

LAB: HEAT & TEMPERATURE

Phase Changes

Purpose:

To examine temperature change and phase change

Materials:

Thermometer, hot plate, water, beaker, ice, graph paper

Theory:

Heat is that form of **energy** which is transferred from one body to another by virtue of a temperature difference between them. Heat spontaneously flows from the hotter to the colder body. Provided no work is done by or on a body, when the body gains or loses heat energy it will either change its **temperature** or its **phase** (solid, liquid, or gas). When heat is added to a substance, the temperature of the substance will rise until it reaches a point at which a phase change will occur. Any additional heat will then be used to melt the solid or to vaporize the liquid. The temperature of the substance will not rise again until all of the sample has changed phase.

Procedure:

- 1) Fill a beaker with approximately half ice and half cold water.
- 2) Place a thermometer in the water and gently stir. Wait until the temperature stabilizes near 0° C. (At this point, there should still be a significant amount of ice in the water. If not, add more ice.)
- 3) Make a **data table** in which you can record the temperature of the water every 30 seconds. Record the starting temperature of the water in your data table.
- 4) Place the beaker on the hot plate turned to a low setting, and slowly stir the ice-water mixture. Record the temperature of the water every 30 seconds.
- 5) Continue taking readings until 3 minutes after all of the ice has melted.
- 6) Make a graph of temperature vs. time. Do not draw in a best-fit line. Label the section of your graph which corresponds to the ice's phase change and the section of your graph which corresponds to the water's temperature change.

Questions:

- 1) Did heat transfer from the ice to the water or from the water to the ice? Explain.
- 2) Did the temperature of the water rise significantly before the ice had completely melted? Explain.