

# Gas Density and Molar Mass

Since all ideal gases have the same molar volume at STP (22.4 L/mol) and different molar masses, different gases have various densities.

$$D = m/V$$

$$H_2 =$$

$$CO_2 =$$

That's why  $H_2$  balloons float and  $CO_2$  balloons sink!

Read pg 491

Ex 1. What is the density of 1.0 L of pure  $Cl_2$  gas, at 15.2 °C and 137.1 kPa?

## Identifying Unknown Gases

We can use the Ideal Gas Law and the mole map to find the molar mass of unknown gas samples. Then using percent composition data, we can find the molecular formula.

Ex 1. A scientist finds that 9.72 L of a gas sample has a mass of 8.75 g at STP. What is the molar mass of the gas?

Ex. 2. Lab techs analyze a gas and find the % composition is 82.6 % C and 17.4 % H. They also observe that a 10.00 g sample has a volume of 4.14 L at 12.5 °C and 98.7 kPa. Find the molecular formula of the gas.