

Pollution in Our Watershed

GRADE LEVEL	2 nd - 8 th ; CA Science Content Standards for 5 th and 6 th
SUBJECTS	Earth Sciences
DURATION	Preparation: 10 minutes Activity: 20 - 40 minutes
SETTING	Classroom

Objectives

Students will:

1. understand what constitutes a watershed.
2. understand how pollution accumulates in our water sources, especially from pesticides used in agriculture

Materials

1 page of white typing paper per team
1 page of card stock per team
permanent markers of multiple colors; washable orange marker
tape
spray bottle
water

Vocabulary

- ❖ **watershed:** a continuous ridge of high ground forming a divide between two different drainage basins or river systems. The region enclosed by such a divide and draining into a river, river system, or other body of water.
- ❖ **pollution:** the contamination of air, water, or soil by substances that are harmful to living organisms. Pollution can occur naturally, for example through volcanic eruptions, or as the result of human activities, such as the spilling of oil or disposal of industrial waste.
- ❖ **pesticide:** a chemical used to kill harmful animals or plants. Pesticides are used especially in agriculture and around areas where humans live. Some are harmful to humans, either from direct contact or as residue on food. Others are harmful to a range of organisms in the environment because of their high toxicity.

Teacher Background

A watershed or drainage basin is a region of land where water from rain or snow melt drains downhill into a body of water, such as a stream, river, lake, dam, estuary, wetland, sea or ocean. The drainage basin includes both the streams and rivers that convey the water as well as the land surfaces from which water drains into those channels. The drainage basin acts like a funnel collecting all the water within the area covered by the basin and channeling it into a waterway. Each drainage basin is separated topographically from adjacent basins by a ridge, hill or mountain, which is known as a water divide or a watershed. Especially in North American usage watershed refers to the drainage basin itself.

Surface runoff is used to describe the flow of rain and snowmelt over the land surface. When runoff flows along the ground, it can pick up soil contaminants such as pesticides (in particular herbicides and insecticides) and carry them into creeks, streams, and rivers and ultimately into the ocean.

Reported pesticide use in California has stabilized at about 200 million pounds of active ingredients each year. This figure only includes farm use and professional pesticide use. Not included are consumer and much institutional pesticide use. Also not included in this figure are so-called 'inert' ingredients. U.S. pesticide use is about 1.2 billion pounds each year, and worldwide pesticide use is about 5 billion pounds each year.

Activity

Introduction

Students will create watersheds using paper and markers. Precipitation will occur and marked areas with pesticides/pollutants will drain down into rivers, lakes, and streams ending up in the ocean.

Procedure

It can be messy.

1. Students will crumple a piece of white paper lightly. This will look like a topographical map.
2. Students will then use their permanent markers to outline and define various areas in the watersheds using appropriate colors such as:
 - ❖ Black or brown—mountains
 - ❖ Green—agricultural areas
 - ❖ Blue—rivers, lakes, streams, ocean
 - ❖ Gray—urban areas and buildings
3. Ask student teams to determine how many watersheds are in their model. Review the definition of a watershed.
4. Using a washable orange marker, students will “spray” pesticides on the crop areas by making lots of dots and streaks over the green agricultural areas
5. Students will then tape down the four corners of the crinkled paper onto a larger piece of card stock. To give the watersheds model a variety of elevations, the paper should not be taped completely flat.
6. Now it will rain. The teacher will walk around and spray each map with the water using the spray bottle.
7. Students will most likely be able to observe the movement of pesticides/pollution (orange water) from the fields to the streams, rivers, lakes and ocean.

Wrap-Up

- ❖ What are some solutions to pesticide use on crops? (*Organic farming does not permit the use of synthetic pesticides*)
- ❖ What are other sources of pollution in fresh water? (*Chemicals from factories, oil leaks from cars, untreated sewage, fertilizer from farms, golf courses, and lawns, household cleaner, medicines*)

References

Vocabulary definitions: The American Heritage® Science Dictionary. Retrieved October 22, 2007, from Dictionary.com website: <http://dictionary.reference.com/browse>

Drainage basins. Retrieved October 22, 2007 from http://en.wikipedia.org/wiki/Drainage_basin

Correlated California State Content Standards

Grade Five

Earth Sciences

3d. Students know that the amount of fresh water located in rivers, lakes, underground sources, and glaciers is limited and that its availability can be extended by recycling and decreasing the use of water.

Grade Six

Earth Sciences

2a. Students know water running downhill is the dominant process in shaping the landscape, including California's landscape.

6b. Students know different natural energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests, and know how to classify them as renewable or nonrenewable.