Go with the Flow

Study a watershed, and then map your own local watershed

Objectives:
Define watershed.
Explain how pollutants can affect water quality in a watershed.

Grade Level: 6-8

Subject:
Science

Materials:
- Copies of the student worksheet
- Markers or colored pencils
- State highway, regional or topographic maps
- Tracing paper
- Masking tape

No matter where you live, you live within a watershed. Conditions within that watershed greatly affect the quality of the rivers and streams flowing through it. After learning about watersheds, the kids in your group will have a better understanding of how water can become polluted. But before you do this activity, make sure the kids are familiar with some of the different kinds of water pollution.

Part 1: Upstream, Downstream

Begin by asking the kids if they've ever seen splotches of oil in a parking lot or driveway. Then tell them that by doing this activity they'll find out what eventually happens to this oil. Next introduce the group to the term watershed.

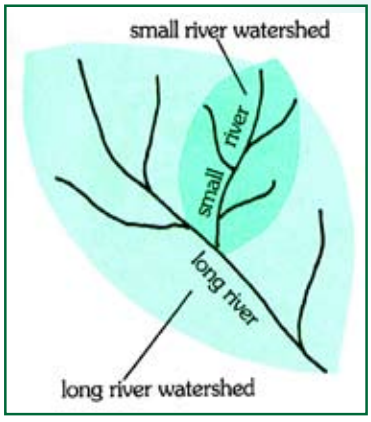
Watershed = an area of land from which rainwater and snowmelt drain into a particular stream or river. Watersheds may be small areas of land that drain water into small streams or huge areas of land that drain water into large rivers. Within each large watershed there are many smaller watersheds. A watershed is usually named after the stream or river it drains into.

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. They pick up and carry material along the way: trash, dirt, pesticides, oil, and so on.

Next pass out copies of the worksheet to the group. Tell the kids to use the map at the top of the page to answer the questions on the bottom of the sheet. If the kids 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 the Cedar River are in the Cedar River watershed. Afterward go over the page with the kids, using answers on the next page.

Part 2: Local Waters

Now have the kids map the watershed they live in. Pass out copies of state highway, regional, or topographic maps of your area that show a stream or river flowing though (or near) your community. (For topographic maps of your area go to the U.S. Geological survey website www.usgs.gov/pubprod/). Also pass out sheets of tracing paper, masking tape, and colored pencils or markers and tell the kids to follow these directions:



1. Find your community and the nearest stream or river on the map. Then tape tracing paper over that section of the map. *(Note: as we*

Go with the Flow
(continued)

discussed in the answers to Part 1, slope is the factor that separates one watershed from another. Depending on the slope of the land in your area, the watershed of the nearest stream or river may or may not include your community. The only way to tell is to look at slope on a contour map. For this activity, the kids can assume that your community is in the watershed of the nearest stream).

2. 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 you can and to trace all the tributaries that dump into the river or stream all along its length.

3. Use a different colored pencil or marker to trace other streams and rivers in your area.

4. Outline the watershed you live in. Remind the kids that the watershed they live in is made up of all the land that drains into the nearest stream or river. So, to outline the watershed, they should be outlining the land surrounding the nearest waterway and all its tributaries. Afterward discuss the following questions as a group.

- *What types of things do rainwater and snowmelt flow over in your area?* Rooftops, sidewalks, roads, agricultural land, lawns, golf courses.
- *What kinds of pollutants might rainwater or snowmelt pick up as they flow through your area?* Rain water and snowmelt that run over streets, parking lots, fertilized yards, construction sites, and so on, often pick up toxic chemicals, silt, and other pollutants. The water then flows into storm drains that empty into rivers. And water running off agricultural land often contains high amounts of animal waste, pesticides, fertilizers, dirt, and other pollutants.
- *In what other ways might you community affect water quality?* Some industries dump pollutants directly into rivers; pollutants from overflowing sewage treatment facilities may wash directly into waterways; pollutants from landfills or dumps may leach into water supplies; and so on.
- *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.
- Finally, ask the kids 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.

Action Tip: Help a Local Waterway!

Your group can organize a cleanup, set up a monitoring program, or organize a media campaign to make others in your community more aware of the problems facing a local waterway. Here are some organizations to contact for more information:

- Adopt-A-Stream Foundation, How to Adopt a Stream, www.streamkeeper.org/aasf/Adopt_Steps.html.
- Save Our Streams, Izaak Walton League of America, www.iwla.org/index.php?ht=d/sp/i/1977/pid/1977.
- GREEN (Global Rivers Environmental Education Network), www.rivernetwork.org/resource-library/green-global-rivers-environmental-education-network.

Go with the Flow
Student Worksheet

Questions:

1. 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.

2. What larger watershed is the Cedar River watershed a part of? What other rivers are part of this watershed? _____

3. There's a chemical manufacturing plant in Decker that dumps its waste into the Cedar River. What communities might be affected by this waste? Explain your answer.

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4. Which river would animal waste and other pollutants from farms near Sutton was into? What about from farms near Clarksville? Why would you think that Sutton and Clarksville are in two different watersheds? Is it possible for Sutton and Clarksville to be in the same watershed? Explain your answer.

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5. Eventually the Ames River empties into Lake Churchill. Two other larger rivers also empty into Lake Churchill. What effect might these three rivers have on conditions in the lake?

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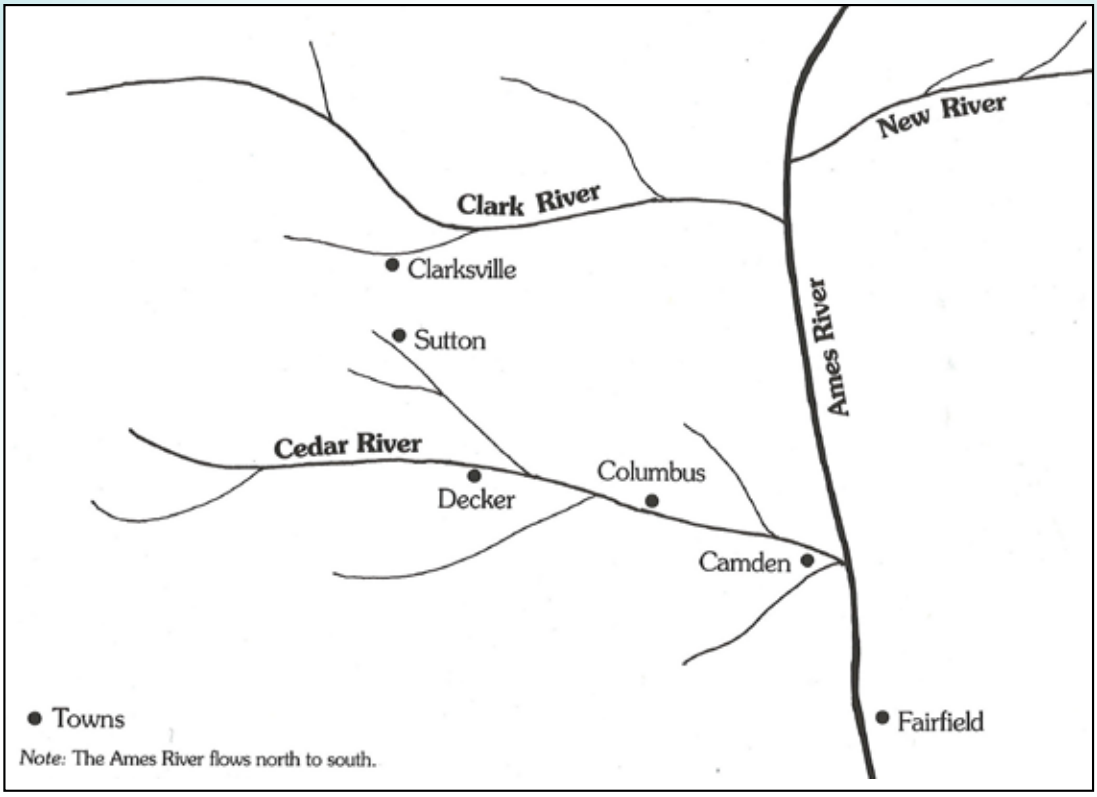
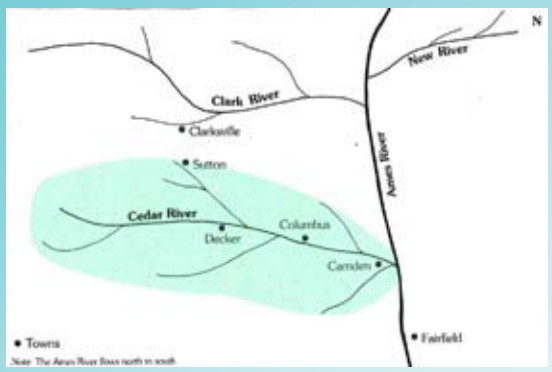


Go with the Flow Worksheet Answers

Questions:

1.



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 of hill separated Clarksville from the near-by 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, the Chesapeake Bay and the Great Lakes are suffering from the accumulations of pollutants flowing into them.