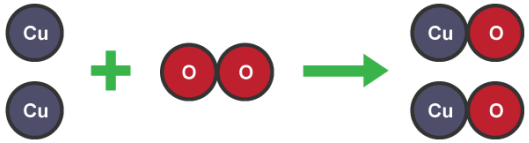
KNOWLEDGE ORGANISER
BIG IDEA: REACTIONS
TOPIC: TYPES OF REACTION

Key Word	Definition
atom	Smallest particle of matter. Elements are made of one type of atom.
reactant	Substances that react together
product	Substances formed in a reaction
conservation of mass	No atoms are created or destroyed in a chemical reaction
combustion	Burning in oxygen
thermal decomposition	Chemical reaction where heat breaks down a substance
balanced equation	Same number of atoms of each element on both sides
fuel	Stores energy in a chemical reaction
exothermic / endothermic	Releases energy / takes in energy



Chemical Reactions
Atoms are rearranged in a chemical reaction.
The substances that react together are called the reactants.
The substances that are formed in the reaction are called the products.
e.g.

iron + sulfur → iron sulfide

reactants — the arrow means "reacts to make" — product

The atoms in a compound are chemically joined together by strong forces called bonds. This is why the properties of a compound are different from the elements it contains.

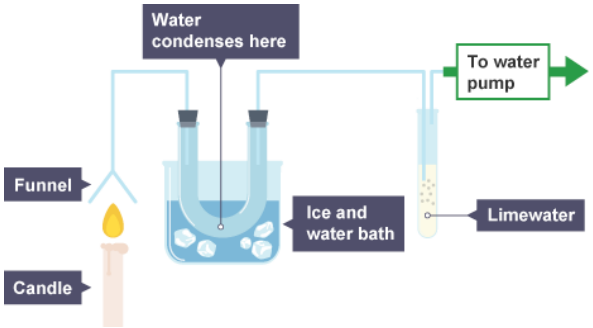
No atoms are created or destroyed in a chemical reaction. This means that the total mass of the reactants is the same as the total mass of the products. We say that mass is conserved in a chemical reaction.

Balanced Equations
Word equations only show the **names** of the reactants and products.
Symbol equations show the **chemical formulas** of the reactants and products.
Symbol equations must be **balanced** – so the number of atoms of each element is the same on both sides.

copper + oxygen → copper oxide this is a **word equation**

$Cu + O_2 \rightarrow CuO$ this is **unbalanced**

$2Cu + O_2 \rightarrow 2CuO$ this is a **balanced** symbol equation



Thermal Decomposition
Some compounds break down when heated, forming two or more products from one reactant. This type of reaction is called thermal decomposition.

Metal carbonates decompose to make a **metal oxide** and **carbon dioxide**.

These reactions are **endothermic** - they take in energy from the surroundings. In your science lessons, you will strongly heat metal carbonates with a Bunsen burner to provide this energy.

Combustion
Combustion means burning in oxygen.
Combustion is **exothermic** – it releases energy (heat and light)
There are two types of combustion – **complete** and **incomplete**

Complete combustion happens when fuel burns in excess oxygen. It produces water and carbon dioxide. We observe a clean or blue flame.

Incomplete combustion happens when fuel burns in too little oxygen. It produces water and carbon monoxide. We observe a smoky flame or soot also being produced.

Carbon Dioxide
We can test to see if an unknown gas is carbon dioxide. We bubble it through a chemical called **limewater**. If the limewater goes **cloudy** then the gas was CO_2