

# Introduction to Organic Chemistry

## What is Organic Chemistry?

- Organic chemistry studies compounds containing carbon
  - Some carbon compounds are excluded because they act more like non-carbon containing compounds (carbon oxides, metal carbides, and carbonates)
- Organic compounds include drugs, fuels, toiletries, plastics, and fabrics.

Organic Chemistry - studies compounds containing carbon.

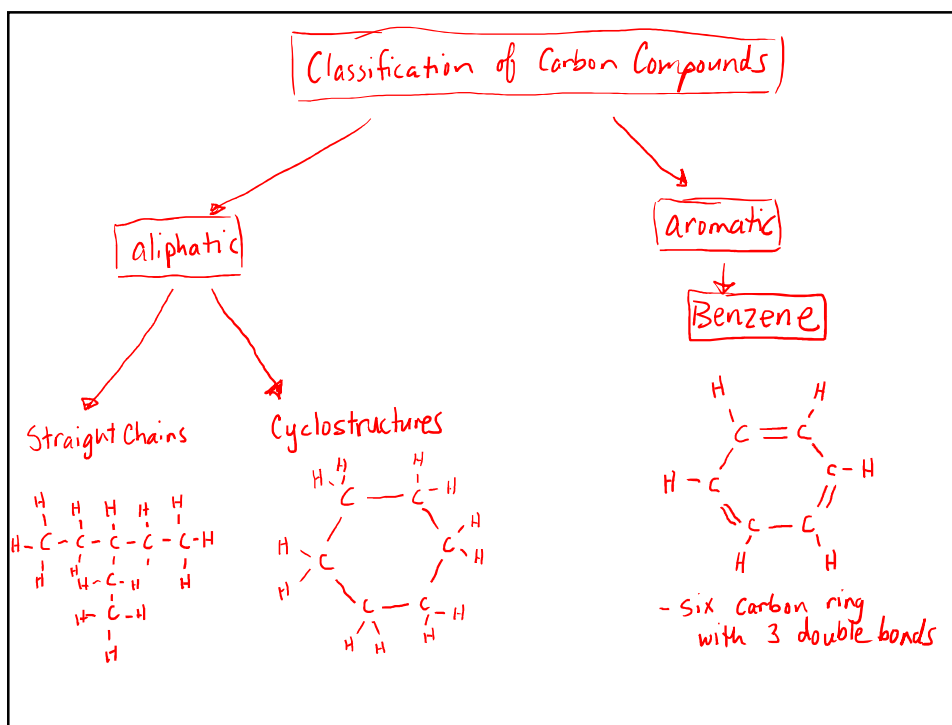
→ examples of organic compounds include drugs, fuels, toiletries, plastics, fabrics.

## Why is Carbon So Special?

- Carbon can form a vast array of long chain and ring containing compounds because carbon has the unique ability to bond to itself.
- There is no theoretical limit to the number of organic compounds that can exist
- Aliphatic vs aromatic
- Carbon forms strong covalent bonds to hydrogen, nitrogen, oxygen, sulfur, and phosphorus in addition to others

### Why is carbon so special?

- 4 valence electrons allow for a unique ability to bond to itself in chains and rings.
- there is no theoretical limit to the number of organic compounds that exist.

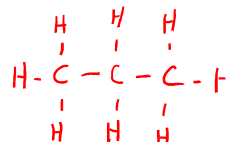


# Carbon Bonding

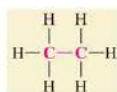
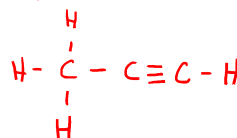
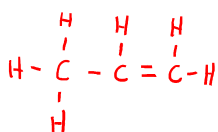
- ~~Most organic molecules have a hydrocarbon chain foundation, sometimes with "things" attached to it called substituent groups~~
- Two Categories of Hydrocarbon chains
  1. Saturated
  2. Unsaturated
    - Caution: Some saturated carbon-containing molecules may have carbon double bonded to an OXYGEN...being saturated or unsaturated has to do with the bonds between carbon atoms

## 2 categories of hydrocarbons

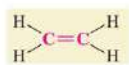
1) Saturated - carbon chains contain all single bonds.



2) Unsaturated - carbon chains contain at least one double or triple bond.

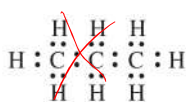


Ethane is a saturated hydrocarbon because it has all single bonds.

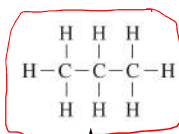


Ethene is an unsaturated hydrocarbon because it has a double bond.

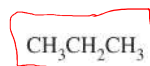
## Organic Formulas and Molecular Models



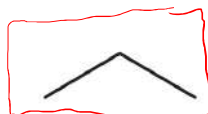
Lewis structure



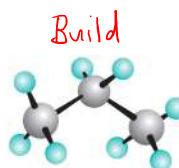
Structural formula



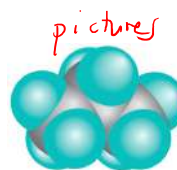
Condensed structural formula



Line structure



Ball-and-stick model



Space-filling model

