

UNIT 6 | PEOPLE AND RESOURCE USE

WATER, WATER EVERYWHERE

METHOD

Students observe a demonstration of how much water is available on the planet for human consumption.

MATERIALS

Part 1:

- Large, clear container (can hold at least one gallon)
- Medium clear container (can hold at least one cup)
- 3 small clear containers (test tubes, juice glasses, etc.)
- Water
- Soil
- Blue food coloring
- 1 cup measure
- Full set of measuring spoons
- Masking tape

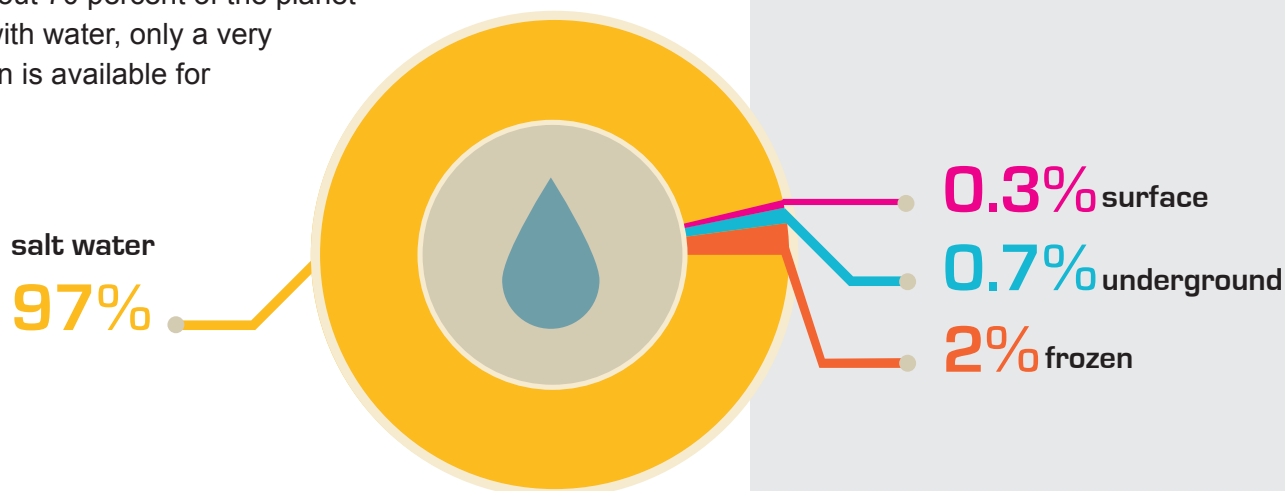
Part 2:

- Adding machine paper (1 meter per student)
- Meter sticks
- Markers

INTRODUCTION

Water is absolutely essential for life. Science might be able to provide us with alternatives to gasoline, for example, but there is no substitute for water. Though water is a recyclable resource (we can, to some degree, clean and reuse it), it is not a renewable one (we are not able to create more of it).

Although about 70 percent of the planet is covered with water, only a very small fraction is available for human use.



CONCEPT

Although water covers nearly three-quarters of the earth, only a small fraction is available for human consumption.

GRADE LEVEL

Upper elementary

SUBJECTS

Science, Social Studies, Math

OBJECTIVES

Students will be able to:

- Identify the percentage of freshwater on earth that is available for human use.
- Describe the distribution of different types of water around the world.
- Explain why it is important to preserve the water we currently have available for human use.

SKILLS

Observing, dividing, measuring, calculating with percentages, converting percentages to decimals

PART 1: WATER DEMONSTRATION

PROCEDURE

1. Explain to students that **freshwater** is a term used for the water we use in our daily lives – for drinking, washing, and growing food. Freshwater comes out of faucets, drinking fountains, and garden hoses. It is found in rivers, streams, many lakes, and underground. Ask the students, “Can you think of any other types of water? Water that we cannot drink or use to grow plants?” (*Saltwater*)
2. Set out all the containers, measuring cups, and spoons where the class will be able to see them. Add about a half inch of soil to the second small container.
3. With the masking tape and marker, make a label for each of the four water categories you’ll be discussing: (1) Salt water – 97% (2) Frozen – 2% (3) Underground – 0.7% (4) Surface water – 0.3%. Leave the labels stuck to the edge of the counter at this point; you’ll attach them to the containers later.
4. Fill the large clear container with 6 cups of water and add a few drops of blue food coloring.
5. Ask, “How much of the earth’s surface is covered by water?” (*70 percent*) You may want to pull out a map of the world or globe so the students can make better estimates. Point out the full container. “This represents all of the water on the planet.”
6. Scoop 3 tablespoons from the big container into the medium container. Attach the “Salt water” label to the large container and hold it up again. “This represents the 97 percent of the earth’s water that is salty. Most of it is found in the oceans.” Hold up the medium container containing the 3 tablespoons of water. “This represents the other 3 percent of the world’s water – freshwater.” You’ll now divide the freshwater to find what amount is accessible to humans.
7. From the medium container, measure out two tablespoons and pour into the first small container. Attach the “Frozen” label and hold it up. “This amount represents the 2 percent of the earth’s water that is frozen in glaciers and icecaps.”
8. Again from the medium container, measure out 2 teaspoons and pour into the second small container with soil. Attach the “Underground” label and hold it up. “This amount represents the 0.7 percent of the earth’s water that is located under the ground.”
9. Pour out the remaining water (1 teaspoon) from the medium container into the third small container. Attach the “Surface water” label and hold up. “This amount represents the 0.3 percent of the earth’s water that is on the surface of the planet – in places such as rivers, lakes, and streams.”

PART 2: A LINEAR LOOK AT WATER

PROCEDURE

1. In small groups, students will show the breakdown of the earth's water in a linear way. Provide each group with a meter-long strip of adding machine paper and a meter stick. Explain that the paper represents all of the water in the world and that they will divide it into the four subcategories you've been discussing.
2. Write the percentages of each subcategory on the board: Oceans – 97%; Frozen – 2%; Underground – 0.7%; Surface Water – 0.3%.
3. Have the students calculate the length of the adding tape that represents each portion. In order to do this, they'll need to convert each percentage into a decimal. For example, Frozen: $2\% = 0.02$. The calculation is then: $100 \text{ cm} \times 0.02 = 2 \text{ cm}$.
4. Using the calculated lengths, students can measure the amount of adding tape that represents each of the four subcategories. Students should label each section and can color each a different color so they are easier to distinguish.

DISCUSSION QUESTIONS

1. Which of these kinds of water could we use for daily purposes such as drinking, washing our clothes, brushing our teeth, and watering our gardens?

The 0.3 percent of surface water and maybe some of the water underground. [Holdup containers #3 and #4.]

2. What sources of water can't we use for those purposes?

Salt water, water that is frozen, and some of the water underground if it's very deep. [Hold up containers #1, #2, and #3.] Even if water is fresh, it can't be used if we can't access it.

3. Do you think it's important for us to be careful with this fresh, accessible water? Why? What are some ways we can be careful to preserve this water?

Yes. We need water for our survival but can only use a small portion of the water on earth. We can be careful with water by conserving it through actions such as turning off the faucet when brushing our teeth, watering our plants in the evening, etc.

4. As our population grows, does the demand for clean, freshwater increase or decrease? (*Increase – more people will need water.*) As more people use the limited amount of water on earth, what will happen to our reserves, will they increase or decrease? (*Decrease – more people are using water.*)

5. In addition to more people using more freshwater, what else might decrease the amount of freshwater available?

If water becomes polluted, it can no longer be used. Water can become polluted from many things including the following: fertilizer run-off from farms, waste being poured down storm drains, acid rain, oil spills, etc.

MEASURING LEARNING

Collect and look over the students' completed paper strip line graphs from Part 2.

Have students write an exit slip to the following prompts:

- It's important to take care of the freshwater we use because... (name two reasons)
- To protect the earth's freshwater I will... (name two actions)
- The thing that surprised me most today was...
- I would still like to learn more about...

FOLLOW-UP ACTIVITIES

The activity *Every Drop Counts* is a great way for students to find how much water they use in their daily lives. And to investigate how water becomes polluted, facilitate the activity *Who Polluted the Potomac?* with your class.