1) Chemical & Physical Changes

A chemical change is not reversible and we often call these chemical reactions. The atoms of the reactants are rearranged to form new products. During a chemical reaction you will often see fizzing, colour changes and changes in temperature.

> C + D A + B reactants products

A physical change is one where no new product is made. It is a reversible change. A change in state, e.g. melting, is a physical change.

2) Combustion

Combustion is the scientific word for **burning**. It is a chemical reaction and for it to take place oxygen is required.

metal + oxygen \rightarrow metal oxide

This is also an example of an **oxidation reaction** as the metal is reacting with oxygen.

Combustion and Fuels

A fuel is a substance, such as wood or oil, that is burned to give out heat energy.

The amount of energy contained within a fuel can be determined by burning a known amount of fuel and measuring the temperature change. Other factors also influence how good a fuel is, such as the cost, availability and toxicity of the fuel.

3) Oxygen (O₂)

- Gas at room temperature
- Non-metal
- Molecule made up of 2 oxygen atoms

If oxygen is present in a test tube, a glowing splint relights when it is held inside.

4) Acids & Metals

Some metals react with acids to form a salt and hydrogen gas.

acid + metal \rightarrow salt + hydrogen

Common acids include:

- Hydrochloric acid (HCl)
- Sulfuric acid (H₂SO₄)

5) Hydrogen (H₂)

• Gas at room temperature



- Non-metal
- Very flammable
- Molecule made up of 2 hydrogen atoms

If hydrogen is present in a test tube, a squeaky pop will sound when a lighted splint is held inside.

6) Thermal Decomposition

Thermal decomposition reactions happen when substances break down to simpler products when they are heated. No new substances are added. Many metal carbonates are decomposed on heating:

metal carbonate \rightarrow metal oxide + carbon dioxide

When metal carbonates decompose they produce carbon dioxide gas.

7) Carbon Dioxide (CO₂)

- Gas at room temperature
- Human activities increase the amount of CO.
- Compound made up of 1 carbon atom and 2 oxygen atoms

To test a gas to see if it is carbon dioxide it is bubbled through limewater. If the limewater turns cloudy then the gas is carbon dioxide.

8) Electrolysis

Electrolysis is a process where compounds are decomposed (broken down) into simpler substances when an **electric current** is passed through them. It can be used to extract metals from their ores.

For electrolysis to work the compound must contain ions (charged particles). The ions must be free to move.



9) Exothermic & Endothermic Reactions

Exothermic reaction - energy is given out to the surroundings, shown by a rise in temperature.

Examples: burning fuels (combustion) and neutralisation reactions (acid + alkali)

Endothermic reaction - energy is taken in from the surroundings, shown by a fall in temperature.

Examples: thermal decomposition and photosynthesis in plants

10) Naming Compounds and Formula

When the name of a compound ends in -ide then it only contains that element, e.g. iron sulfide contains iron and sulfur. When a compound ends in –ate then is contains that element and oxygen, e.g. iron sulfate contains iron, sulfur and oxygen.

The formula of a compound tells us:

- · Which elements are in the compound
- How many atoms of each element are present

For example, the formula for water is H_20 . This tells us there are 2 hydrogen atoms and 1 oxygen atom.









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