

HOW MUCH DRINKING WATER

5TH-
7TH

OBJECTIVES

- Estimate the percentage of water in different locations around the world.
- Evaluate the distribution of usable fresh water vs. salt water.

BACKGROUND INFORMATION

Water covers approximately 71% of the earth's surface. Of that total water supply on earth, around 97% is found in oceans. This means that about 3% of all the water in the world is freshwater. Of this freshwater, as much as 2.4% is locked up in icecaps and glaciers. In fact, only about 0.419% of all the water in the world is usable drinking water for humans!

MATERIALS

- Inflatable Globe
- 5-Gallon Aquarium Tank
- Blue Food Coloring
- Measuring Cup
- Ice Cube Tray
- Clear Cup Filled with Sand
- Large Sheet of Paper
- Pipette

ANTICIPATORY SET

Toss a globe from person to person around the room and record how many times a left thumb lands on water when caught. If you throw the globe 100 times, your left thumb would land on water around 70-75 times!

PRIOR KNOWLEDGE ACTIVATION

Ask your students: Can we drink all the water on Earth? Why not?

As a class, estimate the percentage of earth's surface covered with water, and take a vote on the percentage of water that is available for humans to drink. Record their answers on the board or a large piece of paper. At the end of this lesson, return to their answers and discuss as a class.

HOW MUCH WATER?

1. Inform your class that all quantities of water used for this lesson are relative, and not meant to serve as exact quantities.
2. Fill an aquarium tank with 5-gallons of water. This water represents all the water on earth.
3. Ask the class to list locations where water is found on earth. Write these on the board. *Answers: Rivers, Lakes, Groundwater, Icecaps/Glaciers, Atmosphere, Oceans.*
4. Next, have your class predict the percentage of Earth's water found at each location (ex – 10% rivers, 50% oceans). Create a pie chart on the board for the class's predictions.
5. Have a student volunteer remove 532 ml from the tank.
6. Add blue food coloring to the water remaining in the aquarium. This represents all the water found in the oceans.
7. From the water you just removed, have a new volunteer scoop out an additional 443 ml. Pour this water into an ice cube tray to represent freshwater locked up in icecaps/glaciers. Float this tray on top of the "ocean" water in the tank. This symbolically represents how water locked up in icecaps/glaciers is unusable.
8. The last 89 ml represent all the available freshwater on Earth. Place one dropper-full of this water in a student's hand to represent all the freshwater located in lakes and rivers.
9. Pour the remaining water into a clear cup filled halfway with sand. This represents groundwater, where water is held in pore spaces between rocks.

MATH TIME!

Groundwater and Surface water are two sources of freshwater available for human use. If groundwater consists of 0.0397% of Earth's water, and surface water consists of 0.022%, how much is usable?

Only 0.419% of earth's water is usable by humans.

VIDEOS

TED Talk: Are We Running Out of Clean Water?

Youtube: California's Drought: A City Without Water

PONDER

As a class, discuss the following:

1. While the majority of Earth's surface is covered with water, only 0.419% of that water is available for human use. We use surface water from lakes and rivers, as well as groundwater, in our daily lives. How does this knowledge impact the way you think about your own water usage?
2. What would you do if your town were to run out of water?
 - a. How would your life be different?
3. How can you positively influence environmental practices in your community, at school, and at home?

ASSIGNMENT: WATER FOOTPRINT CALCULATOR

Each student will go home and complete the Water Footprint Calculator found under the "Resources" section. They may need help from a parent or guardian to answer some of the questions. The next day, discuss as a class whether they were surprised by their individual daily water use and their household daily water use.

FINAL PROJECT

Students will choose a specific water body to conduct a research project about (ex. Atlantic Ocean, Canyon Lake, San Marcos River, Groundwater from the Edwards Aquifer). Encourage students to choose a water source close to the community they live in. Students will look for ways in which Climate Change has impacted the volume and quality of the water body and identify sources and solutions. Students can generate a presentation using PowerPoint, make a poster, or info-graphic.

RESOURCES

- All the Water in the World: EPA Activity, Retrieved from <https://www.epa.gov/sites/default/files/2015-08/documents/mgwc-gwa5.pdf>
- TED Talk: Are We Running Out of Clean Water? Retrieved from <https://www.youtube.com/watch?v=OCzYdNSJF-k>
- California's Drought: A City Without Water, Retrieved from https://www.youtube.com/watch?v=xbj18_IJHO4
- Water Footprint Calculator: <https://www.watercalculator.org/wfc2>

TEKS ALIGNMENT

Science, Adopted 2021:

- 5th: (a) 1Ai, 1D, 5. (b) 1A, 1C, 1D, 1E, 1G, 2A, 2C, 3B, 3C, 4A, 5A, 5B, 5C, 5D, 11.
- 6th: (a) 1Ai, 1D, 5. (b) 1A, 1C, 1E, 1G, 2A, 2C, 3B, 3C, 5A, 5B, 5D, 11A, 11B.
- 7th(a) 1Ai, 1D, 5. (b) 1A, 1C, 1E, 1G, 2A, 2C, 3B, 3C, 5B, 5D, 11A, 11B.



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