Molar Volumes of Gases

Since gas volumes vary with pressure and temperature, some standard conditions must be chosen. Gas volumes are usually compared at **0 ^{O}C and 101.3 kPa**. These conditions are referred to as **standard temperature and pressure, stp**.

Avogadro in 1811 suggested:
"equal volumes of gases measured at the same conditions of temperature and pressure contain the same number of molecules ".

It follows from Avogadro's hypothesis that if equal volumes of gases contain equal numbers of molecules then the volume occupied by one mole of molecules must be the same for all gases.

It is called the **gas molar volume**. The value is **22.414 dm^3 at stp** (0 ^{O}C and 101.3 kPa).

Complete the following table:

GAS	Molar Volume at STP	Volume at STP (litres)	MOLES	MASS (g)	MOLAR MASS (g mol^{-1})
NH_3		22.4			
N_2		44.8			
CH_4		2.8			
O_2			3.0		
H_2S			0.10		
CO_2			1.5		
NO_2			10		
H_2				4	
CO				2.8	
NO				45	
N_2O				22	
C_2H_6				6	