1 – Hydrocarbons

Hydrocarbon	Molecules that only contain **hydrogen** and **carbon** atoms.
Homologous series	A group of **organic** compounds that **react** in a **similar** way.
Properties	-The **longer** the hydrocarbon, the **more viscous** it is. -The **longer** the hydrocarbon, the **less volatile** it is. -The **longer** the hydrocarbon, the **less flammable** it is.
Alkanes	**Simplest** type of hydrocarbon. They are **saturated** compounds. They have **general** formula $\mathbf{C_nH_{2n+2}}$ The first four alkanes are: **methane** ($\mathbf{CH_4}$), **ethane** ($\mathbf{C_2H_6}$), **propane** ($\mathbf{C_3H_8}$) and **butane** ($\mathbf{C_4H_{10}}$).

2 – Crude oil and fractional distillation

Crude oil	A **fossil fuel** formed over **millions** of years. It is a **non-renewable** fuel. It is an important source of fuels such as **petrol**, **diesel**, **kerosene**, **heavy fuel oil** and **liquified petroleum gas**. It is also used for **feedstock** in the petrochemical industry.
Fractional distillation	1. Oil is **heated** to a **gas** and enters **fractionating column**. 2. There is a **temperature gradient** in the column, **long** hydrocarbons (with **high boiling points**) condense early on near the **bottom** of the coloum. 3. **Shorter** hydrocarbons (**lower boiling points**) points condense much later on near the **top** of the column. 4. The crude oil is separated into different fractions, each one containing a mixture of hydrcarbons of similar length.
Fractions	

Carbon chain length	Name
~3	Liquified petroleum gas
~8	Petrol
~15	Kerosene
~20	Diesel
~40	Heavy fuel oil
40+	Bitumen

3 – Combustion

Complete	Happens when there is a **good supply** of **oxygen**. **hydrocarbon** + **oxygen** → **carbon dioxide** + **water**
Incomplete	Happens when there is **not** a **good supply** of **oxygen**. **Carbon monoxide** or **carbon particulates** produced instead of carbon dioxide.
Balancing combustion equations	*1. Balance number of carbons by adding a number in front of CO_2.* E.g. C_5H_{12} + O_2 → 5 CO_2 + 6 H_2O *2. Balance the number of hydrogens by adding a number in front of H_2O.* E.g. C_5H_{12} + O_2 → 5 CO_2 + 6 H_2O *3. Add up the number of oxygen atoms on the right hand side and balance by outing a number in front of O_2.* E.g. C_5H_{12} + 8 O_2 → 5 CO_2 + 6 H_2O

4 – Alkenes and cracking

Alkenes	Alkenes are **hydrocarbons** with a **double** carbon-carbon bond. They are **unsaturated**. They have the general formula $\mathbf{C_nH_{2n}}$.
Cracking	Cracking is a **thermal decomposition** reaction. Hydrocarbons are cracked to produce **smaller**, more **useful** molecules.
Catalytic cracking	Hydrocarbons are **vapourised** at around **550°C**. The vapour is passed over a hot **aluminium oxide catalyst**.
Steam cracking	Hydrocarbons are **vaporised** at a **very high temperature**. They are then mixed with **steam**.
Testing for alkenes	**Bromine water** will become **colourless** (bromine added across double bond to form colourless di-bromo compound) in an **alkene** and remain **bright orange** in an **alkane**.

GCSE Science

Chemistry C7 – Organic Chemistry