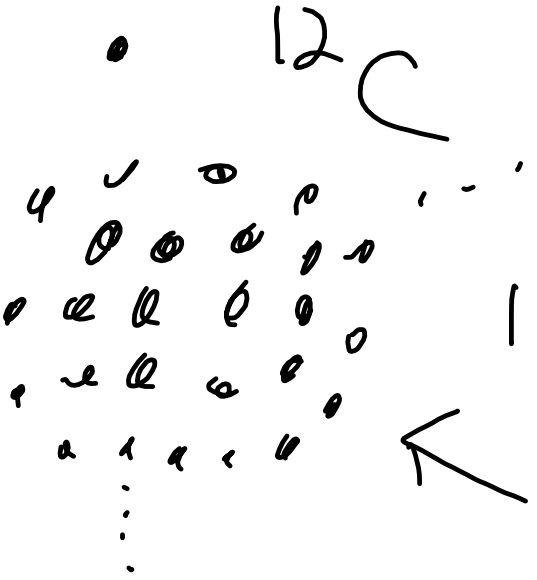

^{12}C mass = 12 amu (exact)

12 g

1 mole of ^{12}C atoms

6.022×10^{23} Avogadro's Number

Mole - The number of ^{12}C atoms in exactly 12 g of ^{12}C.

One mole of ANYTHING will weigh in grams, the same as one particle in amu.

If the particles don't all have the same mass, then one mole of them will weigh in grams, the same as the average particle mass in amu.

How many moles of Al are present in 56.91 g of Al?

$$56.91\ \text{g Al} \left(\frac{1\ \text{mol Al}}{26.98\ \text{g Al}} \right)$$

$$= 2.109\ \text{mol Al}$$

What is the mass of 3.172 mol of Si?

$$3.172 \text{ mol Si} \left(\frac{28.09 \text{ g Si}}{1 \text{ mol Si}} \right)$$

$$= 89.10 \text{ g Si}$$

How many Fe atoms are present in 3.827 mol of Fe?

$$3.827 \text{ mol Fe} \left(\frac{6.022 \times 10^{23} \text{ Fe atoms}}{1 \text{ mol Fe}} \right)$$

$$= 2.305 \times 10^{24} \text{ Fe atoms}$$

How many moles of Mg are present if you have 3.197×10^{22} Mg atoms?

$$3.197 \times 10^{22} \text{ Mg atoms} \left(\frac{1 \text{ mol Mg}}{6.022 \times 10^{23} \text{ Mg atoms}} \right)$$

$= 0.05309$ mol Mg

What is the mass of 1.567×10^{24} Cr atoms?

Cr atoms $\longrightarrow$ mol Cr $\longrightarrow$ g Cr

$$1.567 \times 10^{24}\ \text{Cr atoms} \left(\frac{1\ \text{mol Cr}}{6.022 \times 10^{23}\ \text{Cr atoms}}\right)\left(\frac{52.00\ \text{g Cr}}{1\ \text{mol Cr}}\right)$$

$= 135.3\ \text{g Cr}$

How many S atoms are present in 65.82 g of S?

g S → mol S → S atoms

$$\frac{65.82\ \text{g S}}{1}\left(\frac{1\ \text{mol S}}{32.07\ \text{g S}}\right)\left(\frac{6.022\times10^{23}\ \text{S atoms}}{1\ \text{mol S}}\right)$$

$$= 1.236\times10^{24}\ \text{S atoms}$$

How many H_2O molecules are present in 49.17 g of H_2O?

$g\ H_2O \longrightarrow mol\ H_2O \longrightarrow H_2O$ molec.

$$49.17\ g\ H_2O \left(\frac{1\ mol\ H_2O}{18.016\ g\ H_2O}\right)\left(\frac{6.022\times10^{23}\ H_2O\ molec.}{1\ mol\ H_2O}\right)$$

$$= 1.644\times10^{24}\ H_2O\ molec.$$

$$MW_T = 2(1.008) + 1(16.00)$$

$$= 2.016 + 16.00$$

$$= 18.016$$

$$\text{PERCENT} = 100\% \left(\frac{\text{PART}}{\text{WHOLE}} \right)$$

$$MW_{H_2O} = 2(1.008) + 1(16.00)$$

$$= 2.016 + 16.00$$

H PART O PART

$$= 18.016$$

WHOLE

$$\%\,H = 100\% \left(\frac{2.016}{18.016} \right) = 11.19\%$$

$$\%\,O = 100\% \left(\frac{16.00}{18.016} \right) = 88.81\%$$