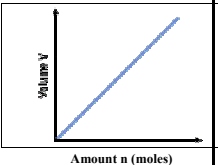
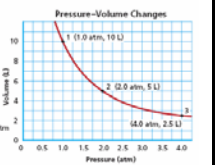
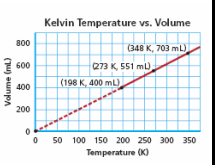
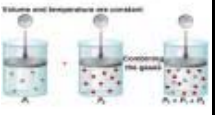
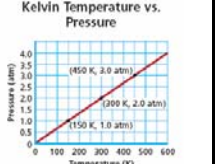


Gas Relationships

Relationship	Graph	In words:	Name	Example
$V \propto n$ at constant P, T		At constant pressure and temperature the volume of a gas is directly proportional to the amount of gas present.	A Avogadro's Law	The more air you blow into a bag the bigger the bag gets.
$P \propto \frac{1}{V}$ at constant T, n		At constant temperature and amount of a gas, pressure and volume are inversely proportional .	B Boyle's Law	Hold your breath; push with your diaphragm. You're decreasing the volume of your lungs and increasing the pressure.
$V \propto T$ at constant P, n		At constant pressure and amount of a gas, volume and temperature are directly proportional .	C Charles' Law	Blow up a balloon at room temperature; put it in the freezer and it shrinks.
$P_T = P_1 + P_2 + P_3 \dots$		The total pressure of a mixture of gases is the sum of all the individual partial pressures of the gases in the mixture.	D Dalton's Law of Partial Pressure	You collect a gas over water; the total pressure of the mixture is the sum of the pressure from the gas and the water vapor in the container.
$P \propto T$ at constant V, n		At constant volume and amount, pressure and temperature are directly proportional.	G Gay-Lussac's Law	A spray paint can thrown on a fire will "explode." Increasing the temperature causes the pressure to increase until the walls of the container can't hold the gas.

Gas Equations

Combined Gas Equation
—Use when you have a sample of gas with **two sets of conditions**.

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

Ideal Gas Equation
—Use when you have a sample of gas at a **single condition**.
R is the "ideal gas constant"

$$PV = nRT$$

Most commonly used $\rightarrow R = 0.0821 \frac{L \cdot atm}{mol \cdot K}$

$$R = 8.314 \frac{L \cdot kPa}{mol \cdot K}$$

$$R = 62.4 \frac{L \cdot mmHg}{mol \cdot K}$$

Molar Mass of a Gas
—Use to find the molar mass (g/mol) of a gas if you know the mass, T, P, and V.

$$M = \frac{mRT}{PV}$$

Density of a Gas
—Use to find the density if you know the molar mass (g/mol), P, and T.

$$D = \frac{MP}{RT}$$