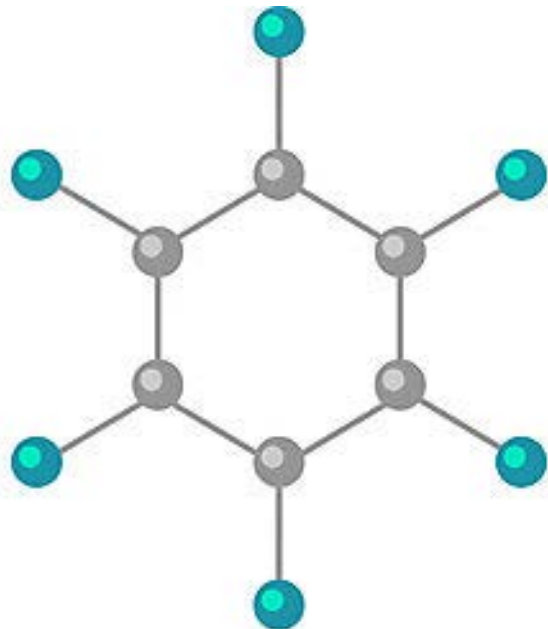


Aromatic Hydrocarbons



ONE RING
TO RULE THEM ALL

Outcome:

- Compare & Contrast the structure of aromatic and aliphatic hydrocarbons.
- Describe practical uses of aromatic hydrocarbons.

Aromatic Hydrocarbons:

So far, we have been looking at strictly aliphatic hydrocarbons...

Aliphatic Hydrocarbons

- Are mainly **STRAIGHT CHAIN** hydrocarbons, with some **CYCLIC HYDROCARBONS** as exceptions.
- Are mostly derived from **FATTY ACID** sources, hence the name '**ALIPHATIC**'. (from greek '**ALIPHATOS**' meaning fat)
- Are hydrocarbon compounds that maintain the **STABLE OCTET** structure for carbon.
- Are generally **FLAMMABLE**, and have relatively low **BOILING POINTS**.

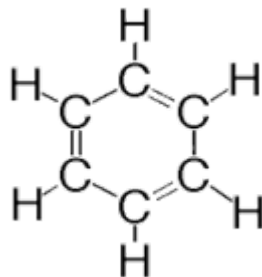
Aromatic Hydrocarbons:

Aromatic Hydrocarbons

- Are named such because of the usually **PLEASANT ODOUR** of many naturally occurring compounds.
- Consist mainly of **BENZENE** and derivatives of **BENZENE**.
- **BENZENE** and its derivatives were produced from a number of **ODOROUS BALSAMS** and **RESINS**.
- Are generally **FLAMMABLE**, with low **BOILING POINTS**.
- Have a different **STRUCTURE** and **REACT** differently than aliphatic compounds.

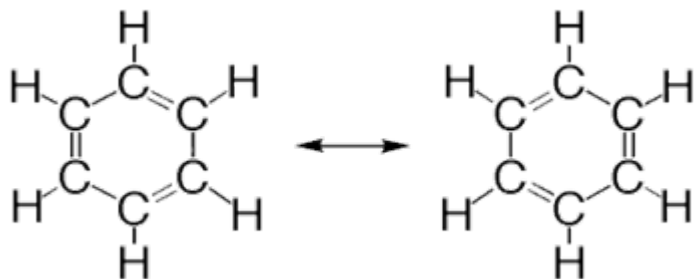
Discovery of Benzene

- Michael Faraday isolated benzene in 1825 from an oily condensate in the illuminating gas lines in London.
- Faraday determined the **EMPIRICAL FORMULA** to be **CH**, and named it '**CARBURETTED HYDROGEN**'.
- Eilhard Mitscherlich determined the **MOLECULAR FORMULA** to be **C₆H₆** in 1834.
- Chemists had great difficulty determining the **STRUCTURAL** formula of benzene, its formula suggests it is **UNSATURATED**, but it didn't seem to **REACT** that way...it was extremely **STABLE**!
- In 1865 Friedrich Kekule "discovered" the structure of benzene after dreaming about a snake biting its own tail.
- He proposed a **CYCLIC HEXAGONAL STRUCTURE** of 6 carbon atoms with **ALTERNATING DOUBLE** and **SINGLE BONDS**:



Discovery of Benzene

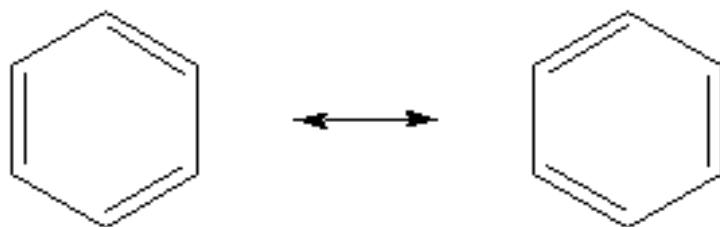
- Later, after further investigation by other scientists, Kekule proposed the double bonds could **ALTERNATE** or **RESONATE** back and forth between the carbon atoms:



- These two structures are called **RESONANCE HYBRIDS**.
- The actual structure is believed to be **BETWEEN** these two structures.

Discovery of Benzene

- We can simplify these structures as:



- These diagrams can be simplified further to a single diagram to represent both **RESONANCE HYBRIDS**.

