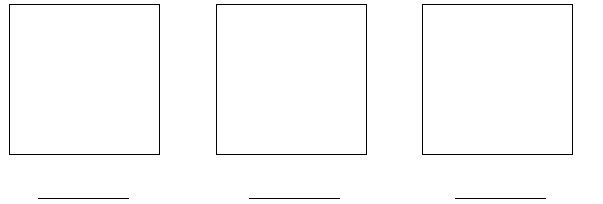
Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Heating Curve – Simulation Activity**

***Background***

The three states of matter are solid, liquid, and gas. To change from one state to another, energy is either \_\_\_\_\_\_\_\_\_\_\_\_\_\_ to or \_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the system. In this investigation, you will look at heating up water.   
1. Does that involve adding or removing energy? Explain.

2. In the squares below, draw how you think particles are arranged in the three states. Use spheres to represent the particles and label each box with the state it represents.

3. When changing from one state to another, what happens to particles in terms of ***energy***?

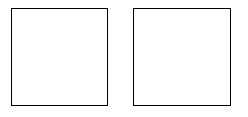
*Procedure*:

1. Visit <teachchemistry.org/heating-curve>  
   You should see this on your screen.  
     
   On the heating curve above, label the states of matter. Include the state changes.
2. Choose an initial point on the graph. This is your starting temperature/state. Choose a second point that is the same state. Draw the two particle diagrams in the squares.

**T1=**

**T2=**

1. Explain why the diagrams look the way they do.



1. Choose a mass of water. Pick 2 readings on the graph in the liquid phase. Have the program calculate the energy required to make that temperature change. Use this chosen & collected data to calculate the **specific heat** of liquid water. Make any necessary conversions to report your answer in units of [J/gC°]. Show your work. (Hint: Use Q=mcΔT)

cwater =

1. Use the same method (as in #4) to calculate the **specific heats** of ice and steam. Show your work.  
     
     
     
     
     
    cice =

Csteam =

1. Pick 2 readings on the boiling horizontal segment. (T1 and T2 should both be 100 ºC.) If there is no ΔT, what formula can you use to calculate Q (heat)? (Hint: check notes…)
2. Use the readings in #6 to calculate the ***latent heat of vaporization*** of H2O in units of [J/g].

Lv =

1. Do the same for the ***latent heat of fusion***.

Lf =