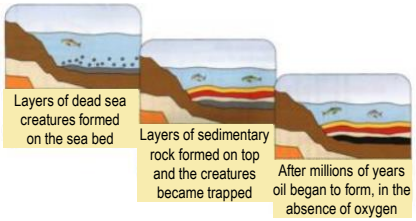
Exmouth Community College
Academy Trust

Hydrocarbons

Crude Oil is made from the remains of living **sea creatures** decayed in mud millions of years ago



It is a **FINITE** resource

It is made from a mixture of Hydrocarbons. Hydrocarbons are made from **Hydrogen and Carbon only**

The main hydrocarbons in Crude Oil are **alkanes**

Alkane	Molecular Formula	Structural Formula
Methane	CH_4	
Ethane	C_2H_6	
Propane	C_3H_8	
Butane	C_4H_{10}	

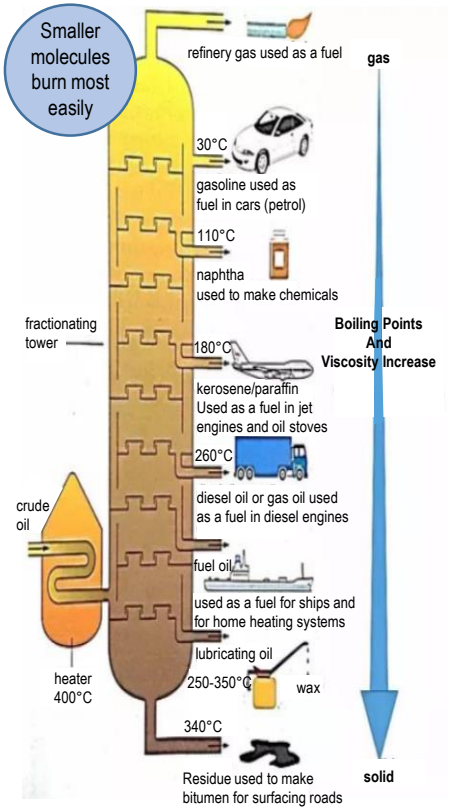
The general formula for an alkane is:

$$C_nH_{2n+2}$$

Fractional Distillation

How do we separate the mixture of hydrocarbons to use them?

Works by **evaporation** and then **condensation**



1. **Heat** the crude oil to **evaporate** it
2. The gases **rise** up the column
3. The different fractions **condense** at **different temperatures**

Combustion

Combustion (burning) is a reaction with **oxygen**

A reaction with oxygen is called **'oxidation'**

When hydrocarbons burn a lot of **energy** is released

Complete combustion of hydrocarbons the only products are **carbon dioxide and water**

Complete combustion only happens if there is plenty of oxygen

General equation

hydrocarbon + oxygen → carbon dioxide + water

Complete combustion of propane

propane + oxygen → carbon dioxide + water

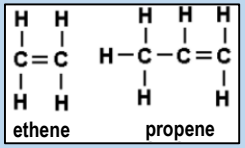
$$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$$

Cracking

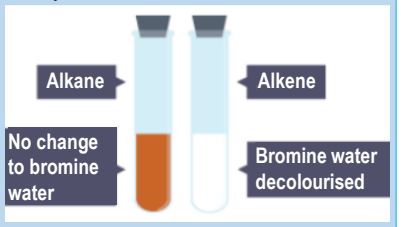
The larger molecules from fractional distillation are less useful. We can break them down into smaller, more useful molecules

Cracking produces a mixture of **alkanes** and **alkenes**

Alkenes have some **double bonds**

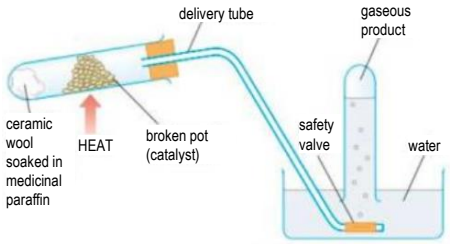


They turn **bromine water colourless**



They are used to make **polymers**

The apparatus for cracking



Catalytic cracking – catalyst and 500°C

Steam cracking – steam and 850°C

Year 9 – Chemistry / Carbon Chemistry – HT5