Chemistry Reactions 2 – Knowledge Organiser KS3

Chemical Reactions	Chemical and Physical Changes	Combustion	Oxidation	Thermal Decomposition	Reactivity of metals	Displacement reactions	Extracting metals	Exo and Endo reactions	Exo and Endo Practical

Key Word	Definition
Chemical reaction	A change in which a new substance is formed
Physical changes	One that changes the physical properties of a substance, but no new substance is made
Reactants	Substances that react together, shown before the arrow in an equation
Products	Substances formed in a chemical reaction, shown after the reaction arrow in an equation
Oxidation	Reaction in which a substance combines with oxygen
Reactivity	The tendency of a substance to undergo a chemical reaction
Thermal decomposition	Breaking something down using heat
Combustion	Scientific word for burning fuel in the presence of oxygen
Catalyst	Substance that speeds up chemical reactions but are unchanged at the end
Exothermic reaction	One in which energy is give out, usually heat or light
Endothermic reaction	One in which energy is take in, usually as heat

Misconceptions

When a substance is dissolved, this is not a chemical reaction but a physical change

Radiators are not examples of exothermic reactions; heat is transferred from hot water via convection

Key questions

What is the difference between a chemical and physical change

What is an exothermic reaction and give 2 examples

What are the products of complete combustion?

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Chemical Reactions

A change in which a new substance is formed

They can be represented by equations:

Word equations:
Reactant + Reactant → Product + Product
Magnesium + Hydrochloric acid → Magnesium Chloride + Hydrogen

Symbol Equations:
$Mg + HCl \rightarrow MgCl_2 + H_2$

Combustion

Combustion is the scientific word for burning

Complete combustion:
Fuel + Oxygen → Carbon dioxide + Water

Incomplete combustion:
Fuel + Oxygen → Carbon + Carbon monoxide + Water

Incomplete combustion happens when there is not enough oxygen
Carbon monoxide is made which is toxic. It is difficult to detect as it is colourless and odorless.

Chemical and physical changes

Chemical changes
In a chemical change/ reaction atoms and molecules in reactants rearrange to make products

Signs of chemical changes:
- Colour change
- An explosion
- Gas given off
- Smell given off

Most chemical reactions **cannot be reversed**

Physical changes
A changes in the physical properties of a substance (shape, size or state). No new products are made

Examples: melting, boiling, condensing and freezing

It is possible to reverse a physical change

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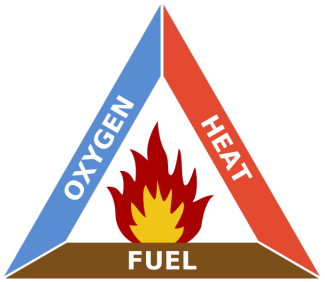
Fire Triangle

This shows the three things needed for a fire to burn.

If you remove one of these, the fire goes out.

Different fire extinguishers target different parts of the fire triangle



Oxidation

Happens when substances react with oxygen

e.g. Magnesium + Oxygen → Magnesium oxide

Thermal Decomposition

Breaking down using heat

e.g.
Copper carbonate → Copper oxide + carbon dioxide

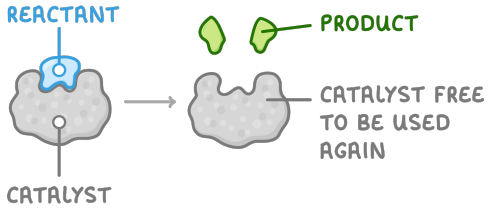
Reactivity Series

Shows metal in order from most reactive to least reactive

Please - Potassium
Stop - Sodium
Liam - Lithium
Calling - Calcium
Me - Magnesium
A - Aluminium
Cute – Carbon
Zebra - Zinc
I - Iron
Like - Lead
Hilary - Hydrogen
Clinton - Copper
She's – Silver
Great - Gold

Catalysts

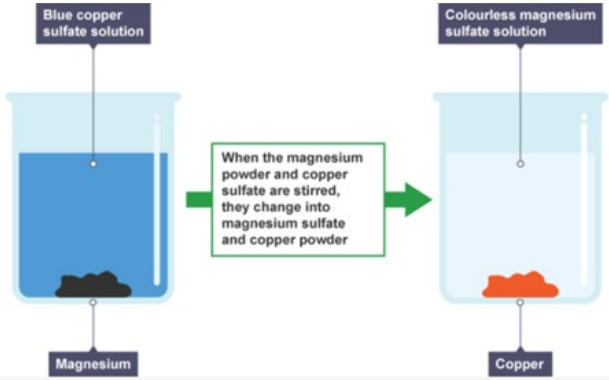
Something that speeds up the rate of a chemical reaction, without being used up



Displacement Reactions

When a more reactive element replaces a less reactive element, in a compound

e.g.,
Magnesium + copper sulfate → Magnesium sulfate + copper



Extracting metals

Metals between carbon and hydrogen are extracted using carbon

e.g.,
Iron oxide + Carbon → Carbon dioxide + Iron

This is called **carbon reduction** as the metal is reduced (loses oxygen).

It is an example of a displacement reaction

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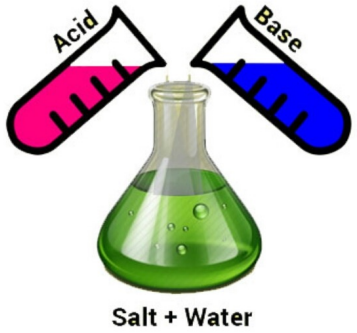
Exothermic reactions

Reactions that **give out** thermal energy to the surroundings. The temperature of the surroundings increases

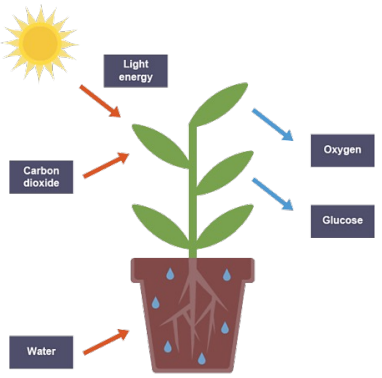
Examples:
Hand warmers
Combustion
Neutralisation



Endothermic reactions

Reactions that **take in** thermal energy from the surroundings. The temperature of the surroundings decreases

Examples:
Sports injury packs
Thermal decomposition
Photosynthesis



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