the objective. This could also be an essay question on a post-lesson evaluation.

PRIOR KNOWLEDGE ACTIVATION

Looking on a topographic map of your region, identify locations of high elevation. Challenge your students to determine the path any rainfall will take as it makes its way to an area of lower elevation.

Take a walking field trip around the school to document potential destinations for water. What clues can you find to indicate the direction the water moved? (Sloped land, bare rock on an incline, pipes, heavily eroded areas, etc).

Watch the following videos (links under "Resources"):

- WGCU Curiouskids: What Is A Watershed?
- Oregon State University Ecampus: Understanding the Watershed
- PBS: A Watershed Moment

CREATE A WATERSHED

1. In groups of 4, slightly crumple a 15-inch piece of aluminum foil. Spread the foil out on a flat surface while still protecting the folds and indentations. This represents a land surface with varying elevations.
2. Students should observe the contours to determine where hilltops and valleys are located in this artificial landscape. Which pathways will rain follow across the terrain of this land surface?
3. In their science journal, ask students to write a definition of a Watershed in their own words. Students should then identify how many watersheds are found on their aluminum foil land surface.
4. One student from each group should carefully sprinkle a small amount of water over the foil and watch the movement of water over the land surface.
5. As a group, students should hypothesize which areas are more susceptible to flooding than others. Using water, simulate heavy rain to see if their hypothesis is supported or not. If not, challenge students to explain why.

EXTENSION: CREATE A WATERSHED

Using the same foil from the previous activity, challenge each group to create the following watersheds:

- Water moving quickly across the land surface
- Water moving slowly across the land surface
- A watershed within a watershed
- Two side-by-side watersheds

PONDER

Non-Point Source pollution occurs when runoff from rainfall carries pollution into waterways. It is difficult to identify the exact source of this type of pollution.

Based on what we learned about how topography impacts water flow, what problems could develop in watersheds from non-point source contaminants? Can you think of specific examples of how humans have impacted watersheds over time? Do you think these impacts can be reversed? How?

Watch the following video (found under "Resources")

- National Geographic: 50 Years Ago, This Was a Wasteland. He Changed Everything.

PROJECT

Have your students use the websites listed below to identify your school's watershed, as well as the health of the water in your community. Links to the websites can be found under Resources. Then, have your students compare your school's watershed to two other locations of their choice. Do these locations have anything in common, such as the Watershed or River Basins? Challenge your students to create a report explaining why your community's watershed is healthy or impaired.

- EPA: Enviromapper for Watersheds
- EPA: How's My Waterway
- TPWD: Texas Watershed Viewer

RESOURCES

- Enviromapper for Watersheds (n.d.). In Environmental Protection Agency Website. Retrieved from <https://www.epa.gov/waterdata/waters-geoviewer>
- How's My Waterway (n.d.). In Environmental Protection Agency Website. Retrieved from <https://www.epa.gov/waterdata/how-s-my-waterway>
- Texas Parks and Wildlife: Texas Watershed Viewer <https://tpwd.texas.gov/education/water-education/Watershed%20Viewer>
- Project Wet Water Education Today: Explore Watersheds Retrieved from <https://www.discoverwater.org/explore-watersheds/>
- WGCUCuriouskids: What Is A Watershed? Retrieved from <https://www.youtube.com/watch?v=yhsHS1sYfdc>
- Oregon State University Ecampus: Understanding the Watershed Retrieved from <https://www.youtube.com/watch?v=b98kdNGYZt0>
- PBS: A Watershed Moment Retrieved from <https://klru.pbslearningmedia.org/resource/729d87c8-ea5f-456d-826d-f4da88e8d101/a-watershed-moment/>
- National Geographic: 50 Years Ago, This Was a Wasteland. He Changes Everything Retrieved from <https://www.youtube.com/watch?v=ZSPkcpGmfIE&t=16s>

TEKS ALIGNMENT

Middle School, Science (Adopted 2021):

- 7th: (a) 1Ai, 1Aii, 1D, 3A, 3B, 3C, 5. (b) 1A, 1B, 1C, 1D, 1E, 1G, 2D, 3A, 3B, 3C, 5A, 5B, 5C, 5D, 5F, 5G, 11A, 11B.
- 8th: (a) 1Ai, 1Aii, 1D, 3A, 3B, 3C, 5. (b) 1A, 1B, 1C, 1D, 1E, 1G, 2D, 3A, 3B, 3C, 5A, 5B, 5C, 5D, 5F, 5G.

High School, Biology (Adopted 2020):

(b) 1, 3A, 4A, 4B, 6. (c) 1A, 1B, 1C, 1D, 1E, 1F, 1G, 2D, 3A, 3B, 3C, 4A.

Aquatic Science (Adopted 2021):

(b) 1, 3A, 4A, 4B, 6. (c) 1A, 1B, 1C, 1D, 1E, 1G, 2D, 3A, 3B, 3C, 4A, 10A, 10B, 10C, 10D.

Environmental Systems (Adopted 2021):

(b) 1, 3A, 4A, 4B, 6. (c) 1A, 1B, 1C, 1D, 1E, 1G, 2D, 3A, 3B, 3C, 4A, 6B.

Earth Systems Science (Adopted 2021):

(b) 1, 3A, 4A, 4B, 6. (c) 1A, 1B, 1C, 1D, 1E, 1G, 2D, 3A, 3B, 3C, 4A, 9A, 9B.



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