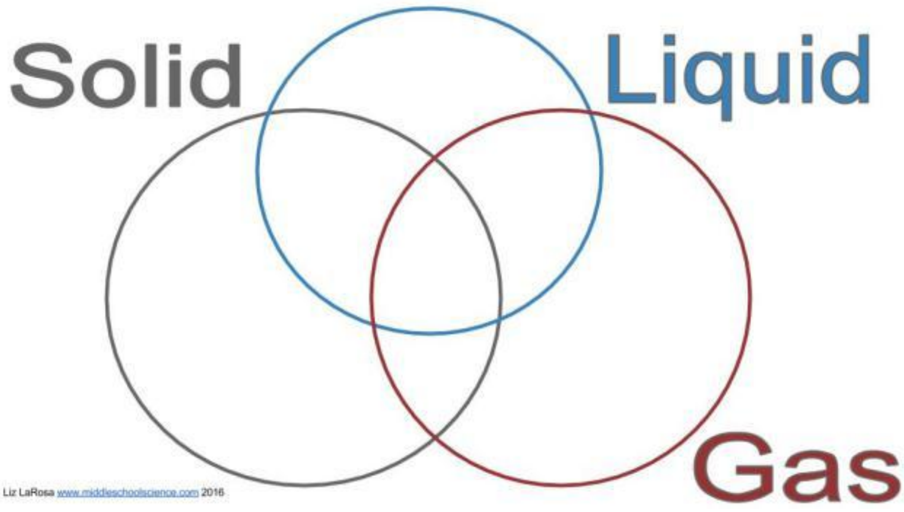
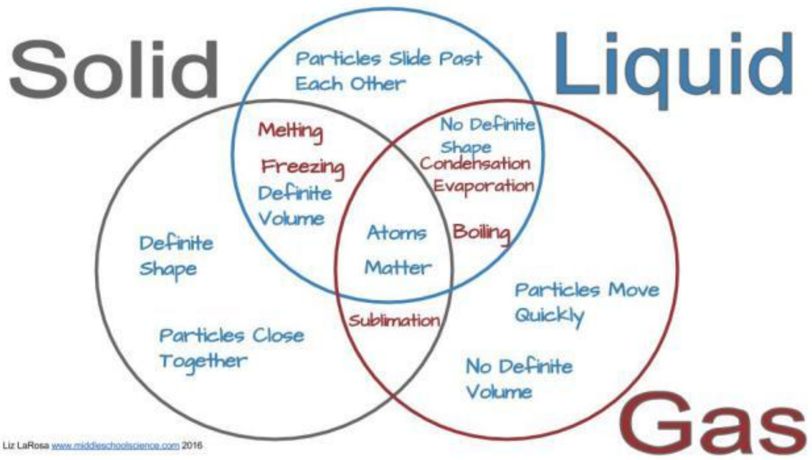


Directions: Read the following statements and place them into your Venn diagram.

1) Definite Shape	5) Mater	9) Definite Volume	13) Particles move quickly
2) No Definite Volume	6) Freezing	10) Evaporation	14) Particles slide past each other
3) No Definite Shape	7) Atoms	11) Condensation	15) Sublimation
4) Melting	8) Boiling	12) Particle close together	

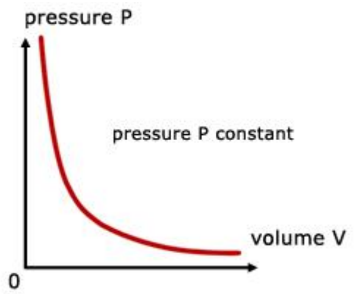


Compare and Contrast Gas Laws

Gas Law	Relates	Equation	Unit
Boyle's	Pressure to Volume	$P_1V_1=P_2V_2$	L or kPa
Charles's	Temperature to Volume	$T_1V_2=T_2V_1$	K or L
Combined Gas law	Temperature, pressure and volume	$V_2=V_1(P_1/P_2)(T_2/T_1)$	K, L and kPa
Gay- Lussac's Law	Temperature and pressure	$P_1T_2=P_2T_1$	K or kPa
Avogadro's Law	volume to moles	$V_1 / n_1 = V_2 / n_2$	kPa or mol
Ideal Gas Law	Pressure, volume, temp and moles	$PV=nRT$ and $PV = \frac{m}{M} RT$	Mol, L, K, or kPa

Boyle's Law

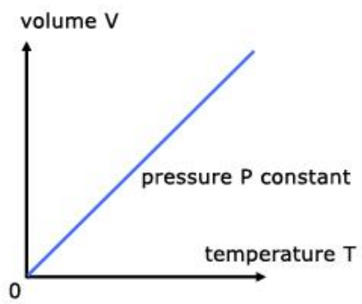
For a fixed mass of gas at constant temperature and pressure, the pressure is inversely proportional to the volume.



$$p_1V_1 = p_2V_2$$

Charles' Law

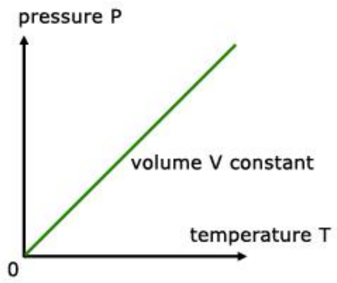
For a fixed mass of gas at constant temperature and pressure, the volume is directly proportional to the temperature(K).



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

Pressure Law

For a fixed mass of gas at constant temperature and pressure, the pressure is directly proportional to the temperature(K).



$$\frac{p_1}{T_1} = \frac{p_2}{T_2}$$

Combined Gas Equation

$$\frac{p_1 V_1}{T_1} = \frac{p_2 V_2}{T_2}$$

<u>The Mole</u>(mol)

A Mole is the amount of substance that has the same no. of particles as there are atoms in 12g of carbon 12.

or

A Mole of anything contains the Avagadro number of particles.

Avagadro's Number (**N_A**) = 6.022×10^{23} mol^{-1}

The '**equation of state**' for an ideal gas is then given by:

$$pV = nRT$$

An '**ideal gas**' is not a perfect model, but it is a good approximation.

The concept is based on the assumption that gas internal energy is **<u>only</u> kinetic in nature**.

The equation is accurate for **real gases at low pressures** and at **temperatures well above liquefaction**.

<u>Units</u>

V - volume **cubic metres m^3**

p - pressure **Pascals Pa** (1 **Pa** = 1 **Newton per square metre**)

T - temperature **Kelvin K**