Student worksheet for option 1

(see Campers, Prepare for option 2: open-ended lab)

**Modeling heat lab**

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

**Tools and materials:** Ice cubes, thermometers, timers, beakers, hotplates, electronic scales, notebook, and pens.

**Safety:** Wear protective goggles and gloves. Do not touch the hotplate, the hot water, or the apparatus.

**Procedure:**

1. Use electronic scale to measure the mass of the given ice.

2. Transfer the ice into a beaker and place a thermometer into the beaker.

3. Place the beaker on the hotplate and measure the temperature of the ice.

4. Turn on hotplate to recommended level. Measure the temperature, while stirring, every two minutes and record the result in the provided table.

5. Continue your recording until after three minutes of boiling.

6. Draw a time-temperature graph.

**Data table**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Time** |  |  |  |  |  |  |  |  |  |
| **Temperature** |  |  |  |  |  |  |  |  |  |

**Graph**

**Questions**

1. Explain your observations. Summarize what happened.
2. Where are the interesting parts of the curve? (Where on the graph did it not match what you expected?)

What is happening in terms of energy and molecular motion? Temperature?

1. If temperature drops below 0°F in Florida, fruit farmers will spray their fruit with water. The energy freezes the water, not the fruit. This is an exothermic process, so fruit will go up in temperature. Explain why this is a beneficial practice.
2. Look at two graphs from two different groups. What is the difference between the graphs?

What on the graph indicates different amounts of ice per group?

How would the graph change if you doubled the amount of ice? If you had the hotplate on “2”?

1. Do you think the amount of ice make any differences for the process? Why?
2. Do you think the power of the hotplate influences the process? Why?