FLINN SCIENTIFIC

Name_____

Pressure vs. Temperature Gas Law Apparatus Worksheet

Data Table

Heating Data			Cooling Data		
Temperature, °C	Gauge Pressure, kPa	Total Pressure, kPa	Temperature, °C	Gauge Pressure, kPa	Total Pressure, kPa
			Note: Atmospheric pressure = _____ mm Hg, ____ kPa.		

Questions

1. Plot or obtain a graph of pressure on the *y*-axis versus temperature on the *x*-axis. *Note:* Extent the scale of the *x*-axis from –300 to 100 °C.
2. Looking at the data, is the pressure of a gas proportional to its temperature over the temperature range studied? Use a computer or calculator to generate the best-fit straight line through the data points.
3. Extend the straight line backwards to estimate the *x*-intercept, the point at which the line crosses the *x*-axis. The *x*-intercept corresponds to absolute zero—the minimum temperature that would be needed to reduce the pressure of a gas to zero. What is the estimated value of absolute zero? How close is your value of absolute zero to the accepted value?
4. Guy-Lussac's law is explained on the basis of the kinetic-molecular theory for ideal gases. Would you expect to see greater deviations from ideal gas behavior at high or low temperatures? At high or low pressures? Explain.
5. Safety warnings on aerosol cans illustrate a real-world application of Guy-Lussac's law. Most aerosol cans will have a warning similar to the following:

   "Do not place in hot water or near radiators, stoves or other sources of heat. Do not puncture or incinerate container or store at temperatures over 120 °F."

   Use the results of this experiment to predict what will happen to the gas in an aerosol container at elevated temperatures and to explain why the warning label is needed.