FRIENDS of *Great Salt Lake*

Changing States

Background:

Great Salt Lake is a terminal lake. This means that there is no way for water to exit the lake other than evaporation. There are three river systems that flow into the lake, and the shores of the lake are ever-changing. Massive amounts of evaporation take place over the lake. The powdery snow that Utah is credited with having exists due to the lake effect when snow from the lake is evaporated and only moves as far as our mountains and then condenses and precipitates as snow.

The process of evaporation involves the movement of the molecules from liquid to gas phase. In evaporation, the more rapidly moving water molecules leave first. The rate of evaporation is increased by any factor that will help molecules escape from the liquid to the gas phase. An increase in temperature aids evaporation by increasing the speed of the movement of the water molecules. More molecules then have enough energy to escape. The rate of evaporation is also increased by the presence of air currents. Water salinity also affects evaporation rate. The higher the salinity, the more slowly water evaporates under given conditions.

Evaporation rate is measured in terns of inches or centimeters per unit of time, regardless of the area from which the evaporation occurs. Due largely to the hot, dry summers, the evaporation rate from Great Salt Lake averages about 45 inches per year.

Surface area affects the total amount of evaporation which occurs from a body of water. Under the same conditions temperature, air, movement, and salinity, the larger the surface area of a body of water, the greater the total amount of evaporation. The deepest part of the lake is only approximately 30 feet deep, making it a fairly shallow lake. Great Salt Lake has a very large surface area, averaging about 1,500 square miles, which allows for a large total amount of evaporation.

Materials:

- 2 bowls (1 with straight sides & small surface area, other with more gentle sides & larger surface area)
- 1 flat pan, about 1” deep with large surface area (pizza pan or cookie sheet)
- 3 spot lights
- 1 oscillating fan
- 1 meter stick
- 1 measuring cup or graduated cylinder
- graph paper

Activity:

Introduce the students to the word evaporation and its definition. Then talk about surface area and its definition. Make sure students know how to find surface area of a rectangle and circle. (For rectangle length x height and for a circle measure the diameter, divide by 2 to determine the radius (r) and use the formula A= 3.14r^2.)

Explain to the students that you are going to look at evaporation from "lakes" that have several different shapes. Tell them the pan and bowls represent that. Have them measure 1 cup of water at a time into each container until the smallest container is full. All containers should have the same amount (volume) of water. They should then measure and determine the surface area of each container. Make sure the students record surface areas and volumes.

Have them place spot lights so that shines on each container. Turn the lights on. The fan should be placed to the side of the three containers and turned on to the oscillate. The lights and fans should be adjusted so that each pan gets approximately the same amount of light and "wind." After five minutes, instruct the students to turn off the lights and fan. The volume of water in each container should be remeasured, and the results recorded. Make sure they measure the water and return it to the containers carefully without spilling any. This should be repeated every five minutes for fifteen minutes.

Have the students repeat the experiment with the same amount of water in each container but without using the lights or fan. Record the amounts of water left in each container after fifteen minutes. This serves as the control.

Have the students make a graph showing their results, then have them share their results. Ask them if they can see a pattern, and discuss the results. Make sure students understand the difference between **evaporation rate** and **total amount** of evaporation.