Honors Chemistry Name:
Lab 18.2: Charles Law Date:

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Purpose: To see how volume and absolute temperature of a gas are related.

Hypothesis:

Equipment: serum tube with a glycerin plug thermometers barometer
ice-water bath salt-ice bath warm water bath hot water bath

Procedure:

1. Use the following data table to record room temperature and the atmospheric pressure_____mm Hg

Bath	Temperature (Celsius)	Absolute Temperature (Kelvin)	Volume (Gas Column Length)
ice/salt			
ice water			
room			
warm water			
hot water			

2. Obtain a serum tube with a glycerin plug at room temperature and record the length of the gas column entrapped in the tube to the nearest 0.1 mm.
3. Move to the ice-water bath. Place the tube vertically in the bath. Make sure the tube is immersed from the bottom of the tube to the plug. Allow the tube to sit in the bath for 2 to 3 minutes. Record the temperature of the bath and the length of the gas column entrapped in the tube to the nearest 0.1 mm.
4. Repeat step 3, but this time at the ice/salt bath station.
5. Repeat step 3, but this time at the warm water bath station. **Allow the tube to be immersed for only 1 minute this time!**
6. Repeat step 4, but this time at the hot water bath station**. Allow the tube to be immersed for only 2 to 3 seconds (NO LONGER)!!!**

ANALYSIS: Calculations and Graphs

1. Using a piece of graph paper, plot a graph with volume on the y-axis and absolute Temperature (K) on the x-axis. Label your axes!
2. Circle each of your data points on the graph. Draw the best-fit line through the data points. Give your graph a title.
3. For each of your 5 data points, calculate the value of the constant k. (Divide each volume by its absolute temperature).

4. Are your values for k (Analysis #3) constant? _____

5. Is Charles' Law an example of direct or inverse variation? _____

QUESTIONS:

1. State Charles' Law in words and write the equation for the working form of Charles' Law.

2. Describe what happens to the volume of the gas as the temperature is increased.

3. Provide two possible sources of error and explain their effect on your results.

   Error #1:

   Error #2:

4. A gas at constant pressure occupies 404 ml at 22^{o}C. Calculate the volume the gas would occupy at 44^{o}C.

5. Did the volume in #5 double when you doubled the Celsius temperature? Explain.

Conclusion: *Make a statement about the relationship between temperature and volume. For a LEVEL 4, provide a real world example of where this law/relationship can be observed and how it works in that situation.*