Gasses:

Units of pressure	convert to atm
torr	
atm	
mmHg	
bar	
kPa	
lb/in^2	

A geochemist heats a limestone sample ($CaCO_3$) and collects the CO_2 released. After the system comes to room temp, $\Delta h = 291.4$ mmHg. Calculate P_{CO2} in torr, atm, and kPa.

Gas laws:
Boyle's Law – vary _____, fixed _____ and _____

Charles' Law– vary _____, fixed _____ and _____

Avogadro's Law– vary _____, fixed _____ and _____

Ideal gas law

When solving gas law problems, keep in mind two types
1.

use:
2.

use:

Examples:
A student finds the air trapped in a J tube to occupy 24.8 cm^3 at 1.12 atm. Mercury is added to the tube causing the pressure to increase to 2.64 atm. What is the new volume of air in (L)?
Relationship:
Looks like:
Solve:

Steel fuel delivery tanks have safety valves that open if internal pressure exceeds 1.00 X 10^3 torr. When filled with methane at 23 deg C at 0.991 atm and placed in a 100.00 deg C boiling water bath, does the safety valve open?
Relationship:

Looks like:
Solve:

A model builder knows it takes 55.0 dm^3 of He to cause a scale model of a blimp to rise. His son fills his dad's blimp with 1.10 mol He, 26.2 dm^3, and it does not rise. The son doesn't want to waste his dad's helium. How many more grams of He does he need to cause the blimp to rise?
Relationship:
Looks like:
Solve:

An O_2 storage tank has a capacity of 438 L. It is filled with 0.885 kg O_2 (MW = 32.00 g/mol). At 21 deg C how much pressure does the O_2 exert?
Relationship:
Looks like:
Solve:

A student doing research using the tank in the above question does not close the valve completely when he is finished with his experiment. By the time someone else comes along, the tank reads 1.37 atm. How much O_2 was lost by the careless student?

Density of a gas can be found using the ideal gas law by:

To apply a green chem approach, a chemical engineer uses waste CO_2 from a manufacturing process instead of CFC's while making polystyrene containers. Find the density (g/L) of CO_2 and number of molecules per liter at STP (0 deg C and 1 atm) and at room temp (20.0 deg C and 1.00 atm).

Molar mass can be found by:

An organic chemist isolates a colorless liquid from a petroleum sample. She obtains the following data:
V (flask) = 213 mL, T = 100.0 deg C, P = 754 torr, mass of flask + gas = 78.416 g, mass of flask = 77.834 g.
Calculate the molar mass of the liquid.