

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.

**Learning Target:** I will be able to explain, demonstrate, and annotate the changes in molecular motion and structure of solids, liquids, gases, and plasmas once heat is added or taken away by completing a phase change lab and constructing phase change diagrams.



### Phase Change Lab

Materials: Beaker, Ice, Water, Thermometer, Graph paper, hot plate

Task: Observe and record data on the phase change of ice to water to steam

Predictions:

- 1) What will happen to the molecular structure of the water as heat is added?
- 2) What happen to the physical properties of ice as heat is added?
- 3) Are you adding or subtracting energy during this experiment?

Procedure:

- 1) Pour about 75 ml of water into the beaker

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- 2) Place 5 ice cubes into the water and record the temperature of the water \_\_\_\_\_
- 3) Place the water on the hot plate.
- 4) Turn the hot plate up to highest level.
- 5) Record the temperature of the water every 30 seconds for 15 more minutes. KEEP THE THERMOMETER IN THE BEAKER OF WATER WHEN YOU ARE TAKING THE TEMPERATURE. DO NOT, I REPEAT DO NOT TAKE THE THERMOMETER OUT TO TAKE THE TEMPERATURE OF THE WATER. DOING THAT WILL INVALIDATE YOUR DATA RESULTS!!!
- 6) Use graph paper to prepare a line graph comparing time versus temperature. Time will go on the X-axis and temperature will go on the Y-axis.

Answer the following questions:

- a) What was the initial temperature of the water? \_\_\_\_\_ Celsius
- b) What was the highest temperature that the water reached? \_\_\_\_\_ Celsius
- c) What was the temperature of the water as the ice was melting? \_\_\_\_\_ Celsius
- d) What were the phase changes that you were observing? (liquid to gas, liquid to solid, solid to liquid, gas to liquid, etc.)
- e) Can you explain the temperature change (or lack of temperature change) as the ice was melting? As the water was heating up?
- f) Describe the physical changes you observed and the energy associated with those changes.

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Time	Temperature of Water	Time	Temperature of Water
:30		8:00	
1:00		8:30	
1:30		9:00	
2:00		9:30	
2:30		10:00	
3:00		10:30	
3:30		11:00	
4:00		11:30	
4:30		12:00	
5:00		12:30	
5:30		13:00	
6:00		13:30	
6:30		14:00	
7:00		14:30	
7:30		15:00	

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