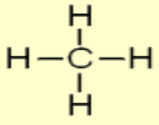
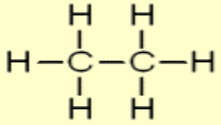
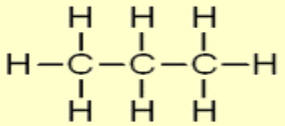
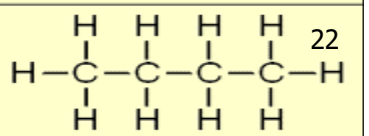
Chemistry 7: Hydrocarbons

Section 1: Key terms

1 Crude oil	A **mixture** of **hydrocarbons** formed over **millions of years** from dead **plankton** subjected to **pressure**.
2 Hydrocarbon	A molecule containing **hydrogen** and **carbon** atoms **only**.
3 Alkane	A **hydrocarbon** containing only **single bonds**. Follows the formula C_nH_{2n+2}.
4 Fractional distillation	The method of **separating hydrocarbons** based on their **boiling point**.
5 Intermolecular force	**Weak forces of attraction** that exist between **molecules**.
6 Boiling point	The temperature at which a **liquid** turns into a **gas**.
7 Viscosity	The ability of a substance to **flow**.
8 Flammability	The ability of a substance to **burn** or **ignite**.
10 Combustion	A **reaction** between a **fuel** and **oxygen** that produces **heat**.
11 Complete combustion	Combustion in **adequate oxygen**. Complete combustion of a hydrocarbon will produce **carbon dioxide** and **water**.
12 Incomplete combustion	Combustion in **inadequate oxygen**. Incomplete combustion of a hydrocarbon produces **water** and **carbon monoxide or carbon particulates**.
13 Alkene	A **hydrocarbon** containing at least one **double bond**. If they contain one double bond only they follow the formula C_nH_{2n}. Used to make **polymers**.
14 Bromine water	A chemical that is **brown/ orange** in colour. If added to an **alkene** it reacts and changes to **colourless**. Alkanes do not produce a change in colour.
15 Cracking	The process by which less-useful **long-chain hydrocarbons** are **split** to produce an **alkane** and an **alkene**.
16 Catalyst	A chemical that **speeds up the rate of reaction** without being used itself.
17 Covalent bond	A **strong bond** that exists between **non-metal atoms**.
18 Fraction	A fraction contains **similar length hydrocarbons** with a **small range of boiling points**.

Section 2: Alkanes

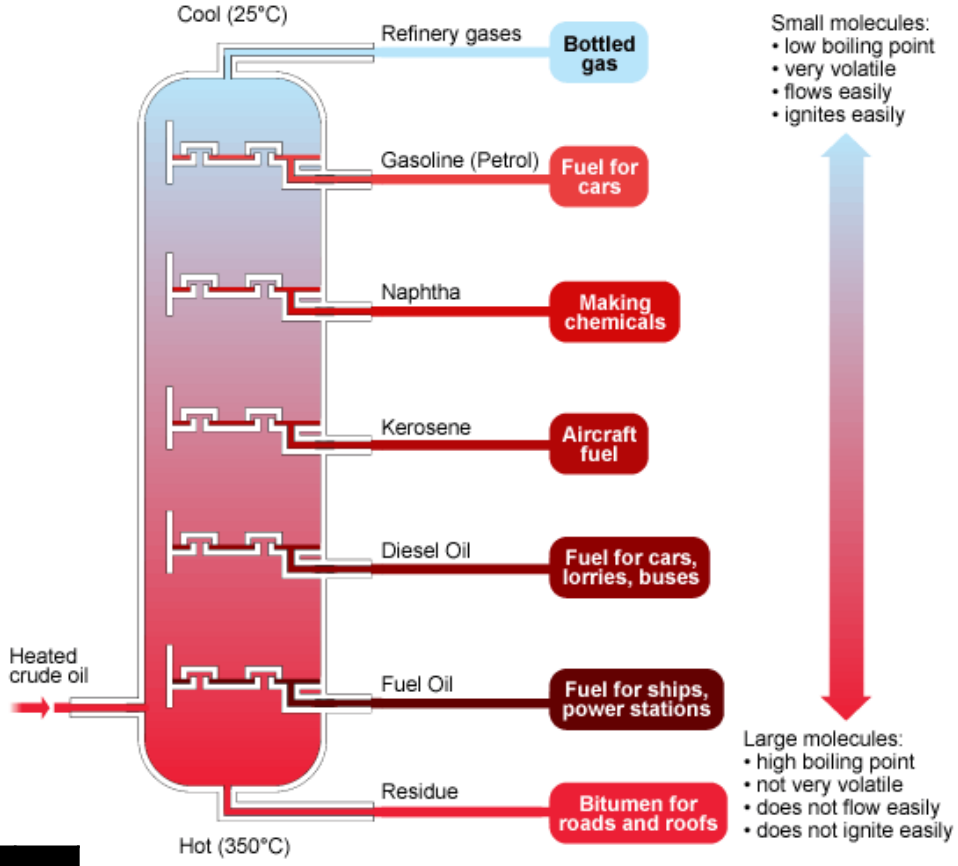
methane CH_4		19
ethane C_2H_6		20
propane C_3H_8		21
butane C_4H_{10}		22

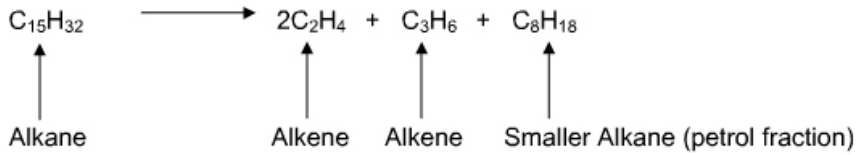
Section 3: Fractional Distillation

23	The crude oil is **heated** to 400ºC.	**H**
24	Most fractions **evaporate** and become **vapours**. The residue doesn't boil and flows to the bottom of the column.	**E**
25	Hot vapours **rise** up the column and **cool down**.	**R**
26	When the vapours **cool** to their **boiling point** they **condense** and flow out of the column.	**C**
27	Those with **lower boiling points rise further** before cooling down.	
28	Refinery gases do not cool down to their boiling point so **remain as gases**.	

Section 4: Cracking

Cracking Method	Process	Temperature
29 Catalytic Cracking	Fraction is **heated** in the presence of a **zeolite catalyst**.	**500ºC.**
30 Steam Cracking	Fraction is diluted with **steam** and **heated**.	**850ºC.**





31 Cracking breaks down long-chain hydrocarbons to shorter hydrocarbons and an alkene. The atoms in the products must be the same as the atoms in the reactants.