Chemical Equations

$$HCl + NaOH \longrightarrow NaCl + H_2O$$

"reactants"
(starting materials)

"products"
(finishing materials)

Law of Conservation of Mass

In a chemical reaction, the total mass of the reactants is always equal to the total mass of the products.

$A + B \rightarrow C$

10g 15g 25g

$$HCl + NaOH \longrightarrow NaCl + H_2O$$

5g 45g

50g

30g 20g

50g

Counting Atoms

$CaSO_4$

Ca → 1
S → 1
O → 4

$Mg(NO_3)_2$

Mg → 1
N → 2
O → 6

$2NaCl$

Na → 2
Cl → 2

$3Al(HCO_3)_3$

Al → 3
H → 9
C → 9
O → 27

Mg NO_3
NO_3

NaCl
NaCl

$Al(HCO_3)_3$
$Al(HCO_3)_3$
$Al(HCO_3)_3$

$4Al_2(CO_3)_3$

Al → 8

C → 12

O → 36

$2(NH_4)_2Cr_2O_7$

N → 4

H → 16

Cr → 4

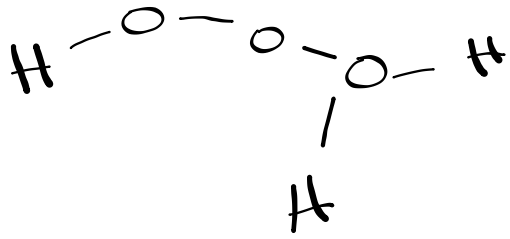
O → 14

$2H_2O$

H-O-H

H-O-H

$(H_2O)_2$



Skeleton Chemical Equation

Represents the chemical reaction, connecting the reactants to the products.

Ex. methane + oxygen ⇒ carbon dioxide + water

Balancing Chemical Equations

$CH_4 + 2O_2 \Rightarrow CO_2 + 2H_2O$

Count the Atoms!

ATOM	REACTANTS	PRODUCTS
C	1	1
H	4	2 4
O	2 4	~~3~~ 4

Tips for balancing chemical equations:

- **You can only add coefficients (number in front of formula)**
- **Balance each atom individually, unless it appears to be a polyatomic compound**
- **Choose the 'easy' atoms first**

$\_\ CaCl_2 + 2\ KF \rightarrow 2\ KCl + \_\ CaF_2$

$2\ Na_2CO_3 \rightarrow 4\ Na + 2\ C + 3\ O_2$