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

**Kinetic Theory: *It’s Only A Phase (Mini Webquest)***

**Overview:**

We have completed our unit on motion and are now beginning a unit where we will examine how energy plays a vital role in the world around us. This activity is designed to give you an introduction to the foundation of this unit; an idea called the kinetic theory. We will spend class today in the computer lab working independently and tomorrow we will come back together and discuss your findings. Check out the various activities below and see what you can learn. Make sure you come tomorrow with some great new information to contribute to the discussion.

**Standards:**

-SPS5. Students will compare and contrast the phases of matter as they relate to atomic and molecular motion.

a. Compare and contrast the atomic/molecular motion of solids, liquids, gases and plasmas.

-SPS7. Students will relate transformations and flow of energy within a system.

d. Explain the flow of energy in phase changes through the use of a phase diagram.

-SCSh3. Students will identify and investigate problems scientifically.

e. Develop reasonable conclusions based on data collected.

**Objectives:**

- The student will be able to correctly compare and contrast the phases of matter with relation to atomic and molecular motion using the information they complete on this webquest.

- The student will be able to label the three main phases of matter on a phase diagram that is provided for them with clarity and accuracy.

- The student will be able to create a graph that correctly represents the relationship between variables based on data presented to them.

- The student will be able to correctly explain the flow of energy in each phase change represented on a phase diagram with little to no guidance from the teacher.

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

Click – NEXT –

1. What effect does changing the mass have on the average kinetic energy?
2. Why do you think this is the case?

Click – NEXT –

1. Write two or three sentences summarizing what you observed on this site.
2. 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 –
   2. Liquid –
   3. Gas –
2. What do all three phases have in common?
3. How is each state unique?
   1. Solids –
   2. Liquids –
   3. Gases –

**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.
2. What was unexpected about your observation?
3. 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?
4. Describe what you observe happening during the time periods the temperature is not changing.
5. At what temperature does the substance begin to melt?
6. At what temperature does the substance begin to boil?

**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!)
2. Create a caption for your graph that describes what information the graph is providing.
3. What is the melting point of this substance? How do you know?
4. What is the boiling point of this substance? How do you know?
5. 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?
2. What makes plasma unique?
3. Where are some places you have seen plasma before?
4. What is the most common phase of matter in the universe?

If this were a culminating activity, it would be scored differently, but as an inquiry activity, I have chosen to give the categories listed below:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Exemplary | Proficient | Emerging |
| Part A | All observations are consistent with what was present on website. Relationships were correctly stated. Summary was clear and complete. Graphs were accurate and correctly labeled. | Most observations are consistent with what was present on website. Most relationships were correctly stated. Summary was relatively clear and complete. Graphs were accurate, but perhaps not correctly labeled. | Some observations are consistent with what was present on website. Few relationships were correctly stated. Summary was not clear or complete. Graphs were not accurate or correctly labeled. |
| Part B | Descriptions and sketches are consistent with what was present on website. Similarities correctly identified. Differences correctly identified. | Descriptions and sketches are generally consistent with what was present on website. Similarities attempted but not all are correctly identified. Differences attempted but not all are correctly identified. | Descriptions and sketches are not consistent with what was present on website. Similarities are not correctly identified. Differences are not correctly identified. |
| Part C | Description is consistent with what was present on website. Student noticed what was unusual during the heating process. Melting and boiling points correctly identified. | Description is mostly consistent with what was present on website. Student did not correctly notice what was unusual during the heating process. Melting or boiling point correctly identified. | Description is not consistent with what was present on website. Student did not notice what was unusual during the heating process. Melting and boiling points are not correctly identified. |
| Part D | Sketch of graph accurately represents graph from website and is correctly labeled. Caption accurately summarizes information on graph. Melting and boiling points correctly identified. | Sketch of graph somewhat represents graph from website and is almost entirely correctly labeled. Caption summarizes some of the information on graph. Melting or boiling point correctly identified. | Sketch of graph does not accurately represent graph from website and is not correctly labeled. Caption does not accurately summarize information on graph. Melting and boiling points are not correctly identified. |
| Part E | Primary similarity and major difference correctly identified. More than one real-world example given. | Primary similarity or major difference correctly identified. At least one real-world example given. | Primary similarity and major difference not correctly identified. One real-world example not given. |