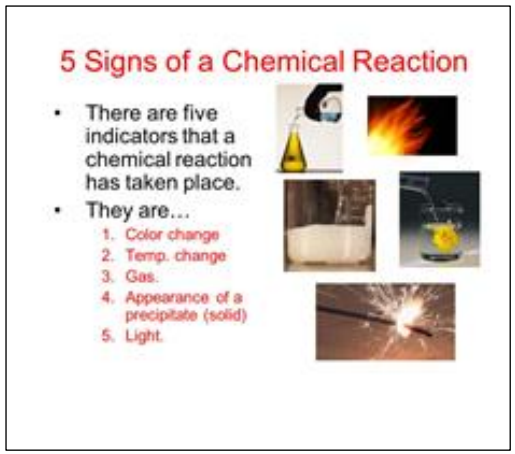


What I know from year 7/8 science:

Know the key differences between elements and compounds.

Writing word and symbol (HIGHER) equations for chemical reactions.

State the products made when metals react with oxygen.

Know the pH scale and neutralisation reaction

Use observations to identify physical process and chemical changes.

Name simple compounds using rules: change non-metal to –ide; mono, di, tri prefixes; and know the symbols for hydroxide, nitrate, sulfate and carbonate

Know the differences between the properties of the reactants and their products.

Be able to balance symbol equations.

Know different types of chemical reactions such as oxidation, complete/incomplete combustion.

Describe the environmental impact of the products of combustion.

Know the products of thermal decomposition of carbonates.

Carry out neutralisation reactions to make salts.

Use temperature changes to Identify exothermic and endothermic reactions and state their uses.

Future learning

Chemical reactions and balancing equations

Atmosphere

Energy changes in reactions.

Making salts

Vocabulary: properties, element, compound, combustion, thermal decomposition, reactants, products, global warming, acid rain, neutralisation, salt, exothermic , endothermic

Year 8 Chemistry
Chemical reactions

Keyword	Definition
Endothermic	Reactions that take in heat
Exothermic	Reactions that give out heat
Oxidation	Reaction of other elements with oxygen
Combustion	Burning fuel in oxygen
Thermal Decomposition	When a substance is broken down into 2 or more products by heat
Reactivity series	List of metals in order of reactivity
Displacement	A more reactive metal will displace a less reactive metal from its compound
Catalyst	A substance that increases the rate of a reaction but is not itself used up.
Polymer	Long chain molecules made up of many monomers.

Chemical & Physical Reaction

Chemical changes happen when chemical reactions occur. They involve the formation of new chemical elements or compounds.
E.g. Iron will react with oxygen to form Iron Oxide (rust).

Physical changes do not lead to new chemical substances forming. In a physical change, a substance simply changes physical state. E.g. A solid to a liquid.

The First 20 Elements and their Symbols

- H Hydrogen
- He Helium
- Li Lithium
- Be Berylium
- B Boron
- C Carbon
- N Nitrogen
- O Oxygen
- F Fluorine
- Ne Neon
- Na Sodium
- Mg Magnesium
- Al Aluminium
- Si Silicon
- P Phosphorus
- S Sulphur
- Cl Chlorine
- Ar Argon
- K Potassium
- Ca Calcium

Endothermic Reactions
In an endothermic reaction, thermal energy is taken in from the surroundings, therefore there is a temperature decrease. Thermal decomposition is an example.

Exothermic Reactions
In an exothermic reaction, thermal energy is given out to the surroundings, therefore there is a temperature increase.
Combustion, oxidation and neutralisation reactions are all examples.

Temp increase →

Temp decrease →

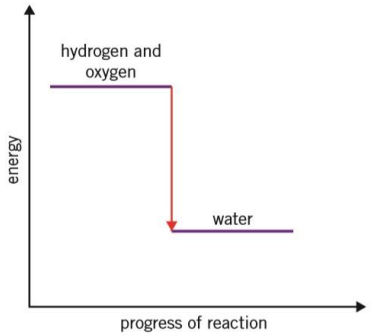
Conservation of mass

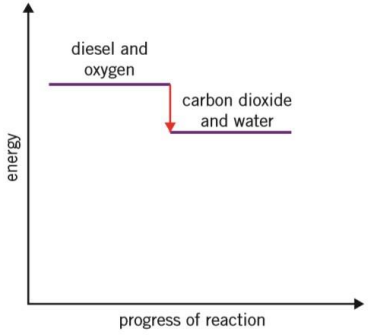
In a chemical reaction, there is no change in mass because the total number of atoms stays the same.

If the mass appears to have gone up, one of the reactants was a gas.

If the mass appears to have gone down, one of the products was a gas.

HA ONLY

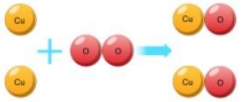




Oxidation Reactions
In an oxidation reaction, a substance gains oxygen. Metals and non-metals can take part in oxidation reactions.

Metals react with oxygen in the air to produce metal oxides. For example, copper reacts with oxygen to produce copper oxide when it is heated in the air.

Copper + Oxygen → Copper Oxide
$2Cu + O_2 \rightarrow 2CuO$



Thermal Decomposition
Some compounds break down when heated, forming two or more products from one reactants.
Many metal carbonates can break down easily when it is heated:
Copper Carbonate → Copper Oxide + Carbon Dioxide

Copper carbonate is green, copper oxide is black. We can test for carbon dioxide using limewater. Limewater is colourless, but turns cloudy when carbon dioxide is bubbled through it.

What are combustion reactions?

Fuels burn in chemical reactions. Burning is also called **combustion**. In a combustion reaction, a substance reacts with oxygen, and energy is transferred to the surroundings as heat and light.

The fuel methane is a compound of carbon and hydrogen. Its chemical formula is CH_4. When it burns, it reacts with oxygen from the air. The reaction makes two products, carbon dioxide and water:

methane + oxygen → carbon dioxide + water

The particle diagram below represents this reaction. It shows that one molecule of methane reacts with two molecules of oxygen to make one molecule of carbon dioxide and two molecules of water.

Petrol is a mixture of compounds. Most of its compounds consist of atoms of hydrogen and carbon. Petrol makes mainly carbon dioxide and water when it burns in car engines.

Some acidic and alkaline solutions are labelled with a different **hazard** symbol. The symbol on the right shows that the solution in the bottle is **corrosive**. It could burn your skin and eyes.

The symbol on the left shows that the solution is an **irritant**. An irritant might cause slight swelling or redness if it gets on your skin.

Keyword	Definition
Acid	Corrosive substance which has a pH lower than 7. Acidity is caused by a high concentration of hydrogen ions.
Acidic	Having a pH lower than 7.
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Alkaline	Having a pH greater than 7.
Base	A substance that reacts with an acid to neutralize it and produce a salt.
Neutralise	To be make neutral by removing any acidic or alkaline nature.
Neutral	When a substance is neither acidic nor alkaline, and has a pH of 7.
Litmus Paper	An indicator that can be red or blue. Red litmus paper turns blue in alkalis, while blue litmus turns red in acids.
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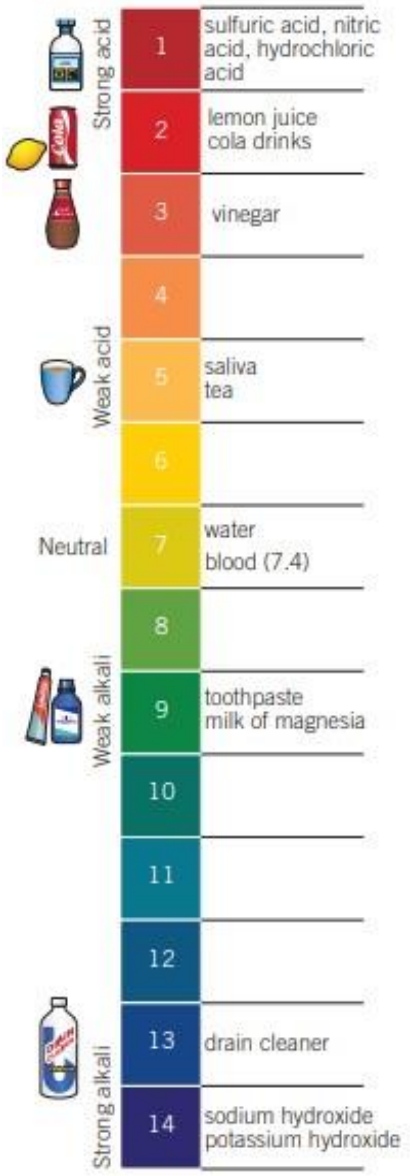

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Year 8 Chemistry Unit 3
Chemical reactions

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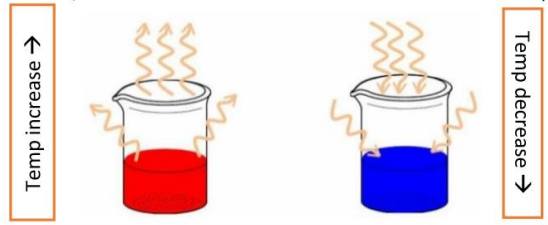

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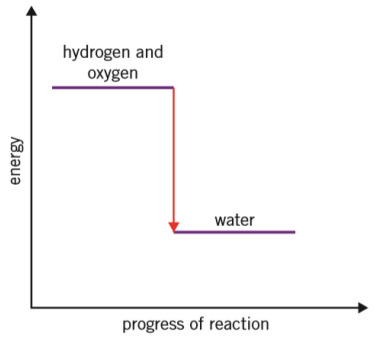

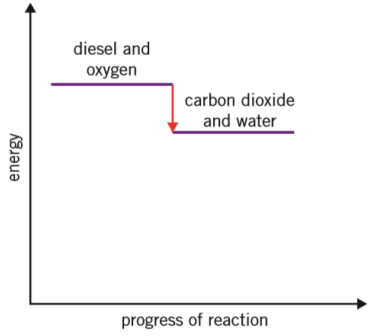

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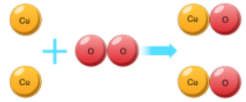

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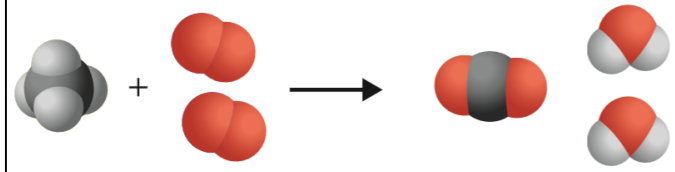

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Year 8 Chemistry Unit 3 Chemical reactions

We can use an **indicator** to find out whether a solution is acidic or alkaline.

Universal indicator is a different colour at each pH. The scale on the right shows the colours of universal indicator in solutions of different pH.

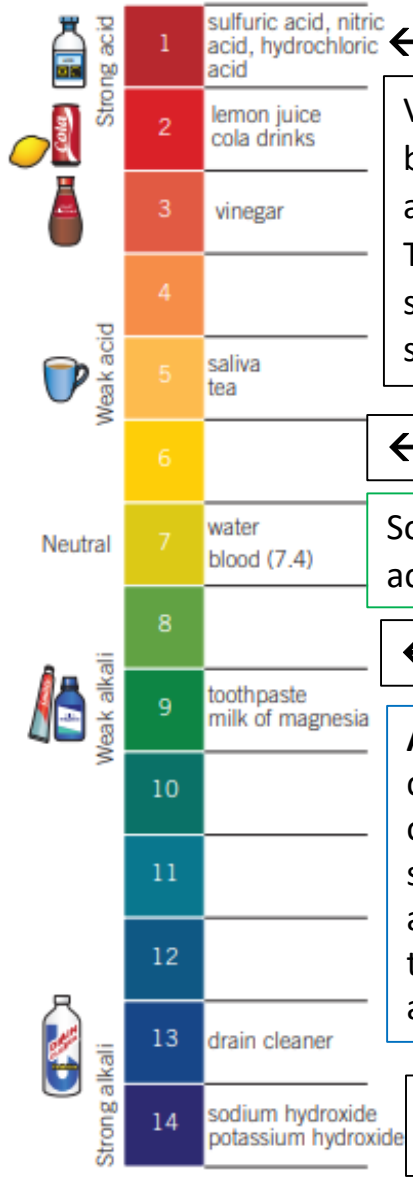
Other indicators, such as **litmus paper**, tell us if something is acid, **or** alkali, not what the pH is.

The **pH scale** is a measure of how acidic or alkaline a solution is.

Concentration is the amount of acid dissolved in water to make 1 litre of solution. It is a measure of the number of particles in a given volume of solution.

The more concentrated the solution, the stronger it is.

The weaker the solution, the more it has been diluted with water.



In a **neutralisation** reaction, an acid reacts with a substance that cancels it out. The pH gets closer to 7.

← **Very strong acid pH 1**

Vomit, vinegar, and lemons all taste **sour** because they contain **acids**. Vomit includes an acid from the stomach, **hydrochloric acid**. This acid helps digest foods. Vinegar is a solution of **ethanoic acid** and other substances. Lemons contain **citric acid**.

← **Very weak acid**

Some solutions are **neutral**. They are neither acidic nor alkaline**. They are pH 7.0.**

← **Very weak alkali**

Alkalis are the chemical opposite of acids. Soap solution is an alkali, and so is toothpaste. Most alkalis feel soapy.

← **Very strong alkali pH14**

Skills Development:
Use data and observations to determine the pH of a solution
Use experimental data to calculate temperature change and determine the type of reaction taking place

Extend to GCSE:
All of these topics will be re-visited in GCSE Chemistry.
Q) Describe the way pH changes when a strong acid is added slowly to a strong alkali.

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