

Organic Chemistry

- The study of CARBON

Basic Naming Structure on Pg. 9 Data Book

Name*	Formula	Name*	Formula
<i>meth</i> ane	CH ₄ (g)	<i>hex</i> ane	C ₆ H ₁₄ (l)
<i>eth</i> ane	C ₂ H ₆ (g)	<i>hept</i> ane	C ₇ H ₁₆ (l)
<i>prop</i> ane	C ₃ H ₈ (g)	<i>oct</i> ane	C ₈ H ₁₈ (l)
<i>but</i> ane	C ₄ H ₁₀ (g)	<i>non</i> ane	C ₉ H ₂₀ (l)
<i>pent</i> ane	C ₅ H ₁₂ (l)	<i>dec</i> ane	C ₁₀ H ₂₂ (l)

*Note: Italics indicate organic nomenclature prefixes.

Prefixes for number of Actual structures

Prefixes for Molecular Compounds

1 = <i>mono-</i>	6 = <i>hexa-</i>
2 = <i>di-</i>	7 = <i>hepta-</i>
3 = <i>tri-</i>	8 = <i>octa-</i>
4 = <i>tetra-</i>	9 = <i>ennea- (nona-)</i>
5 = <i>penta-</i>	10 = <i>deca-</i>

Many types:

- Simple: hydrocarbons C_xH_y

General Formulas and Names of Some Organic Compounds

General Formula	Classification	Example Formula	Example Name
C _n H _(2n+2)	alkane	$\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array}$	ethane
C _n H _(2n)	alkene	$\begin{array}{c} \text{H} \quad \quad \text{H} \\ \diagdown \quad / \\ \text{C}=\text{C} \\ / \quad \diagdown \\ \text{H} \quad \quad \text{H} \end{array}$	ethene
C _n H _(2n-2)	alkyne	H-C≡C-H	ethyne
R-O-H	alcohol	$\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{O}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array}$	ethanol
$\begin{array}{c} \text{O} \\ // \\ \text{R}-\text{C} \\ \\ \text{O}-\text{H} \end{array}$	carboxylic acid	$\begin{array}{c} \text{H} \\ \\ \text{H}-\text{C}-\text{C} \\ // \quad \\ \text{O} \quad \text{O}-\text{H} \end{array}$	ethanoic acid
$\begin{array}{c} \text{O} \\ // \\ \text{R}-\text{C} \\ \\ \text{O}-\text{R}' \end{array}$	ester	$\begin{array}{c} \text{H} \quad \text{O} \quad \text{H} \\ \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{O}-\text{C}-\text{H} \\ \quad \quad \\ \text{H} \quad \quad \text{H} \end{array}$	methyl ethanoate
R-Q	halogenated hydrocarbon	$\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{Cl} \\ \quad \\ \text{H} \quad \text{H} \end{array}$	chloroethane
...[x-y] _n ...	polymer	$\begin{array}{c} \left[\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{---} \text{C} - \text{C} \text{---} \\ \quad \\ \text{H} \quad \text{H} \end{array} \right]_n$	polyethene

R usually represents a carbon group
 R' usually represents a different carbon group
 Q represents a halogen (fluoro-, chloro-, bromo-, iodo-)
 x-y represents the monomer unit
 n represents a whole number

- AMINO ACIDS!! Carbon with NH₂
- Benzene/Aromatic - benzene or phenol

Alkanes

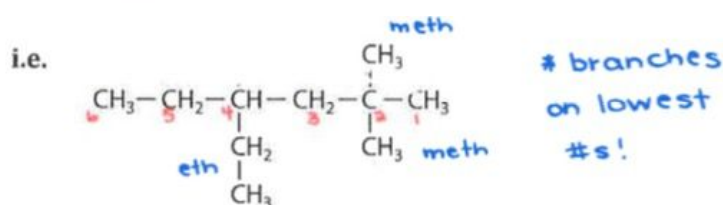
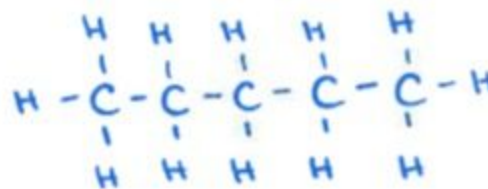
- All single bonds (Saturated)

Naming:

- Find the longest chain
- Name branches from lowest number, name -yl
- Name Branches in alphabetical order

i.e. C₅H₁₂

pentane



4 ethyl 2,2-dimethyl hexane

Alkenes

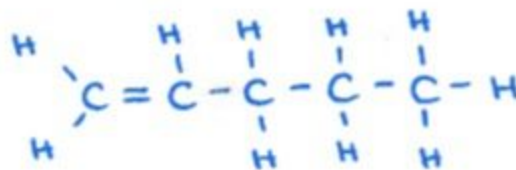
- Contains a double bond (unsaturated)

Naming:

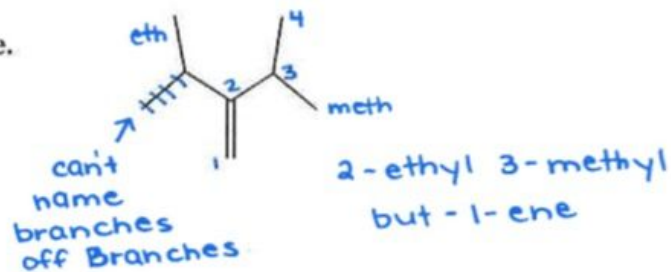
- Find the longest chain with the double bond
 - Note the position of the double bond before the -ene
- Name branches from lowest number, name -yl
- Name Branches in alphabetical order

i.e. C_5H_{10}

pentene



i.e.



Alkynes

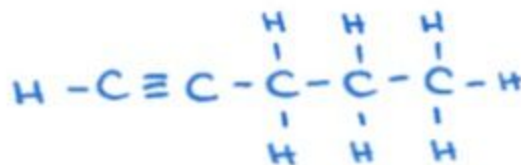
- Contains a triple bond (unsaturated)

Naming:

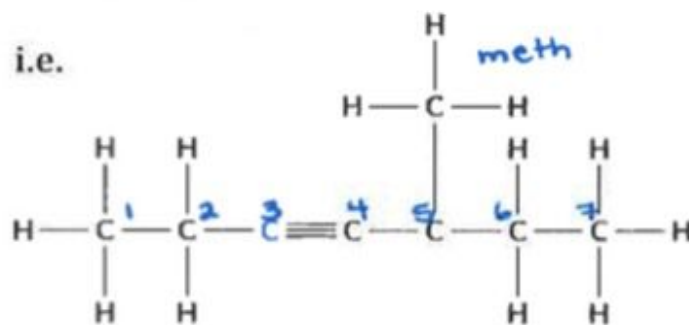
- Find the longest chain with the triple bond
 - Note the position of the triple bond before the -yne
- Name branches from lowest number, name -yl
- Name Branches in alphabetical order

i.e. C_5H_8

pentyne



i.e.



5-methyl hept-3-yne

6

Science 30 - Lesson 21 - Organic Chemistry

Name: _____

Draw and Write the Chemical formula the Following Alkanes

2,6-dimethyl octane	3 ethyl, 4 methyl hexane
2,2,5,7-tetramethyl nonane	3,5-diethyl 2,2,4 trimethyl heptane

Draw and Write the Chemical formula the Following Alkanes

2,6,7-trimethyl 4,5-dipropyl decane	2 methyl propane
2,2,3-trimethyl butane	3 ethyl, 2,3-dimethyl pentane

Draw only the skeletal Diagrams of the Following

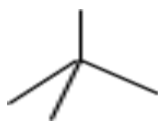
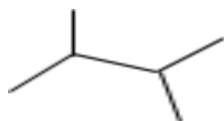
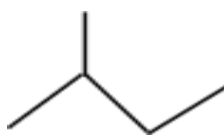
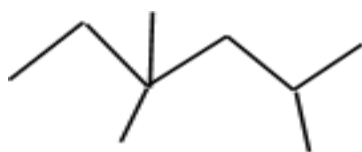
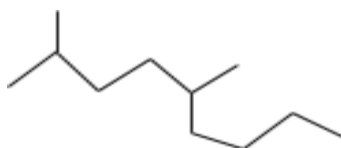
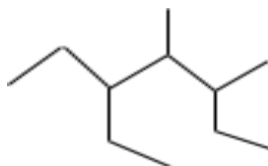
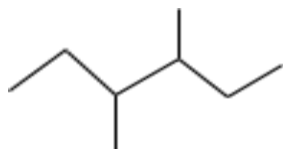
2,3,4-trimethyl 4-propyl heptane

3 ethyl 2,3,4-trimethyl hexane

2,3,4,5,6-pentamethyl octane

5 butyl 3,7-diethyl 6 methyl 4 propyl nonane

Name the Following Alkanes:



Draw the Skeletal Diagrams for the following Compounds

2,4,6 trimethyl hept-1,3,5-triene

3,4 diethyl hex-1,5-diyne

2,5 diethyl 3,6 dimethyl non-1,3-diene

2 methyl prop-1-ene

3 ethyl 3 methyl pent-1,4-diyne

7 ethyl 4,5,6 trimethyl non-1-ene

Name the following compounds

