

Heating Curve of H₂O Lab Activity

Purpose: today you will be studying the Kinetic Molecular Theory as relates to the Heating of Water from the solid phase (ice) to the gaseous phase (vapor). You are to primarily focus on how the temperature of the water relates to the amount of energy being added over time. You will record a data log of temperature and time in the table below. You will finally graph your results and answer the analysis questions.

Your station is already set up. Take a moment to review the set up and familiarize yourself with your surroundings.

Designate a member of your group to be responsible for the following:

- ✓ Official **Time Keeper**
- ✓ Official **Temperature Recorder**
- ✓ Official **Data Logger**
- ✓ Official **Researcher**
- ✓ *Any remaining members of your group are to **assist with the above responsibilities**, making sure that the above responsibilities are being met efficiently and accurately. (i.e. **double check your teammates**).*

Phase Change 50 grams H₂O	
Time (mins)	Temperature °C
5 mins prior (in freezer)	-18°C
4 mins (in transitios)	-14°C
3 mins (in transition)	-10°C
2 mins (in transition)	-5°C
1 mins (in transition)	-2°C
0 (initial)	0°C
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- You need some more information about water to complete this lab activity
- Your official researcher is in charge of completing the table below. Although everyone is responsible for making sure that it is correct!!!
- You can use your physical science book or your phone to find the information needed to complete the table.

Phase Changes of Water	
Freezing point of H ₂ O	°C
Melting point of H ₂ O	°C
Boiling point of H ₂ O	°C
Condensation point of H ₂ O	°C

Analysis Questions & Prompts

- 1. Graph your data on the graph paper provided**
 - a. Label the x axis: Energy Added
 - i. Each box will represent 1 minute. (label time marks every boxes = 5 minutes)
 - b. Label the y axis: Temperature $^{\circ}\text{C}$
 - i. Each box will represent 2°C . (Label temperature indicators every 5 boxes = 10 minutes)
- 2. Does your graph look more like a straight line or Stair Steps? Explain what you see, Bee specific.**
- 3. What happens to the temperature of the water as you initially put it over the heat?**
 - a. Explain what you see.
 - b. Explain what is happening at the molecular level.
- 4. By now your temperature should be steadily increasing as the water melts from solid ice to liquid water.**
 - a. Explain what you can see or measure.
 - b. Explain what is occurring at the molecular level.
- 5. As your water sample reaches its boiling point the temperature should stop increasing. You are still adding heat energy to the water (it is still on the heat source right?) why is the temperature not increasing as it was before? Discuss what is happening both visually and at the molecular level as your water sample is changing from a liquid state to a gaseous state.**
- 6. What does temperature measure?**
- 7. What would happen to the temperature of a sample if the particles of the sample gained kinetic energy?**
 - a. Lost kinetic energy?

