Name:_____ Date: _____

MAKING ICE CREAM: A STUDY OF FREEZING POINT DEPRESSION

PURPOSE:

INTRODUCTION:

Adding solute to a solvent affects the boiling point, freezing point and vapor pressure of the solution. The more particles there are present per amount of solution, the greater the effect will be. This property is called a colligative property. Because of this, solutions exhibit boiling point elevation, freezing point depression and vapor pressure depression. Solutes with ionic bonding are more effective than solutes with covalent bonding.

SAFETY:

MATERIALS:

Milk	Vanilla	Small Ziploc	Papertowels
Sugar	Ice	Large Ziploc	Salt

PROCEDURE:

1. You will work with a partner to complete this activity-
    a. Partner One- Prepare the large Ziploc with ice and salt.
        i. 2-3 cups of ice with liberal amount of salt- pour generously for about 3 seconds.
    b. Partner Two- Prepare the smaller ziplock back with the milk-sugar recipe
        i. 2/3 cup of milk
        ii. ¼ cup of sugar (or less)
        iii. ¼ teaspoon of vanilla

2. Remove any air from the bags, place the smaller back into the larger one and seal
3. Shake vigorously for up to 10 minutes- do this until the milk coagulates.
4. Partner One- remove and rinse the inner bag, transfer ice cream to cup/bowl.
5. Partner Two- empty larger bag into sink and discard bag.
6. Enjoy! Be sure to clean up- wipe all counters, spills and throw out any dirty materials.

QUESTIONS

1. How does adding a solute to the ice help you make ice cream in the classroom?
2. Explain why an ionic salt was used as the solute in this experiment rather than sugar?
3. A solution of water has a concentration of 3.0 M $C_6H_{12}O_6$(non-electrolyte), what is the freezing point of this water solution?
4. A solution of water has a concentration of 3.0 M NaCl, what is the freezing point of this water?
5. Sodium chloride was used in this experiment as a means to depress the freezing point. Identify two other ionic salts that would have been BETTER. Explain why.