

# What is a Watershed?

## Introductory Watershed Activities to Activate the Senses

A watershed is the area of land that is drained by a creek, stream, or river. All of the land on Earth is part of some watershed. Understanding a watershed is the key to understanding water in the Golden State. Have students learn in what watershed they live or from what watershed their drinking water comes. This is the perfect context for learning about the natural environment in which the students live. The activities presented here are designed to introduce the watershed concept to the students.

### The Cupped Watershed

**Grades:** All Grades

**Overview:** This activity involves the student in a simple exercise of cupping their hands and spraying water onto them until it starts to flow off in drops. This introduces them to the concept of a watershed.

**Materials:** Spray bottle with water, Watershed Information Fact Sheet

1. Take students outside and have everyone stand in a circle, shoulder to shoulder, facing towards the center of the circle.
2. Have the students cup their hands together, with their fingertips pointing up. Ask them to pretend that their fingers are now mountains, the space between the fingers are the creeks and valleys, and the palms are the flatlands. They have now created a model of a watershed with their hands.
3. Next have the students reach toward the center of the circle so that their cupped hands touch the hands of those people on both sides of them.
4. Tell them it will rain now on their watersheds. Ask them to observe where the water goes. Now, spray water on their hands.
5. With further discussion, have students describe where the “rain” went when it hit their hands; describe or show the places where it collected into pools or streams in their hands; name their watersheds;

compare the sizes of everyone’s “lakes” or “puddles;” who has the biggest lake; who has the smallest lake; why are they the same or different?

6. After watersheds have been fully discussed in class, have the students write about what they have learned. What is a watershed? Which watershed do they live in? How does pollution affect water? How does water flow over the land?

**Source:**

State Water Resources Control Board,  
[www.swrcb.ca.gov](http://www.swrcb.ca.gov).

### Construct a Watershed

**Grades:** 2–8

**Overview:** This activity introduces student to watersheds and how they work. A watershed guides all precipitation and run off to a common watercourse or body of water. The physical features of the land determine the nature of a watershed.

1. Ask students: What is a watershed? Why are watersheds important?
2. Pick one of the options below to build a watershed or build all three.

#### Watershed A

**Materials:** Spray bottle with water, 8½” x 11” sheets of paper, water soluble color marking pens

1. Take a piece of paper and put it over a hand and crumple around index finger making the point at the index finger a “mountain.”
2. Have the students take water soluble color marking pens and make ridge lines to represent mountain ridges, creeks, etc.

#### Watershed B

**Materials:** Spray bottle with water, plywood sheet approximately 1m x 1m, Plaster of Paris, clay, or similar material, waterproofing material or household plastic wrap

1. Ask the students to work in small groups to create their Plaster of Paris or clay model of a watershed which can include mountains, hills, valleys, etc.
2. Cover the model with the household plastic wrap.

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### Watershed C

**Materials:** Spray bottle of water, plastic or cardboard box, white plastic trash bag, newspaper

1. Ask students to create a landscape by putting the crumpled newspaper in the bottom of the box.
2. Place the plastic bag over the top of the newspaper. Make sure the edges of the plastic bag stay outside the box.
3. Once completed, ask the students to describe the type of land formations they see in their landscape (hills, mountains, valleys).
4. Ask them to predict what will happen when they spray water over the landscape.
5. Tell the students that the spray bottle represents rain. Ask them to spray water on the model and trace the path a drop of water takes across the watershed and into the watercourse.
6. In Watershed A: Observe how the colors of the pens flow down ridges to “valleys.” Discuss the relationship between the physical features of the watershed, paying special attention to how the shape of the model affects the flow of the water, and the location of human activities. Ask students what would happen if they changed the physical features of the model. Ask how they might create a more rapid or slower flow of water or to have more or less water collect in a specific location.

In Watershed B and C: have the students rearrange the model by adding rocks to test their ideas. Repeat this variation several times. Have the students create a town in the watershed. Use something to represent buildings (small game pieces, toy buildings, coins, etc.). Add red food coloring to the watershed to represent non-point source pollution coming from the town and watch it flow into the creeks and ocean.

7. Ask students to describe ways in which human activities change the shape of the watershed and, consequently, the path along

which water will flow. Ask the students to discuss ways that the “town” could keep the non-point source pollution (red food coloring) from entering the watershed.

**Source:**

Adapted with permission from WS Curriculum Lesson 5.

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## Go with the Flow

**Grades:** 6–12

**Overview:** By taking a look at their own environment, students will have better understanding of how water can become polluted.

**Materials:** Copies of “Go with the Flow” Student Worksheet, markers or colored pencils, state highway, regional, or topographic maps of the area, tracing paper, and masking tape

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### Part I: Upstream, Downstream

1. Begin by asking students if they have ever seen splotches of oil in a parking lot or driveway. Then tell them that by doing this activity, they will find out what eventually happens to this oil.
2. Next introduce the group to the term “watershed.” Explain that a watershed is an area of land from which rainwater and snow melt drain into a particular stream or river. Watersheds may be small areas of land that drain water into small streams or huge areas of land that drain water into large rivers. Within each large watershed, there are many smaller watersheds. A watershed is usually named after the stream or river it drains into.
3. Point out that as rain and snowmelt flow across land and into waterways, they wash over everything in their path: golf courses, roads, fields, lawns, woodlands, and so on. Along the way, the water picks up and carries materials such as trash, dirt, pesticides, and oil.
4. Next, pass out copies of the “Go with the Flow” Student Worksheet. Tell students to use the map at the top of the page to answer the questions on the bottom of the sheet. If they are having trouble determining the boundaries of the watershed, have them look at the streams on the map to see which way they flow. Those flowing into

**Key Words:**

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Runoff  
Watershed  
Percolate/infiltrate  
Non-point source  
pollution  
Point source  
pollution

the Cedar River are in the Cedar River watershed. Afterwards, go over the page with the students, using the answers provided.

### Part II: Local Waters

1. Now have the students map the watershed they live in. Pass out state highway, regional, or topographic maps of the area that show a stream or river flowing through (or near) students' communities. Also, pass out sheets of tracing paper, masking tape, and colored pencils or markers.
2. Tell the students to find their community and the nearest stream or river on the map. Then tape tracing paper over that section of the map. (Note: slope is the factor that separates one watershed from another. Depending on the slope of the land in the area, the watershed or the nearest stream or river may or may not include student's community. The only way to tell is to look at slope on a contour map. For this activity, the students can assume that their community is in the watershed of the nearest stream.)
3. Use a colored pencil or marker to trace the stream or river downstream until it joins a larger river. Use the same colored pencil or marker to trace the stream upstream as far as one can and to trace all the tributaries that feed into the river or stream all along its length.
4. Use a different colored pencil or marker to trace other streams and rivers in the area.
5. Remind the students that the watershed they live in is made up of all the land that drains into the nearest stream or river. Outline the watershed. They should be outlining the land surrounding the nearest waterway and all its tributaries.
6. Discuss the following questions:  
What types of things do rainwater and snow melt flow over in your area? Roof-

tops, sidewalks, roads, agricultural land, lawns, golf courses, and so on.

What kinds of pollutants might rainwater or snow melt pick up as they flow through your area? Rainwater and snow melt that run over streets, parking lots, fertilized yards, and construction sites, often pick up toxic chemicals, silt, and other pollutants. The water then flows into storm drains that empty into rivers. Water running off agricultural land often contains high amounts of animal waste, pesticides, fertilizers, dirt, and other pollutants.

In what other ways might your community affect water quality? For example, some industries dump pollutants directly into rivers; pollutants from overflowing sewage treatment facilities may wash directly into waterways; pollutants from landfills or dumps may leak into water supplies.

Which nearby communities might be affected if your community dumped untreated sewage into the nearest stream or river? Those downstream.

Which communities could affect water quality in your community? Those upstream.

What happens to the oil splotches you talked about in the beginning of the activity? The oil may wash into your local stream or river and be carried downstream.

## Source

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Adapted from

“Go with the Flow, Environmental Education in the Schools—Creating a Program that Works!” which was adapted from *Conserving America: Rivers Resource Guide*, published by the National Wildlife Federation and WQED/Pittsburgh.

# Watershed Information

## Fact Sheet

A watershed is the area of land that is drained by a creek, stream, or river. All of the land on Earth is part of some watershed.

When water falls to the Earth it lands in a watershed. A watershed is the land that captures water in any form, such as rain, snow, dew, sleet, or hail. All the land whose water drains into a particular stream system or lake is the watershed for that body of water. All land is part of some creek, stream, river, lake, pond, or puddle's watershed. Some watersheds are huge. The Mississippi River's watershed extends from Minnesota to Louisiana. It has many smaller watersheds that feed water into the main river. In the California counties of Calaveras and Amador, the Upper Mokelumne River Watershed includes fourteen creeks emptying into the North Fork of the Mokelumne River. Two creeks feed the Middle Fork of the Mokelumne River, and four creeks nourish the South Fork of the Mokelumne River. This is also true of the Tuolumne River and the Stanislaus River in Tuolumne County. These smaller watersheds are all part of the larger watershed, just like one's fingers are all part of one's hand.

Think of the word "shed." It can mean something that stores things, like a garden "shed," or it can mean to let something run off, like an umbrella "sheds" water. A watershed does both! Some rain that falls on the watershed runs off, carving the land into hills and valleys in a slow process called "erosion." As water flows it causes erosion and small particles of mud, sand, and rock are transported downstream changing the shape of the streambed and stream banks.

Some of the water seeps into the ground where it is stored for a while before being released slowly into streams by way of springs. This "groundwater" may be tapped by wells and pumped out of the ground to be used by people. California's golden future depends on the watershed doing its job of capturing, storing, and slowly releasing its water.

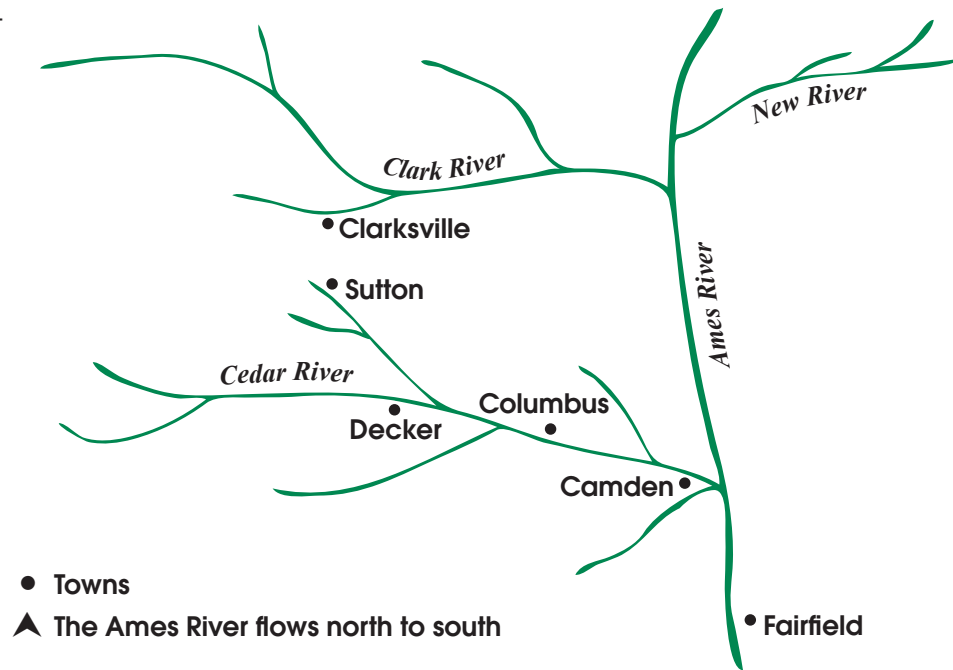
Everyone lives, works, and plays in watersheds, and what humans do affects everything and everyone else in the watershed. Water from homes soaks into the ground or drains into creeks and lakes within the watershed; what is done around homes can change the quality of water downstream.

### Source

The State Water Resources Control Board, [www.swrcb.ca.gov](http://www.swrcb.ca.gov).

# Go With the Flow

## Student Worksheet



- Find the Cedar River and all the Cedar's tributaries—the smaller streams and rivers that flow into it. Then outline the Cedar River watershed.
- What larger watershed is the Cedar River watershed a part of? What other rivers are part of this watershed?
- There's a chemical manufacturing plant in Decker that dumps its waste into the Cedar River. What communities might be affected by this waste?
- Which river or rivers would animal waste and other pollutants from farms near Sutton wash into? What about from farms near Clarksville? Why would you think that Sutton and Clarksville are into two different watersheds? Is it possible for Sutton and Clarksville to be in the same watershed? Explain your answer.
- Eventually the Ames River empties into Lake Churchill. Two other large rivers also empty into Lake Churchill. What effect might these three rivers have on conditions in the lake?

## Answers to “Go with the Flow” Worksheet

1. See map.
2. Ames River watershed, Clark, and New.
3. Columbus, Camden, and Fairfield, because they are downstream from Decker.
4. Cedar River, then into Ames River; Clark River, then into Ames River. Because Sutton is closest to the Cedar River and Clarksville is closest to the Clark River. However, they could be in the same watershed, depending on the slope of the land. For example, if a mountain or hill separated Clarksville from the nearby stream, wastewater from Clarksville could flow into the Cedar River watershed. It's more likely, though, that Sutton is part of the Cedar River watershed and Clarksville is part of the Clark River watershed. (Note: They are both in the same, larger Ames River watershed.)
5. Many of the pollutants carried by the Ames and the two other rivers—pollutants that were collected from large areas of land—would end up in Lake Churchill; as pollutants accumulate in Lake Churchill, water quality could decrease significantly and aquatic plants and animals could be affected.

Explain that as rivers empty into bays, lakes, and other bodies of water, some of the waste they're carrying can accumulate in these areas. This accumulation can create big pollution problems. For example, Long Island Sound, the Chesapeake Bay, and the Great Lakes are suffering from the accumulation of pollutants flowing into them.

### Source

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