

US EPA ARCHIVE DOCUMENT



## THE WATER CYCLE AND WATER CONSERVATION

# ALL THE WATER IN THE WORLD



**Grades 7-9**



### ► OBJECTIVES

- Recognize that there is a lot of water in the world, but that not very much of it can be used for our drinking water and other water supply needs.
- Recognize that ground water is a very small percentage of the earth's water.
- Understand how important it is that we take care of our ground water.

### ► INTERDISCIPLINARY SKILLS

Science, Math

### ► ESTIMATED TIME

45 minutes



### ► MATERIALS

- ☐ 5 gallons of water
- ☐ 5-gallon aquarium
- ☐ Measuring cup (24-ounce size would be best)
- ☐ Green food coloring
- ☐ Ice cube tray
- ☐ Ice pak
- ☐ Dropper
- ☐ 6-ounce see-through container
- ☐ Sand
- ☐ Activity handout

## TEACHING STRATEGY

### Part A - Aquarium Demonstration:

As you do this experiment, stress that the amounts represent relative quantities of different types of water, not actual amounts.

1. Put 5 gallons of water in an aquarium. Tell students to imagine that the container represents all the water in the world.
2. Ask students to guesstimate what proportion of this water exists on the earth as:
  - ocean
  - ground water
  - rivers
  - ice caps/glaciers
  - freshwater lakes
  - inland seas/salt lakes
  - atmosphere
3. Remove 18 ounces of the water from the aquarium with a measuring cup. Using green food coloring, color the remaining water in the aquarium. Tell the students that this water represents all the water on earth held in oceans. The water in the measuring cup represents all the water in the world that is not ocean water.
4. Pour 15 ounces of the water from the measuring cup into an ice cube tray. This water represents all the water held in glaciers and ice caps. This water is not readily available for our use.

Since the amount of water held in the ice cube tray is comparable to that of an ice pack, place the ice pack in the aquarium to represent the total amount of water held in glaciers and ice caps.

5. The remaining 3 ounces represent the world's available fresh water. Of this amount, a fraction of an ounce is held in the world's fresh water lakes and rivers. Place this water (approximately one drop per of water) into a student's hand.



NOTES  
▼ALL THE WATER IN THE WORLD  
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6. The remaining water (approximately 2.5 ounces) is ground water. Pouring this remaining water into a cup of sand, explain that this is what is referred to as ground water and that this water is held in pore spaces of soil and fractures of bedrock. About one-third of New England's drinking water comes from ground water.

*This Aquarium Demonstration was developed by Paul Susca, New Hampshire Department of Environmental Services, Water Supply Engineering Bureau.*

## Part B - Activity Handout: All the Water in the World

1. Ask students to complete the activity worksheet.
2. The answers to the drinking water percentages: 0.419% total and 2.799% grand total.
3. Ask students if the numbers surprised them. Did they realize that such a small percentage of the water in the world is fresh?

## Follow-up Questions

1. Why isn't all fresh water usable? *Some is not easy to get at; it may be frozen or trapped in unyielding soils or bedrock fractures. Some water is too polluted to use.*
2. Why do we need to take care of the surface water/ground water? *Water is very important for humans, plants/crops, and animals. If we waste water or pollute it, we may find that there is less and less of it available for us to use.*



## ACTIVITY HANDOUT: ALL THE WATER IN THE WORLD

## Did you know...?

- ▶ EARTH IS CALLED THE WATER PLANET.
- ▶ APPROXIMATELY THREE-FOURTHS (3/4) OF THE EARTH'S SURFACE IS COVERED WITH WATER.
- ▶ THE EARTH HAS DIFFERENT TYPES OF WATER:

Oceans	97.2% of total water
Ice caps/glaciers	2.38%
Ground water	0.397%
Surface water (e.g., lakes, rivers, streams, ponds)	0.022%
Atmosphere	0.001%

ASSIGNMENT

Add up the percentages for water available for drinking water.

Ground water	_____
Surface water	_____
TOTAL	_____
Now add ice caps/glaciers	_____
GRAND TOTAL	_____

REMEMBER: Only a small percentage of water is suitable for humans to drink. Not all of the water in the ground and in lakes and rivers is easy to reach or clean enough to drink. Ice caps and glaciers are certainly hard to use for humans, plants, and animals. Some work is being done to take the salt out of ocean water (desalinate the water), but that is an expensive process.

This activity is adapted from *Water: The Resource That Gets Used and Used and Used for Everything*. Poster: Middle School Version. United States Geological Survey, Reston, Virginia. 1993.