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

You can download this document and type your answers in as you go or you can pick up a hard copy from me…Let’s get started!

**Part A:**

Click this link to take you to the Classzone website: <http://www.classzone.com/books/ml_science_share/vis_sim/mem05_pg101_kintheory/mem05_pg101_kintheory.html>

1. Use your mouse to adjust the temperature and observe what happens. What effect does increasing the temperature have on the average kinetic energy? What about decreasing the temperature?

I noticed that increasing the temperature increased the kinetic energy and decreasing the temperature decreased the kinetic energy.

1. What effect does changing the temperature have on the molecules sealed in the container?

Increasing the temperature causes the particles to move faster and decreasing the temperature causes the velocity of the particles to decrease.

Click – NEXT –

1. What effect does changing the mass have on the average kinetic energy?

Changing the mass did not change the kinetic energy; it just caused the velocity of the particles to change.

1. Why do you think this is the case?

Kinetic energy is related to mass and velocity. If the energy is remaining constant, then the velocity of the particles must change.

Click – NEXT –

1. Write two or three sentences summarizing what you observed on this site.

On this site I got to manipulate temperature and mass variables and observe their effects on kinetic energy and the speed of the particles. I noticed that temperature is related to the kinetic energy of the particles in a substance. When temperature goes up, so does kinetic energy. I also noticed that the more mass a particle has, the slower it will go if you keep the temperature the same.

1. Sketch a graph showing the relationship you observed between temperature and velocity as well as mass and velocity.(You can use a computer program to draw or you can draw by hand after printing this out to turn it in)



**Part B:**

<http://phet.colorado.edu/en/simulation/states-of-matter-basics> - Click on “Run Now” to open the app.

1. Click on each of the three buttons: Solid, Liquid, and Gas. Describe your observations and draw a sketch of what you see below:
   1. Solid – All of the molecules are moving, but they are not able to move freely. They are very close together and just vibrate in one place.



* 1. Liquid – All of the molecules are moving here as well, but with more freedom than in a solid. The particles are able to slide past each other and do not have a fixed position.



* 1. Gas – The molecules here look like they are free to move anywhere. They are moving faster than the molecules in a solid or liquid and don’t appear to have any restraint.



1. What do all three phases have in common?

In all three phases, the particles are constantly in motion and their speed is affected by the temperature.

1. How is each state unique?
   1. Solids – The shape does not change.
   2. Liquids – The shape can change but the volume does not change.
   3. Gases – The shape and volume both can change.

**Part C:** <http://mutuslab.cs.uwindsor.ca/schurko/animations/waterphases/status_water.htm> - You can play or pause the animation by clicking the button on the left. The button on the right will reset the animation.

1. The sentence on the bottom of the webpage explains what is happening. I want you to click play and only watch the thermometer…describe what you observe below.

The temperature increases at a regular rate, then stays the same for a little while then continues to increase again.

1. What was unexpected about your observation?

I was not expecting the temperature to stay the same while energy was being added because of what I saw in the earlier animation.

1. Reset the animation and play it again. This time, watch the block of ice as well as the thermometer. What do you think the blue dots represent?

I think the blue dots represent atoms or molecules.

1. Describe what you observe happening during the time periods the temperature is not changing.

When the temperature is not changing, the substance is changing from a solid to a liquid or a liquid to a gas.

1. At what temperature does the substance begin to melt?

Zero degrees

1. At what temperature does the substance begin to boil?

100 degrees

**Part D:**

<http://www.chm.davidson.edu/vce/phasechanges/HeatingCurve.html> - Read through the CONCEPTS section and the TO PERFORM EXPERIMENT section **(You do not have to do step 5)**

1. Make a sketch using a computer program or by hand after printing this sheet out of the graph you created during this simulation. (Don’t forget to label it correctly!)



1. Create a caption for your graph that describes what information the graph is providing.

This graph shows a substance changing from a solid to a liquid to a gas. As energy is added, the temperature increases except for the two time periods where the substance is changing state.

1. What is the melting point of this substance? How do you know?

The first flat area on the graph is the melting point.

1. What is the boiling point of this substance? How do you know?

The second flat area on the graph is the boiling point.

1. On the graph you drew above; circle the area where the substance is a solid, draw a rectangle around the area where the substance is a liquid, and draw a cloud around the area where the substance is a gas.

**Part E:**

Plasmas are the phase of matter that “just can’t get no respect”. You may have noticed that all of the resources you have checked out left them off. Watch until 5:25 in this video and see if you can answer the questions below. <https://www.khanacademy.org/science/chemistry/states-of-matter/v/states-of-matter-follow-up>

1. In what ways is plasma similar to the other phases of matter?

Like other forms of matter, the particles in a plasma are always in motion and their velocity is dependent on their mass and temperature.

1. What makes plasma unique?

Plasmas are electrically charged.

1. Where are some places you have seen plasma before?

Lightning, stars, the sun

1. What is the most common phase of matter in the universe?

Plasma