

**Section 1: Key terms**

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

**Section 2: Alkanes**

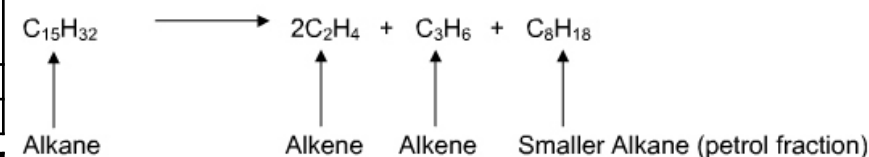
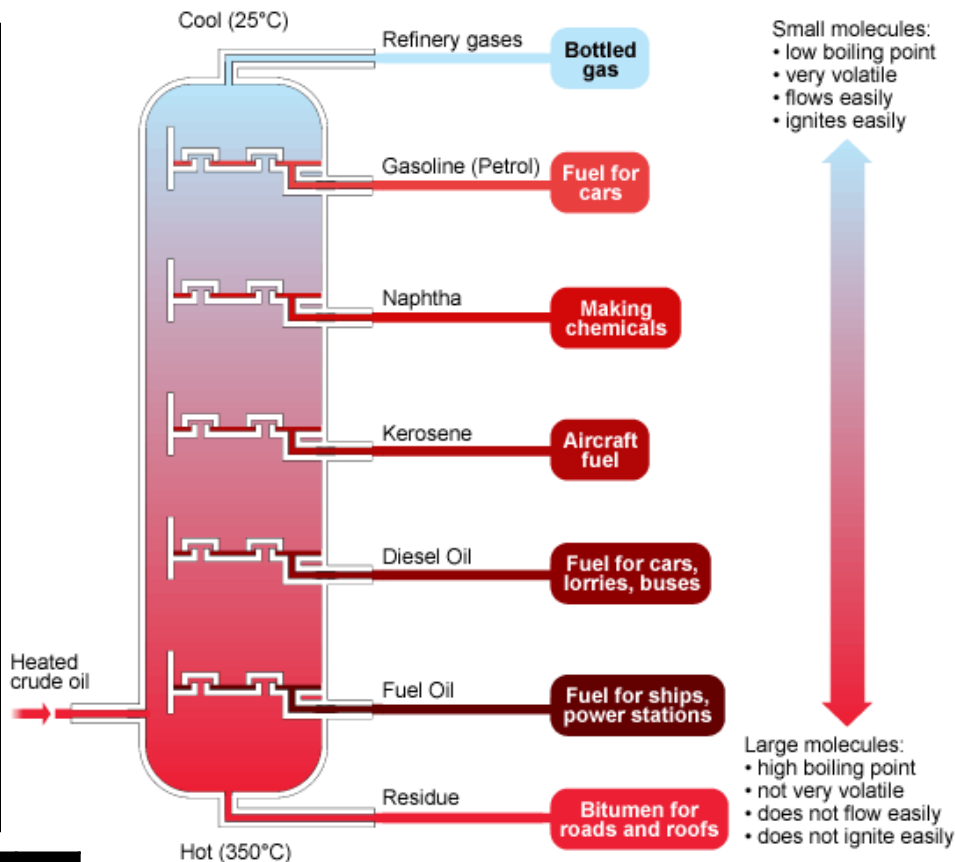
methane CH <sub>4</sub>	$\begin{array}{c} \text{H} \\   \\ \text{H}-\text{C}-\text{H} \\   \\ \text{H} \end{array}$	19
ethane C <sub>2</sub> H <sub>6</sub>	$\begin{array}{cc} \text{H} & \text{H} \\   &   \\ \text{H}-\text{C} & -\text{C}-\text{H} \\   &   \\ \text{H} & \text{H} \end{array}$	20
propane C <sub>3</sub> H <sub>8</sub>	$\begin{array}{ccc} \text{H} & \text{H} & \text{H} \\   &   &   \\ \text{H}-\text{C} & -\text{C} & -\text{C}-\text{H} \\   &   &   \\ \text{H} & \text{H} & \text{H} \end{array}$	21
butane C <sub>4</sub> H <sub>10</sub>	$\begin{array}{cccc} \text{H} & \text{H} & \text{H} & \text{H} \\   &   &   &   \\ \text{H}-\text{C} & -\text{C} & -\text{C} & -\text{C}-\text{H} \\   &   &   &   \\ \text{H} & \text{H} & \text{H} & \text{H} \end{array}$	22

**Section 3: Fractional Distillation**

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

**Section 4: Cracking**

Cracking Method	Process	Temperature
29 Catalytic Cracking	Fraction is <b>heated</b> in the presence of a <b>zeolite catalyst</b> .	<b>500°C.</b>
30 Steam Cracking	Fraction is diluted with <b>steam</b> and <b>heated</b> .	<b>850°C.</b>



**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.