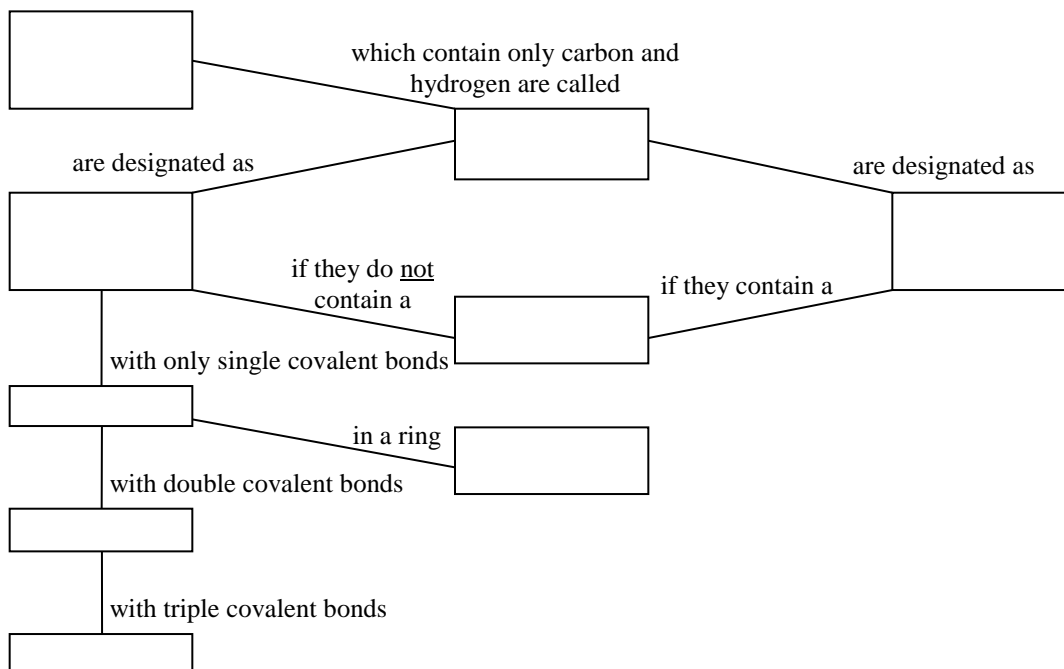


## Organic Compounds

## Unit 6, Chapter 21

Organic chemistry is the study of the vast number of compounds that contain \_\_\_\_\_. Carbon forms more compounds than any other element except \_\_\_\_\_.



### Straight-Chain Alkanes

- Alkanes are \_\_\_\_\_ hydrocarbons, having only single covalent bonds.
  - \_\_\_\_\_ means there is a \_\_\_\_\_ in every possible bonding location.
- Count the carbons, use appropriate prefix, and add the suffix \_\_\_\_\_.
- \_\_\_\_\_ corresponds to the first four alkanes.

Methane

Ethane

Propane

Butane

- Then use the Greek prefixes associated with naming covalent compounds.

<b># Carbons</b>										
<b>Prefix</b>										

- Straight-chain alkanes have the general formula \_\_\_\_\_, where n equals the number of \_\_\_\_\_ atoms.

## Practice

Draw the structural formulas for each of the alkanes below. Structural formulas use dashes to represent bonds, as in #3 above.

Pentane	Hexane	Heptane
Octane	Nonane	Decane

Complete the molecular formulas for the following alkanes.

IUPAC Name	Number of Carbons	Molecular Formula
Methane	1	
Ethane	2	
Propane	3	
Butane	4	
Pentane	5	
Hexane	6	
Heptane	7	
Octane	8	
Nonane	9	
Decane	10	

Hectane is the IUPAC name for the straight-chain alkane that contains 100 carbon atoms. What is the molecular formula for hectane?

## Properties of Alkanes

- Bonds in alkanes are between a \_\_\_\_\_ and \_\_\_\_\_ atom or between two \_\_\_\_\_ atoms.
  - Carbon's electronegativity value is \_\_\_\_\_, and hydrogen's is \_\_\_\_\_. The electronegativity difference for a C—H bond is \_\_\_\_\_, indicating a \_\_\_\_\_ covalent bond.
  - Since the EN difference for a C—C bond is \_\_\_\_\_, it is also a \_\_\_\_\_ covalent bond.
  - Therefore, alkanes are \_\_\_\_\_ covalent molecules.
- Nonpolar covalent molecules are \_\_\_\_\_ (insoluble) in water.
  - The attractive forces between \_\_\_\_\_ are stronger than the attraction between \_\_\_\_\_.
  - The solubility rule “\_\_\_\_\_” explains that nonpolar covalent molecules, such as alkanes, will not dissolve in a \_\_\_\_\_ substance like water.
- The first \_\_\_\_\_ alkanes exist as \_\_\_\_\_ at room temperature. \_\_\_\_\_ appear around C<sub>17</sub>H<sub>36</sub>.
- Alkanes have \_\_\_\_\_ boiling points due to \_\_\_\_\_.
- Alkanes are usually stable at room temperature and have \_\_\_\_\_ reactivity due to their relatively \_\_\_\_\_ C—C and C—H bonds.
- Alkanes are used as \_\_\_\_\_ because they undergo \_\_\_\_\_ reactions. This chemical reaction occurs when a substance reacts with \_\_\_\_\_, releasing energy as \_\_\_\_\_ and \_\_\_\_\_.