

## Organic Compounds

- It used to be thought that only living things could synthesize the complicated carbon compounds found in cells
- German chemists in the 1800's learned how to do this in the lab, showing that "organic" compounds can be created by non-organic means.
- Today, organic compounds are those that contain carbon. (with a few exceptions such as carbon dioxide and diamonds)

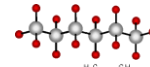


## Carbon's Bonding Pattern

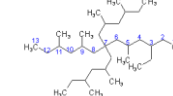
- Carbon has 4 electrons in its outer shell. To satisfy the octet rule, it needs to share 4 other electrons. This means that each carbon atom forms 4 bonds.



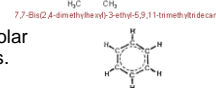
- The 4 bonds are in the form of a tetrahedron, a triangular pyramid.



- Carbon can form **long chains**, **branched chains** and **rings**.

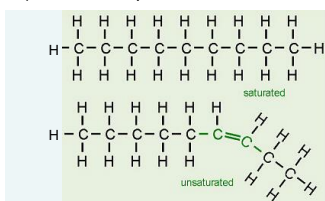


- Compounds with just carbon and hydrogen are "hydrocarbons"; non-polar compounds like fuels, oils and waxes.



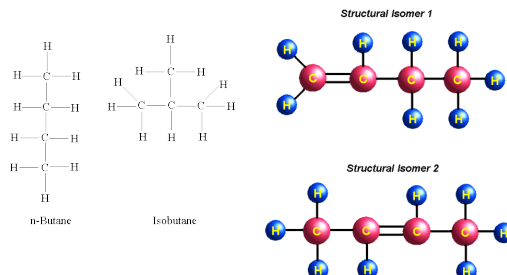
## Saturated vs. Unsaturated

- **Single Bonds** -Saturated Hydrocarbons contain only single bonds. (They are saturated with the maximum number of hydrogen atoms.)
- **Multiple Bonds** -Unsaturated Hydrocarbons contain at least one (or more) double or triple bond.



## Isomers

**Isomers** – compounds that have identical chemical formulas but different molecular structures (shapes).



## Organic Nomenclature

- **Prefix** indicates the number of carbon atoms in the compound

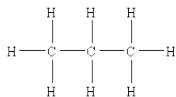
1	meth
2	eth
3	prop
4	but
5	pent
6	hex
7	hept
8	oct
9	non
10	dec

## Organic Nomenclature

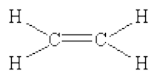
- **Base word** indicates the type of bond(s) in the compound

-ane	single bond
-ene	double bond
-yne	triple bond

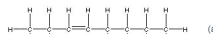
## Practice



Draw hexane.



## Organic Nomenclature



3-octene

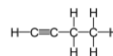


(b)



(c)

- Use a number to indicate where the double or triple bond is located in the compound. (Always use the smallest number possible.)
- Use a **hyphen** between numbers and words



1-butyne

## Organic Nomenclature

- **Alkanes** -  $\text{C}_n\text{H}_{2n+2}$  rule
- **Alkenes** -  $\text{C}_n\text{H}_{2n}$  rule
- **Alkynes** -  $\text{C}_n\text{H}_{2n-2}$  rule

Examples:

- butane  $\text{C}_4\text{H}_{10}$       ethene  $\text{C}_2\text{H}_4$
- octane  $\text{C}_8\text{H}_{18}$       hexyne  $\text{C}_6\text{H}_{10}$

## Practice

What is the chemical formula for

- methane?
- 2-pentene?
- 3-nonyne?

Draw 1-butene