

US EPA ARCHIVE DOCUMENT



ALL THE WATER IN THE WORLD

Grades
K - 3, 4 - 6

► **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 and Math

► **ESTIMATED
TIME**

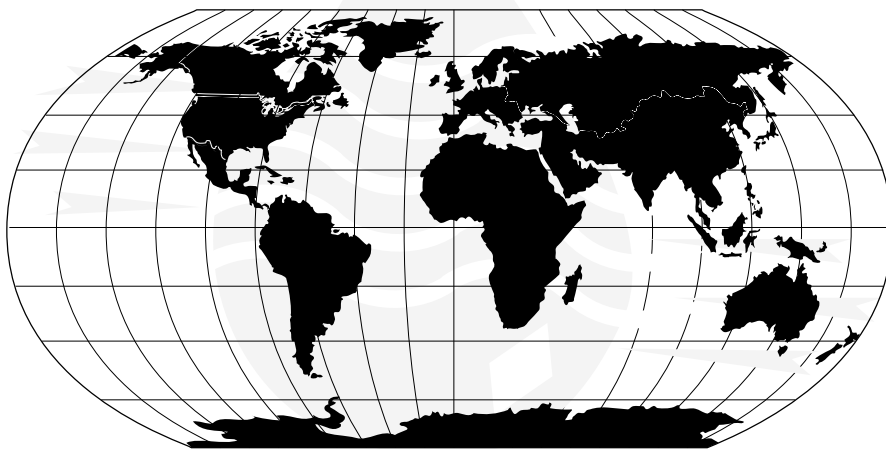
- 30 minutes
(grades K-3)
- 2 hours
(grades 4-6)



BACKGROUND INFORMATION

Because water covers three-quarters of the earth's surface, it might appear that there is plenty to go around and that we will never run out of this valuable resource. In reality, however, we have a limited amount of usable fresh water. Over 97 percent of the earth's water is found in the oceans as salt water. Two percent of the earth's water is stored as fresh water in glaciers, ice caps, and snowy mountain ranges. That leaves only one percent of the earth's water available to us for our daily water supply needs. Our fresh water supplies are stored either in the soil (aquifers) or bedrock fractures beneath the ground (ground water) or in lakes, rivers, and streams on the earth's surface (surface water).

We use fresh water for a variety of purposes. Agricultural uses represent the largest consumer of fresh water, about 42 percent. Approximately 39 percent of our fresh water is used for the production of electricity; 11 percent is used in urban and rural homes, offices, and hotels; and the remaining 8 percent is used in manufacturing and mining activities.





ALL THE WATER IN THE WORLD

Grades
K - 3

► MATERIALS

- ☐ Globe
- ☐ 97 pieces of uncooked ziti dyed blue, 1 piece dyed red, and 2 pieces dyed green or 100 dixie cups (optional strategy)
- ☐ Food coloring

TEACHING STRATEGY FOR GRADES K-3

Part A - Exploring the Globe

1. Look at the globe with the students. See if they can find where they live on the globe. Have them point out lakes, rivers, and oceans. Explain that these are called surface waters.
2. Ask the students if they know which kinds of waterbodies are salt water and which are freshwater. Have they ever tasted salt water? Was it good?
3. Ask the students if they think there is more water or land on the globe. Is there water beneath the surface of the ground that we cannot see on the globe?

Part B - Demonstrating With Ziti

1. Spread the ziti out on a table. Explain that there are 100 ziti pieces that represents all (100%) of the water in the world.
2. Using the concept of percentages, ask the students if they know what the red and green zitis represent. See if they can estimate percentages. Explain that the two green zitis represent water that is stored as ice in glaciers and at the poles (2%). The lonely red ziti represents the fresh water that is available for plants, animals, and people (1% of all the water on the earth). Ask the students what the remaining blue zitis represent. *They represent the water that's in the ocean, 97% of all the water on earth.*
3. Ask the students what we should do to take good care of the water we use in our homes and businesses. *Use only what we need.*

Optional Strategy

Use 100 dixie cups filled with water. Use food coloring (as described above) to indicate ice glaciers and fresh water.

Supplementary Activities

- Draw a water pie. Have students draw a circle that represents all the water in the world. Have them make pie slices in the circle that represent 97% ocean, 2% glaciers and ice, and 1% fresh water. Color and label the water pie.



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- Make a water necklace. String the ziti (you'll probably need to have more on hand) on pieces of yarn. Have the students take the necklaces home and explain "all the water in the world" to their families.

**Grades
4 - 6**

► MATERIALS

- ☐ Globe
- ☐ 5 gallons of water
- ☐ Tablespoons
- ☐ Container (such as aquarium)
- ☐ Droppers
- ☐ Graph paper
- ☐ Small containers (quart jars)
- ☐ Copies of activity handout

TEACHING STRATEGY FOR GRADES 4-6

Part A - Exploring the Globe

Same as K-3

Part B - 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 or other container. Tell students to imagine the container represents all the water in the world.
2. Have students remove 34 tablespoons of the water and put them into a cup. Tell them this amount represents all the water in the world that is not ocean.
3. Have the students remove 26 tablespoons of water and then another 8 tablespoons of water from the cup containing the 34 tablespoons of water. Put each into separate cups. The 26 tablespoons represent the world's ice caps and glaciers. The 8 tablespoons represent the world's fresh water. A fraction of a tablespoon (1/10) represents the world's fresh water lakes and rivers. Of that, all rivers amount to less than a drop.
4. Be sure to recycle the water. Use it to water plants.

Part C - Work Sheet: All the Water in the World

1. Ask students to complete the activity work sheet.
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?



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NOTES



Part D - Bar Graph

1. Distribute graph paper.
2. Ask students to create a bar graph that shows 97% ocean, 2% ice caps and glaciers, and 1% fresh water.

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.*



Adapted from: Project Aquatic Wild. *How Wet is Our Planet?* Western Regional Environmental Education Council, 1987.





ACTIVITY: ALL THE WATER IN THE WORLD

DID YOU KNOW....?

- ☐ Earth is called the water planet.
- ☐ Between two-thirds ($\frac{2}{3}$) and three-fourths ($\frac{3}{4}$) 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%

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.

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.