



8 • Why Do Hot Air Balloons Float?

The Kelvin Scale of Temperature

Temperature is due to the **motion** of the particles. **Pressure** is due to the **collisions** of the particles with the walls of their container.

The Kelvin scale of temperature is important because the temperature in K's is a true measure of the kinetic energy (motion) of the gas particles. Zero Kelvin really means zero motion. Temperature in °C is just a comparison with the freezing (0°C) and boiling point (100°C) of water.

Each of the gas laws (except for Boyle's law) includes temperature. Questions arise concerning the use of a temperature measured in °C.

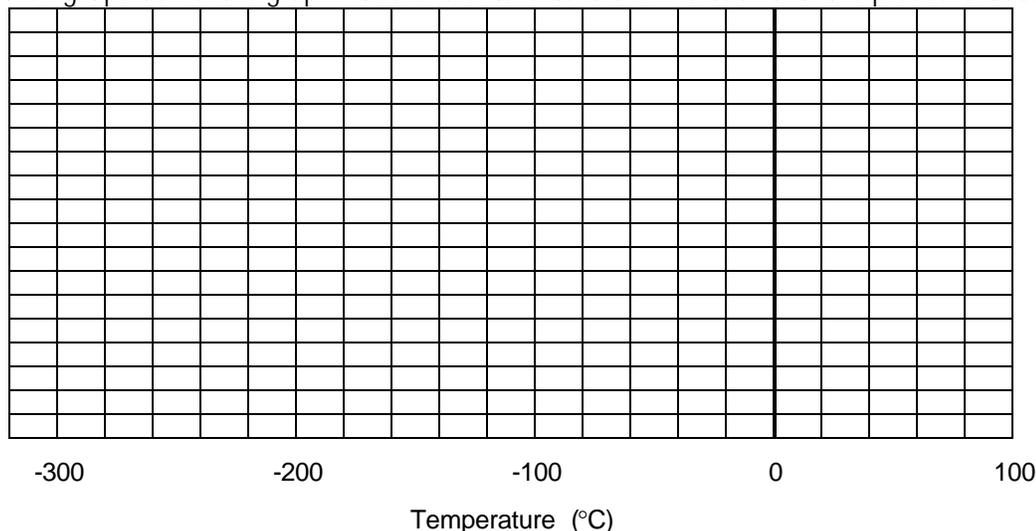
- Does a gas at 100 °C have twice the kinetic energy as a gas at 50 °C?
- Does a gas at 0 °C have NO kinetic energy (no motion)?

As we **cool** a gas more and more, the kinetic molecular theory states that the molecules of the gas move _____ (more, less). The pressure (collisions) of these cooler molecules should therefore be _____ (greater/less). As the motion of these particles approaches zero, the pressure of the gas should approach _____.

Gas Sample at Four Temperatures (from class)
Temperature (°C) Pressure (atm)

Temperature (°C)	Pressure (atm)

Plot the data in the right portion of the graph. Use a ruler to extend the line back until the pressure becomes zero:



As you extend the line to the left, at what temperature does the pressure approach zero? _____ °C

This is the temperature at which all motion of particles is zero... Absolute Zero. O K. (note... no ° sign on K)

How do you convert from °C to K? $K = °C$ _____

Practice:

25 °C = _____ K

100 °C = _____ K

200 K = _____ °C

400 K = _____ °C