



Teacher Guide

A Lot or a Little?

Key idea: Only a tiny percentage of Earth's water is drinkable.

Time: 50 minutes

Objective

In this whole-class activity, students work in teams representing the different classifications of Earth's water. They transfer water among containers until they are left with an amount reflecting Earth's drinkable water. They apply their observations to understanding the need to protect our limited supply of clean, fresh water.

Do the activity

Give students the *A Lot or a Little?* Student Handout and ask them to use it to record a prediction about what percentage of Earth's water is drinkable.

Divide students into five teams:

- > Total Water
- > Fresh Water
- > Unavailable Water
- > Unusable Water
- > Drinkable Water

Guide the class through the activity by following the steps below. Tell all students they should follow along and fill in their handouts as each team does its part of the investigation in the order listed.

Procedure with answer key

1. **Total Water** team: Make a label for the 20-liter container that reads *Total Water on Earth*. This container doesn't have to be filled with water—you can use your imagination.
2. **Fresh Water** team: Either remove 500 milliliters (1/2 liter) of water from the large container, or, if the large container is empty, fill a liter bottle half full with water. It's easier for the whole group to see if you put some blue food coloring in the water.

What does this water represent? Remember your team's name. Make a label for the bottle. What does your label say? [*The label should read: Fresh Water.*]

STANDARDS ALIGNMENT

NGSS MS-ESS3.A.1: Natural Resources: Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources. Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes.

MS-ESS3.C.2: Human Impacts on Earth Systems: Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise.

CCSS RST.6-8.3: Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
W.6-8.1: Write arguments to support claims with clear reasons and relevant evidence.

MATERIALS

For the whole class

- > 20-liter container (such as a trash can, ten 2-liter bottles, or a 5-gallon water cooler bottle)
- > 1-liter container
- > 500-ml beakers
- > Pipette
- > Clear plastic cup
- > Six labels
- > Blue food coloring (optional)



3. **Total Water** team: Now that the *Fresh Water* team has removed (or pretended to remove) the 500 milliliters from your container, that container no longer represents the total water on the planet.

After the fresh water has been removed, what is left? Think about and discuss it. You'll need to change the label on your 20-liter container—what will your new label say? *[The new label should read: Ocean Water.]*

Everyone: Do you want to change your prediction for the percentage of Earth's total water that's drinkable? If so, change it to _____ percent.

4. **Unavailable Water** team: You'll need the beaker and the *Fresh Water* container. Pour 375 milliliters from the 500 milliliters (1/2 liter) of fresh water into the beaker.

What does the water in the beaker represent? Think about your team name and make your label. What does your label say? *[The label should read: Unavailable Water.]*

Everyone: So, what do you think "unavailable water" means? *[Unavailable water is the water in glaciers, ice caps, soil, and the atmosphere. None of it is immediately available for human use.]*

5. **Unusable Water** team: Using a pipette, remove 0.6 milliliters (5 drops!) from the *Fresh Water* liter bottle and put it in a plastic cup. Set it aside. This leaves 124.4 milliliters of the 125 milliliters of water remaining in the *Fresh Water* liter bottle.

What do you think the water remaining in the liter bottle represents? Think about your team name and make your label. What does your label say? *[The label should read: Unusable Water.]*

Everyone: So, what do you think "unusable water" means? *[Unusable water is the water that is in remote places or is polluted.]*

6. **Drinkable Water** team: The plastic cup set aside by the *Unusable Water* team belongs to your team.

How are you going to label this cup? *[The label should read: Drinkable Water.]*

Everyone: Now, here's one more chance to change your prediction of the percentage of Earth's total water that's drinkable. *[Of all the water on Earth, approximately 97 percent is salt water and 3 percent is fresh water. Less than 1 percent of all water is drinkable.]*

Interpret your results

What do the investigation results show about how we should use Earth's water? *[Sample answer: The investigation shows that even though Earth is covered with water, the amount that is fresh and clean is a tiny percentage—less than 1 percent of the total. This is the water that living things need to stay alive. We need to protect this clean, fresh water and use it wisely to make sure there will be enough drinkable water for everyone.]*