Science Glossary

**Chemistry - C1**

Science Glossary

Chemistry Unit 1.1 – **Fundamental Ideas.**

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| **Key Word** | **Definition** |
| Alkali Metal | A group 1 metal, such as Lithium, Sodium or Potassium. They have characteristic flame colours and react with water to give hydrogen gas and a hydroxide. |
| Atom | The smallest particle of a substance with no overall charge, made up of protons, neutrons and electrons. |
| Aqueous (aq) | A substance that is dissolved in water. |
| Compounds | A substance made up of two or more different elements chemically bonded together. |
| Covalent Bonds | A pair of electrons shared between two atoms. Present between atoms in simple covalent molecules and giant covalent structures. |
| Electronic Structure | The number and arrangement of electrons in the electron shells (energy levels) around the nucleus of an atom |
| Electrons | A tiny subatomic particle that has a negative (-) charge and negligible mass. |
| Energy level (shell) | A position that electrons can occupy around the nucleus of an atom. |
| Gas (g) | The physical state of matter in which a substance can flow and expand to fill any container. It can be compressed when put under pressure. |
| Group | A vertical column in the Periodic Table containing elements with the same number of electrons in their outer shell (energy level) so they have similar chemical properties. |
| Ionic Bonds | A chemical bond in which oppositely charged ions are held together by mutual attraction. |
| Liquid (l) | A physical state of matter where particles take the shape of their container. They can flow but cannot be compressed under pressure. |
| Mass Number | The number of protons and neutrons in the nucleus of an atom. |
| Molecule | A particle made up of two or more atoms joined together by covalent bonds. |
| Neutrons | A subatomic particle found in the nucleus of an atom that has a mass of 1 and no overall charge. |
| Nucleus | The central part of an atom containing most of the mass. It is made up of protons and neutrons. |
| Periodic Table | A table of all the elements arranged inn order of increasing atomic (proton) number. |
| Product | An element or compound formed during a chemical reaction. |
| Protons | A subatomic particle found in the nucleus of an atom. It has a mass of 1 and a positive (+) charge. |
| Reactant | An element or compound that takes part in a chemical reaction to produce new products. |
| Solid (s) | A physical state of matter in which a substance has a ridged structure with particles packed closely together and unable to be compressed or to flow. |
| Symbol Equation | A representation of a chemical reaction using symbolsof the elements to indicate the reactants used and the products formed. |
| Word Equation | A representation of a chemical reaction using the names of elements and compounds to indicate the reactants used and the products formed. |

Chemistry Unit 1.2 – **Rocks and building Materials.**

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| **Key Word** | **Definition** |
| Calcium Carbonate | CaCO3 the main compound in limestone and marble. |
| Calcium Hydroxide | Ca(OH)2 common name slaked lime. The alkali produced when calcium oxide reacts with water. |
| Calcium Oxide | CaO common name quick lime. The solid product made when calcium carbonate has been thermally decomposed by heating. |
| Cement | A powder used in construction that sets hard when mixed with water. It is made by heating limestone with clay. |
| Concrete | A building material made by mixing cement, sand and gravel with water; it sets to become a very hard “artificial rock”. |
| Limewater | A test for carbon dioxide (CO2). It goes cloudy when carbon dioxide is bubbled through it. |
| Mortar | A workable paste used to bind construction blocks together and fill the gaps between them, made from calcium oxide, clay, sand and water. |
| Thermal Decomposition | The breakdown of a chemical compound by heating. |

Chemistry Unit 1.3 – **Metals and their uses.**

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| **Key Word** | **Definition** |
| Alloy | A mixture of metals (or a metal and a non-metal like carbon). Alloys have different properties to the pure metal. |
| Bioleaching | The process of extracting metals from their ores using bacteria or other microorganisms. |
| Blast Furnace | A furnace in which ore containing iron oxide is heated with limestone and coke to produce iron. |
| Displacement reaction | A reaction where a more reactive substance (e.g. Magnesium) displaces a less reactive substance (e.g. Iron) from its compound (e.g. Iron oxide).  Mg + FeO → MgO + Fe |
| Electrolysis | Decomposition (splitting up) of a molten or dissolved ionic compound by an electric current passing through it. |
| Ore(s) | Rock containing high enough quantities of a metal to make it economic to mine. |
| Phytomining | Growing plants in order to concentrate metals or other minerals from the soil in their tissues so that they can be burned and the metal extracted from their ashes. |
| Reactivity Series | A list of elements in order of their reactivity. |
| Reduction | A type of chemical reaction. When a compound is reduced it loses Oxygen, gains Hydrogen or gains electrons. |
| Smelting | [Metal](http://www.businessdictionary.com/definition/metal.html) extraction [process](http://www.businessdictionary.com/definition/process.html) in which an [ore](http://www.businessdictionary.com/definition/ore.html) is heated at [high](http://www.businessdictionary.com/definition/high.html) [temperature](http://www.businessdictionary.com/definition/temperature.html) in an enclosed furnace to cause a reduction reaction and extract the metal. |
| Stainless Steel | An alloy mixture containing Iron and Chromium. It is more resistant to corrosion than pure Iron. |
| Steel | An alloy mixture of Iron and Carbon (and other elements) which is harder and stronger than pure Iron. |
| Titanium | Silver grey transition metal used in alloys that are harder, stronger, lighter and more corrosion resistant than the pure metals. |
| Transition Metals | An ‘everyday ‘ metal like iron or copper , found in the middle block of The Periodic Table between Groups 2 and 3. |

Chemistry Unit 1.4 – **Crude oil and fuels.**

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| **Key Word** | **Definition** |
| Alkanes | A hydrocarbon that has only C-H and single C-C bonds, with the general formula Cn H2n+2 |
| Biodiesel | A renewable fuel made from vegetable oil that can be used in place of diesel from crude oil. |
| Biofuels | A renewable fuel made from living sources such as plant matter. |
| Carbon Monoxide | (CO) product of incomplete combustion of carbon based fuels. Toxic to humans. |
| Catalytic Converters | Platinum/Rhodium/Palladium metals used to convert harmful gases to less harmful gases in car exhaust fumes. |
| Distillation | A method for separating a liquid from a mixture by evaporating and condensing it at its boiling point. |
| Flammable | Easily ignited and burned. |
| Fractional Distillation | A method used to separate a mixture of two or more liquids with different boiling points. The process involves boiling the mixture, then condensing the vapour at different temperatures. |
| Fractions | A mixture of compounds with similar boiling points, produced by fractional distillation. |
| Global Warming | The rise in mean surface temperatures on the Earth, thought to be due to increasing amounts of greenhouse gases such as carbon dioxide and methane. |
| Hydrocarbons | A compound containing hydrogen and carbon only. |
| Incomplete Combustion | Burning of carbon-based fuels in limited Oxygen to form Carbon Monoxide. |
| Mixture | Two or more substances mixed in any proportions which are not chemically combined and can be separated. |
| Nitrogen Oxides | (NOx) product of the reaction of Nitrogen and Oxygen in car engines at high temperatures. Can cause acid rain. |
| Oxidised | When a compound is oxidised it gains Oxygen, loses Hydrogen or loses electrons. |
| Particulates | A very small solid particle produced when Carbon based fuels burn in limited Oxygen.  Can cause global dimming and breathing difficulties in humans. |
| Saturated Hydrocarbons | Having only single bonds between the Carbon atoms in a Carbon chain |
| Sulphur Dioxide | (SO2) product of burning Sulphur in Oxygen. Can cause acid rain. |
| Viscosity | A measure of how easily a liquid will flow. The longer the carbon chain the higher the viscosity. |
| Volatility | A measure of how easily a liquid will turn into a gas.  The shorter the carbon chain the higher the volatility. |

Chemistry Unit 1.5 – **Products from oil.**

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| **Key Word** | **Definition** |
| Alkene | A hydrocarbon with one or more C = C double bonds. |
| Biodegradable | Able to be broken down easily into simpler chemicals by natural, biological processes. |
| Cracking | The process by which long-chain hydrocarbons, usually alkanes, are broken up into shorter and more useful hydrocarbons, usually alkanes and alkenes. |
| Double Bond | Two covalent bonds between two atoms e.g. C=C |
| Fermentation | One kind of anaerobic respiration by microorganisms. This process is used to make carbon dioxide and ethanol from glucose.  C6H12O6  → 2 C2H5OH + 2 CO2 |
| Hydration | A chemical reaction involving the addition of water to a compound, for example the hydration of ethene to ethanol. |
| Monomers | A small molecule that when joined together make up the subunits of a polymer chain. |
| Non-renewable | A resource that cannot easily be replaced once it has been used up. Fossil fuels are all non- renewable. |
| Polymerisation | A reaction in which many small molecules (monomers) are joined together to make a longer polymer chain. |
| Polymers | A long-chain molecule made by joining many small molecules (monomers) together. |
| Smart material | A material that has one or more properties that can be significantly changed in a controlled fashion by external stimuli, such as [stress](http://en.wikipedia.org/wiki/Stress_(physics)), [temperature](http://en.wikipedia.org/wiki/Temperature), moisture, [pH](http://en.wikipedia.org/wiki/PH), [electric](http://en.wikipedia.org/wiki/Electric_field) or [magnetic](http://en.wikipedia.org/wiki/Magnetic_field) fields. |
| Unsaturated Hydrocarbon | Having one or more multiple bonds, usually double C=C bonds, between the carbon atoms in a carbon chain. |

Chemistry Unit 1.6 – **Plant Oils.**

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| **Key Word** | **Definition** |
| E Numbers | A code number preceded by the letter E, denoting food additives. |
| Emulsifier | A substance added to an emulsion of two liquids that do not mix to stabilise it and stop it from separating.  These molecules have a hydrophobic tail and a hydrophilic head. |
| Emulsion | A mixture of two immiscible liquids, such as oil and water, in which tiny droplets of one liquid are distributed evenly through the other liquid. |
| Food Additive | A substance added to food to enhance its flavour or appearance or to preserve it. |
| Hydrogenation | The process of turning unsaturated oil into harder more saturated fats by reacting C=C bonds with Hydrogen gas using a Nickel catalyst at 60⁰C.  This process is used to make margarine so it spreads more easily. |
| Hydrophilic | ‘Water-loving’; refers to a part of a molecule (usually the head) that is attracted to water and can dissolve in it. |
| Hydrophobic | ‘Water-hating’; refers to a part of a molecule (usually the tail) that is attracted to oil or fat and can dissolve in it. |
| Poly-unsaturated oils | Large molecules that have many double bonds (C=C) between their carbon atoms in the chain. |
| Mono-unsaturated oils | Large molecules that have one double bond (C=C) in their chain. |

Chemistry Unit 1.7 – **Our Changing Planet.**

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| **Key Word** | **Definition** |
| Atmosphere | The layer of gases surrounding the Earth. Today it contains 78% Nitrogen, 21% Oxygen, 0.9% Argon and 0.1% other gases. |
| Continental drift | The extremely slow movement of the continents across the surface of the Earth causing the continents which were once joined together to break apart. |
| Convection Currents | Circulating currents that form when a fluid is heated or cooled in one area, for example when the heat energy from the Earth’s core heats up the mantle causing magma to rise and currents to form. |
| Core | The central part of the Earth made from mainly Iron and Nickel. The inner core is solid and the outer core is liquid. |
| Crust | The thin, rocky outer layer of the Earth. |
| Earth’s early atmosphere | Formed when volcanoes released gases as the Earth cooled. Mainly carbon dioxide with some methane and ammonia. |
| Earthquake | Shaking and distortion of the ground due to the sudden movement of tectonic plates at their boundaries. |
| Mantle | A thick layer of hot, molten rock inside the Earth between the crust and the core. Convection currents in the mantle cause the tectonic plates that make up the crust to move slowly. |
| Tectonic Plate boundaries | The area where the edges of tectonic plates meet and move against each other. Volcanoes and earthquakes commonly occur along tectonic plate boundaries. |
| Tectonic Plates | A massive section of the Earth’s crust that gradually moves a few centimetres a year relative to other plates. |
| Volcano | An opening in the Earth’s crust from which magma (molten rock from deep underground) can escape to the surface. |