NAME: _____ Period: _____ Date:_____

Do at Home Lab #1

Background: One of the fundamental laws of chemistry is that in any interaction, neither mass nor energy can be created or destroyed – it simply moves around. In this lab, we are going to explore what energy gets moved when we change water from its solid phase (ice) to its liquid phase (water) to its gaseous phase (water vapor).

Aim: To explore heat transfer during phase change.

Materials (you should have at home):

Ice
Glass
Tap water
Pot
Stove with heat

Method/Data:

1. Fill glass half way with tap water. Allow it to stand about 5 minutes. Observe the temperature of the water relative to the room. Circle one:
    i. Much colder than the room
    ii. About the same as the room
    iii. Much hotter than the room
2. Add a few pieces of ice to the water. Allow to stand about 5 minutes. Describe any changes to the ice: _____. Observe the temperature of the water relative to the room. Circle one:
    i. Much colder than the room
    ii. About the same as the room
    iii. Much hotter than the room
3. Transfer your water to a pot. Place on the stove (burner on) and allow to heat about 5 minutes. Describe any changes to the water:_____. **CAUTION: TAKE CARE NOT TO BURN YOUR HAND!!!** Observe the temperature of the water in the pot relative to the room. Circle one:
    i. Much colder than the room
    ii. About the same as the room
    iii. Much hotter than the room
4. Turn off stove; discard hot water; and remove pot to a heat resistant surface. Replace all materials and return the kitchen to the state in which you found it!!

Analysis:

1. When you added the ice to the water (step 2), did the temperature of the water change? _____. In which direction (went up or went down?) _____. Did the ice undergo a phase change? If so, what change:_____.

2. In question 1 above, which direction did the heat (energy) flow? From the water to the ice or the ice to the water? _____

3. Given 1 and 2 above, if heat (energy) flows out of a substance, its temperature goes _____.

4. When you heated the water, did the temperature of the water change? _____ In which direction (went up or went down?)_____. Did the water undergo a phase change? If so, what change _____.

5. In question 4 above, did energy (heat) flow into or out of the water? _____. If energy (heat) flowed in, where did it come from?_____

6. Given 4 and 5 above, if heat (energy) flows into a substance, its temperature goes _____.

7. To melt ice, heat must (go into or come out of) the ice? _____
   To boil water, heat must (go into or come out of) the water?_____

8. Melting and boiling are phase changes which are _____ changes.
   (physical or chemical)