SPRINGS PRESERVE

Theme: Water (grades 9-12)
Sub Theme: Global Water Issues

Pre-visit Activity #1:
How Much Water is on Earth?

Overview:
The following pre-visit activity is designed to impact students with an understanding of the amount of usable water that is present on the planet. The lesson will encourage students to think about local water usage and how it affects the global water supply.

Objectives:
- Students will learn about the global water distribution on Earth
- Students will understand that there is a limited supply of fresh water on Earth
- Students will design tables, charts, and graphs that can be used in making arguments and claims in oral and written presentations
- Students will explore multiple countries in order to understand which country uses the most water
- Students will learn about water conservation and how preserving the local water supply in Las Vegas affects the global water supply

Materials:
7 - 2000mL polypropylene beakers
Labels for beakers
Graduated cylinders
Calibrated pipettes

Background:
Earth as seen from space is clearly a water planet; about 71% of the surface of the planet is covered by water. Water is found in the oceans, rivers, ponds, lakes, groundwater, ice caps, glaciers, and in the atmosphere as water vapor and clouds. Water changes state and moves from place to place through the water cycle in a series of processes known as evaporation, condensation, precipitation, and sublimation. Earth's water supply seems almost limitless when viewed from an ocean beach but water forms only a thin film on the surface of the planet. This lesson will prepare students for a *Global Water Issues* activity that they will take part in while at the Springs Preserve field trip.

Vocabulary:

1. Groundwater - Underground water that is held in the soil and in pervious rocks
2. Glacier - A huge mass of ice slowly flowing over a land mass, formed from compacted snow in an area where snow accumulation exceeds melting and sublimation
3. Water cycle - The cycle of evaporation and condensation that controls the distribution of the earth's water as it evaporates from bodies of water, condenses, precipitates, and returns to those bodies of water. Also called *hydrologic cycle*
4. Ice cap - An extensive dome-shaped or plate-like perennial cover of ice and snow that spreads out from a center and covers a large area, especially of land
5. Atmosphere – The gaseous mass or envelope surrounding a celestial body, especially the one surrounding the earth, and retained by the celestial body's gravitational field
6. Evaporation - The change of a liquid into a vapor at a temperature below the boiling point
7. Condensation - The change of a gas or vapor to a liquid, either by cooling or by being subjected to increased pressure
8. Precipitation - A form of water, such as rain, snow, or sleet, which condenses from the atmosphere, becomes too heavy to remain suspended, and falls to the earth's surface
9. Water Vapor - Water in a gaseous state, especially when diffused as a vapor in the atmosphere and at a temperature below boiling point

Activity:

Waters of the Earth

1. Review vocabulary words (found above) before beginning the activity.
2. Place 2 liters of water in a 2000mL beaker.
3. Give students the percentage of the water types on the earth (found in chart below).
4. The total of Earth’s water will be represented as 2000mL.
5. Have students calculate the volumes of water that will represent each category of the earth’s water supply (listed in chart below).
6. Have students measure out the volumes, and add each amount to separate 2000mL beakers using graduated cylinders and/or pipettes.
7. Have students create their own table, using a similar format as the one below (you might want to show them this table without the calculated volumes of water).
8. Students can make a bar graph showing the percentages of water in different forms.

Type of Water	Percentage of Earth's Water Supply	Volume of Water to Use in Bottle
All of Earth's water	100 %	2000 ml
All of Earth's salt water (oceans)	97.2 %	1944 ml
All of Earth's fresh water	2.8 %	112 ml
Fresh water locked up as ice	2.3 %	92 ml
Underground fresh water	0.4 %	16 ml
Surface fresh water	~ 0.05 %	2 ml
Water in soil and air	~ 0.01%	0.4 ml

Evaluation and Discussion:

1. Where is most of Earth's water located?
2. Are humans able to use the water for consumption?
3. Where is the greatest percentage of Earth's fresh water found?
4. Why might the amount of fresh water found in ice caps be diminishing?
5. How might this affect the fresh water supply?
6. What are the complications involved with accessing underground water?
7. How much water is used by an average person annually in the United States?
8. How much water is used by an average person annually in the Netherlands?
9. How much water is used by an average person annually in India?
10. Why do you think the United States uses more water than any other country?
11. How much water does the Mojave Desert receive annually?
12. Why is it especially important to conserve water in the desert?
13. Do you think that if each individual conserves water at home that it will help the global water supply? Why or why not?
14. How can you conserve water in your home or at school?

Websites:

- http://www.usgs.gov/
- http://www.ifpri.org/media/water_countries.htm
- http://www.thinkquest.org/apr04dec04/water.shtml