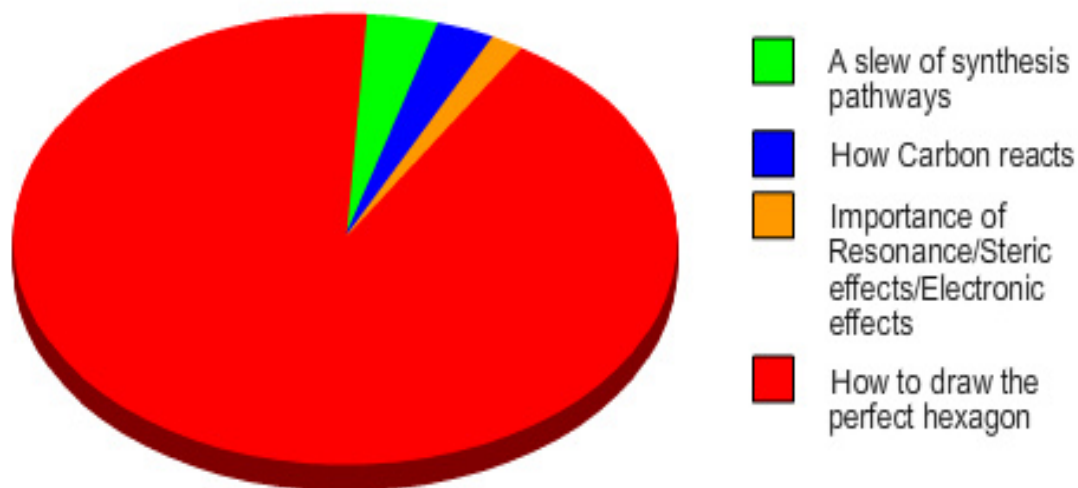


Intro to Organic Chemistry

Things learned in Organic Chemistry



Outcomes:

- Compare & Contrast inorganic and organic chemistry (include: the contribution of Freidrick Wohler)

O-Chem Introduction:

A bit of history...

- After the discovery of **FIRE**, man categorized substances into those that **BURN**, and those that **DON'T BURN**.
- Combustible materials generally come from **LIVING THINGS** (ex. oil/fats), and non-combustible from **NON-LIVING THINGS** (ex. salt)
- Substances that came from living things were called **ORGANIC**, and all others (ex. water) were called **INORGANIC**.

Freidrich Wohler (1800-1882):

- Heated Ammonium Cyanate ($\text{NH}_4\text{OCN}_{(s)}$) which created **UREA** ($\text{H}_2\text{NCONH}_{2(s)}$), a waste product produced by **LIVING ORGANISMS**.
- Changed the definition of organic compounds...

Organic Compounds:

Most compounds that contain **CARBON**, except **CO**, **CO₂** or **IONIC** carbon compounds like CaC₂.

Organic Chemistry:

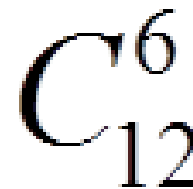
- The study of organic compounds.

Inorganic Compounds:

- Compounds that do not fit the definition of organic compounds (ex. NaCl).
Most compounds are inorganic.

Carbon:

- Has the ability to make **4 COVALENT BONDS**, due to its **4 VALENCE ELECTRONS**.



Single Bonds



Double Bonds



Triple Bonds



Organic Compounds:

Influence On Our Lives:

Organic chemistry has led to the production of many of the substances we use every day:

Plastics

Nylon

Food Flavouring

Rubber

Shampoos

Artificial Fragrances

Paints

Gasoline

Soap & Detergents

We can produce almost any naturally occurring organic compound synthetically, in the lab. These “synthetic” compounds are chemically identical to their natural counterparts.

Production of Organic Substances...



Outcomes:

- Identify the origins and major sources of Hydrocarbons and other organic compounds. (include natural and synthetic sources)

Petroleum Refining:

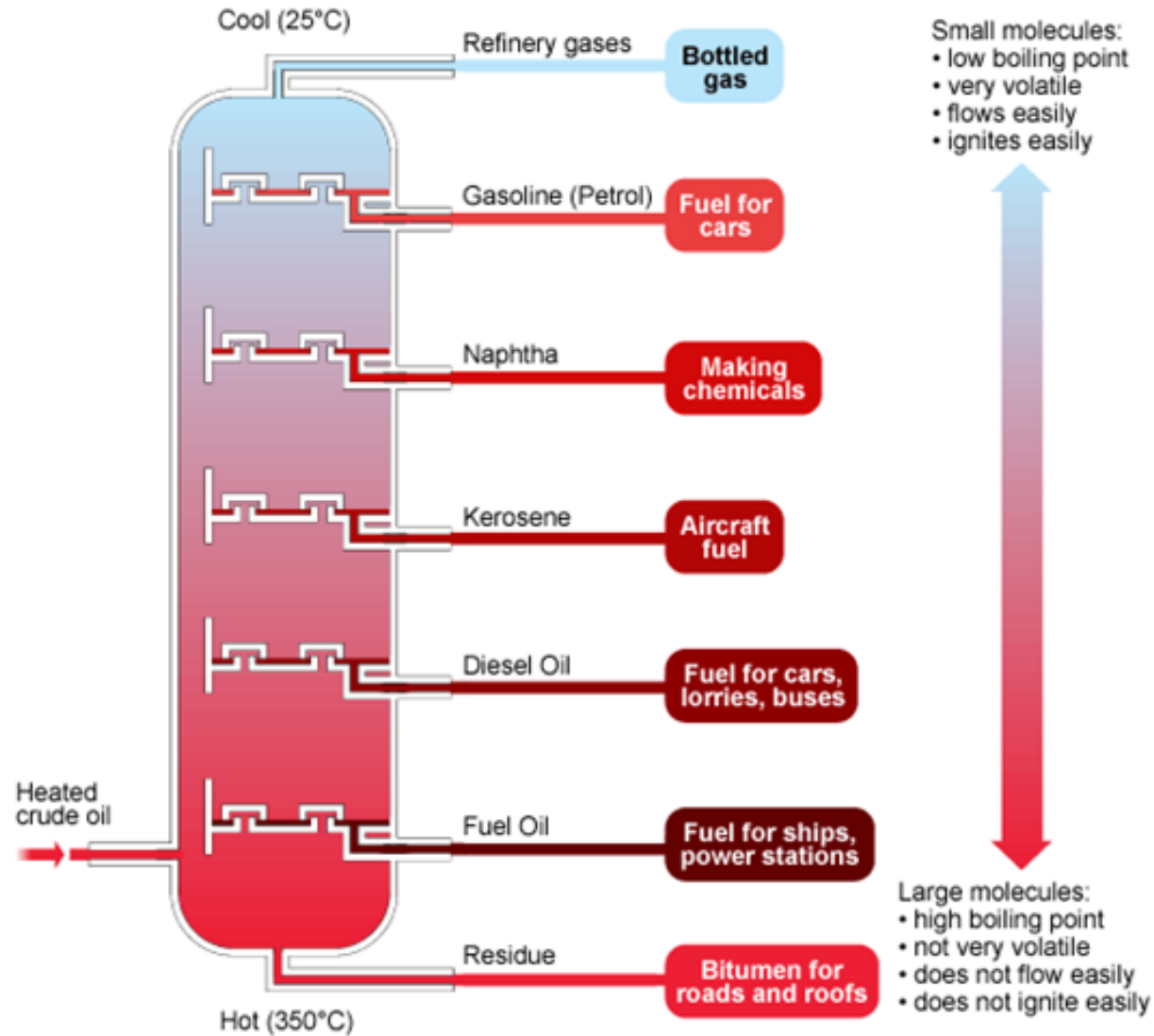
Petroleum:

- A complex liquid mixture mostly made of HYDROCARBONS with varying numbers of carbon atoms.
- Over millions of years, HEAT and PRESSURE deep in the earth transform plant and animal material into PETROLEUM.
- Surrounded by NATURAL GAS (lighter hydrocarbons).
- Petroleum is used to make most of our FOSSIL FUELS.

Fractional Distillation:

- The process of REFINING petroleum into its COMPONENTS using differences in BOILING POINTS.
- CRUDE OIL is pumped into a FRACTIONATING tower, and HEATED.
- The different components of the oil BOIL at different temperatures, and VAPORIZE.
- As the vapours rise up the tower, they cool and CONDENSE at different POINTS, into different types of FUELS.
- The remnants that do not vaporize are used in ASPHALT, and TARS.

Fractional Distillation:



Organics From Agricultural Sources:

- **GASOHOL** is a gasoline **EXTENDER**, a mixture of **GASOLINE** (90%) and **ETHANOL** (10%) or gasoline and **METHANOL**.
- Gasohol has a higher **OCTANE** rating and burns more **SLOWLY** and **COMPLETELY**, thus reducing emissions of some **POLLUTANTS**.
- **OCTANE** rating is the rating scale used to rate gasoline burning **EFFICIENCY**.
 - The **HIGHER** the rating, more **COMPLETELY** the gasoline will burn.
- Gasohol made with **METHANOL** may produce **CARCINOGENIC** by-products.
- Both types of gasohol are very **EXPENSIVE** to produce.
- **ETHANOL** is a **GRAIN** alcohol made by **FERMENTING** agricultural products and/or wastes.
- Gasohol is intended to be a **SUBSTITUTE** for petroleum-based fuels.
- There are several agricultural **CROPS** that are used to make fuels. These include: **SUGARCANE**, **SUGAR BEET**, **CORN**, etc.