



Understanding Chemical Formulae

Topic Summary

- Chemical formulae are a universal language used by chemists to represent substances. They show which elements are present and how many atoms of each are in a compound.
- Each element is represented by a symbol, containing either one or two letters. The first letter is always capital, and the second (if present) is always lower-case — e.g. H for hydrogen, Na for sodium, Co for cobalt.
- This means that each capital letter in a formula signals a new element - count the capital letters to find how many different elements are present.
- Formulae use subscripts (small numbers) to show the number of atoms of an element. If no number is shown, it means just one atom, so H_2O means 2 hydrogen atoms and 1 oxygen atom.
- Remember that brackets multiply everything inside them so a subscript outside a bracket applies to all the atoms inside. For example $\text{Ca}(\text{OH})_2$ has 1 calcium but 2 oxygens, and 2 hydrogens.
- Be careful when writing elements down - Co (cobalt) is not the same as CO (carbon monoxide).



Easy ones first to build your confidence

Here are a few simple compounds to start with. For each one, write out the names of the elements present and the number of each of them. The first one has been done for you.

CO_2 1 x carbon and 2 x oxygen

NO_2 1 x nitrogen and 2 x oxygen

H_2O_2 2 x hydrogen and 2 x oxygen

HF 1 x hydrogen and 1 x fluorine



Now a bit trickier

These next few contain a mixture of one and two letter symbols, watch out.

NaCl 1 x sodium and 1 x chlorine

CH_3F 1 x carbon, 3 x hydrogen, 1 x fluorine

LiBr 1 x lithium and 1 x bromine

CaBr_2 1 x calcium and 2 x bromine

KCl 1 x potassium and 1 x chlorine.....

Al_2O_3 2 x aluminium and 3 x oxygen.....





Understanding Chemical Formulae

Page 2



Extra tough ones, with brackets!

These next few contain a mixture of one and two letter symbols, watch out.

$\text{Mg}(\text{OH})_2$ 1 x magnesium, 2 x oxygen and 2 x hydrogen.....

$\text{Sr}(\text{NO}_3)_2$ 1 x strontium, 2 x nitrogen and 6 x oxygen

$\text{Fe}(\text{OH})_3$ 1 x iron, 3 x oxygen and 3 x hydrogen.....

$\text{Al}(\text{NO}_3)_3$ 1 x aluminium 3 x nitrogen and 9 x oxygen

$\text{Al}_2(\text{CO}_3)_3$ 2 x aluminium 3 x carbon and 9 x oxygen



Do this later...

Give your brain a break and come back to these questions later. Cover the rest of the sheet while you have a go. By doing this 24-48 hours after watching the video you will boost your chances of remembering the key points in an exam. If you struggle with these questions, re-watch the video and then try again.

This is a mixed bag of examples to test you.

LiCl 1 x lithium and 1 x chlorine

CuSO_4 1 x copper, 1 x sulphur and 4 x oxygen

FeCl_3 1 x iron and 3 x chlorine

Na_2SO_4 2 x sodium, 1 x sulphur and 4 x oxygen

$\text{Ba}(\text{OH})_2$ 1 x barium, 2 x oxygen and 2 x hydrogen

$\text{Al}(\text{NO}_3)_3$ 1 x aluminium 3 x nitrogen and 9 x oxygen