



Hands-on Science with NOAA

A Drop in Your Hand - Water Stewardship from NOAA Education

In this adaptation, a modification from the original activity has been made so that the volume of the water containers remains constant. Participants can more readily see the change in the relative volume of water available that is clean, safe, and available to drink.

Materials:

4 - 1Liter plastic bottles (SmartWater bottles work great – peel off the label)

Eye dropper

Small cup

Food coloring

Measuring instrument in ml (a cough syrup dispenser from pharmacy works well)

Copy of a water cycle model like <http://www.srh.noaa.gov/jetstream/downloads/hydro2010.pdf>

Optional -

Inflatable globe showing ocean and land surfaces.

Another bottle may be inserted between numbers 3 and 4 to illustrate the non-frozen freshwater total (add 6ml to this bottle.) But 75% of this water is too far or trapped underground. The new Bottle 5, then, contains 1.5 ml representing the total fresh surface water. This option works well if you have more time, are working with older children, or are doing math calculations as part of the activity.

Filling the bottles:

Bottle 1: Fill the entire bottle with water. This is the 1Liter that represents all water on the planet...in all forms on the planet (liquid, solid, gas.)

Bottles 2 & 3: Fill an entire bottle – which will be Bottle 2. Remove 30ml from Bottle 2 and place in Bottle 3. Add a little blue food coloring to Bottle 2...this is the 97% water held in the ocean. Add a little red food coloring to Bottle 3...this represents the 3% fresh water on the planet in all forms.

Bottle 4: Measure 1.5ml of water and pour into the last bottle. Add a little green food coloring. This represents the amount of surface water available.

Place caps on all the bottles. Label the bottles with a marker if you like (cover with clear tape so that markings don't wear off.)

Narrative for the bottles:

Most participants will be familiar with the water cycle. Tell them you are going to show how much water is available for people to drink, compared to the total amount found on the planet. Ask them to imagine that Bottle 1 represents this total amount of water (100%). You could ask them how many forms water takes on the planet, and get them to identify the three states – liquid, solid, gas.

Bottle 2: Ask them where *most* water is found on the planet. This bottle of blue water is the 97% that is in the oceans. Ask if we can drink this water. (Answer being no, since the water is salty.) With adults and older kids you could discuss the energy and money it takes to desalinate sea water (and, for career purposes, that some future engineer could develop a better process than we know of now!)

Bottle 3: This bottle represents the total fresh water available on earth. **But** 80% of this water is frozen – at the poles, in ice caps and mountain glaciers.

Bottle 4: This small amount (relative to the 100% bottle 1 you are holding up for comparison) represents the amount of fresh water that is on the earth's surface – and easy to get to. **But** much of this water is polluted (would you take a drink out of a puddle in a parking lot?)

Eyedropper: That leaves just this tiny amount compared to ALL the water on the planet. (Move Bottle 1 to the front, ask the participant to put out their hand, palm up.) *Very slowly* squeeze a single drop from the eyedropper into their hand. For emphasis, hold their upheld hand in yours as you release the drop and meet their eyes when they look up. “That’s it, just A Drop in Your Hand!” This is 0.00003% of Bottle 1, the total water available for people to use.

What do we need to do about water? (Don’t waste any, and keep it clean.) A reinforcing next step is to ask them if they let the water run while brushing their teeth, or turn the water off while brushing their teeth?

Extensions:

Combine the Learning Lesson “Water, Water Everywhere” from Jetstream

http://www.srh.noaa.gov/jetstream/atmos/II_water.htm with the game What-A-Cycle!

http://www.srh.noaa.gov/srh/jetstream/atmos/II_whatacycle.htm At each station, have the relative amount of water displayed...

Adapted from Project WET “A Drop in the Bucket” (The Watercourse and Council for Environmental Education.)