SL Physics Date \_\_\_\_\_\_\_\_\_ NAMES\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Problem:** To experimentally determine the heat of fusion of ice.

**Introduction:** In this lab you will be combining an ice cube with liquid water to determine the heat of fusion of the ice. During the process the water will lose heat energy and the ice will gain heat energy. *Please submit a single copy of the report for your lab group. (Maximum 3 students per lab group.)*

Mice

mw Ti

**

**Water in a cup ice starting to melt**

**Pre- Lab:**

Complete the following information in the boxes provided for the water and ice:

1. Sketch the cooling curve for the water and the heating curve for the ice. **Label Ti and Tf** in the diagram relative to the melting temperature of ice. (No numbers are required. *Note- the ice will already be starting to melt when you start the experiment.*
2. Using the sketch of the cooling/heating curve write the equation for the heat lost by the water , and the heat gained by the ice.

|  |  |  |
| --- | --- | --- |
|  | **Liquid Water** | **Ice** |
| 1. | Temp. C0  00  time | Temp.C0    00  time |
| 2. | Heat lost = | Heat gained= |

**Procedure:**

1. Before obtaining your ice cube, collect the following data for your sample of liquid water.
2. These next steps must be performed quickly and carefully
   1. “Dry the ice cube” with a paper towel
   2. quickly measure the mass of the ice
   3. use a paper towel to quickly put the ice in the water
   4. continue to gently stir the water and ice with the thermometer
   5. as you stir, watch the ice to see when it has completely melted and read the final temperature

**DATA:**

|  |  |
| --- | --- |
| **Liquid water in a Foam Cup** | **Ice** |
| Empty cup mass=  Cup with water mass=  Initial temperature= | Mass of the ice =  Assumed starting temperature of the ice= |
| Final temperature of the water and the ice = | |

**ANALYSIS:**

1. Use the equation you wrote in the Pre-Lab to calculate the heat lost by the water. (Show your work here.)
2. We will assume that the heat lost by the water is exactly equal to the heat gained by the ice. Use the equation you wrote in the Pre-Lab for the heat gained by the ice and your answer to question 1 above to calculate the heat of fusion of ice. *Remember to use absolute values for the ΔT, and the specific heat of water is different when it is a solid, liquid, and gas; use the correct form.* (Show your work here.)
3. What is the accepted value for the heat of fusion of ice? Cite your source.
4. Calculate the percent error for your result. (Show your work.)

**Error Discussion and Evaluation:**

1. State one reason why the assumption you made for the initial temperature of the ice is a reasonable assumption.
2. State one reason why the assumption you made for the initial temperature of the ice may not be an accurate assumption.
3. We also assumed that the heat lost by the water is exactly equal to the heat gained by the ice. State reason(s) why this assumption may not be exactly true.

