

Just a Drop in the Bucket

Activity Time: 40 minutes

TEACHERS: Read “Water Efficiency - Water Smart Peel” on page 79 of Peel Water Story book.

Objectives:

Students will understand that:

- That water is a limited resource
- Water is not available equally around the world
- There are various sources of water

Introduction:

By using a demonstration, students will be shown that although the earth is covered mainly by water, only a small amount is available for human consumption. Learning that water is a limited resource helps students appreciate the need to use water resources wisely.

Background Information

Ironically, on a planet extensively covered with water (approx. 70-75%); this resource is one of the limiting factors for life on Earth.

Approximately:

- 97% of the world’s water is SALT WATER.
- 2% of the world’s water is FROZEN in polar ice caps and glaciers.
- 1% of the world’s water is FRESH WATER, and of that most is unavailable (too far underground, polluted or trapped in soil, etc...) for human use.¹
- So in the end only 0.01% of the total water on the earth is actually accessible for humans to consume.²

- *Groundwater*: Is water that is found underground in the spaces and cracks between soil, sand, gravel, and rock.
- *Aquifer*: A natural underground area where large quantities of groundwater fill the spaces between soil, sand, gravel, and rock.
- *Great Lakes*: Lake Superior, Lake Michigan, Lake Huron, Lake Erie, and Lake Ontario together comprise the “Great Lakes.” They hold 20% of the world’s surface fresh water. Forty million people—30% of Canada’s population and 10% of the U.S. population—live in the Great Lakes basin. The Great Lakes have a rich and diverse ecosystem and support a wide array of plants and animals. All aspects of the natural environment, from weather and climate, to wildlife and habitat are affected by the Great Lakes system. The long history of agricultural and industrial development has placed the Great Lakes basin’s ecosystem under tremendous stress. The challenge is to minimize the pressures on the environment by changing the way we live and do business.

¹ Curriculum and Activity Guide, Wet in the City

² UNEP, Global Environment Outlook 3 (Earthscan 2002)

- Salt Water -- Why you can't drink it? Humans can't drink salt water because the kidneys can only make urine that is less salty than salt water. Therefore, to get rid of all the excess salt taken in by drinking salt water, you have to urinate more water than you drank, so you die of dehydration. Marine animals have kidneys or other organs that remove large amounts of salt from their bodies. The kidneys of humans and other land creatures cannot handle the massive amounts of salt that would accumulate if they drank salt water.

Materials:

- World map
- 1000 mL beakers (2)
- 100 mL beakers (2)
- Small container
- Eye dropper
- Container of water

Procedure:

Remember that doing an experiment and discovering the answer is more powerful than watching and listening to someone, so try to involve as many students as possible.

1. Begin by asking the students what they use water for in their daily lives. Encourage them to think of both indoor and outdoor uses of water.
2. Ask the students where we find water on earth (oceans, lakes, streams, rivers, underground in aquifers and frozen in glaciers).
3. Explain aquifers and groundwater (see background).
4. Ask the students why we are so lucky to live where we do? What water source surrounds us? Explain the importance of the Great Lakes and what part of the world's freshwater they represent (see background).
5. Show the students 1 litre of water in a beaker. Tell them to imagine that this litre represents all of the water on the earth including glaciers and groundwater.
6. Ask the students to guess how much of that one litre of water represents the amount of salt water in the oceans. Get them to guess in percentages (i.e. 50%, 70 % etc.). You can have the students guess the amounts as you go along for step numbers 8, 9 and 10 as well.
7. Pour 970 mL of water into a beaker, or ask a student to do it. Explain that this represents the amount of salt water on the earth. Ask if they know why you can't drink salt water. Explain (see background).
8. Next pour 20 mL into a second beaker or ask a student to do it. Explain that this represents the amount of water that is frozen in polar ice caps and glaciers around the world. Explain why we can't drink that.
9. Pour 10 mL into the third beaker or ask a student to do it; explain that this represents the total freshwater on the earth, but most of it we can't drink either. Explain why.
10. Finally, with the eyedropper, from the freshwater beaker (10 mL), put one drop of water into the palm of one student's hand explaining that this represents all of the available fresh water we have to share on this planet.

Debrief:

Recall with the students what you have taught them in this activity. Specifically remind them that:

- Only 0.01% of the world's total water is available for human consumption.
- The water that is available is not distributed evenly around the world.
- Conserving water is important everywhere in the world!

Then, ask the students to tell you ways that they can conserve water:

- Turn the tap off when brushing teeth.
- Take shorter showers.
- Turn tap off when lathering up (for showers & hand washing).
- Only run dishwashers and washing machines with full loads.
- Water lawn one inch once a week in the summer (use a tuna can to measure) or don't water at all and let the grass go dormant.
- Spread the word! Encourage others to save water too!

Giving Them Extra Information

Have the students do The Peel Water Story's "Water Terminology" activity.

Adapted from the Peel Children's Water Festival by the Region of Peel's *Environment, Transportation and Planning Services Department*, Public Education & Outreach.

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