Making Ice Cream without a Freezer

Objective: You will use the concept of freezing point depression to move thermal energy and freeze ice cream.

Materials:

Sugar
Milk
Vanilla
Ice
Rock salt

Quart freezer bag
Gallon freezer bag
Spoons
Serving cups

Procedure:

1. Pour **1/2 C sugar, ½ C milk** and **¼ teaspoon vanilla** in the **small bag** and seal it. Try to remove as much air as possible before sealing. Take the bag to your lab table.
2. Pour **2 Cups of ice** into the large bag and take the **temperature of the ice.** Record the temperature on your Chemistry Journal sheet.
3. Then add **1/3 Cup salt** to the ice in the **large bag.** Take the bag to your lab table.
4. Make sure the small bag is completely sealed! Place the small bag inside the large bag. Seal the large bag. Try to remove as much air as possible before sealing. Make sure the large bag is completely sealed!
5. Take turns slowly shaking the bags until the ice melts and the ice cream freezes.
6. Open the **large bag** and take the **temperature of the salt-water mixture**. Record the temperature on your Chemistry Journal sheet.
7. Open the **small bag** and "dip" the ice cream into cups for each person in your group. SHARE!

Analysis and Conclusion:

Why do you need the salt?

To make ice cream, the ingredients—typically milk (or half and half), sugar and vanilla extract—need to be cooled down. One way to do this is by using salt. If you live in a cold climate, you may have seen trucks spreading salt and sand on the streets in the wintertime to prevent roads from getting slick after snow or ice. Why is this? The salt lowers the temperature at which water freezes, so with salt ice will melt even when the temperature is below the normal freezing point of water.

Technically, the temperature that the salt lowers is called the freezing point. When a freezing point is lowered, such as by adding salt to water, the process is called *freezing-point depression*. Freezing-point depression is not unique to solutions made of water and salt; it also happens with other solutions. (A solution is made when a substance, such as salt, is dissolved and becomes a *solute*. The medium into which it is dissolved is a *solvent*—typically a liquid, like water.)

(http://www.scientificamerican.com/article/scrumptious-science-making-ice-cream-in-a-bag/)

Complete the Chemistry Journal sheet on the other side of this paper.