Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period:\_\_\_\_\_\_\_\_\_\_\_\_\_

**Learning Target 9.3: Ice Cream Lab**

**Task**:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Procedure: Ice cream ball**

1. Rinse out the stainless steel portion of the ice cream ball with water be fore adding your ingredients
2. Poor the contents of your mixture in the stainless steel end of the ice cream ball and place the cap on it.
3. If you didn’t bring your own milk use the recipe below
   1. 10 oz. milk
   2. 1 1/2 teaspoons vanilla
   3. 1/4 cup sugar
4. Measure ½ cups of rock salt (sodium chloride) and using a scale find the mass and record it below.
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_mass of salt in Kg.
   2. \_\_\_\_\_\_\_\_\_\_\_\_\_ mass of any additional salt added kg.
5. Pour the salt in the other end of the ice cream ball.
6. Fill your ice cream ball with as much as ice as possible and seal it.
7. With both ends of the ice cream ball sealed start rolling the ball around to mix the salt and ice.
8. Check the state of the ice cream after 10 minutes, add salt and ice as needed.
9. Ice cream should be the consistency of soft sever ice cream.
10. Clean up procedure:
    1. Find the ending mass of the salt/ice/water mixture in the ice cream ball .\_\_\_\_\_\_\_\_\_\_\_\_\_ g
    2. Take the total mass of water – total mass of salt = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ g water used.
    3. Covert mass of water from grams to kilograms:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
11. Thoroughly rinse out the salt water from the inside of the ice cream ball. Make sure to put the cap on when you are done.
12. Add one drop of dish soap the stainless steel portion of the ball.
13. Fill it half way with water.
14. Put the cap on and shack the ball. Rinse and place the cap back on.
15. Return the ice cream ball to where you got it.

**Procedure: Ziplock Bag**

1. Pour the contents of your mixture in the sandwich size ziplock bag. Make sure it is sealed tightly.
2. If you didn’t bring your own milk use the recipe below and pour it in the in the sandwich size ziplock bag. Make sure it is sealed.
   1. 10 oz. milk
   2. 1. 1.2 teaspoons vanilla
   3. 1/4 cup sugar
3. Measure 3/4 cups of rock salt (sodium chloride) and using a scale find the mass and record it below.
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_mass of salt in Kg.
   2. \_\_\_\_\_\_\_\_\_\_\_\_\_ mass of any additional salt added kg.
4. Pour the salt in the large gallon ziplock bag.
5. Place the small ziplock bag in the 1 gallon bag with the salt. Make sure your bag of soon-to-be ice cream is sealed tightly!!!
6. Fill your ice cream ball or the gallon bag with as much as ice as possible and seal.
7. Using both hands start shacking the back with both of your hands holding the top of the gallon bag.
8. Check the state of your ice cream after 10 minute. Add salt and ice as needed.
9. Ice cream should be the consistency of soft sever ice cream.
10. Clean up procedure:
    1. Find the ending mass of the salt/ice/water mixture in the ice cream ball .\_\_\_\_\_\_\_\_\_\_\_\_\_ g
    2. Take the total mass of water – total mass of salt = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ g water used.
    3. Covert mass of water from grams to kilograms:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
11. Throw away the ziplock bag that contained the ice cream.
12. Rinse out the gallon ziplock bag and return in to where you picked it up.

**Data Analysis:**

Calculate the freezing point of the solution of rock salt (sodium chloride) and water.

**Follow up Questions:**

1. Which of the following salts would lower the freezing point of water the most beryllium sulfide or ammonium bromide? Assume equal moles of each. Provide explanation.
2. Explain in detail how salt lowers the freezing point of water.
3. Which would have the greatest change in freezing point? 1) 4 mol of sodium chloride dissolved in 2.3 kg water or 2) 2 mol of calcium chloride dissolved in 1.15 kg of water.
4. Prove with calculations whether it is possible to make ice cream substituting the same mass of salt for glucose in this lab.