Ideal Gas Law

Boyles', Charles', and Avogadro's laws combine to form the ideal gas law, which is the *uber* law of gases.

The ideal gas law can be manipulated to explain Dalton's Law of Partial Pressure, gas density, and the mole fraction. It can also be used to derive the other gas laws. In short, it will satisfy most of your gas-based needs.

Let us address one caveat before we begin. The ideal gas law is an **ideal** law. It operates under a number of assumptions. The two most important assumptions are that the molecules of an ideal gas do not occupy space and do not attract each other. These assumptions work well at the relatively **low pressures and high temperatures** that we experience in our day to day lives, but there are circumstances in the real world for which the ideal gas law holds little value. With this in mind, let us begin.

http://www.sparknotes.com/chemistry/gases/ideal/summary.html

$$\frac{P_1V_1}{n_1T_1} = R$$

R = the ideal gas constant

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

If a gas is behaving ideally P x V / mole x T (K) will = $8.314 \ \frac{kPa\ L}{mol\ K}$

The Ideal Gas Law is normally written as:

$$PV = nRT$$

2 Types of Stoichiometric Problems with PV = nRT

1) PV = nRT then Stoichiometry

2) Stoichiometry then PV = nRT

1) Write the balanced chemical equation for the reaction between sodium and chlorine:

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How many grams of sodium would be necessary to produce 50. mL of chlorine at 20.0 °C and 95 kPa?

2) Write the balanced chemical equation for the reaction between magnesium and hydrochloric acid.

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How many L of gas would be produced at 22.0 °C and 1.05 atm if 5.00 g of magnesium reacted?