Name: _____ Date: _____ Block: _____

Charles' Law Lab

Purpose: To determine the effect of temperature on the volume of a gas at constant pressure.

Pre-Lab Questions:

1. What type of relationship is demonstrated between the temperature and the volume of gas at constant pressure? Sketch a graph to support this relationship.

2. Explain why this type of relationship exists, referencing the behavior of the particles.

Materials:

Inflated balloon	1000 mL beaker	string	ruler	bucket
Hot plate	plastic beaker	thermometer	permanent marker	ice

Procedure:

1. Turn the hot plate on to the high setting.
2. Fill the 1000 mL beaker with about 300 mL of water and place it on the hot plate.
3. Wrap a piece of string around the widest part of the balloon. Use the permanent marker to make three marks that are evenly spaced out to indicate the placement of the string.
4. Use the length of the string to measure the circumference of the balloon in centimeters. Record this data in Table 1.
5. Measure the temperature of the room. Record this data in Table 1.
6. Fill the bucket with ice and water. Use the plastic beaker to submerge the balloon in the ice bath for ten minutes.
7. While the balloon is submerged, take the temperature of the ice bath and record this data in Table 1.
8. After the ten minutes are up, remove the balloon and measure the circumference using the string. Use the marks on the balloon to line up the string in the same place you measured previously.
9. Allow the balloon to come back to room temperature by waiting ten minutes.
10. Hold the balloon over the steam from the 1000 mL beaker for ten minutes. Be sure to rotate the balloon to allow for even heating of the gas inside.
11. While the balloon is heating, measure the temperature of the water in the 1000 mL beaker and record the data in Table 1.
12. Once the ten minutes are up, remove the balloon from over the steam and measure the circumference as you did previously. Record this data in Table 1.

Results:

Table 1. The Affect of Temperature on Volume

Temperature (°C)	Circumference (cm)

Graph 1:
Make a graph to represent the data collected from the lab. Include all necessary parts for a complete graph! Use a trend line instead of connecting the data points to best demonstrate the relationship between temperature and volume of a gas.

Questions:

1. Did your plot of the volume versus temperature support the anticipated results? Explain why or why not.

2. Identify one significant source of error that occurred during this experiment. Explain how it could have affected the results.

3. Identify one reasonable improvement for the error you identified.