Balancing Chemical Equations

Since all chemical reactions obey the **law of conservation of mass**, when we write an equation to represent a chemical reaction on paper, it must be balanced. **Conservation** means stays the same. This law says that mass (weight) will not change during the reaction.

Balanced means that the number of atoms of each type of element that are present at the start of the reaction will also be present when the reaction is complete. No atoms will be gained or lost, but simply rearranged into different particles.

The mass of the **reactants** (starting ingredients) is always equal to the mass of the **products** (new stuff that forms) .

Law of Conservation of Mass

https://www.youtube.com/watch?v=2S6e11NBwiw

Symbols Found in Chemical Equations

→ yields, produces, forms, results in, etc.

This arrow separates reactants from products

Reactants → Products

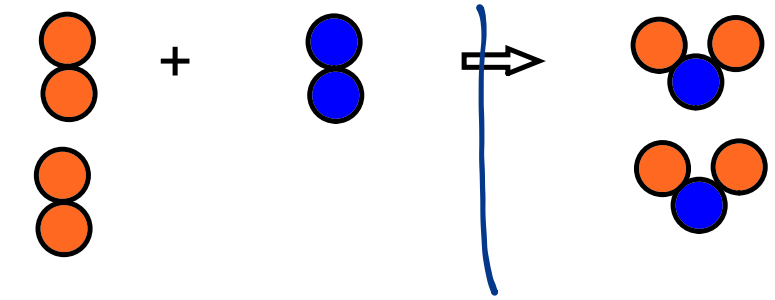
$H_2O(g)$ (l) $NaCl(aq)$

(s) = solid
(l) = liquid
(g) = gas
(aq) = aqueous solution (a solute is dissolved in water)

If we want to make water, we need:

$2H_2 + O_2 \rightarrow 2H_2O_1$

$H_2O + H_2O$



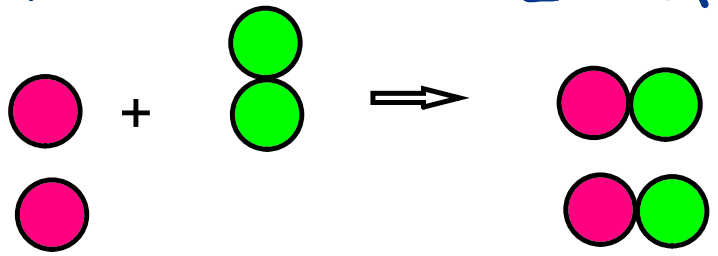
~~H_2O_2~~

~~H_2O~~

Coefficient: A number placed in front of a formula indicating how many of an atom, molecule, or ion are present in a balanced equation.

If we want to make NaCl we need:

$2Na + Cl_2 \rightarrow 2NaCl$



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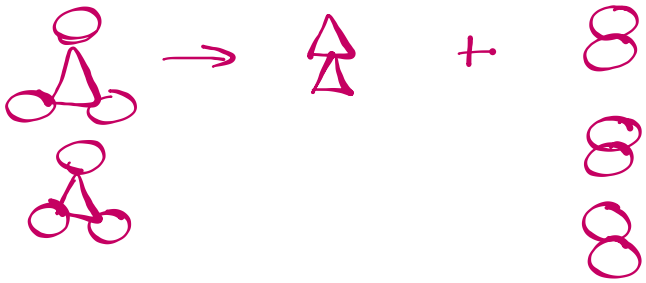
Draw pictures to show how to balance the following equation.

$2NH_3(g) \longrightarrow N_2(g) + 3H_2(g)$



Δ = N
O = H

N= Δ H= O

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$Al_2(SO_4)_3$

How many of each type of atom are present?

2 Al 3 S 12 O

$3Al_2(SO_4)_3$

How many of each type of atom are present?

6 Al 9 S 36 O

Balance the following:

$Ga_2(SO_4)_3 + Ca_3(PO_4)_2 \rightarrow 3CaSO_4 + 2GaPO_4$

2 Ga x 2
3 SO4 x 3
3 Ca x 3
2 PO4 x 2

$2C_6H_{14} + 19O_2 \rightarrow 12CO_2 + 14H_2O$

6 C 6
14 H x 14
2 O 19