

# Water Wonders Pre and Post Activities

## Pre-Activity: A Drop in the Bucket

### Concept:

Students gain a better understanding of how much available fresh water is on the planet and that it needs to be conserved because it is a limited resource.

### Materials:

Map of the world or a globe, 5-gallon bucket (or 5 one gallon milk jugs), 1 cup and 1/3 cup measuring cups, 1/8 teaspoon, eye dropper, 5 gallons of water and a clear container.

### Vocab:

Conserve: to use less of something.

### Background:

Approximately 75% of the earth is covered with water. Sources of water are oceans, icecaps and glaciers, groundwater, freshwater lakes, inland seas and salt lakes, the atmosphere, and rivers. Although the earth appears to have a plentiful supply of water, it is important to realize that fresh water is a limited resource. See the table below for the percentage of each water source in relation to the total amount, and the appropriate measurement for each source.

Not all of the freshwater is available for humans to use. Water in the atmosphere and in the icecaps and glaciers is not available for humans to use. We also cannot access all the groundwater. Therefore, only the water in rivers, freshwater lakes and a portion of ground water can be used by humans. The percentage of usable freshwater is reduced by pollution and contamination. The actual amount of water that is useable by humans is very small (approximately .00003 %).

### Lesson:

Show students the globe or map of the world and ask them what the blue represents (water). Ask them what percentage of the earth is covered by water (75%). Then ask if all the water is available for humans to use.

Show the students the 5 gallons of water in the container and explain that it represents all the water on the earth. Ask the students to think about what area we find the majority of the water on earth? (oceans) Explain that because the majority of the water is in the ocean, we will leave that water in the bucket. We will be taking out all the water that is from a source other than the ocean.

Ask students to name other sources of water. As they give you answers, remove the correct amount of water for the area (refer to chart in the below), and place it into the clear container.

| <b>Water Source</b>   | <b>% of the Total Amount</b> | <b>Measurement</b>           |
|-----------------------|------------------------------|------------------------------|
| Oceans                | 97.2%                        | All water left in the bucket |
| Icecaps/Glaciers      | 2.0%                         | 1 cup                        |
| Groundwater           | 0.62%                        | 1/3 cup                      |
| Freshwater Lakes      | 0.009%                       | 1/8 teaspoon                 |
| Inland Seas/Salt Lake | 0.008%                       | 1/8 teaspoon                 |
| Atmosphere            | 0.001%                       | One drop                     |
| Rivers                | 0.0001%                      | One flick                    |

After you have removed all the different water sources (other than oceans), ask the students if all the water you have removed is useable by humans. Discuss the sources, and put the water back into the bucket with the ocean water if it is not usable by humans (icecaps/glaciers not available because it is frozen, some of the groundwater isn't accessible, inland seas/salt lakes is salt water and the atmosphere isn't available to use). Show the students the small amount of water that is left for humans to use. Impress the idea that water is a valuable and limited resource on our planet. All the water we have on this planet, is all we will ever have. We cannot make more water. Therefore, we must conserve what we have.

To wrap up, review the sources of freshwater on the earth, and how little water is available for human use. Discuss ways students can conserve water in their homes, schools, and communities. Here are some ideas:

- Don't leave the water running while brushing your teeth.
- Limit showers to 10 minutes or less.
- Look around your house for leaky faucets and ask your parents to fix them.
- Keep a pitcher of water in the refrigerator so you don't have to run the faucet and wait for the water cool.
- Don't fill up the sink the entire way when doing dishes.
- Don't turn the water on full blast from the faucet.
- Only wash full loads of laundry.
- Only run the dishwasher when it is full.

This lesson was adapted from Project Wet.

## Post-Activity:

Concept:

Students review the various forms of pollution runoff learned on the Water Wonders field trip, then create 30-45 second commercials to educate their peers as to how it can be reduced or eliminated.

Materials:

Scenario cards, paper and pencils.

Vocab:

Pollution: contamination of the environment (land, air and water) as a result of human activity. Also called non-point pollution because the exact source of the pollution cannot be located. Point pollution is pollution that comes from one specific source such as a pipe that empties in a river.

Runoff: water from snow or rain that flows over the surface of the ground into ditches, drains, streams and lakes. This water often carries pollution with it.

Prep:

Print and cut up scenario cards.

Lesson:

Review the terms pollution and runoff with your students. These concepts were addressed in the Water Wonders field trip when the students interacted with the Enviroscape model and saw how human actions polluted the water via non-point pollution.

Divide the class into small groups of 3-5 students and give each group one scenario (see below), a pencil and a piece of blank paper. Give them 5-10 minutes to discuss the problem in the scenario by answering the following questions:

1. What is the concern in this scenario?
2. Can the activity be reduced or prevented from happening? How?
3. Can this form of nonpoint pollution be reduced or prevented from entering the water cycle? How?

Next, give each group time to put together a short (30-45 second) public awareness commercial addressing how to limit the specific nonpoint pollution they evaluated. Encourage them to have fun and be creative! Finally, have each group present their commercial to the rest of the class.

Scenario Cards:

Scenario #1: Mrs. Jackson has two small trees next to the house porch that attract wasps, mosquitoes and other pesky insects. She sprayed the trees with a chemical to kill the insects. A storm occurs soon after she sprayed and most of the chemical is washed off the leaves, onto the sidewalk and driveway and eventually to the storm drain.

Scenario #2: A small stream winds through a park. During a heavy rain, the stream is filled with fast-flowing water and in certain places, the sides of the stream are wearing away and tree roots are showing. During and after each rain, soil, sand, leaves, pebbles and other natural debris are swept away with the heavy flow of water as the shores of the stream slowly collapse.

Scenario #3: Sarah enjoys helping her father change the motor oil in the family automobile. She carries the pan of black, thick used motor oil to the storm drain in front of their apartment building, where she dumps it. Out of sight, out of mind!

Scenario #4: One of Michael's jobs is to wash the family car. He washes the car with soap in the driveway and rinses it off with the hose.

Scenario #5: Joey enjoys walking the family dog, Patches. When Patches needs to go to the bathroom he is careful to make Patches go on the paved road along the curb so that Patches doesn't create a mess on the neighbors' lawn. He doesn't worry about picking up the mess.

Scenario #6: The Jones family enjoys stopping at a fast-food restaurant for dinner while on their way to the beach for the weekend. To save time, the family eats inside their mini-van that is parked in the restaurant parking lot. In order to keep the car clean, they leave their bags of food trash on the pavement in the parking lot for the workers to pick up.