

It All Runs Downhill



Iron contamination in the Idaho Blackbird Creek, Lemhi County, Idaho. Courtesy NOAA

What You Will Do

Make a model of a watershed, and show how rainfall carries pollution into the ocean and other water bodies.

What do you think of when you hear the word “pollution?” Black smoke belching out of factories? Horrible fluids pouring out of huge pipes?

Thirty years ago, these were classic symbols of pollution. But a lot of progress has been made in reducing pollution from sources such as industrial facilities and sewage treatment plants. Today, the big water pollution problem comes from rainwater and melting snow. Rain and snow are usually pretty clean when they fall from the sky. But as water flows over and through the ground it picks up chemicals, oil, animal wastes, and many other contaminants that change clean water into polluted runoff.

This kind of contamination comes from many sources, such as

- *fertilizers and pest control chemicals from farms and home landscapes;*
- *oil, grease, and toxic fluids from roads, parking areas, and motor vehicles;*
- *acid drainage from abandoned mines; and*
- *wastes from livestock, pets, and leaking septic tanks.*

Because the contaminants cannot be traced to a single source, this kind of pollution is called “nonpoint source pollution” or polluted runoff. More than half of the watersheds in the U.S. are affected by nonpoint source pollution. A “watershed” is an area of land that catches precipitation and channels this water into a marsh, stream, river, lake, or underground reservoir (groundwater). You can think of a watershed as a giant funnel. Water that falls on any land within the watershed will all be funneled to the same water body. Watersheds can be small, feeding to a single stream or pond. Several small watersheds may be part of a larger watershed that funnels into a larger stream or river, and eventually into the ocean.

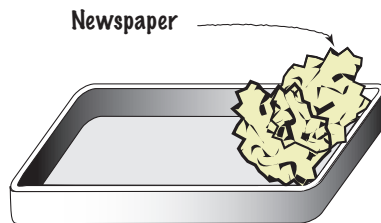
The only way to stop nonpoint source pollution is through education about the problem and what people can do to prevent watershed contamination. Here’s a way that you can help!

What You Will Need

- Rectangular container, about ten inches x twelve inches x two inches; a metal baking pan or plastic storage container is perfect
- Two sheets newspaper
- Plastic wrap or a white garbage bag
- Spray bottle
- Water
- Blue food coloring, about four drops
- Baby powder, cocoa powder, colored drink powder, and/or cake sprinkles; about two tablespoons

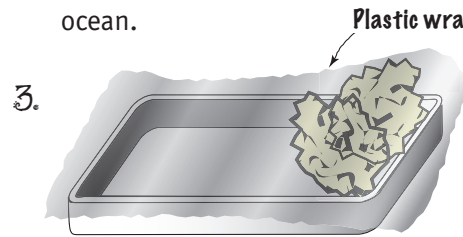
How to Do It

1. Crumple two sheets of newspaper, and place them side by side in one end of the container, like this:



2. Stretch the plastic wrap or garbage bag over the wads of newspaper and down over the sides of the container. Press the plastic down into the container in the end without the newspaper so that it forms a shallow depression. Be sure the plastic extends all the way over both sides of the container. The wads of newspaper represent hills or high places in your model watershed, and the shallow

depression represents lakes, rivers, or the ocean.



3.

Sprinkle a little baby powder, drink powder, cocoa, or cake sprinkles on the hills of your model to represent pollution. You can use different materials to represent different types of pollution. For example, baby powder could represent fertilizer; cocoa powder might represent motor oil or vehicle exhaust; colored drink powder could represent chemical runoff; and chocolate cake sprinkles could represent animal waste.

4. Predict where the pollution will flow and how many watersheds you think you have. Now, rapidly spray water onto the hills to show how rainfall carries pollution into the ocean and other water bodies. Were your predictions accurate?
5. You can use your model to teach other people about nonpoint source pollution. Be sure to talk about things that everyone can do to help solve this problem! Here are some ideas:
 - Keep trash, pet waste, chemicals, etc. out of storm drains, since these often drain directly to lakes, streams, rivers, or wetlands

- Find out about alternatives to lawn and garden chemicals such as mild detergents, planting native species, and alternating rows of herbs with rows of vegetables to attract pest predators such as damsel bugs, ladybugs, and stingless wasps
- Learn how to properly dispose of used oil and hazardous household chemicals
- Dispose of pet wastes in the garbage or toilet

You can find more ideas at www.epa.gov/hwp and www.epa.gov/hwp/basic-information-and-answers-frequent-questions

Want to Do More?

1. See NOAA's National Ocean Service Nonpoint Source Pollution Tutorial: oceanservice.noaa.gov/education/kits/pollution/04non-pointsource.html to find out more about nonpoint source pollution
2. See EarthLabs for instruction on how to make a more realistic model of a watershed: serc.carleton.edu/eslabs/drought/2a.html
3. Visit help.waterdata.usgs.gov/tutorials/site-information/ and click on "What is my watershed address and how will it help me find USGS data? (or What is a Hydrologic Unit?)" to find your watershed address.