**Organic Chemistr**

**the study of carbon**

**Properties of Carbon**

1. **non-metal**
2. **covalent bonding**
3. **relatively low melting/boiling points**
4. **most are insoluble in water because their non-polar**
5. **carbon atoms bond with each other in chains, rings, and networks**
6. **carbon forms 4 bonds, 1 hydrogen bond, oxygen forms 2 bonds, nitrogen forms 3 bonds, and halogens(group 1) form 1 bond**

**Homologous Hydrocarbons**

**Homologous= differs by 1 carbon + 2 hydrogen atoms in the series**

**Hydrocarbon= compounds that contain hydrogen + carbon ONLY!**
**Alkanes- hydrocarbon that contains a carbon-carbon single bond-> Saturated hydrocarbon= Single bonds only**

**End in the “ane” suffix.**


**Alkene- unsaturated( multiple bonds) hydrocarbon that contains double carbon-carbon bonds.**

**-There must be at least 2 carbon atoms present to form an alkene.**
**-Each alkene will contain only one double bond.**

**ends in “ene”**

**Alkyne- unsaturated(multiple bonds) hydrocarbon that contains triple carbon bonds.**

**- There must be at least 2 carbon atom present to form an alkyne.**

**- Each alkyne will contain only one triple bond.**

**Ends in “yne”**

**Isomers- same molecular formula different structural formulas**

**Same # of carbon + hydrogen atoms but they are arranged differently.**

**-In order to have isomers with the hydrocarbon, you must have a minimum of 4 carbon atoms in the compound.**

**Naming Isomers**

1. **find the longest carbon chain & circle it.**
2. **# of carbon from left to right and right to left, choosing the lowest # for each carbon atom.**
3. **name(location of carbon # + # of carbons) Whatever is not included in your circle chain.**

**\* 1 carbon atom= methyl**
**2 carbon atoms= ethyl**
**3 carbon atoms= propyl**
**4. names your longest carbon chain( which your circled in step one)**

**Hexane**

C**7 H 14**
**2, 2 dimethyl butane**

**3,3 ethyl, methyl octane**

**2,2 dimethyl propane**

**Isomers of Alkenes + Alkynes**







**Halide (halocarbon)- organic compound that contains one or more halogen.(group 17)**

**F-(fluoro) Br-(bromo)**
**Cl-(chloro) I- (iodo)**

**CH3CHClCH3**

**Chloro propane**


**Alcohol- organic compounds that contain OH end in “ol”**





**Primary(1 degree) Secondary(2 degree) Tenitary(3 degree) alcohols**

1. **circle the OH**
2. **box the carbon bond to the OH**
3. **count the # of carbons bonded to the box**

**1-primary**
**2-secondary**
**3-teritary**

**Ethers**

**ends in ether**



**Aldenydes**

**ends in “al”**


**CH3CH2CHO -> CHO me your aldehyde**

**butanal**

**Ketones**
**ends in “one”**

**CH3COCH2CH2CH3**
**2 Pentanone**


**3 pentanone**


**2 hexanone**

**2 propanone**

**Organic acid = COOH**

**ends in “oic acid”**

**propanoic acid**
**methanoic acid**

**Pentanoic acid**

**Ester** 

**ends in “oate”**

**- an ester is produced by reacting an alcohol and an organic acid.**
**\*\*\*\* esters smell fantastic!**

**Methyl propanoate**

**Propyl etheranoate**

**Ethyl ethanoate**

**Amine** 

**ends in “amine”**

**2 propanamine isomer propanamine**


**There are organic compounds called amino acids. They contain an amine group + an organic acid group on the same carbon chain.**


**. .**
**amine acid = amino acid**

**Amide** 

**ends in “amie”**

**propanamide**

**Organic Reactions**

1. **combustion- the burning of an organic compound in the presence of oxygen(O2) to produce CO2 and H2O.**

**organic compound + O2 -> CO2 + H2O**

**Table I the first 6 reactions are examples of combustion.**

**2. Substition- ( halogenation)**

**C2H6 + Cl2 -> C2H5Cl + HCl**
**chlorination**



**3. Addition- (halogenation/group 17) or (hydrogenation/ hydrogen)**

**unsaturated hydrocarbon. -> 1 bond break**
**(double or triple carbon bonds)**

**4. Esterification- the production of an ester. Esters smell fantastic!**

**Acid + Alcohol -> Ester + Water(H2O)**



1. **saponficiation- the production of soap(smells horrible)**

**6. fermentation- the production of alcohol (ethanol)**
**Glucose -> CO2 + ethanol**



**7. polymerization- production of a polymer from many small monomers.**

**example: nylon, plastic, rayon, polyethylene**

**\*n(C2H2) 🡪 (C2H2)n**
**\* n= very large # \***

**- if the monomer is unsaturated it is called addition polymerization.**

**\* if water is produced as a result of a polymerization = condensation polymerization**