



OVERVIEW

This activity will demonstrate to students, the different point source and nonpoint source types of pollution that contribute to the pollution of our waterways. They will also be introduced to the concept of a watershed and discover how their actions affect water quality of that watershed.

OBJECTIVES

- Understand the different components of a watershed
- List different types of point source and nonpoint source pollution
- Describe three different ways pollution affects water quality

MATERIALS

- Clear, gallon jug of water, half-filled
- Small cups containing the following (separated):
 - Small amount of dry clay
 - Crumbled dry leaves and twigs
 - ¼ tsp. vegetable oil
 - Knot of nylon fishing line
 - ¼ cup vinegar
 - ¼ cup balsamic vinegar
 - ½ tsp. baking powder
 - 1 tsp. of blue/green food color and water
 - ¼ tsp. of red food coloring and water
 - Miscellaneous trash items
 - ½ tsp. baking soda
 - Pieces of brown cereal

VOCABULARY:

- Watershed
- Water Quality
- Point Source
- Nonpoint Source
- Pollution
- Pesticides
- Herbicides

Because of drought in areas such as California, how we conserve water has become crucial. However, decreasing the amount of water we use is only half of the answer to water conservation. Keeping our precious water resources clean and free of pollution is another key component of water conservation. Our actions at school and home can cause environmental damage to our creeks, lagoons, and oceans. To keep our watersheds and ocean healthy, we first need to learn about the effects of our actions, and then how we can change our behaviors.

Many people assume that most of our water pollution is caused by large industries and agriculture. This type of pollution can be traced back to one particular source so it is called point source pollution. However, the most damaging source of water pollution is actually the combined actions of individuals who misuse, dump, or discard hazardous household substances around their homes, gardens, and city streets. We call this non-point source pollution because it is hard to trace the pollution back to just one place. Rubber dust from tires, antifreeze, oil, insecticides, pesticides, herbicides, household chemicals, fertilizers, and paint are all substances that become pollutants when they are washed off our yards, streets, and parking lots. This polluted water flows into the gutter, disappears down storm drains, flows into creeks, and eventually runs untreated into our rivers, lagoons and ocean. This pollution harms our drinking water, marine animals, wildlife, and our eco-system.

ACTIVITY

STEP 1

Label each of the small cups with what the material represents (refer to table below). These will be used to call the students to pour their pollutant into the river. Give each student, or group of two, one of the cups filled with a substance. Explain to the students that the contents of each cup represents a different pollutant that can end up in our watershed.

What's in the cup:	What it represents:
Small amount of dry clay	Construction Site
Dry Leaves and Twigs	Trees
¼ tsp vegetable oil	Motorboats
Knot of nylon fishing line	Fishermen
¼ cup vinegar	Power plant
¼ cup balsamic vinegar	Cars
½ tsp baking powder	Farmers

1 tsp of green/blue food coloring and water	Antifreeze
¼ tsp red food coloring and water	Unidentified liquid
Assorted litter	Picnics
½ tsp baking soda	Gardeners
Pieces of brown cereal	Pet waste

*The clear gallon jug with half water will represent our river

STEP 2: Discuss what each substance represents within the category of what is written on their small cups.

STEP 3: Use the pollution story to illustrate how different pollutants can affect the water quality of our watershed.

POLLUTION STORY

People have lived throughout areas around reservoirs like ____ (Name reservoir near you, ex: Lake Hodges for Escondido) for hundreds of years. In that time, they have grown and harvested food, fished the waters, and hunted for animals in the forests. Let's imagine this water was taken from ____ (Reservoir, ex: Lake Hodges) 200 years ago.

*How does the water look?
Would you drink this water?
Would you swim in it? Eat fish from it?*

When this sample of water was taken, there was plenty of fish in the river, and lots of clean water to drink. Soon after, people starting moving to ____ (Name a city near you, ex: Escondido) and developing the area. There was plenty to eat, plenty of fertile land, and lots of wildlife. How do you think those people used the river and the surrounding land?

Do you think this has changed a lot since then?

Now, let's come back to the present and see what is happening to ____ (Reservoir, ex: Lake Hodges) today.

Listen for the name printed on the outside of your cup. When the name is said, pour the contents of your cup into the river.

A winter storm hits ____ (Name your geographic area, ex: Southern California) and dumps five inches of rain. The rain starts to loosen the soil from a **construction site**. There are also high winds, which rip through the **trees** blowing lots of leaves and twigs into the river.

*Is the water safe to drink?
Would you swim in it? Eat fish from it?
Is it safe for wildlife to drink and live in?*

Soon after the storm passes, the sun comes out and people head out to have some fun. **Motorboats** head up and down the river, not realizing that they are leaking a little oil. Families are having **picnics** at parks along the river. Unfortunately, some of these people left some trash behind. There are also some **fishermen** out on a dock. One of them snags their line on an oyster bed and breaks the line.

*How is the water doing now?
Would you drink from it?
Swim in it? Is it safe for wildlife?*

Further up the river, there is a **power plant** that is releasing some gasses out of their smokestacks into the air. The gas then mixes with moisture in the air and forms acids. This then falls back down to earth in the form of acid rain. Lots of people drive to and from work in their **cars**. Car exhaust fumes can also cause acid rain. If the car is not maintained, it may also leak oil or other chemicals, which would then be washed into the river by rain.

*Would you drink the water now?
Swim in it? Could fish and other wildlife live in water that was like vinegar?*

There is also a **farmer** who has been fertilizing his soybeans. The rain from the tropical storm has washed some of the fertilizer into the river. If we look around the neighborhood to see what people are doing regularly, we notice there are a lot of **gardeners** who like to keep their lawns looking nice. To get rid of those pesky weeds, many spread chemicals like pesticides and herbicides over their lawns. The next time it rains, those chemicals will wash into the nearest river. Your best friend is out walking their dog and the dog goes to the bathroom. The pet waste was not picked up. If it rains, the **pet waste** will go into the storm drain and into the river. Next door you notice someone changing the **antifreeze** in his or her car. You know this because you see a trail of green liquid running down the driveway. And again, the next time it rains, it too will be washed into the nearest river.

And last, but definitely not least, you notice the neighbor across the street is cleaning out his garage. He finds a can with a poison symbol on the outside of it, but does not know

what it is. He doesn't want to keep it around the house, so he decides to pour this **unidentified liquid** down the storm drain. He thinks he doesn't have to worry about it anymore. What he doesn't realize is that it's headed for his local waterways!

*Would you drink the water now?
Swim in it? Is it safe for wildlife?*

Explain that environmental scientists think in terms of point source, and nonpoint source pollution. Sometimes it is very easy to find the source of pollution, such as a pipe leaking green goo directly into the river. This is what we refer to as **point source pollution**. This simply means that it is easy to "point" to the source; the pollution is coming from one single point.

Other times, it is not so easy to determine the source of pollution. A parking lot with oil that has leaked onto the surface is a good example of what we refer to as **nonpoint source pollution**. This means that pollution is entering a waterway from many different places. **Storm water** can be a major non-point source of pollution. Storm water not only refers to rainwater, but also to water from washing cars, over-watering lawns, and other sources. Storm water washes down storm drains on the curbs of roads and is then dumped directly into lakes, rivers and streams untreated. This could also be the same body of water that our drinking water supply comes from.

Think about what was in your cup. Was this a point or nonpoint source? What could have been done to prevent it from going into the water?

Is there something you could start doing today that could help clean up our waterways?

