

## 5.3 - Organic Chemistry

**Organic Compounds** – refers to almost all \_\_\_\_\_ containing compounds. These compounds are produced both naturally by organisms and synthesized in a \_\_\_\_\_.

**Inorganic Compounds** – refers to compounds that do not contain \_\_\_\_\_. The exceptions to this are \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.

**Carbon** – has \_\_\_\_\_ electrons in its valence shell and forms \_\_\_\_\_ covalent bonds. In almost all organic compounds, carbon atoms are bound to \_\_\_\_\_ or other elements that are near carbon on the periodic table → \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and the \_\_\_\_\_.



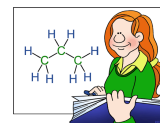
Carbon can also bind to itself to form long chains of atoms, such as those found in \_\_\_\_\_.

Because carbon forms \_\_\_\_\_ bonds, it forms very complex structures. No other element can match carbon's ability to make \_\_\_\_\_ compounds with such a variety of shapes and arrangements.

Chemists have identified millions of different organic compounds and are synthesizing more every day.

Many of these new compounds are used in \_\_\_\_\_ and \_\_\_\_\_ and to create new materials for \_\_\_\_\_ and \_\_\_\_\_.

### How can we recognize an organic compound?



The formula for an organic compound must contain \_\_\_\_\_.

Ex. CH<sub>4</sub>

CH<sub>3</sub>CH<sub>2</sub>OH

C<sub>6</sub>H<sub>5</sub>COOH

C<sub>8</sub>H<sub>10</sub>N<sub>4</sub>O<sub>2</sub>

CH<sub>3</sub>(CH<sub>2</sub>)<sub>n</sub>CH<sub>3</sub>

Notice that hydrogen does not come first in the formulas. The reason for this is that most **organic compounds** are not \_\_\_\_\_.

There are some **inorganic compounds** that contain carbon.

Ex.

CaCO<sub>3</sub>, Na<sub>2</sub>CO<sub>3</sub>

Al<sub>4</sub>C<sub>3</sub>, SiC

CO, CO<sub>2</sub>

## Hydrocarbons








A **hydrocarbon** is an organic compound that contains only elements \_\_\_\_\_ and \_\_\_\_\_. There are \_\_\_\_\_ of known hydrocarbons.

Just like when we used prefixes when naming covalent compounds, prefixes are used when naming hydrocarbons. The first four prefixes are different than what we have already used. There are patterns to hydrocarbons.

**Prefixes – 1 = meth, 2 = eth, 3 = prop, 4 = but, 5 = pent, 6 = hex, 7 = sept, 8 = oct | Suffix (ending) → “-ane”**

Finally we need to be able to determine the “**carbon backbone**” of the structure which is given to us in the name or formula.

**Table 5.8** The First Five Hydrocarbons

Name	Molecular Formula	Structural Formula	Shortened Structural Formula	Space-Filling Model	Common Uses
methane	$\text{CH}_4$		$\text{CH}_4$		<ul style="list-style-type: none"> <li>• Natural gas heaters</li> </ul>
	$\text{C}_2\text{H}_6$		$\text{CH}_3\text{CH}_3$		<ul style="list-style-type: none"> <li>• Manufacturing plastic</li> </ul>
					<ul style="list-style-type: none"> <li>• Camp fuel</li> </ul>
	$\text{C}_4\text{H}_{10}$				<ul style="list-style-type: none"> <li>• Hand-held lighters</li> </ul>
					<ul style="list-style-type: none"> <li>• Component of gasoline</li> </ul>

Line structure:

## Alcohol

An **alcohol** is one kind of organic compound that contains \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_. Some examples are **methanol**, **ethanol**, and **isopropyl** alcohol.




**Methanol** is a \_\_\_\_\_ that is very useful as a \_\_\_\_\_. A **solvent** is a liquid that can \_\_\_\_\_ other substances.

**Ethanol** is used in some beverages as well as some disinfectants. If consumed in large amounts, ethanol is \_\_\_\_\_. Ethanol is also used as a \_\_\_\_\_, and in \_\_\_\_\_ and \_\_\_\_\_.

**Isopropyl** is commonly known as rubbing alcohol and is also \_\_\_\_\_.

All three examples of alcohols are highly \_\_\_\_\_.

**Table 5.9** Some Common Alcohols

Name	Molecular Formula	Structural Formula	Shortened Structural Formula	Space-Filling Model	Common Use
methanol	$CH_3OH$	$\begin{array}{c} H \\   \\ H-C-O-H \\   \\ H \end{array}$	$CH_3OH$		• Solvent
ethanol	$C_2H_5OH$	$\begin{array}{c} H & H \\   &   \\ H-C & -C-O-H \\   &   \\ H & H \end{array}$	$CH_3CH_2OH$		• Fuel
isopropyl alcohol	$C_3H_7OH$	$\begin{array}{c} & H & \\ &   & \\ H & -O- & H \\   & &   \\ H-C & -C & -C-H \\   &   &   \\ H & H & H \end{array}$	$(CH_3)_2CHOH$		• Sterilizer • Cleaner

**PRACTICE:** Draw the structural formula for the following hydrocarbons:

1. methane –

2. propane –

3.  $C_4H_{10}$  –

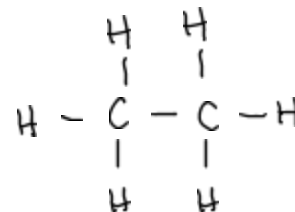
4.  $CH_3CH_2CH_3$  –

**Name the following:**

1.  $C_8H_{18}$  –

2.  $CH_3CH_2CH_2CH_3$  –

3.



Carousel Questions:

1.

2.

3.

4.

5.