

Definitions and Concepts for WJEC (Wales) Chemistry GCSE

Topic 2.5 - Crude Oil, Fuels and Organic Chemistry

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

Definitions have been taken, or modified from the [WJEC \(Wales\) Specification for GCSE Chemistry. 3410. Version 2 March 2019](#)

Addition polymerisation: The reaction in which many small molecule monomers bond together to form a long chain polymer.

Addition reaction: A reaction in which at least two molecules combine together to form a larger molecule.

Alcohols: Organic compounds containing the functional group –OH. The first four members of a homologous series of alcohols are methanol, ethanol, propanol and butanol. Alcohols can be oxidised to carboxylic acids.

Alkanes: The most common hydrocarbon found in crude oil. The first four members of a homologous series of alkanes are methane, ethane, propane and butane. Alkanes have the general formula C_nH_{2n+2} .

Alkenes: Hydrocarbons with a double bond between two of the carbon atoms in their chain, causing them to be unsaturated. The first four members of a homologous series of alkenes are ethene, propene, butene and pentene. Alkenes have the general formula C_nH_{2n} .

Biodegradable: Able to be broken down by living organisms.

Calorimetry: The process used to measure the amount of heat energy released or absorbed during a chemical reaction.

Carboxylic acids: Organic compounds containing the functional group –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.

Combustion: The burning of a substance in oxygen causing energy to be transferred to the surroundings as heat and light. If there is sufficient oxygen present for the substance to burn then it is called complete combustion.

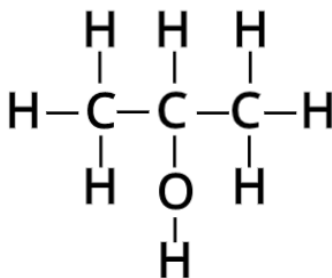
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Cracking: A process that involves breaking down larger hydrocarbons to produce smaller more useful molecules. Cracking can be done by catalytic cracking or steam cracking.

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 which can be separated by fractional distillation.

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



Fermentation: A chemical process by which molecules such as glucose are broken down anaerobically. Ethanol is produced when sugar solutions are fermented using yeast.

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

Fire triangle: A symbol which contains the three elements required for a fire to burn: oxygen, fuel and heat. Removing any of the three elements will prevent the fire from burning.

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. The mixture of liquids is vaporised and then the gases enter the fractionating column, where they condense at different fractions.

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.

General formula: A chemical formula which applies to a class of compounds, representing the composition of the atoms present in the compound. For example, alkanes have the general formula $\text{C}_n\text{H}_{2n+2}$, where n is the number of carbon atoms in the molecule.

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.

Infrared spectroscopy: An experimental technique used to identify the presence of certain bonds in organic molecules. It can be used alongside other techniques to determine the structure of a compound.



Microbial oxidation: The oxidation of a substance by microorganisms. Ethanol undergoes microbial oxidation to produce ethanoic acid.

Monomer: Small short chain molecules which can join together to form a long chain polymer.

Polymer: Large long-chain molecule made up of lots of small monomers joined together by covalent bonds.

Positional isomers: Compounds with the same molecular formula but with different structural formulas due to the differing position of the functional group on the carbon chain.

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. $\text{CH}_3\text{CH}_2\text{COCH}_3$.

Structural isomerism: A type of isomerism which occurs when compounds have the same molecular formula but a different structural formula.

