

# Relative Formula Mass

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						Group 0
						4 He Helium 2
1 H Hydrogen 1						
	Group 3	Group 4	Group 5	Group 6	Group 7	
	11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
	27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16	35.5 Cl Chlorine 17	40 Ar Argon 18

Relative atomic mass (A<sub>r</sub>) is indicated by arrows pointing to the top-left and bottom-left of the Boron (B) element box.

Atomic (proton) number (Z) is indicated by an arrow pointing to the bottom-left of the Boron (B) element box.

The relative atomic mass (A<sub>r</sub>) is the number of protons and neutrons added together.

The relative formula mass (M<sub>r</sub>) is the mass of each of the elements in a compound added up. So you will need the A<sub>r</sub> of each element present

So for

- H<sub>2</sub>O it is 1+1+16 = 20
- CO<sub>2</sub> it is 12+16+16

Working out percentage mass in a compound:

$$\text{Percentage mass of an element in a compound} = \frac{A_r \times \text{number of atoms of that element}}{M_r \text{ of the compound}} \times 100$$

Example:

What is the % of carbon in carbon dioxide?

$$\% = \frac{A_r \times N}{M_r} = \frac{12 \times 1}{48} \times 100 = 25\%$$

You might guess then that the % of oxygen would be 100-25=75%...

$$\% = \frac{A_r \times N}{M_r} = \frac{16 \times 2}{48} \times 100 = 75\%$$

So - not so bad then....

Try this:

You have 50g of a mixture. 20% of this mixture is Iron.

You decide that you will provide FeCl<sub>2</sub> as the source of iron in your mixture. How much FeCl<sub>2</sub> do you need?

- Mass of iron in the mixture: 50g x 20% = 10g
- So we need 10g of iron from the FeCl<sub>2</sub>
- % mass of iron in FeCl<sub>2</sub>:

$$\% = \frac{A_r \times N}{M_r} = \frac{56 \times 1}{56 + 35.5 + 35.5} = 44.09\%$$

- So we know 44.09% of any mass of FeCl<sub>2</sub> is iron & we want that to be 10g

$$\text{So: mass iron} = \text{mass of FeCl}_2 \times 44.09\%$$

$$10 = x \times 0.4409$$

$$\therefore x = \frac{10}{0.4409} = \underline{\underline{22.7g}}$$