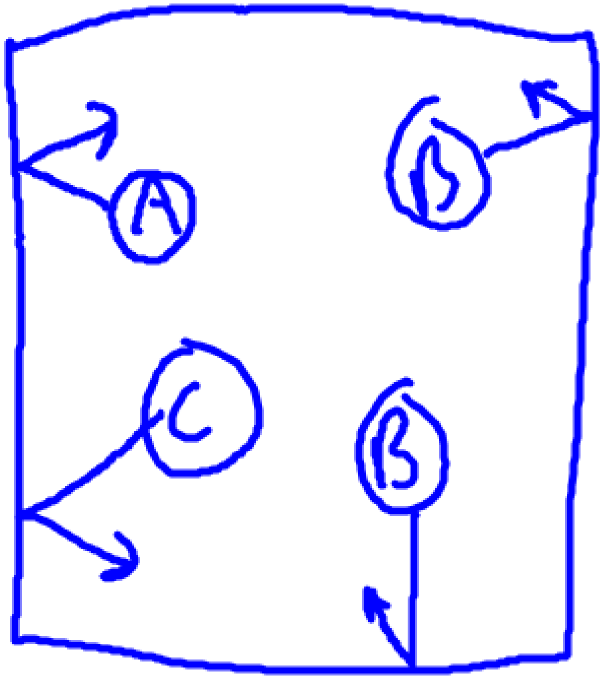
Dalton's + Gas Stoich



$$P_{Total} = \underbrace{P_A + P_B + P_C}_{\text{partial pressures}} + \cdots$$

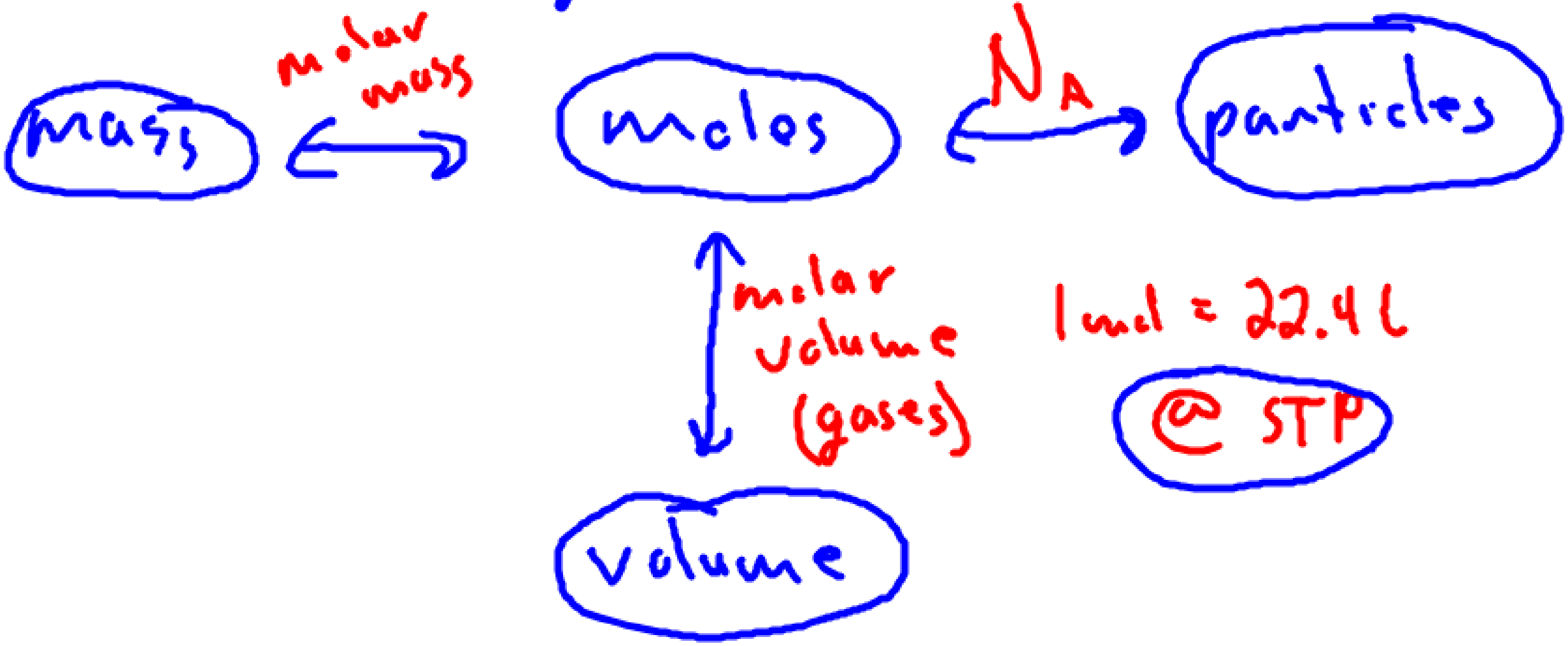
Dalton's Law of Partial Pressure

Gas Stoich

① @ STP - standard Temp + Pressure

0°C   1 atm

1 mol of gas = 22.4 L



10.0 L of O_2 at STP = ______ g O_2

$$10.0\,\cancel{L\,O_2} \times \frac{1\,mol\,\cancel{O_2}}{22.4\,\cancel{L\,O_2}} \times \frac{32.00\,g\,O_2}{1\,\cancel{mol\,O_2}} = \underline{14.3}\,g\,O_2$$

(3) (3)

16+2

$\underline{2}H_2 + \underline{\quad}O_2 \rightarrow \underline{2}H_2O$ @ STP

$\underline{?}$ L 10.0g

$$10.0\,g\,\cancel{H_2O} \times \frac{1\,mol\,\cancel{H_2O}}{18.02\,\cancel{g\,H_2O}} \times \frac{1\,\cancel{mol\,O_2}}{2\,\cancel{mol\,H_2O}} \times \frac{22.4\,L\,O_2}{1\,\cancel{mol\,O_2}} = \underline{6.22}\,L\,O_2$$

② use $\check{P}\check{V}=nR\check{T}$

when not @ STP

what volume of CO_2 at 3.4 atm and 200.°C will form from the combustion of 10.0g of propane?

propane + oxygen → carbon dioxide + water

$$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$$

10.0g

stoich

$T = 200.°C + 273 = 473\ K$

$P = 3.4\ atm$

$V = \underline{?}\ L$

$n = .680\ mol$

(3)

$$10.0\,g\,C_3H_8 \times \frac{1\,mol\,\cancel{C_3H_8}}{44.09\,g\,C_3H_8} \times \frac{3\,mol\,CO_2}{1\,mol\,C_3H_8} = \frac{.680\,mol\,CO_2}{(3)\,mol}$$

$$PV = nRT$$

$$V = \frac{nRT}{P} = \frac{\overset{((3)\,mol)}{(.680\,\cancel{mol})}\left(\frac{.0821\,\cancel{atm}\cdot L}{\cancel{mol}\cdot\cancel{K}}\right)(473\,\cancel{K})}{3.4\,\cancel{atm}}$$

$$V = \frac{7.8\,L}{(2)}$$