

## Definitions and Concepts for OCR (B) Chemistry GCSE

### Topic 3 - Chemicals of the Natural Environment

Definitions in **bold** are for higher tier only

Definitions marked by '\*' are for separate sciences only

Definitions have been taken, or modified from the [OCR \(B\) Specification for GCSE Chemistry, J258, Version 3.2 April 2020](#)

**\*Alcohols:** Organic compounds containing the functional group  $\text{-OH}$ . The first four members of a homologous series of alcohols are methanol, ethanol, propanol and butanol. Alcohols can be oxidised to carboxylic acids and dehydrated to alkenes.

**Alkanes:** The most common hydrocarbon found in crude oil. Alkanes have the general formula  $\text{C}_n\text{H}_{2n+2}$ . The first four alkanes are methane, ethane, propane and butane.

**\*Alkenes:** Hydrocarbons with a double bond between two of the carbon atoms in their chain, causing them to be unsaturated. They have the general formula  $\text{C}_n\text{H}_{2n}$ . The first four alkenes are ethene, propene, butene and pentene.

**Anode:** The positive electrode. It is where negatively charged ions lose electrons in oxidation reactions. It is the electrode where oxygen is produced unless the solution contains halide ions - then the halogen is produced.

**Bacterial extraction:** A method of metal extraction which uses bacteria to extract metals from their ores. The bacteria breaks down low-grade ores to produce an acidic solution containing metal ions.

**\*Carboxylic acids:** Organic compounds containing the functional group  $\text{-COOH}$ . The first four members of a homologous series of carboxylic acids are methanoic acid, ethanoic acid, propanoic acid and butanoic acid. Carboxylic acids have typical acidic properties.

**Cathode:** The negative electrode. It is where positively charged ions gain electrons in reduction reactions. It is the electrode where hydrogen is produced if the metal in the electrolyte is more reactive than hydrogen.

**Conductor:** A material that contains charged particles which are free to move to carry electrical or thermal energy.

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**Conservation of mass:** A law which states that no atoms are lost or made during a chemical reaction so the mass of the products equals the mass of the reactants.

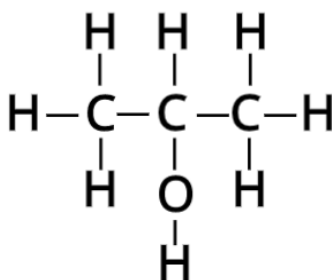
**Covalent bond:** A shared pair of electrons between two non-metals.

**Cracking:** A process that involves breaking down larger hydrocarbons to produce smaller more useful molecules. Cracking long chain alkanes produces short chain alkanes and alkenes. Cracking can be done by catalytic cracking or steam cracking.

**Crude oil:** A finite resource found in rocks. It is the remains of an ancient biomass consisting mainly of plankton that was buried in mud. Most of the compounds in crude oil are hydrocarbons.

**Displacement:** A chemical reaction in which a more reactive element displaces a less reactive element from its compound.

**Displayed formula:** A type of formula that shows all the bonds between every atom in the compound. E.g.



**Electrode:** A solid conductive material through which electricity can flow. Positive and negative electrodes are used in electrolysis to conduct electricity.

**Electrolysis:** The splitting up of an ionic compound using electricity. The electric current is passed through a substance causing chemical reactions at the electrodes which lead to the decomposition of the materials. Electrolysis is used for metal extraction if the metal is more reactive than carbon.

**Electrolyte:** A solution containing free ions from a molten or aqueous ionic substance. The ions are free to move to carry charge.

**Empirical formula:** The simplest whole number ratio of atoms of each element in a compound.

**Finite resource:** A resource which will one day run out.

**Fractional distillation:** A process used to separate a mixture of liquids. The liquids have different boiling points so can be separated into different fractions within a fractionating column.



**\*Functional group:** The group of atoms responsible for how a particular compound reacts. All compounds in the same homologous series have the same functional group.

**Homologous series:** A series of compounds with the same functional group and similar chemical properties.

**Hydrocarbons:** Molecules that are made up of hydrogen and carbon atoms only.

**Ionic equation:** Equations that show only the ions that change in the reaction and clearly indicate the gain/loss of electrons. They are used for representing displacement reactions because they show what happens to the ions.

**Malleable:** Capable of being deformed and moulded into various shapes. Metals are malleable since the uniform layers of atoms can slide over each other.

**Metallic bond:** The bonds present in metals between the positive metal ions and negatively charged delocalised electrons.

**Ore:** A type of rock which contains metal compounds. The metals or metal compounds are present in sufficient amounts to make it worth extracting them.

**Oxidation:** A reaction involving the gain of oxygen. **Oxidation is the loss of electrons.**

**Phytoextraction:** A method of metal extraction which uses plants to absorb the metal compounds through their roots. The plants are then burned so that the metal compound can be removed from the ash.

**Reactivity series:** A series in which metals are arranged in order of their reactivity. This can be used to predict products from reactions.

**Reduction:** A reaction involving the loss of oxygen. **Reduction is the gain of electrons.**

**Reduction with carbon:** Process used to extract metals from their oxides when the metal is less reactive than carbon. The metal oxide is heated with carbon so that carbon reduces the metal oxide to the metallic element.

**Simple molecules:** Molecules containing a fixed number of atoms covalently bonded together. Simple molecules have low boiling points since they have weak intermolecular forces which are easy to overcome.

**\*Structural formula:** A formula which shows the arrangement of atoms in the molecule of a compound but does not show all the bonds between them. E.g.  $\text{CH}_3\text{CH}_2\text{COCH}_3$ .

