

### Hydrocarbons

Made out of only hydrogen and carbon.

Alkanes have the general formula  $H_nC_{2n+2}$ .

Alkanes are homologous- they react in a similar way.

Alkanes are saturated- they all have **four covalent bonds**.

The first four alkanes are *methane, ethane, propene and butane*.

These can be remembered by **My Elephants Pooley Bum**.

As the chains get shorter, the flammability, volatility, and thickness **decreases**.

Short chain hydrocarbons are more useful than longer ones.

### Cracking

Cracking is the breaking of long chain hydrocarbons into small ones.

Cracking produces an alkane and an alkene.

Cracking is a thermal decomposition reaction.

Catalytic Cracking- You can pass long chain molecules over a hot powdered aluminium oxide catalyst.

Thermal Cracking- You can crack hydrocarbons by vaporising them, mixing them with steam and heating them to a very high temperature.

What ever goes into a cracking reaction comes out.

### Combustion of Hydrocarbons

The complete combustion of any hydrocarbon in oxygen releases a lot of energy.

Hydrocarbon + Oxygen  $\rightarrow$  Carbon Dioxide + Water (+energy)

Both carbon and hydrogen are oxidised.

An equation must be balanced.

### Crude Oil

Crude oil is a fossil fuels, formed over millions of years, with high temperatures and pressure.

It is formed from plankton, and can be drilled up from rocks.

It is a non-renewable and finite resource. They are being used up much faster than they are being formed.

### Uses of Crude Oil

Oil is used for modern transport. This includes LPG, Heavy Fuel Oil, Diesel Oil and Kerosene.

All of the products from crude oil are organic compounds.

### Fractional Distillation of Crude Oil

Crude oil is made out of hydrocarbons, mostly alkanes.

The oil is heated until most of it turns not a gas. It enters the fractionating column. ↓

There is a temperature gradient in the column. It is cooler at the top, and hotter at the bottom. ↓

The shorter hydrocarbons have the lowest boiling points and are condensed at the top. ↓

You end up with LPG, Petrol, Kerosene, Diesel Oil, Heavy Fuel Oil, and Bitumen.

Little (shortest chain) Penguins Keep Drinking Hot Beer

### Alkenes

Alkenes have a C=C Double Bond, meaning that alkenes have two fewer hydrogens compare to alkanes.

Alkenes are **unsaturated**.

Alkenes are more reactive than alkanes due to the double bond being able to make a single bond.

Ethene, Propene, Butene and Pentene.

The General Formula is:  $H_nC_{2n}$

To test for alkenes, you use bromine water, which turns from bright orange to colourless.

Alkenes can be used to produce polymers and may other chemicals.

