



Unit  
12

Lesson  
1

**AIM**

- What is organic chemistry?

**AGENDA**

- U12L1 Lesson video
- Intro to Orgo Notes

**YOYO**

- Watch the lesson video on YouTube (U12L1)

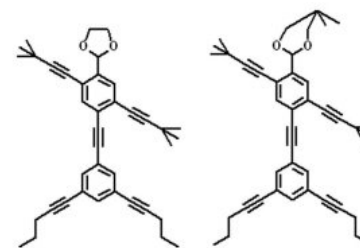
**HOMEWORK**

- Nothing tonight
- Follow calendar

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## What is organic chemistry?

- Organic Chemistry: the study of compounds that contain **carbon** and **hydrogen**



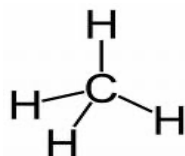
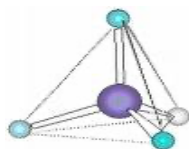
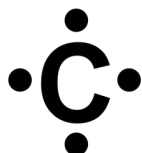
NanoKid

NanoAthlete

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## Why is Carbon So Special?

- Carbon has **4 valence electrons**
- These four single bonds spread out evenly to create a **tetrahedral** molecule (like a tripod)



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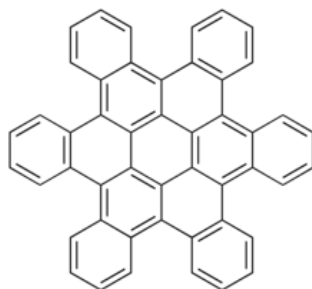
## Why is Carbon So Special?

- Carbon atoms **bond** with other carbon atoms, forming **covalent chains, rings, and networks**
- Two adjacent carbon atoms can share up to **3 pairs of e-**
- Each shared pair of electrons is represented by a **dash line**

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## What are Hydrocarbons?

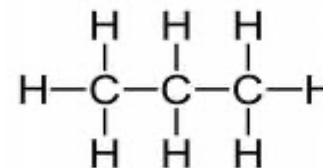
- Hydrocarbons – organic molecules that contain only **carbon & hydrogen**



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## What are Hydrocarbons?

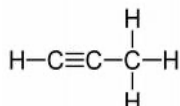
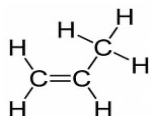
- Saturated Hydrocarbons - all **single bonds** between carbons
  - maximum** number of **hydrogens** attached (the same way a saturated solution holds the maximum amount of solute)
  - Single dash line (**C-C**) → **single bond/1 shared pair of e/ 2e-total** make up bonds (C:C)



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## What are Hydrocarbons?

- Unsaturated Hydrocarbons - at least one **multiple bond** in carbon chain
  - Two dash lines (**C=C**) → **double bond**
    - 2 shared pairs/4 e- total** make up bonds (**C::C**)
  - Three dash lines (**C≡C**) → **triple bond**
    - 3 shared pairs/6 e- total** make up bonds (**C:::C**)



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## Properties of Organic Compounds

- Bonding: **Covalent** → **nonmetal + nonmetal**
- Solubility: most are **insoluble** in water (generally **nonpolar**)  
**\*like dissolves like**
- Conductivity: mostly **nonconductors** (s), (l), & (aq) states  
\*Only **organic acids ionize** in solution = **poor conductors**
- Melting/boiling points: **weak IMF** → **low MP's and BPS**
- Reactivity Rate: react **slowly**; more bonds to break

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## Types of Chemical Formulas

- Molecular Formula: shows the **# of atoms** of each **element** in a compound; least informative formula
- Structural Formula: shows the **# of atoms** of each **element** AND the **arrangement** of the **atoms**; most informative formula
- Condensed Formula = each carbon is written with its constituent hydrogens followed by the proper subscript

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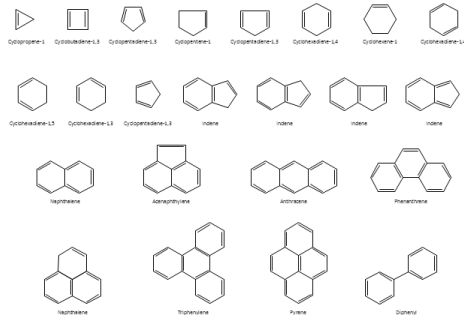
## Open Chain (Aliphatic)

Structural Formula			
Condensed Formula			
Molecular Formula			

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## Closed-Chain (Aromatic)

- When drawing organic compounds you **MUST** always have 8e<sup>-</sup> around each atom! \*\*  
EXCEPTION: Hydrogen (H) achieves its "octet" with only 2e<sup>-</sup> around it.



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## Table Q: Homologous Series of Hydrocarbons

- Homologous series: a group of **related compounds** in which each member differs from the one before it by **one carbon unit**

- Note (above): there are always 4 bonds (8 electrons) around carbon & H can only have one bond around it (2 electrons)

Table Q  
Homologous Series of Hydrocarbons

Name	General Formula	Examples	
		Name	Structural Formula
alkanes	$C_nH_{2n+2}$	ethane	
alkenes	$C_nH_{2n}$	ethene	
alkynes	$C_nH_{2n-2}$	ethyne	

Note: n = number of carbon atoms

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## Drawing Alkanes

- An organic compound ending in “-ane” represents a simple hydrocarbon chain with single bonds
- Use Table P to correctly match the number of carbons and the proper prefix

**Table P  
Organic Prefixes**

Prefix	Number of Carbon Atoms
meth-	1
eth-	2
prop-	3
but-	4
pent-	5
hex-	6
hept-	7
oct-	8
non-	9
dec-	10

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## Drawing Alkanes Practice

Structural Formula:

Compound Name: \_\_\_\_\_

Condensed Formula: \_\_\_\_\_

Molecule Formula: C<sub>4</sub>H<sub>10</sub>

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## Drawing Alkanes Practice

Structural Formula:

Compound Name: hexane

Condensed Formula: \_\_\_\_\_

Molecule Formula: \_\_\_\_\_

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## Drawing Alkanes Practice

Structural Formula:

Compound Name: \_\_\_\_\_

Condensed Formula: CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub>

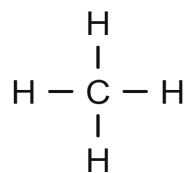
Molecule Formula: \_\_\_\_\_

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## Drawing Alkanes Practice

Structural Formula:



Compound Name: \_\_\_\_\_

Condensed Formula: \_\_\_\_\_

Molecule Formula: \_\_\_\_\_