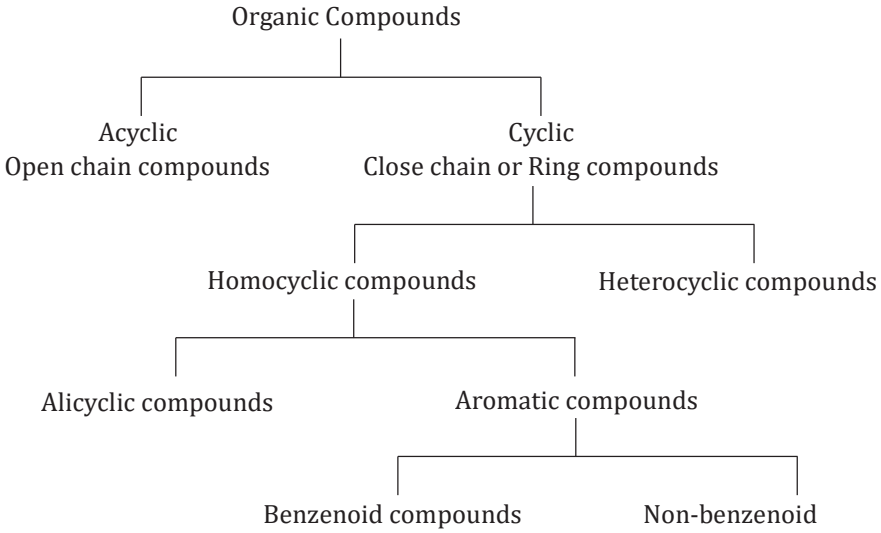
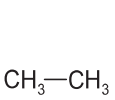
CLASSIFICATION OF ORGANIC COMPOUNDS

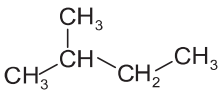
Organic compounds have hydrocarbon and things related to hydrocarbon. Based on their structures, we classify organic compounds into different types:

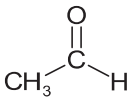


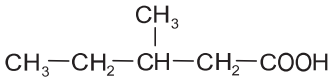
Acyclic or Open Chain Compounds

These Compounds have open chains of carbon atoms in them. These carbon chains can either be straight or have branches. People also call them aliphatic compounds.


Ethane


Isopentane


Acetaldehyde


3-Methyl pentanoic acid

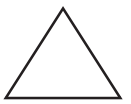
Alicyclic or Closed Chain or Ring Compounds

These Compounds have chains or rings of atoms within their molecules.

Alicyclic Compounds

In these Compounds, there's a ring made up of three or more carbon atoms. They share many properties with aliphatic compounds.

For instance,


Cyclopropane


Cyclobutane

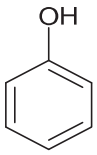

Cyclopentene


Cyclohexane

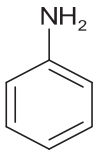
Aromatic Compounds

These substances have a circular structure that includes at least one benzene ring. The main member of this group is called benzene. Benzene itself has a circular hexagonal ring with six carbon atoms and three double bonds at alternate positions. Some examples of different kinds of aromatic compounds include

Benzene

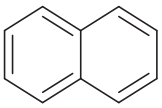


Phenol

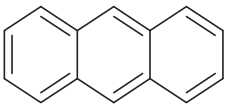


Aniline

These substances are also known as benzenoid compounds, and they have a special characteristic called aromaticity. Bicyclic and tricyclic compounds are also part of this group.

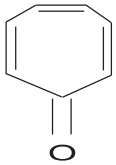


Naphthalene (Bicyclic)



Anthracene (Tricyclic)

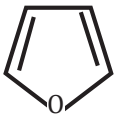
Apart from these, there are certain compounds that exhibit aromaticity without having any benzene rings. These are termed non-benzenoids.



Tropone

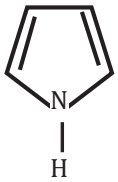
Heterocyclic Compounds

In these substances, the circular structure includes carbon atoms as well as one or more atoms of nitrogen, oxygen, or sulfur. The atoms in the ring that are not carbon (like N, O, S) are called heteroatoms.



Furan

Thiophene

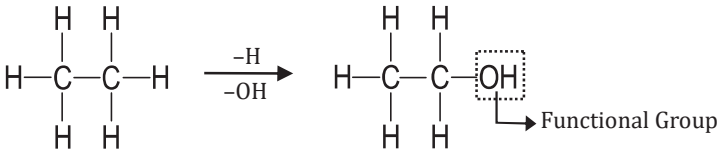


Pyrrole

Functional or Characteristic Groups

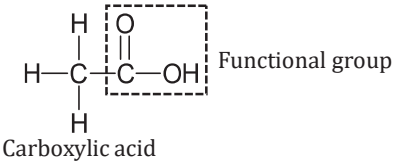
We've learned that hydrocarbons are the main organic compounds. When one or more hydrogen atoms are replaced by other atoms or groups, we call them derivatives of hydrocarbons. These atoms or groups are known as functional groups, and the properties of organic compounds, especially the chemical properties, depend on the functional groups in the compound.

Therefore, a functional group can be defined as:



Hydrocarbon Derivatives of Hydrocarbon

The rest of the molecule mostly influences how it behaves physically, like when it turns from a solid to a liquid (melting point), when it starts bubbling (boiling point), how heavy it is (density), and if it can dissolve in other substances (solubility).



Carboxylic acid

We can group organic compounds based on their functional parts, and this helps us organize them into families or sets that share similarities.

Homologous Series

A homologous series is like a group of chemical buddies that have the same building blocks, called functional groups, and act alike in reactions. In this series, each pair of friends has a slight difference in their recipe, where one friend has an extra -CH_2 group compared to the other. All the buddies in the same series follow a general formula.

For instance, members of the alcohol family always have the formula C_nH_{2n+1}-OH, where n can be 1, 2, 3, 4, and so on.

Here are a few members of this chemical family:

CH_3OH	C_2H_5OH	C_3H_7OH	C_4H_9OH
Methyl alcohol	Ethyl alcohol	Propyl alcohol	Butyl alcohol