**Introduction to Organic Chemistry**

What is Organic Chemistry?

* Organic Chemistry: the study of compounds that contain \_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_



Why is carbon so special?

* Carbon has \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* These four single bonds spread out evenly to create a \_\_\_\_\_\_\_\_\_\_\_\_ molecule (like a tripod)
* Carbon atoms \_\_\_\_\_\_\_\_\_\_\_\_ with other carbon atoms, forming \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Two adjacent carbon atoms can share up to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Each shared pair of electrons is represented by a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What are hydrocarbons?

* Hydrocarbons – organic molecules that contain only \_\_\_\_\_\_\_\_\_\_\_ & \_\_\_\_\_\_\_\_\_\_\_\_
* Saturated Hydrocarbons - all \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ between carbons
	+  \_\_\_\_\_\_\_\_\_\_\_\_\_ number of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ attached (the same way a saturated solution holds the maximum amount of solute)
	+ Single dash line (\_\_\_\_\_\_) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\_\_\_\_\_\_ make up bonds (\_\_\_\_\_\_)
* Unsaturated Hydrocarbons - at least one \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in carbon chain
	+ Two dash lines(\_\_\_\_\_\_) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\_\_\_\_\_\_ make up bonds (\_\_\_\_\_\_)
			* Example:
	+ Three dash lines (\_\_\_\_\_\_) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\_\_\_\_\_\_ make up bonds (\_\_\_\_\_\_)

Properties of Organic Compounds

* Bonding: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_
* Solubility: most are \_\_\_\_\_\_\_\_\_\_\_\_\_ in water (generally \_\_\_\_\_\_\_\_\_\_\_\_) \*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Conductivity: mostly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (s), (l), & (aq) states \*Only \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in solution = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Melting/boiling points: \_\_\_\_\_\_\_\_\_\_\_\_\_ 🡪\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Reactivity Rate: react \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; more bonds to break

Types Of Chemical Formulas

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

Open-Chained (Aliphatic)

|  |  |  |  |
| --- | --- | --- | --- |
| Structural Formula |  |  |  |
| Condensed Formula |  |  |  |
| Molecular Formula |  |  |  |



Closed-Chained (Aromatic)

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

Table Q: Homologous Series of Hydrocarbons

* Homologous series: a group of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in which each member differs from the one before it by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Note (above): there are always 4 bonds (8 electrons) around carbon & H can only have one bond around it (2 electrons)

Drawing Alk*anes*

* 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

Drawing Practice: Determine the molecular formula, condensed formula, and structural formula

|  |  |
| --- | --- |
| Structural Formula:Compound Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Condensed Formula: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Molecular Formula: C4H10  | Structural Formula:Compound Name: HexaneCondensed Formula: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Molecular Formula: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Structural Formula:Compound Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Condensed Formula: CH3CH2CH2CH2CH3Molecular Formula: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Image result for methaneStructural Formula:Compound Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Condensed Formula: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Molecular Formula: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |