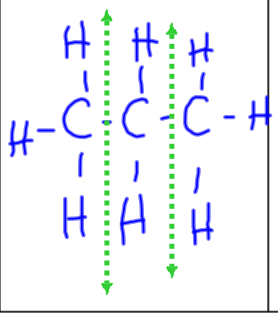
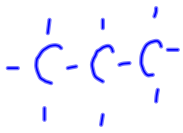
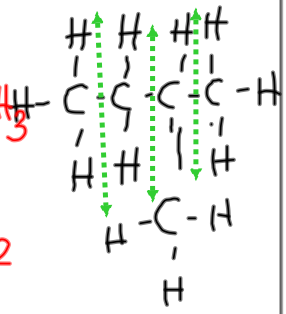
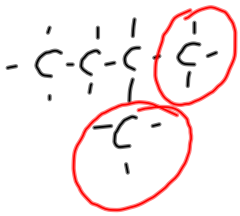
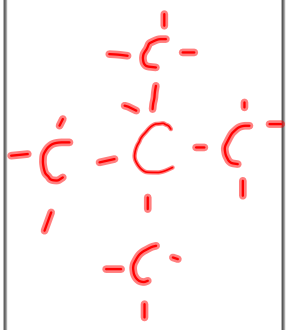
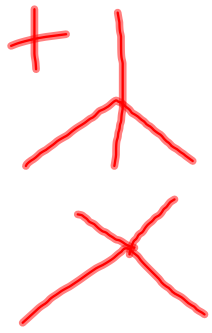
## Why does carbon form a large variety of compounds?

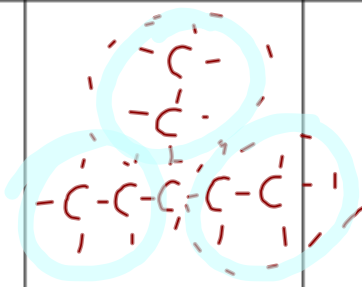
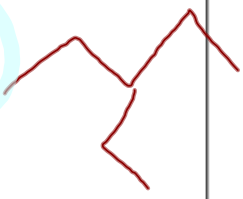
- 4 bonds
- double/triple bonds
- electronegativity (2.5)
- chains / cyclic
- isomers ($C_7H_{16}$)

# Quick Review of Structural Models and Diagrams

| | separate C's | Atoms and Bonds | No H's | C's at end of line segment |
|---|---|---|---|---|
| **Molecular Formula** | **Expanded Molecular Formula** | **Complete Structural Diagram** | **Condensed Structural Diagram** | **Line Diagram** |
| $C_3H_8$ | $CH_3CH_2CH_3$ |  |  |  |

| Molecular Formula | Expanded Molecular Formula | Complete Structural Diagram | Condensed Structural Diagram | Line Diagram |
|---|---|---|---|---|
| $C_5H_{12}$ | $CH_3CH_2CH(CH_3)CH_3$<br>$CH_3CH_2CH(CH_3)_2$ |  |  |  |

| Molecular Formula | Expanded Molecular Formula | Complete Structural Diagram | Condensed Structural Diagram | Line Diagram |
|---|---|---|---|---|
| $C_5H_{12}$ | $C(CH_3)_4$ | |  |  |

| Molecular Formula | Expanded Molecular Formula | Complete Structural Diagram | Condensed Structural Diagram | Line Diagram |
|---|---|---|---|---|
| | $CH_3CH_2CH(C_2H_5)_2$<br>$CH_3CH_2CH(C_2H_5)CH_2CH_3$<br>$CH(C_2H_5)_3$ | |  |  |

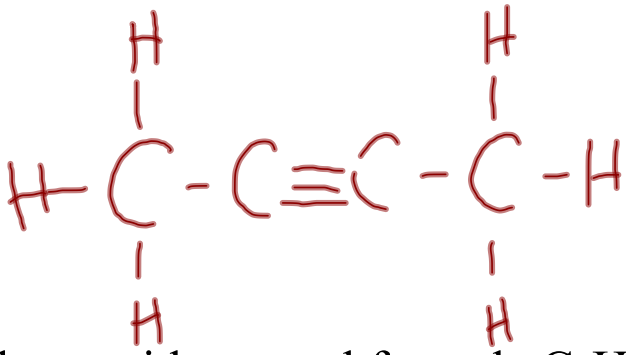
| Molecular Formula | Expanded Molecular Formula | Complete Structural Diagram | Condensed Structural Diagram | Line Diagram |
|---|---|---|---|---|
| | | | | |

# Organic Families

Organic families are classed according to functional groups. Functional groups are areas on a molecule that are reactive.

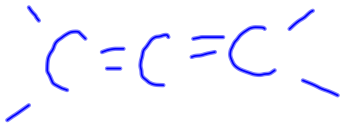
Hydrocarbons with general formula $C_nH_{2n+2}$ contain all single bonds and are called alkanes.

Ex.



Hydrocarbons with general formula $C_nH_{2n}$ contain one double bond (**alkenes**) or are cyclic (**cycloalkanes**).

"closed ring"



Hydrocarbons with a general formula $\mathbf{C_nH_{2n-2}}$ have a triple bond (**alkynes**) or are cyclic with a double bond (**cycloalkenes**).

$C_2H_6$

$C_3H_8$

$C_4H_{10}$

$C_5H_{12}$

$C_6H_{14}$

$C_7H_{16}$

$C_nH_{2n-2}$

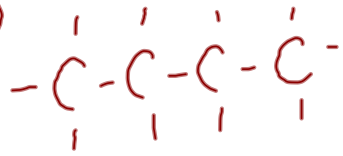
# Isomers

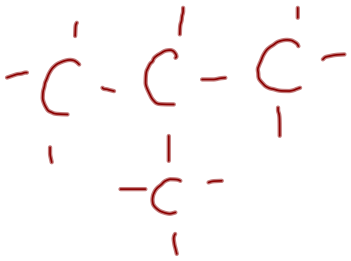
$C_6H_{12}$

**Structural Isomers - compounds with the same molecular formula, but atoms are connected differently**

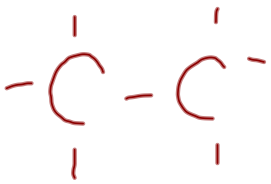
***Find longest chain**
***Begin counting from either end**

Ex. $C_4H_{10}$ → alkanes

① 

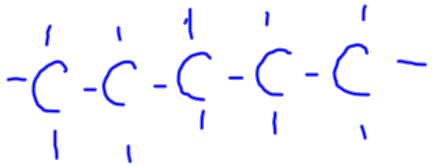
② 

How many isomers can be drawn for $C_2H_6$?



$C_5H_{12}$

1



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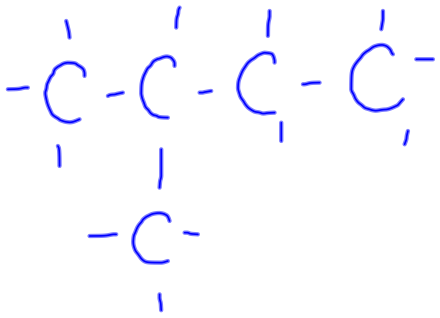

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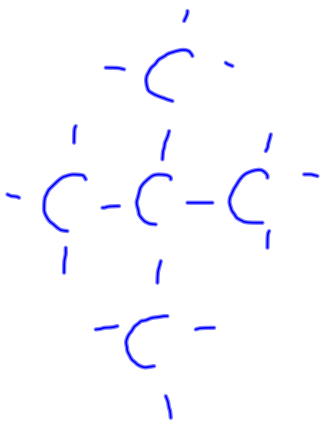

# Homework

## Draw all isomers of $C_7H_{16}$