

Galena Creek Visitor Center
Adapted Lesson Plan

Understanding Our Watershed

Adapted from Alice Ferguson Foundation Activity



Summary of Activity

In this activity, students will use a model to create their own watershed. By observing how the shape of the land affects water-flow, students will gain a better understanding of the water cycle and the physical characteristics that make up a water-shed. They will also investigate the impacts that human-activity has on our water supply.

Objective:

Students will be able to define the word “watershed”, understand the boundaries of a watershed, and visually see how runoff from human activity affects our water quality.

Discipline or Subject Covered:

STEM, Water-Cycle, Formation of Lakes and Streams, Effects of Water Pollution.

Grade Level:

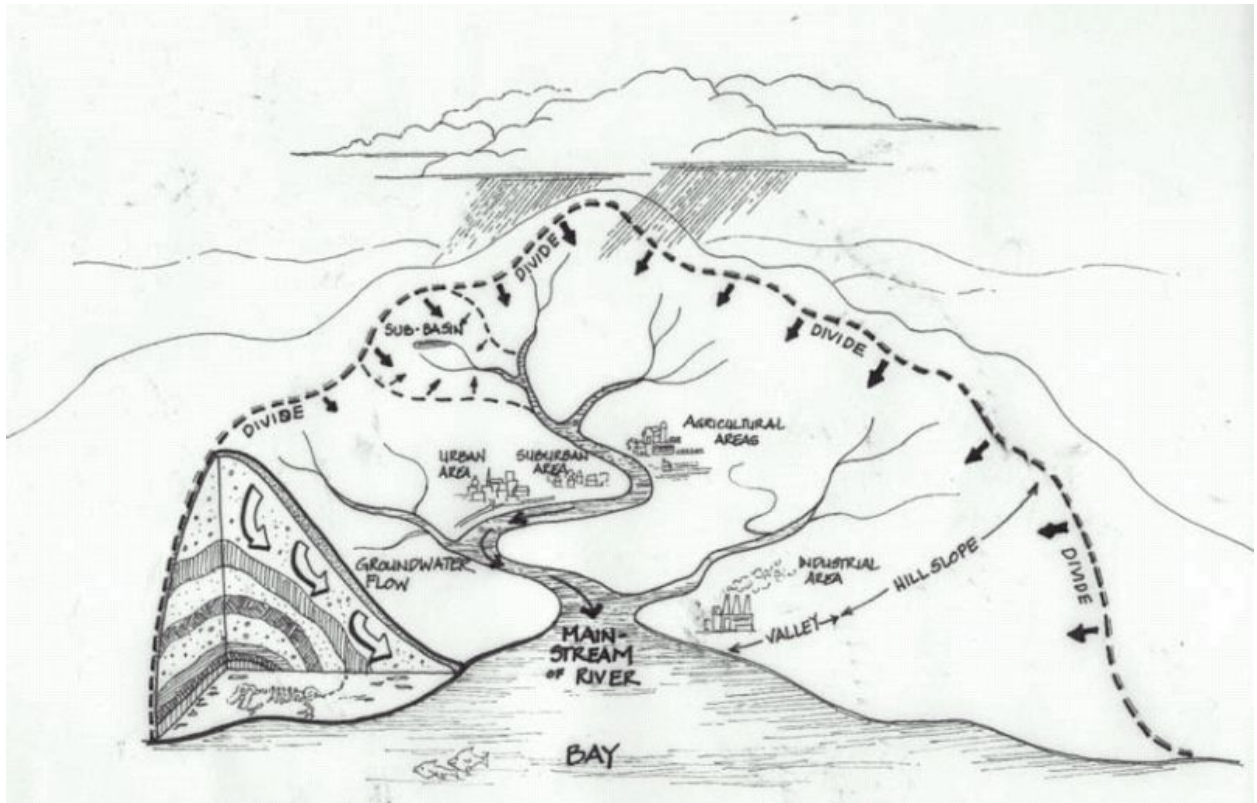
1st - 5th grade

Materials:

- Tin foil
- Spray Bottle (or method of spreading water)
- Water
- Water coloring [Food-dye, water-color paints, or household spices will all work. We just want to make the water easier to see against the tin foil]

Background:

A watershed is an area of land where all the streams and rivers drain into. In other words, all of the rainfall that falls into a certain watershed will accumulate in the same location, usually a lake or ocean. The word watershed refers to all the surface water--lakes, streams, reservoirs, and wetlands--and underlying groundwater. Watersheds are separated by ridges and hills, which due to gravity, force the rainfall to accumulate in specific locations.



Understanding watersheds is important because it allows us to measure how human activity affects the water quality of our water-ways. We all live within a watershed, and are all equally dependent on the water within it. That is why we need to understand how each of our actions affect the quality of our water.

PART 1

Procedure:

- 1) Cut a piece of tin foil about the size of a sheet of paper and set it in an area that can get a little wet. We will pretend that this piece of tin foil is our "land".
- 2) Crumple the foil slightly and then open it back up to create some "ridgelines" (high-points), and preferably one or two "valleys" (low-points).
- 3) Mix your food coloring (or spice) into the water to give it a certain color. In this example, we have mixed some curry powder into our water to make the water yellow, though any color will work.
- 4) Make a hypothesis: what do you think will happen when it "rains" on your land? Where will the water go? Why will it go there?
- 5) Use a spray bottle to create "rain" on your land. Spray enough times so that you can see the water gathering into "lakes".
- 6) As the rain falls onto your land, observe the path that the water takes to settle. Try to follow one "bead" of water and determine where it ends up.



Critical Thinking Questions:

- Where did the water collect on your land? Explain why this happened.

- Find a lake on your land and name it! Why did this lake form here?

- Where did no water collect at all?

- While spraying "rain", find a major stream that runs into your lake. Name the stream! Why did this stream form here?

- With your finger, trace your stream back up to where it starts at the top of the ridge. This is the "beginning" of the watershed for your lake.

- Now, still with your finger, follow this ridgeline around the entire area of your lake. **The entire, downward-sloping area inside this ridgeline is the watershed of your lake.** Draw a picture of your watershed below and label the stream and lake.

- How would you define the word "watershed"?

- What kind of pollution do you think you add to the watershed?

Discussion:

Understanding the watershed is important because all of our actions have a direct impact on water quality “downstream” of where we live. Anything that is put down the sink drain, or onto the street, ends up in our waterways.

Although this simple activity helps visualize what a watershed is, in reality, there are a number of factors that affect the water-flow within our watershed. Here we have listed just a few; try to imagine how the following characteristics of the land might affect the experiment we just performed:

- **Precipitation:** The greatest factor controlling streamflow, by far, is the amount of precipitation that falls in the watershed as rain or snow. What would this activity look like if it kept “raining” for several hours?
- **Infiltration:** When rain falls on dry ground, some of the water soaks in, or infiltrates the soil. Some water that infiltrates will remain in the shallow soil layer, where it will gradually move downhill. Some of the water may infiltrate much deeper, recharging groundwater aquifers. In this activity we used tin foil, which does not absorb water. How might the activity change if we used real dirt?
- **Soil characteristics:** Clay soils absorb water at a slower rate than sandy soils. Soils absorbing less water results in more runoff overland into streams when there is a slope, such as in a desert.
- **Plant cover:** An area with many deep-rooted plants may better be able to absorb water into the soil, preventing erosion and runoff.
- **Land:** Some land types have a great impact on infiltration and rainfall runoff. Surfaces where water is unable to be absorbed, such as roads, act as a “fast lane” for rainfall, where water goes right into storm drains which drain directly into streams. Flooding becomes more prevalent as the area of these types of surfaces increases.
- **Slope of the land:** Water falling on steeply-sloped land (like mountains) runs off more quickly than water falling on flat land.
- **Evaporation:** Most of the rainfall that we experience in the Sierra Nevada mountains comes from water that has evaporated in the Pacific Ocean. The

amount of evaporation depends on temperature, wind, atmospheric pressure, and other factors.

- **Water use by people:** We use water for every aspect of our lives: to water our lawns, wash our clothes in a washing machine, irrigation to grow our food, and all of the water we drink each day. Each of these uses affects the quality and quantity of water that is available downstream.

Other Resources/Further Information:

The following links provide information on what you can do to save water within your home, and help maintain the quality of our water supply!

- ❖ The Water Project: https://thewaterproject.org/water_conservation_tips
- ❖ Water One: <https://www.waterone.org/community/keep-water-clean>