

LITERACY  
ACROSS THE  
CURRICULUM

# SUBJECT TERMINOLOGY FOR CHEMISTRY



The  
**Appleton**  
School

**Acid** A solution with a pH of less than 7 - a "proton donor"

**Activation energy** The minimum amount of energy needed to start (or "activate") a reaction.

**Addition polymerisation** Reaction where many small molecules are joined together to make a long chain molecule and nothing else is produced

**Alcohol** A homologous series of compounds containing the functional group OH

**Alcohol (in Chemistry)** A homologous series of compounds containing the functional group OH

**Alkali** A solution with a pH of more than 7 - a "proton acceptor".

**Alkali metal** Metals from group 1 in the periodic table that react with water to produce an alkaline solution

**Alkane** A hydrocarbon that contains only single bonds - a "saturated hydrocarbon"

**Alkene** A hydrocarbon that contains 1 carbon carbon double bond - an unsaturated hydrocarbon

**Alloy** A mixture of metals

**Ammonia** A compound made from nitrogen and hydrogen

**Ammonium nitrate** A fertiliser made from a neutralisation reaction between ammonia and nitric acid

**Anhydrous** Describes a substance that does not contain water

**aq** An abbreviation that stands for "aqueous solution"

**Aqueous** When something has been dissolved in water

**Ar** A symbol for relative atomic mass - the relative mass of one atom of an element

**Atmosphere** The layer of gases above the Earth's surface

**Atom** The smallest particle of an element that can exist

**Atom economy** A way to measure how many starting chemicals end up as useful products

**Atomic mass** See Relative Atomic Mass (use this for your definition)

**Atomic number** Also known as the proton number, the number of protons in the nucleus of an atom

**Atoms** The smallest particle of an element

**Balanced equation** A way to show how many moles of products and reactants are involved in a reaction

**Base** A compound that will neutralise an acid

**Biodegradable** A word used to describe a substance that can be broken down by microorganisms

**Biodiesel** A hydrocarbon fuel made from plant oils that can be burned releasing heat energy

**Biofuel** A fuel derived from plants

**Biogas** A gas produced by the breakdown of organic matter in the absence of oxygen. Biogas is a renewable energy source

**Bioleaching** When bacteria are used to extract metals.

**Blast furnace** A device used to extract iron from iron oxide

**Boiling point** The temperature at which a substance turns from a liquid to a gas

**Bond** A "link" formed between atoms or ions, holding them together in a compound

**Bond energy** The amount of energy released when a bond is made or the amount of energy required to break a bond

**Burette** A burette is a long glass tube with a tap at the bottom used to measure volumes of liquids

**Calcium carbonate**  $\text{CaCO}_3$ , Limestone

**Calcium hydroxide**  $\text{Ca}(\text{OH})_2$  (s) also known as slaked lime or  $\text{Ca}(\text{OH})_2$  (aq) also known as lime water. Both forms are produced by adding water to calcium oxide.

**Calcium oxide**  $\text{CaO}$ , or quicklime.

**Carbon monoxide** A poisonous gas

**Carbonate** A general name for a compound containing carbon and oxygen

**Cast iron** Cast iron or pig iron is the iron produced by the blast furnace. It contains carbon which makes it brittle.

**Catalyst** A chemical that speeds up a reaction

**Cement** A substance made from limestone and clay; it is used to concrete.

**Chemical formula** A way to represent how many atoms are in a compound

**Chemical reaction** A reaction between chemicals (reactants) which produce one or more new substances (products)

**Chromatography** A technique used to separate dissolved substances e.g. artificial colours in foods

**Collision theory** For a reaction to occur, the reactants must collide with sufficient energy for a successful collision.

**Combustion** Burning something, a reaction with oxygen to release heat energy

**Complete combustion** When combustion occurs in an excess of oxygen.

**Compound** A substance made from atoms of different elements joined together by covalent or ionic bonds.

**Concentration (mass)** The number of grams of solute per cubic decimetre of a solution

**Concentration (molar)** The number of moles per cubic decimetre of a solution

**Concrete** An artificial stone made using cement.

**Condensation** When a gas is cooled to form a liquid

**Conductor** A substance that allows electricity or thermal (heat energy) to pass through it easily.

**Continental drift** The process of tectonic plates moving relative to each other

**Convection current** Convection currents are movements occurring in materials that can flow because of differences in temperature. Between different parts.

**Core** The part of the Earth's structure nearer to the centre

**Corrode** When a substance usually a metal reacts with the environment which causes it to break down

**Corrosion** When a substance usually a metal reacts with the environment which causes it to break down

**Covalent** When a compound has no free electrons and no free ions

**Covalent bond** A type of bond formed when atoms "share" electrons

**Cracking** The breaking up of long chained hydrocarbons to form an Alkene and an Alkane.

**Crude oil** A mixture of hydrocarbons from fossil fuel.

**Crust** The outer layer of the Earth, it is solid.

**Delocalised electron** An electron which is not located in an electron shell but can move between different atoms.

**Diamond** A form of carbon

**Diesel** A fossil fuel

**Dilute solution** A weak form of a solution

**Displacement** An element which is more reactive can displace a less reactive element.

**Distillation** A process used to separate a mixture of liquids with different boiling points

**Dot and cross diagram** Dot and cross diagrams are used to display electrons in ionic or covalent bonding.

**Double bond** A bond found between carbon atoms in alkenes

**Economically viable** If a product is worth the expense of making it then the process is economically viable

**Electrodes** These supply an electric current to a molten or dissolved ionic compound so that electrolysis can occur. The products of electrolysis form at the electrodes.

**Electrolysis** The process of splitting a compound using electricity

**Electrolyte** The molten substance or solution where electrolysis occurs.

**Electron** The negatively charged particle in an atom

**Electron arrangement** A way to show which shells electrons are in

**Electron configuration** A way to show which shells electrons are in

**Electronic configuration** A way to show which shells electrons are in

**Electrostatic attractions** The attraction of a positive charge to a negative charge.

**Element** A substance that is made of one type of atom only

**Empirical formula** the simplest formula of a compound

**Emulsifier** A substance added to form an emulsion, it stops the mixture from separating

**Emulsion** A mixture of two liquids in which small droplets of one liquid are spread throughout the other liquid e.g. Oil and water can be mixed with an emulsifier to form an emulsion

**End point** In a titration the point at which a colour change indicates the change in pH.

**Endothermic reaction** A chemical reaction that takes in energy from the surroundings often as thermal (heat) energy.

**Energy profile** A diagram showing the energy of reactants and products in a reaction, the activation energy and shows whether the reaction is endothermic or exothermic

**Equilibrium** the point in a reversible reaction when the rate of the forward reaction (reactants to products) exactly balances the rate of the reverse reaction.

**Ethanol** Ethanol is more commonly referred to as alcohol.  $C_2H_5OH$

**Exothermic reaction** A chemical reaction that transfers energy to the surroundings often as thermal (heat) energy.

**Extraction** The process of releasing a metal from its ore

**Fermentation** A reaction involving yeast that produces carbon dioxide.

**Fertiliser** A chemical used to help crops to grow

**Flammable** A substance that catches fire easily

**Fossil fuel** Coal, oil and gas (remember solid, liquid and gas)

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**Fraction** A part of crude oil that is separated using fractional distillation, the hydrocarbon in each fraction will have similar boiling points

**Fractional distillation** A process used to separate crude oil into different fractions.

**Fullerene** A type of carbon structure in the shape of a ball, cage or cylinder

**Functional group** A group of atoms arranged in the same way that have the same chemical reactions

**g** An abbreviation standing for "gas"

**Gas** One of the three states of matter, along with solid and liquid

**Gas chromatography** A technique used to separate mixtures of compounds

**Giant covalent structure** A large number of covalently bonded non metal atoms in a regular arrangement

**Giant lattice** An ionic structure

**Global dimming** The reflection of sunlight by tiny solid particles in the air

**Global warming** The warming of the Earth due to the reflection of infra red radiation by Greenhouse gases

**Glucose** The product of photosynthesis in plants and the molecule used in respiration

**Graphite** A carbon structure where carbon atoms are covalently bonded to three other carbons and the fourth electron is delocalised

**Greenhouse effect** The warming of the Earth due to the reflection of infra red radiation

**Greenhouse gas** A greenhouse gas is any gas that contributes to the greenhouse effect, e.g. carbon dioxide, methane and water vapour

**Groups** The columns in the Periodic Table, eg group 7 - the halogens

**Haber process** A process used to make ammonia from nitrogen and hydrogen

**Haematite** A rock containing iron oxide, an example of iron ore.

**Half equation** An equation used to show the reaction that occurs at the electrodes during electrolysis

**Halogens** Elements from group 7 of the Periodic Table, such as chlorine and bromine

**Hard** A hard material is difficult to scratch, e.g. diamond

**Hard water** Hard water contains ions which cause scum or limescale

**Hardening** During hydrogenation of vegetable oils, the hydrogenated product has been hardened so that it has a higher melting point and is more solid at room temperature.

**Homologous series** Alkanes, alkenes and alcohols are all examples of homologous series. They all contain the same functional group but different carbon chain lengths.

**Hydrated** Chemicals that have water bonded in the molecule

**Hydrocarbon** A compound containing only hydrogen and carbon, e.g. methane

**Hydrogenated oil** A polyunsaturated oil can be hydrogenated to make it more solid at room temperature. Some of the double bonds in the polyunsaturated oil are saturated oil by reacting with hydrogen in the presence of a nickel catalyst at 60 degrees C

**Hydrogenation** Adding hydrogen to a polyunsaturated oil in the presence of a nickel catalyst at 60 degrees Celsius. In the process some of the double bonds are saturated.

**Hydrophilic** Water loving

**Hydrophobic** Water hating

**Ignite** To set fire to

**Impurities** Something added to a chemical to change its properties

**Incomplete combustion** Insufficient oxygen is available during combustion so carbon, carbon monoxide and water are formed

**Indicator** A chemical used to determine the pH of a substance

**Inert** Unreactive

**Insoluble** A substance that cannot dissolve is called insoluble

**Intermolecular forces** Forces between molecules

**Ion** An atom that has gained or lost electrons

**Ion exchange column** Is used to remove calcium ions and magnesium ions from hard water. The ions are replaced by sodium ions

**Ionic** Used to describe a bond formed between a metal and a non-metal

**Ionic bonding** A type of bond formed between positive and negative ions

**Ionic compound** A compound made from ions involving one or more electrons being transferred between atoms

**Iron** A common metal used to make steel

**Iron oxide** A compound made from iron and oxygen

**Isotope** An atom with the same number of protons but a different number of neutrons



**l** Short for liquid (as used in symbol equations)

**Lava** Molten rock above the Earth's surface

**Limestone** A sedimentary rock - chemical name Calcium Carbonate,  $\text{CaCO}_3$

**Limewater** Calcium hydroxide. Used to test for carbon dioxide. Limewater turns cloudy if carbon dioxide is bubbled through it.

**Liquid** One of the three states of matter, along with solid and gas

**Low grade ore** An ore that contains little metal

**Macromolecular** A very large covalent molecule. Thousands of elements share electrons to complete their outer shells forming a macromolecule. Examples include graphite, diamond and silicon dioxide

**Magma** Molten rock below the Earth's crust

**Mantle** The part of the Earth below the crust

**Mass number** The number of protons and neutrons in the nucleus of an atom.

**Mass spectrometer** An analytical technique used to determine the relative formula mass or the relative atomic mass of substances which can be used to identify substances

**Melting point** The temperature at which a solid turns into a liquid

**Metal** A substance containing delocalised (free) electrons - they are good conductors of heat and electricity

**Metallic** A type of bond between metal ions and delocalised electrons

**Methane** A hydrocarbon containing one carbon atom and four hydrogen atoms. The main substance in natural gas.

**Mixture** Two or more chemicals mixed together but not held together by a bond

**Molar concentration** The number of moles per cubic decimetre of a solution

**Mole** The relative formula mass of a substance in grams

**Molecular formula** A formula which tells us the number of atoms of each element in a compound eg calcium carbonate has the molecular formula  $\text{CaCO}_3$

**Molecular ion peak** The peak furthest on the right hand side on the mass spectrum which corresponds to the mass of the molecular ion

**Molecule** A molecule contains atoms that are joined together

**Monomer** A small molecule (usually an alkene) that can be reacted together to make a polymer

**Mortar** The paste used to hold bricks or stones together

**Mr** Short for "relative formula mass"

**Nanometre** Nanometre, nm

**Nanoparticle** A nanoparticle has a size of 1 - 100 nm

**Nanoscience** The study of nanoparticles

**Neucleus** The central part of an atom

**Neutral** 1. A neutral solution is neither acidic or alkaline, it has a pH of 7 2. No charge

**Neutralisation** When an acid reacts with an alkali, insoluble base or carbonate to make a neutral solution

**Neutrons** Sub atomic particles which have no charge. Neutrons have the same mass as protons

**Nickel catalyst** A catalyst made from nickel which is used during the hydrogenation process to harden vegetable oils.

**Nitrogen oxides** Compounds made from nitrogen and oxygen

**Noble gases** Unreactive gases in Group 0 of the periodic table

**Non-renewable** Supplies of a non renewable substance will eventually run out eg fuels like petrol and diesel

**Nucleus** The central part of an atom

**OIL RIG** Oxidation Is Loss (of electrons), Reduction Is Gain (of electrons)

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**Ore** A substance from which it is economically viable to extract a metal

**Outer shell** The outermost electron shell in an atom - it usually takes up to 2 or 8 electrons

**Oxidation** A type of reaction where oxygen is added to a substance or where an atom or ion loses electrons

**Oxide** A compound made up of oxygen and another metal.

**Oxygen** A compound of two oxygen atoms covalently bonded together to form an oxygen molecule.

**Particle** A general name for a very small thing (e.g. an atom or molecule) that everything is made of

**Percentage yield** The amount (in %) of product made in a reaction compared to what SHOULD have been made

**Periodic table** A table of all of the known elements

**Permanent hard water** Permanently hard water contains calcium ions or magnesium ions

**Petrol** A fossil fuel

**pH scale** A number that tells you how acidic or alkaline a solution is

**Phytomining** A method to extract copper from a low grade source (low percentage of copper) using plants to extract the copper from the ground.

**Pipette** Used to measure an accurate volume of liquid

**Plant oils** Oils that can be extracted from plants

**Plastics** Materials made from crude oil, usually made of polymers.

**Pollution** A general name for a chemical or substance that contaminates the environment

**Poly(ethene)** More commonly called polythene - a plastic made from the monomer ethene

**Polymer** A substance made of a number of monomers

**Polymerisation** The joining of monomers to form polymers

**Precipitate** When two solutions react together to form an insoluble salt, the insoluble salt is called a precipitate

**Products** The substances produced during a chemical reaction

**Properties** The properties of a substance describe what it is like eg reactive, hard

**Proton** One of the sub atomic particles found in the nucleus. Protons have a positive charge.

**Proton number** Also known as the atomic number, it tells you the number of protons in the nucleus of an atom

**Quarries** Places where we can dig a substance, usually a rock, out of the ground.

**Quicklime** Calcium oxide. A substance made by the thermal decomposition of calcium carbonate (limestone)

**Rate of reaction** How fast a chemical reaction takes place

**Reactants** The substances used up during a chemical reaction

**Reaction** When chemicals react or break apart

**Reactivity** How easily a substance burns or reacts with other chemicals like water and acid

**Reactivity series** A list of elements in order of how reactive they are.

**Reduction** When oxygen is removed from a compound or when an atom or ion gains electrons

**Relative atomic mass** The relative atomic mass,  $A_r$ , is the average mass of the atoms of an element compared to carbon-12

**Relative formula mass** The relative formula mass,  $M_r$ , is the mass of one mole of a substance (in grams)

**Renewable** Supplies of a renewable substance will not run out for example biofuels

**Retention time** In gas chromatography, the retention time is a measure of the time taken for a solute to pass through a chromatography column.

**Reversible reaction** A chemical reaction that can go both ways for example reactants form the products and the products form reactants

**Rust** Iron oxide

**s** An abbreviation that stands for "solid"

**Salt** A compound formed when an acid is neutralised by an alkali or base

**Saturated hydrocarbon** An alkane - a hydrocarbon that only has single bonds

**Scale** Heating temporarily hard water decomposes the hydrogen carbonate ions to form limescale or scale.

**Scum** Scum is formed when soap reacts with calcium ions or magnesium ions.

**Sediment** Small bits of solid that settles at the bottom of a liquid

**Sedimentary rock** Rocks formed from layers of sediment for example limestone

**Shape memory alloy** An alloy which returns to its normal shape after bending

**Shape memory alloys** A metallic material which has one shape at a low temperature and a different shape at a higher temperature

**Shell** Shells are made from calcium carbonate

**Slaked lime** Solid Calcium hydroxide

**Smart material** Smart materials have properties that react to changes in their environment

**Smelting** Extracting a metal from its ore by heating and melting

**Soapless detergent** A petroleum based detergent which reacts with the calcium ions or magnesium ions in hard water but does not form scum

**Sodium chloride** NaCl, sodium chloride is the salt used in cooking to flavour foods

**Soft water** Soft water does not contain any calcium ions, magnesium ions or hydrogen carbonate ions so lathers readily.

**Solid** One of the three states of matter, along with liquid and gas

**Soluble** Able to dissolve

**Solution** A mixture formed when a substance (the solute) dissolves in a solvent (often water)

**Stainless steel** An alloy of iron that does not corrode very easily.

**State symbol** State symbols are used in chemical equations to describe the physical state a reactant or product is in when the reaction occurs

**Steam** The vapour formed when water is boiled

**Steel** An alloy of iron.

**Strong acids** Strong acids are fully ionised in solution

**Structural formula** A way of showing the structure of molecules using symbols for the atoms and lines to represent the chemical bonds between them

**Symbol** A short way of writing an element eg C = carbon, H = hydrogen, N = nitrogen

**Symbol equation** A symbol equation shows the reactants and products of a chemical reaction using their formulas and state symbols

**Tectonic plate** A section of the Earth's crust

**Temporary hard water** Temporary hard water contains hydrogen carbonate ions ( $\text{HCO}_3^-$ ).

**Thermal decomposition** A reaction that uses thermal (heat) energy to break down a substance into new substances

**Thermosetting polymer** A thermosetting polymer has cross links between the hydrocarbon chains which makes the polymer more heat resistant. Thermosetting polymers cannot be remoulded.

**Thermosoftening polymer** Thermosoftening polymers do not have cross links so when heated the plastic can be reshaped and cooled to a new shape.

**Titanium** A transition metal which has high strength, low density and good resistance to corrosion.

**Titration** Titration is a method used to determine the concentration of an unknown acid or alkali

**Transition metal** Metals in the central block of the periodic table, they do not belong to any of the groups.

**Universal indicator** An indicator used to determine the pH of a substance

**Unreactive** Not able to take part in a chemical reaction

**Unsaturated** In an unsaturated hydrocarbon molecule, two of the carbon atoms are linked by a double bond.

**Vapour** a gas produced when a liquid evaporates

**Viscous** If a hydrocarbon is viscous, it has a thick sticky consistency.

**Volatility** If a hydrocarbon is volatile, it evaporates easily

**Weak acids** Weak acids partially ionise in solution

**Wegener, Alfred** (1880-1930) The first person to develop the idea of continental drift, where a super continent, Pangaea has moved to form several smaller continents.

**Word equation** A word equation shows the reactants and products of chemical reactions using their names not chemical symbols

**Yeast** micro-organisms which produce alcohol from a sugar and water mixture

**Yeasts** micro-organisms which produce alcohol from a sugar and water mixture

**Yield** The amount of an agricultural product produced