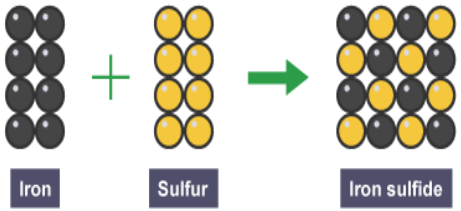
7C3 Knowledge Organiser – **Chemical Reactions**

Key words

Term	Definition
Acid	Substance with a pH lower than 7.
Alkaline	Having a pH greater than 7
Base	A substance that reacts with an acid to neutralise it and produce a salt
Combustion	The process of burning by heat
Complete combustion	Burning in a plentiful supply of oxygen or air. Produces water vapour and carbon dioxide
Fuel	Material that is used to produce heat
Incomplete combustion	Burning when there is a limited supply of oxygen or air
Neutralise	To be made neutral by removing any acidic or alkaline nature
Product	A substance formed in a chemical reaction
Reactant	Substances present at the start of a chemical reaction
Thermal decomposition	Type of reaction in which a compound breaks down to form two or more substances when heated
Word equation	An equation in which only the names of the reactants and products are used to show the reaction that happens.

What is a chemical reaction?

In a chemical reaction the atoms are rearranged. No atoms are created or destroyed in a chemical reaction, meaning the **mass is conserved**. That is, it stays the same before and after the reaction.



Here iron and sulfur react together to form iron sulphide.

You can see there are the same number of atoms before as after.

Chemical vs physical change

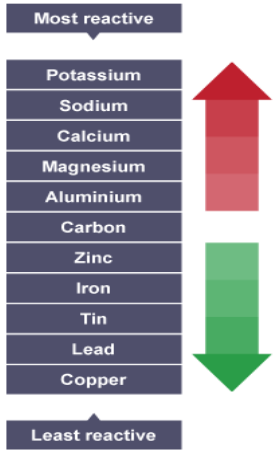
Chemical changes happen when chemical reactions happen. They involve making a new chemical.

Physical changes do not lead to a new chemical substance forming. Instead a substance simply changes physical state, e.g. boiling water (liquid) to form steam (gas) is an example of a physical change.

Extracting metals and displacement reactions

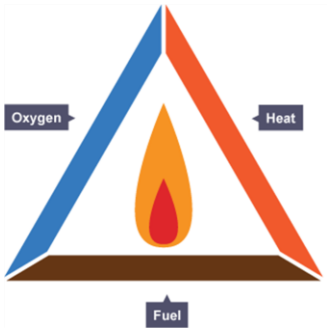
Metals are often chemically bonded to other substances. This means to get the metal alone, you need to remove the other substance. This happens in displacement reactions. Here, a more reactive metal will take the place of a less reactive metal.

For example to free copper from oxygen, you can react it with carbon. The carbon will displace the copper (take coppers place), leaving the copper free.



Combustion

Combustion is another name for burning. In order for a fire to start and keep going you need oxygen, heat and a fuel.



Thermal decomposition

Some compounds break down when heated, forming two or more products from a single reactant. This type of reaction is known as thermal decomposition.

This is an example of an endothermic reaction – a reaction that gains energy from the surroundings. This is why they must continually be heated for the reaction to keep going.

Word equations

A word equation represents a chemical reaction with words rather than chemical symbols. The substances that react together are known as **reactants** whereas whatever is made are called **products.** A word equation will represent chemical reactions like this:

Reactants ⟶ Products

If there are more than one reactant or product then they are separated by a +, e.g. Reactant + reactant ⟶ product + product

Complete and incomplete combustion

When a fuel, such as coal, is burned with plenty of oxygen in the air, complete combustion happens:
methane + oxygen → water + carbon dioxide

If there is a lack of oxygen in the air, then incomplete combustion happens. This forms water, carbon dioxide, carbon monoxide and particles of carbon