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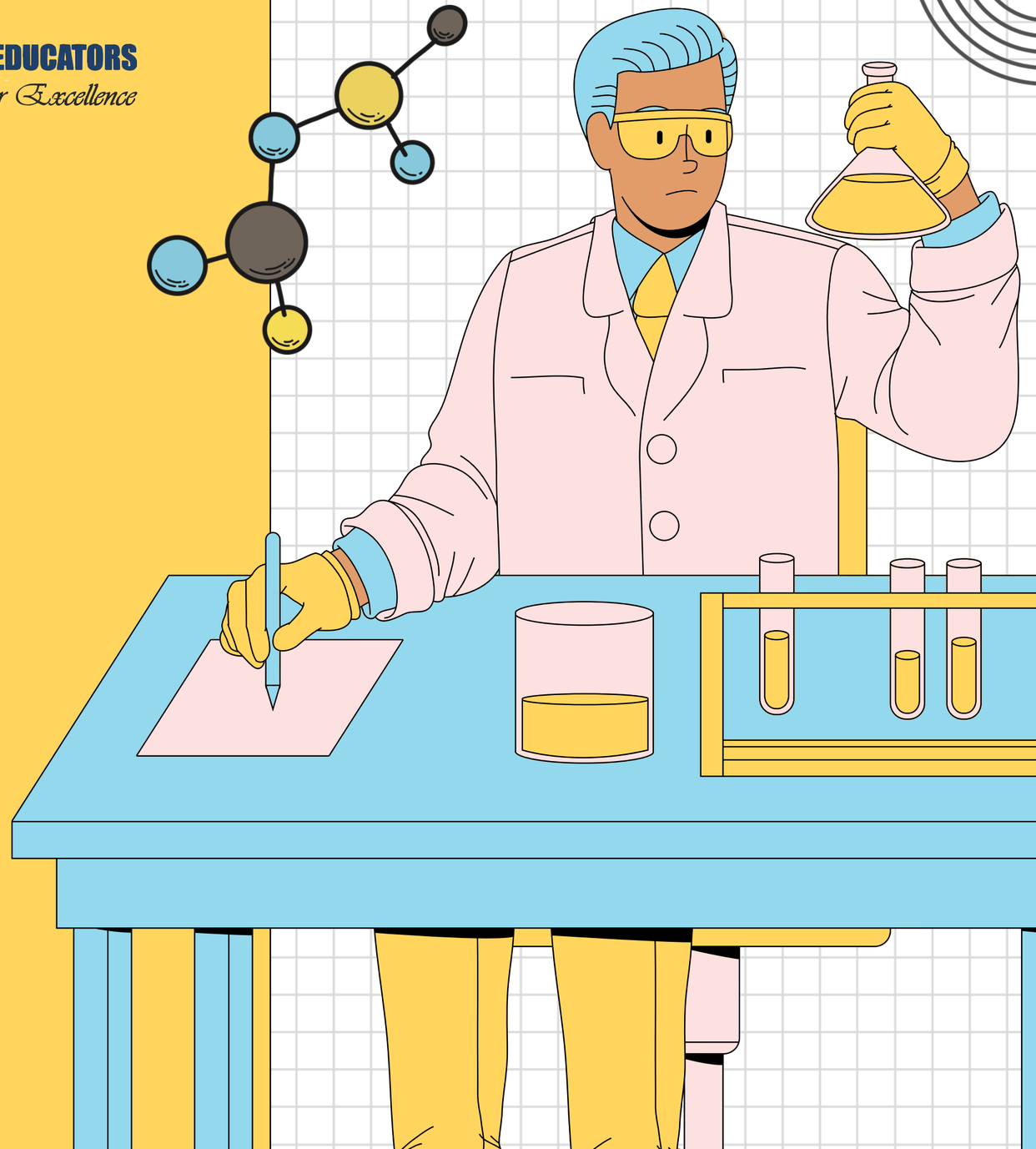
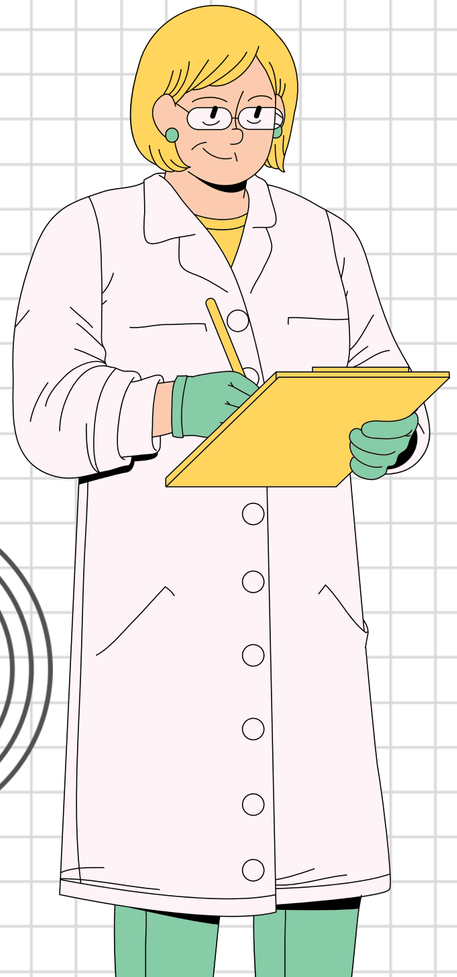
Let's Learn About . . .

Balancing Equations



What are chemical equations?



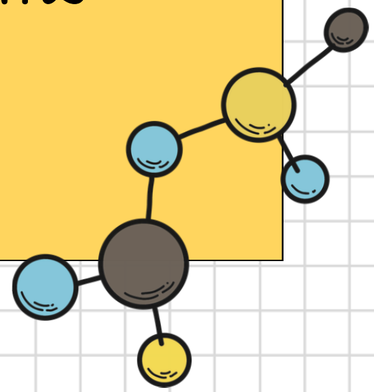
Chemical equations represent what is happening in a reaction. They show us what reacts (the reactants) and what is formed (the products).

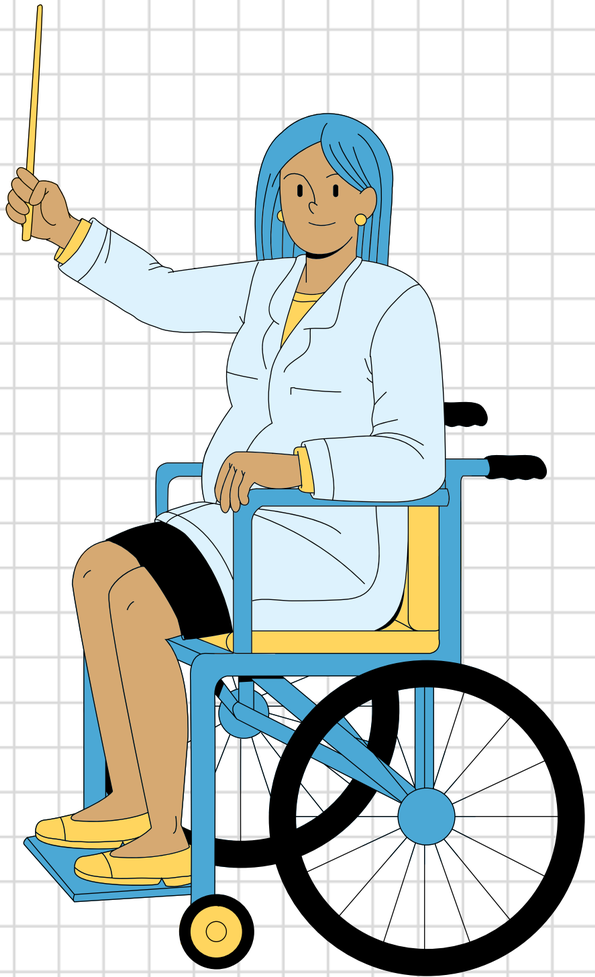
The different reactants and products can be seperated by plus signs. An arrow shows the direction of the reaction.

Reactant A + Reactant B → Product A + Product B

Why do we balance equations?

Atoms can not be lost or gained in a chemical reaction. There must be the same number of each type of atom in the reactants and products. This links to the ‘conservation of mass’, which essentially means that the mass of the reactants must be equal to the mass of the products.

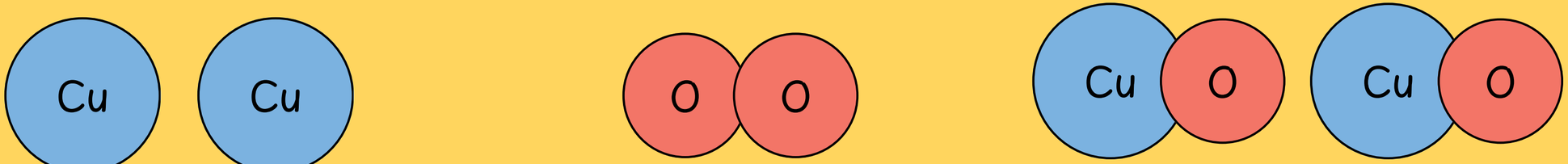




Balancing

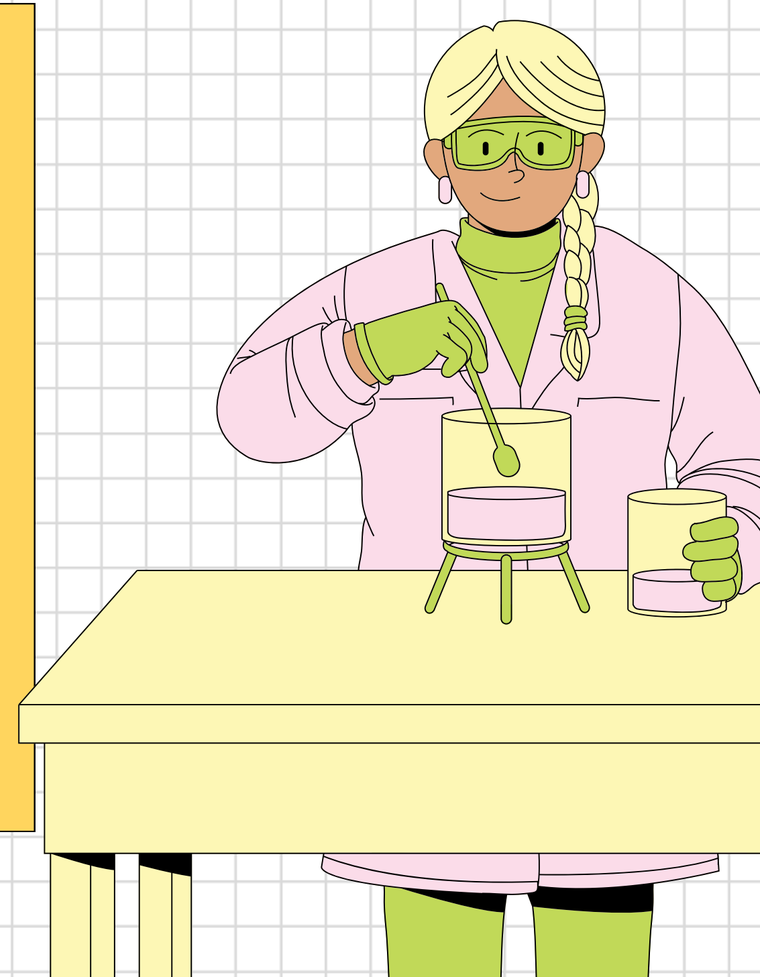
This symbol equation has been balanced. This has been achieved by adding 'big' 2s before Cu and CuO. Adding the 'big' 2s means that there are equal numbers of atoms on both sides of the equation.

Copper	+	oxygen	→	copper oxide
2Cu	+	O_2	→	2CuO

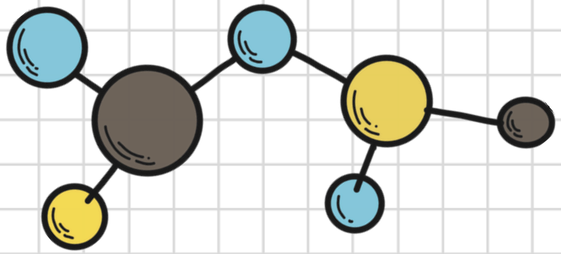


Tips for balancing equations

1. Check that all the formulae in the equation are correct
2. Deal with only one element at a time
3. Balancing is adding ‘big’ numbers to the front of some substances. You cannot change any of the small numbers in a chemical formula.
4. Check each element again and repeat the third step again if needed.



Example 1



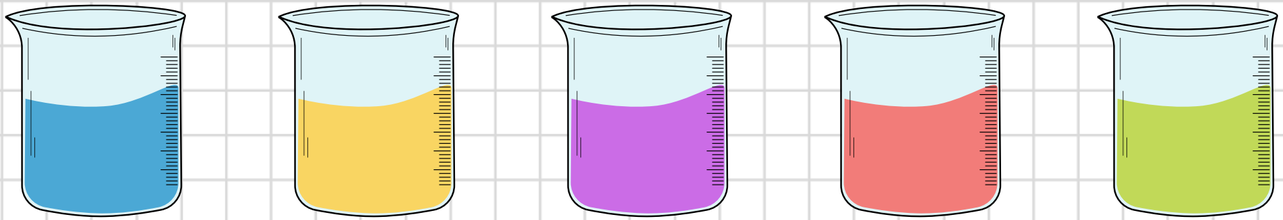
Let's look at the equation: $C + H_2 \rightarrow CH_4$

The reaction is not balanced. There are 2 hydrogen (H) atoms in the reactants but 4 in the product. If we add a 'big' 2 before the H_2, then this should help.

$C + 2H_2 \rightarrow CH_4$

Now the reaction is balanced. There are 4 (2 x 2) hydrogen atoms in the reactants and 4 in the products. The carbons (C) are fine.

Example 2



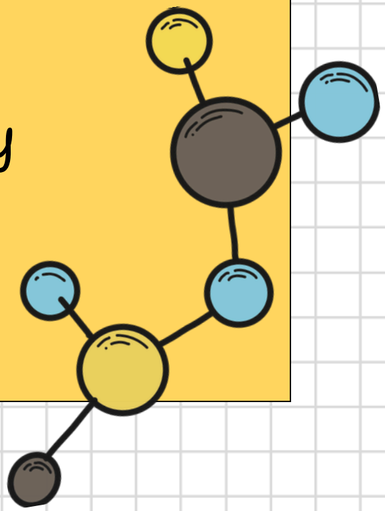
Let's look at the equation: $HgO \rightarrow Hg + O_2$

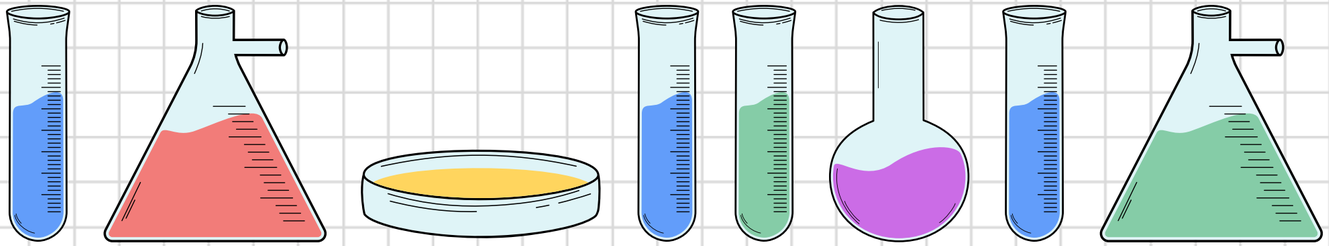
The reaction is not balanced. There is 1 oxygen (O) atom in the reactant but 2 in the products. If we add a 'big' 2 before the HgO, then this should help.

$2HgO \rightarrow Hg + O_2$

The oxygen atoms are now balanced, but when we check the Mercury (Hg) atoms, there are 2 in the reactant but only 1 in the products. The reaction is still not balanced. If we add a 'big' 2 before the Hg, then this should fully balance the reaction.

$2HgO \rightarrow 2Hg + O_2$





Example 3

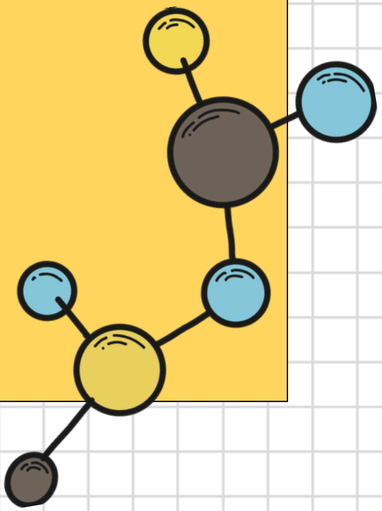
Let's look at the equation: $S_8 + O_2 \rightarrow SO_3$

The reaction is not balanced. There are 8 sulphur (S) atoms in the reactants but 1 in the product. If we add a 'big' 8 before the SO_3, then this should help.

$S_8 + O_2 \rightarrow 8SO_3$

The sulphur atoms are now balanced, but when we check the oxygen (O) atoms, there are 2 in the reactants but 24 (8 x 3) in the product. The reaction is still not balanced. If we add a 'big' 12 before the O_2, then this should fully balance the reaction.

$S_8 + 12O_2 \rightarrow 8SO_3$



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