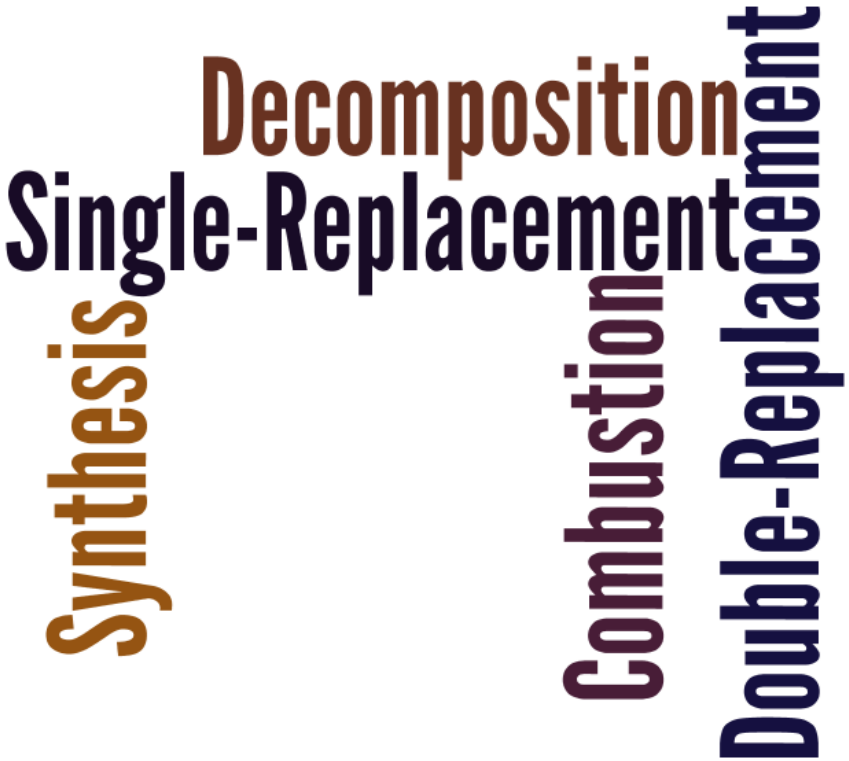
Reaction Types



Outcome:

S2-2-07 Investigate and classify chemical reactions as synthesis, decomposition, single displacement, double displacement, or combustion.

Synthesis (direct combination)

TWO or **MORE** substances react to **PRODUCE** a **SINGLE** substance.

General Form: $A + B \rightarrow AB$

Example: $N_2 + 3H_2 \rightarrow 2NH_3$

Brad + Angelina → Brangelina

Animation

Decomposition

$2\,H_2O_2 \longrightarrow 2\,H_2O + O_2$

$2\,H_2O \longrightarrow 2\,H_2 + O_2$

A **SINGLE** compound is **BROKEN DOWN** into **TWO** or **MORE** substances.

General Form: ***AB → A + B***

Example: ***$2KClO_3 \rightarrow 2KCl + 3O_2$***

→

+

Bennifer → Brad + Jennifer

Animation

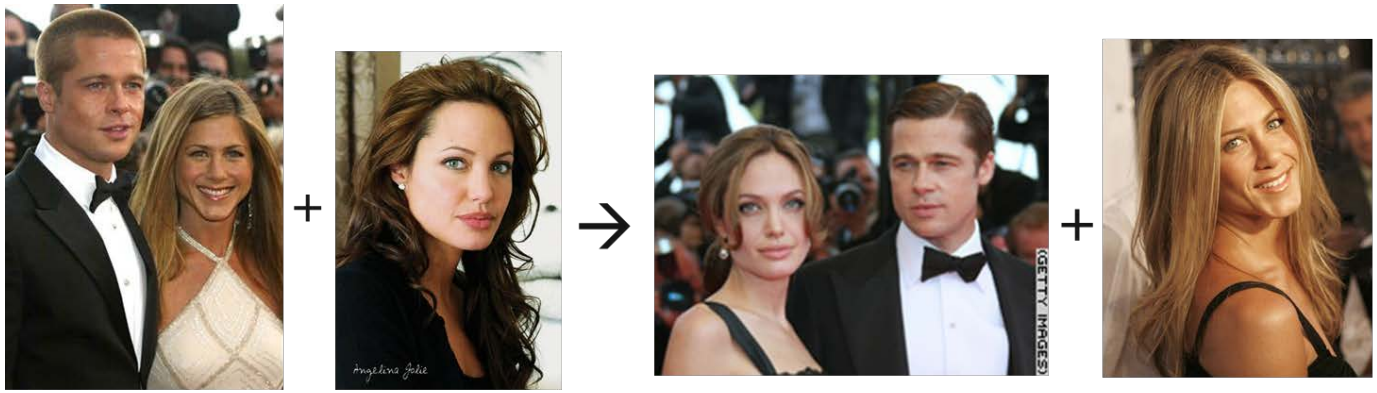
$Cu + AgNO_3 \rightarrow CuNO_3 + Ag$

Single Replacement

ATOMS of an **ELEMENT** **REPLACE** the **ATOMS** of a **SECOND** **ELEMENT** or **COMPOUND**.

General Form: $A + BC \rightarrow B + AC$

Example: $2Na + Mg(OH)_2 \rightarrow Mg + 2NaOH$



Bennifer + Angelina → Brangelina + Jennifer

Animation

$Pb(NO_3)_2 + 2NaCl \rightarrow 2NaNO_3 + PbCl_2$

Double Replacement

Involves the **EXCHANGE** of **POSITIVE** ions between two **IONIC COMPOUNDS**.

General Form: ***AB + CD → AD + CB***

Example: $Al_2(SO_4)_3 + 3Ca(OH)_2 \rightarrow 2Al(OH)_3 + 3CaSO_4$


+

→

+


Pink Panther + Black Eye → Black Panther + Pink Eye

Animation

Combustion

Reaction of a **HYDROCARBON** and **OXYGEN**.

General Form: $Hydrocarbon + O_2 \rightarrow CO_2 + H_2O$

Example: $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$

Hydrocarbon + Oxygen → Carbon Dioxide + Water

$$C_xH_y + O_2 \rightarrow CO_2 + H_2O$$

Balancing Combustion Reactions

Combustion reactions can be tricky to balance…

→ The trick is to balance in **ALPHABETICAL** order…

Carbons → **H**ydrogens → **O**xygens

S
D
DR
SR
C

Ex) $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$

$2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O$

4 + 6 = 7

8 6 14

Try this one…

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

12 + 7 = 19

24 + 14 = 38