Chemistry – Unit 3 Work sheet

1. Divide your heating curve into three regions; label each region:

(A) a low temperature plateau

(B) a region of temperature change

(C) a high temperature plateau

2. For *each* region on your graph,

1. describe how the energy supplied by the burner was stored by the system   
   (Eth or Eph)
2. state what phases were present

3. For *each* region on your graph, draw a model at the particle level that shows how the water particles were behaving.

4. Draw the graph below. Use the following choices to describe what is happening on the following labeled sections of the graph



### A. increasing

### B. decreasing

### C. the same

### D. zero

a. During region B the thermal energy is .

b. During region C the thermal energy is .

c. During region A the phase energy is .

5. Did the system in this lab involve a chemical change? Explain.

Did the system absorb or release energy? Show which sections of the curve were absorbing energy and which sections were releasing energy.

6. How would increasing the rate of heating by doubling the maximum heat of the hot plates affect the shape of the curve? Draw both curves

## Kinetic Molecular Theory

This theory describes all matter as being composed of tiny particles in endless random motion. In a solid, the particles vibrate, but are locked into an orderly array. In a liquid, the particles are still touching but are free to move around past one another. In a gas, the particles are moving very rapidly and are widely separated.



When energy is transferred to a sample of matter, *either* the particles speed up (temperature increases) *or* they get pulled apart (phase change), but *not* both at the same time. This helps account for the shape of the warming curve you got in the Icy Hot lab.

7. Label which phases are present in each portion of the curve above.

8. Label the phase changes (Example: solid liquid).

9. Label the sections in which the thermal energy (Eth) of the sample is changing.

10. Label the sections where the phase energy (Eph) is changing.

11. . On the graph below left sketch the curve that describes the following:

a. Initial state: 150 g solid water at –10 ˚C

b. Final state: 150 g liquid water at 0˚C



12. On the graph above right sketch the curve that describes the following:

Initial state: 200 g liquid water at 40 ˚C

Final state: half of the water has boiled away at 100˚C

13. On a counter is a glass of water with ice cubes floating in it. You measure the temperature and find it to be 0 ˚C. Would the temperature of the water change if you were to add more ice cubes to the glass? Explain your answer.

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14. How has the The Model changed? Note changes in the model we’ve introduced in this unit and the last unit (unit 2).