CO_2

1 carbon atom — 2 oxygen atoms

1 x 12 — 2 x 16

Relative formula mass (Mr) = 44

$$\text{Number of moles} = \frac{\text{Mass (g)}}{\text{Relative formula mass } M_r}$$

Carbon

$A_r = 12$

12 g of carbon = 1 mole of carbon atoms.

602000000000000000000000 carbon atoms.

Oxygen

$A_r = 16$

16 g of oxygen = 1 mole of oxygen atoms.

602000000000000000000000 oxygen atoms.

$$\text{Number of moles} = \frac{\text{Mass (g)}}{\text{Relative formula mass } M_r}$$

You are given a sample of calcium carbonate ($CaCO_3$) with a mass of 300g. Calculate the number of moles of calcium carbonate in the sample.

A_r Ca = 40 A_r C = 12 A_r O = 16

$CaCO_3$

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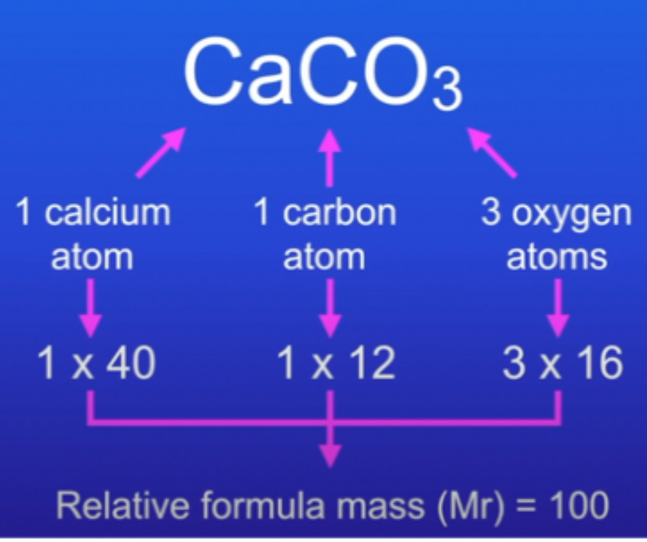
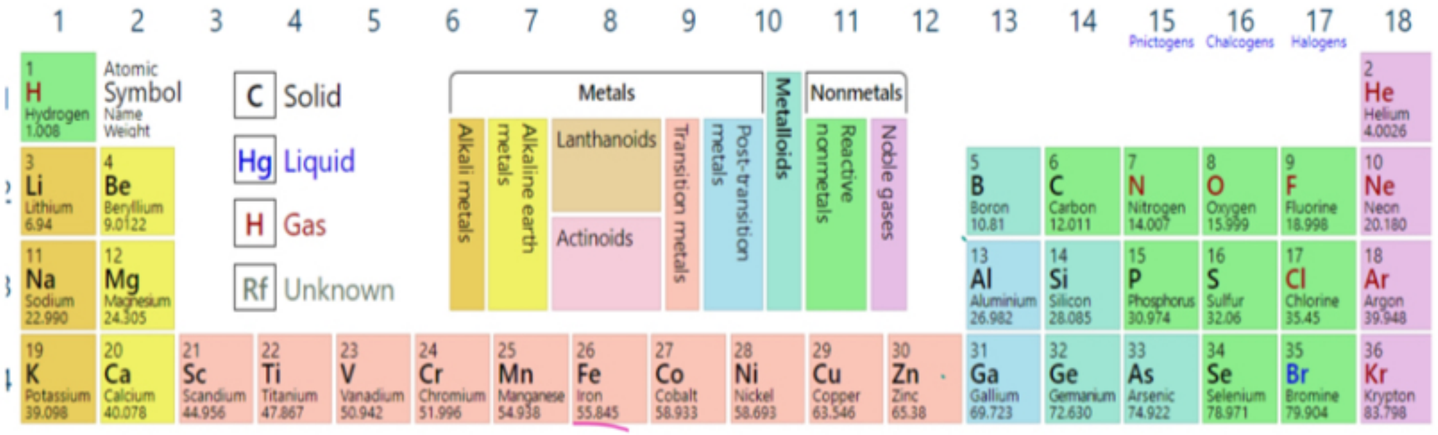


$$\text{Number of moles} = \frac{\text{Mass (g)}}{\text{Relative formula mass } M_r}$$

$$\text{Number of moles} = \frac{300\text{ g}}{100}$$

$$\text{Number of moles} = 3 \text{ moles}$$



Al = 26.982 rounded to 27 = 1 mol of Al = 27g

Fe = 55.845 rounded to 56 = 1 mol of Fe = 56g

Hydrogen and Oxygen

Compound - elements that are bonded together.

$2H_2O$

= 2 x H_2O

2 x 2 H = 4 H
2 x 1 O = 2 O

Your Turn

You are given 380 grams of magnesium chloride ($MgCl_2$). How many moles of magnesium chloride have you been given?

A_r Mg = 24 A_r Cl = 35.5

$MgCl_2$

35.5 x 2 = 71

71 + 24 = 95

$\frac{380}{95}$ = 4 mols

Find the relative atomic mass of Copper sulfate

CuS_4

Cu = 64 (relative atomic mass)

S = 32 (4 atoms = 4 x 32 = 128)

Copper sulfate relative atomic mass = (128 + 64) 192

How many mols are in 960g of Copper sulfate?

$$\text{mols} = \frac{\text{mass in g}}{\text{relative atomic mass (Mr)}}$$

$$\frac{\text{mass} = 960\text{g}}{\text{Mr} = 192} = 5\text{mols}$$

How many mols are in 306g of Aluminium oxide?

Al_2O_3

Oxygen

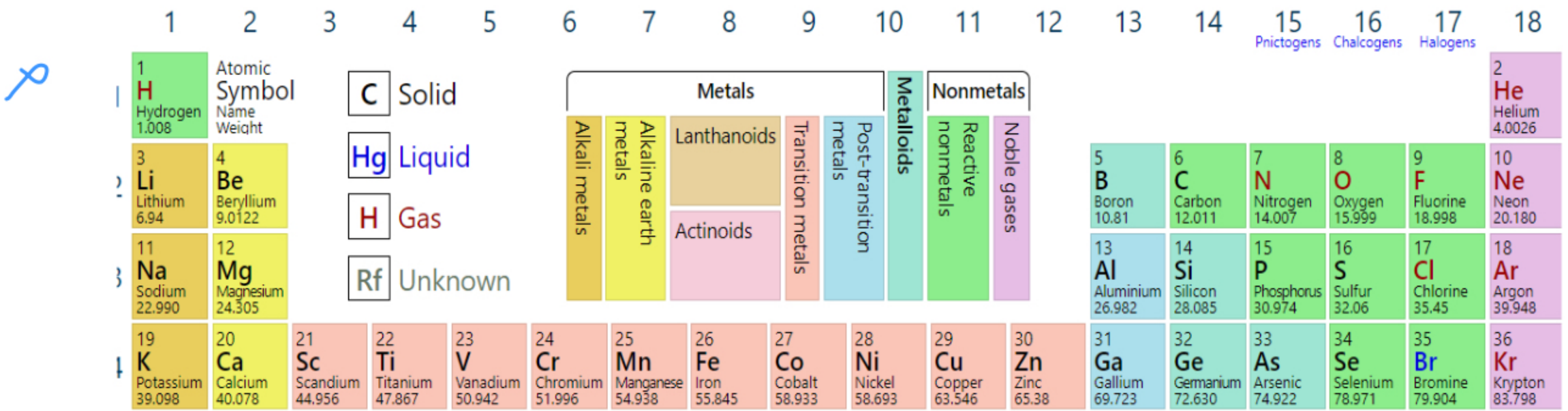
2 atoms of Al (Al = 27, 2 x 27 = 54)
3 atoms of O (O = 16, 3 x 16 = 48)

Relative atomic mass of Aluminium oxide = 102

$$\frac{\text{mass (g)}}{\text{Mr}} = \text{Mols} \qquad \frac{306}{102} = 3 \text{ mols}$$

This shows us that we have 4 lots of Aluminium oxide

Work out the Mr of: $4Al_2O_3$



How many mols are in 216g of water

H_2O = Mr 18

$\frac{216}{18}$ = 12 mols