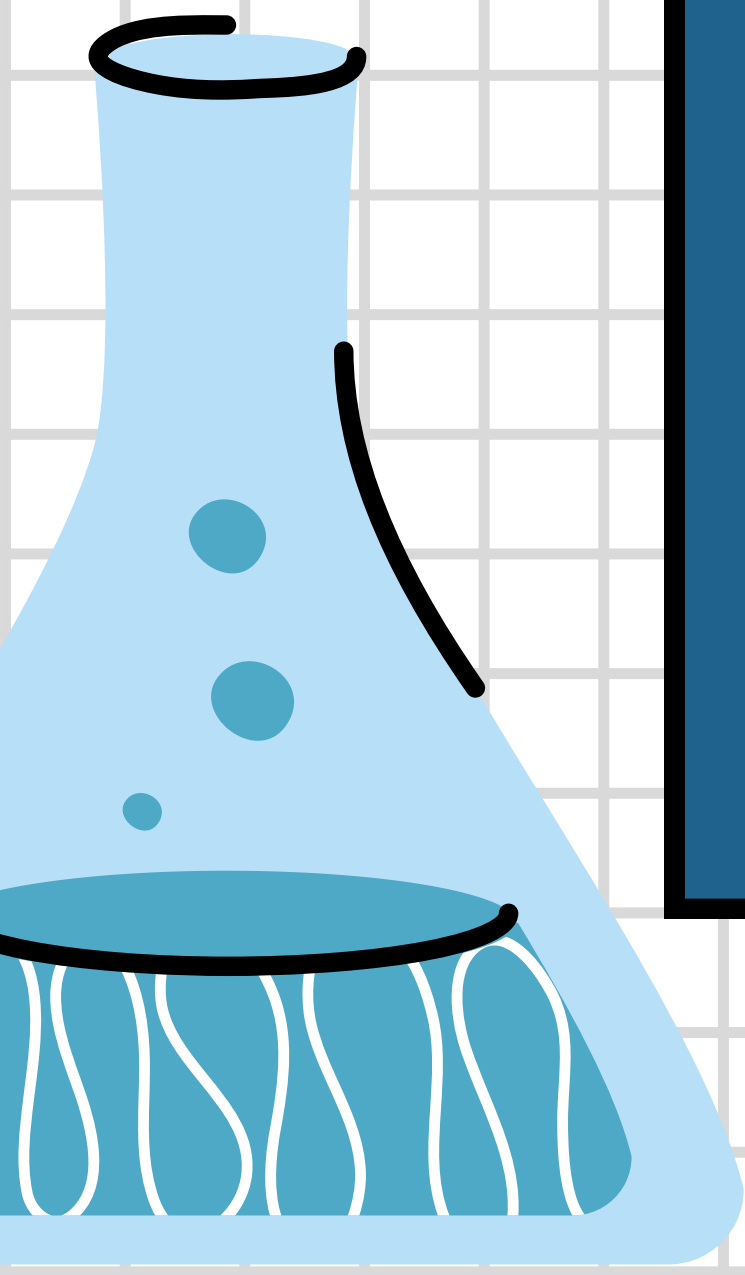
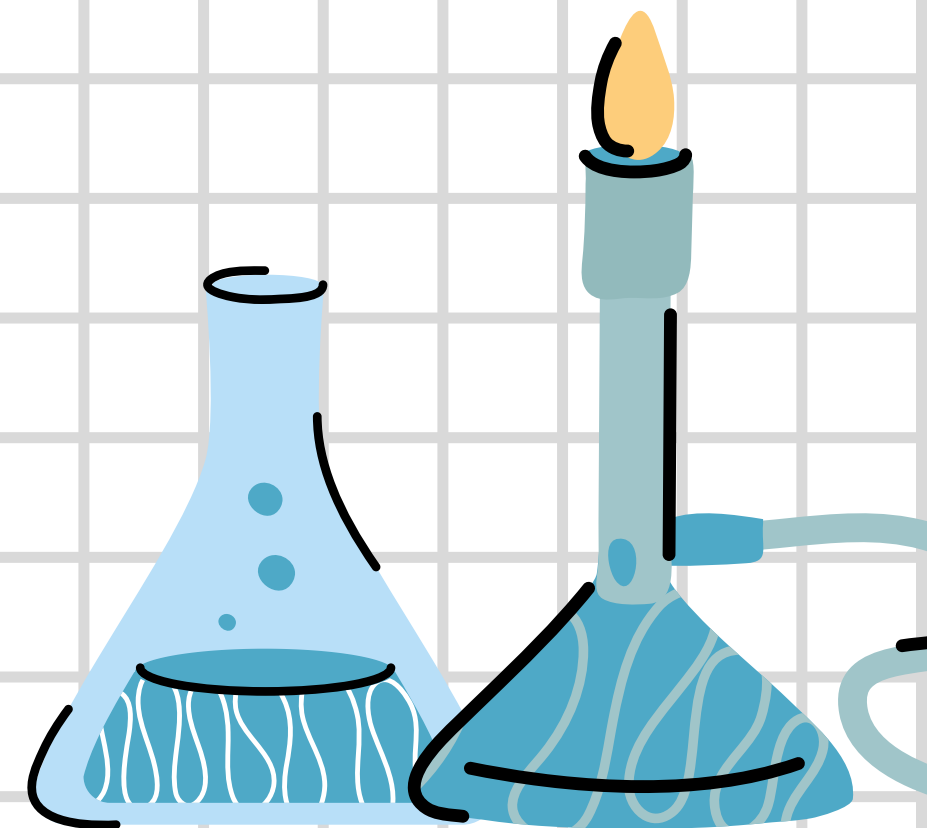


Chemical Equations

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Learning Points



One

State the components of a chemical equation.

Two

Explain how to balance symbol equations.

Three

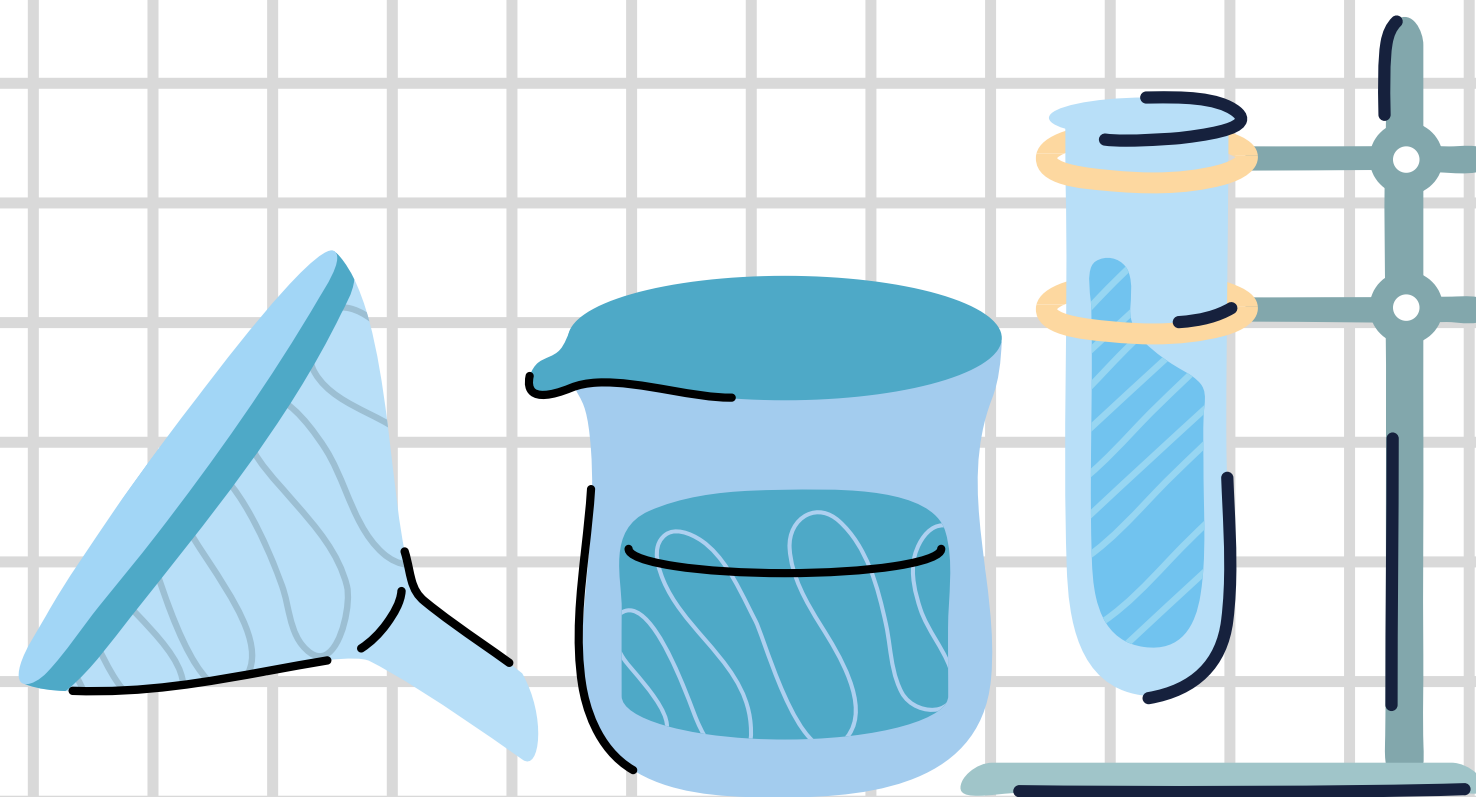
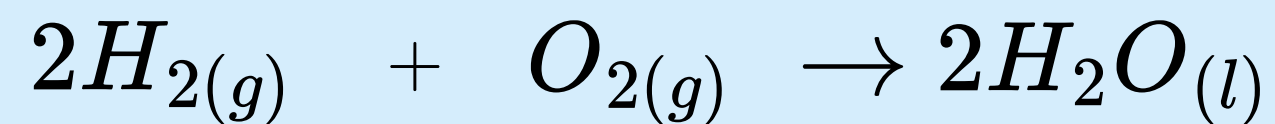
Describe the two types of ionic equation.

What makes up a chemical equation?

Reactants are found on the left hand side of the equation. Products are on the right hand side of the equation. The reactants and products are separated by an arrow. Scientists write equations as word equations or symbol equations. Symbol equations provide more detail as they show the number of atoms in each reactant or product.

Example

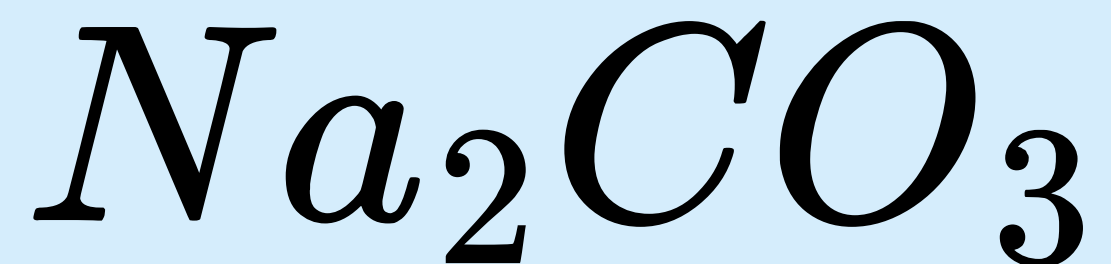
Hydrogen + Oxygen \rightarrow Water



Formula in Symbol Equations

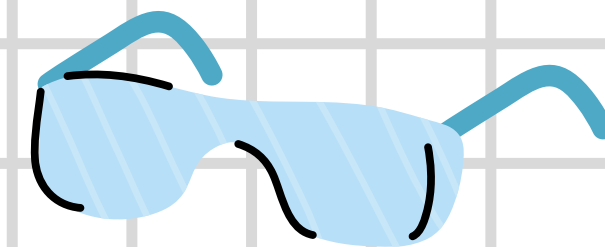
The chemical formula of a compound gives us information about the elements involved and the number of atoms of those elements. The little subscript numbers refer to the element before them. If there is just one atom of an element in the formula, the number 1 is not written.

There are two
sodium (Na)
atoms.



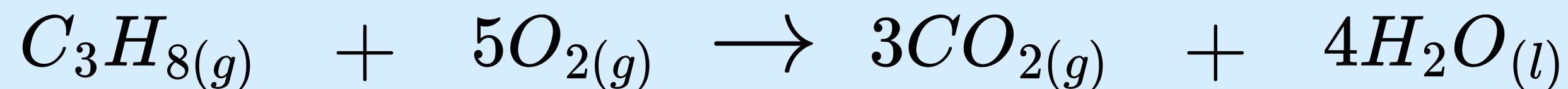
There is one carbon (C) atom.

There are
three oxygen
(O) atoms.



What are state symbols?

A state symbol is used in a chemical equation to show if a substance is a solid, a liquid, a gas, or an aqueous solution. For example, there are three gases and one liquid in this reaction:



(s)

Solid
e.g. $Fe_{(s)}$

(l)

Liquid
e.g. $H_2O_{(l)}$

(g)

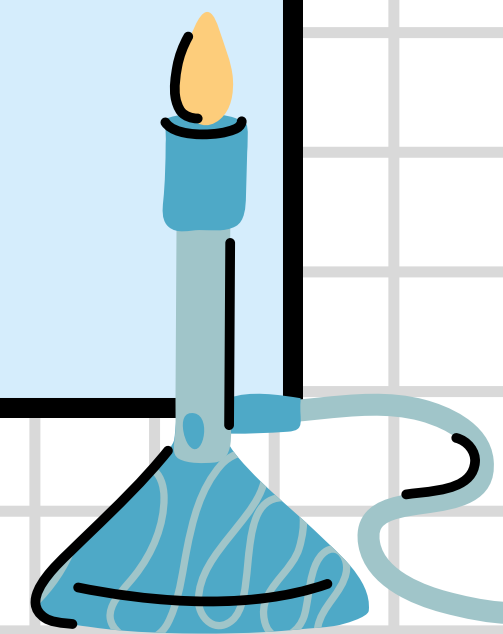
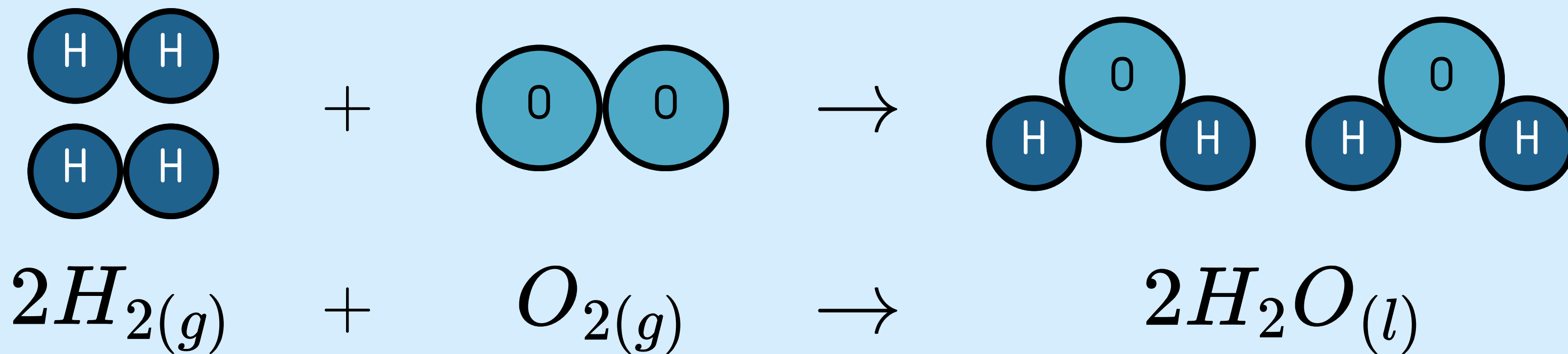
Gas
e.g. $CO_{(g)}$

(aq)

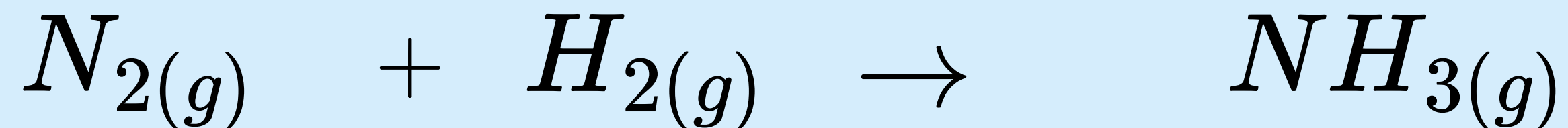
Aqueous solution
(dissolved in water)
e.g. $FeSO_{4(aq)}$

Why do we balance equations?

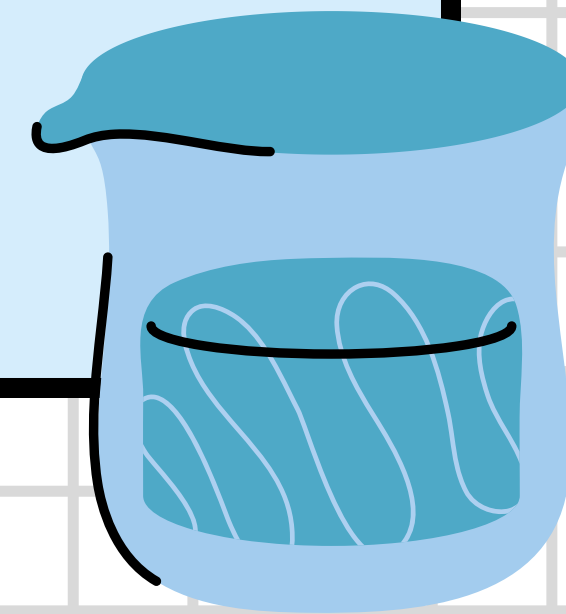
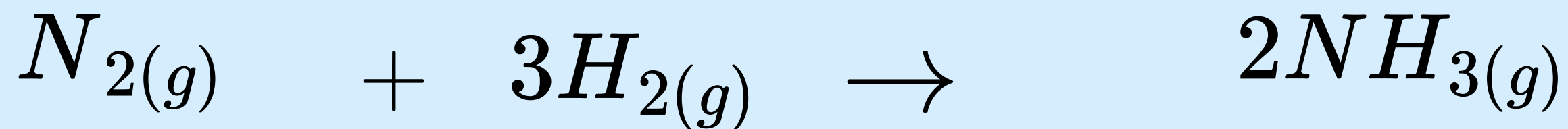
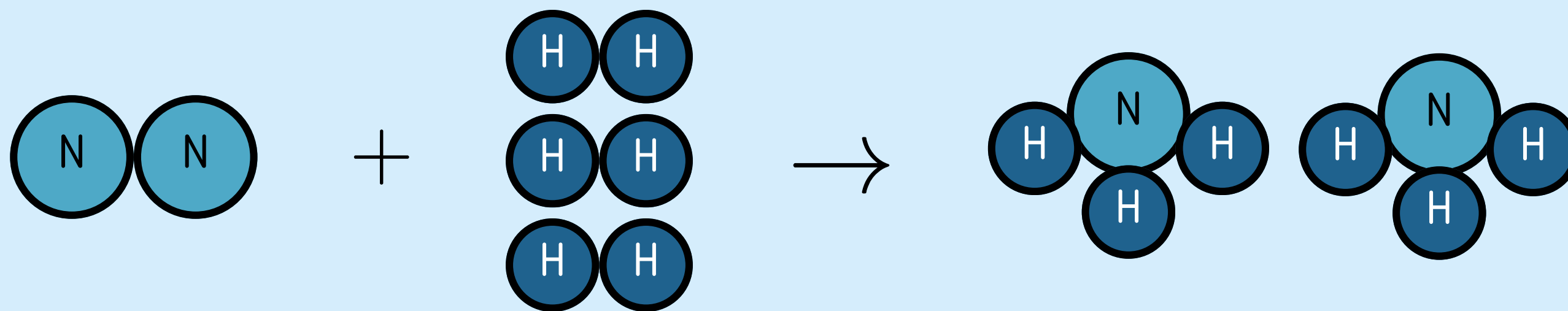
In chemical reactions, the atoms in the reactants are rearranged to form the products. Atoms can not be lost or destroyed. We balance equations to show this. There should be an equal number of atoms on both sides of the equation. We add 'big' numbers at the start of the reactant or product in order to balance the equation.



Balanced Equation Example



There are two nitrogen atoms on the left but only one on the right, so a big 2 needs to be placed in front of the NH_3 . There are two hydrogen atoms on the left but now $(2 \times 3) = 6$ hydrogen atoms on the right due to the big 2, so a big 3 needs to be placed in front of the H_2 .

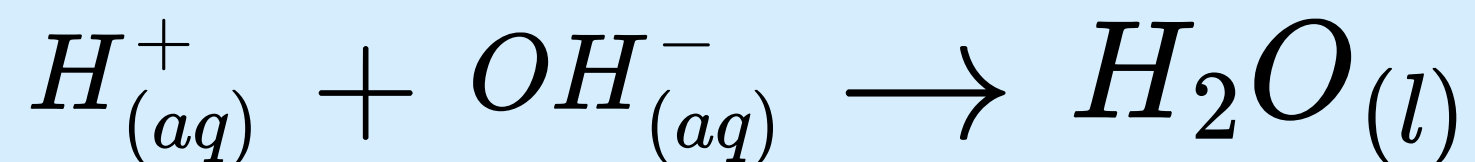


Introduction to Ionic Equations

Ionic compounds can react when they are dissolved in water. Whilst some ions react, ions known as 'spectator ions' remain unchanged and are not involved in the reaction. The two types of ionic equation are neutralisation and displacement reactions.

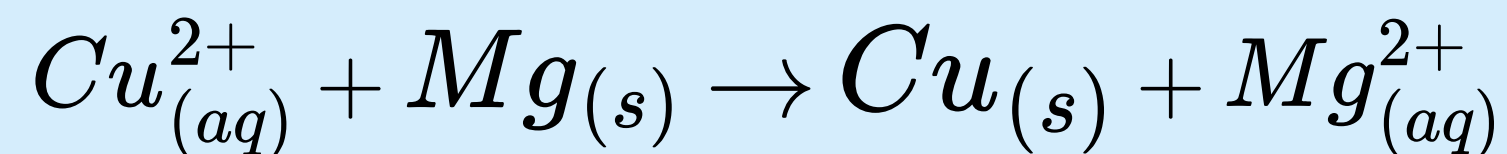
Neutralisation

The reaction of an acid and an alkali.



Displacement

When a more reactive metal takes the place of another metal in a compound.





first step done

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