Active Demonstration of the Distribution of Fresh Water on Earth’s Surface

SEED standard 5.1.4: Develop a model to describe interactions between Earth’s systems including the geosphere, biosphere, hydrosphere, and/or atmosphere. Emphasize interactions between only two systems at a time. Examples could include the influence of a rainstorm in a desert, waves on a shoreline, or mountains on clouds.

Despite the majority of earth’s surface being covered by water (hydrosphere), water is still considered a precious resource. This is because all life on our plant (biosphere) requires fresh water to survive and fresh water makes up just 3% of the water on the planet and of this only 0.5% is can be used to support life. The other 2.5% is trapped in glaciers, underground, ice caps (geosphere), and in the atmosphere.

This activity will help the students to visualize what this small percentage actually looks like and will help them gain a better understanding of how the hydrosphere interacts with all the other spheres. This can also help them understand human’s place in the biosphere and the importance of us using water conservation principles.

Supplies:

* Gallon Water Pitcher (clear sides)
* Water glasses with clear sides (at least 3)
* Salt
* Measuring cups/spoons (1/4 cup, 1 TBS)
* 1cc syringe
* Tall stirring spoon
* Food coloring

Water Distribution Guide:

1 gallon water

* 3690 mL water + ¼ cup salt (97% of total water)
* 95 mL fresh water (1/4 cup + 2 tbs) (3% of total water) further distribute as below

95 mL fresh water (1/4 cup + 2 tbs) (3% of total water)

* + 65 mL glaciers and ice caps (1/4 cup) (68% of fresh water)
  + 29 mL groundwater (2 tbs.) (30% of groundwater)
  + 1 mL surface water (1% of fresh water)
    - 0.69 mL ground ice and permafrost
    - 0.21 mL lakes
    - 0.05 mL rivers
    - 0.04 mL soil moisture
    - 0.03 mL atmosphere
    - 0.03 mL swamps/marshes

Instructions

Fill a pitcher full of water and set out measuring devices and cups so they are visible to the class. To begin demonstration, add a few drops of food coloring to the water so it is easier for the students to see the water being divided.

Inform students that the pitcher of water represents all the water on our earth. Remove the 1/4 cup + 2 tbs fresh water and put it into a smaller glass. This represents all the fresh water on our earth. Add ¼ cup of salt to the remaining water in the pitcher. This represents how much of the water on earth is salt water in oceans compared to the fresh water in the glass.

Now we further divide the fresh water. Take out the glaciers ¼ cup into one glass and 2 tbs ground water into another, lastly pull up the 1 ml surface water amount in the syringe. The surface water is the portion of fresh water available to us. Discuss its different sources and their amounts. You may further divide this water if you would like.

Safety precautions: Salt water should not be consumed.

Disposal instructions: All liquids used can be safely disposed of by pouring into a drain.