
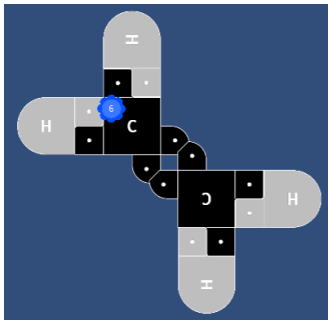
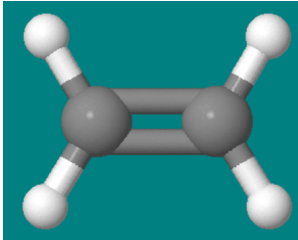




Assignment 11.2: Molecules with Double Bonds

Part A: Molecules that make Plastics

Intro videos = [Extruding plastic bottles](#) (stop after 53 seconds), [Making Polymers](#) (2:15)

Use online modeling websites to build 2-D and 3-D models for the molecules listed in the table. Each of these molecules will contain a DOUBLE BOND!

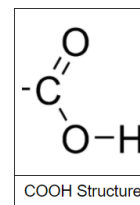
	2-D Lewis structure (InteractiveChemistry.org website with tutorial) Video Instructions	Line Structure (Instructional video for drawing DOUBLE BONDS!)	3-D Molecular Structure (VMK website) VMK instruction
	 #1 Ethylene (C_2H_4)	$\begin{array}{c} H \\ \\ H - C \\ \\ C \quad H \\ \\ H \end{array}$	
	#2 Vinyl Chloride (C_2H_3Cl)	$H \quad C \quad O \quad Cl \quad N$	
	#3 Propylene (C_3H_6)	$H \quad C \quad O \quad Cl \quad N$	



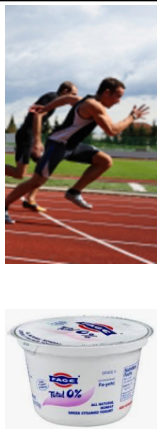
Once you have built these molecules, use the link below to watch a Youtube video showing you how **vinyl chloride molecules (Structure #2)** become **PVC** plastic (polyvinyl chloride).

PVC Polymerization: <https://tinyurl.com/pvc92651>

Part B: Organic Acids

Organic acids are very common. Most organic acids contain a structure that is often written as “COOH”.



	2-D Lewis structure (IC2020 website)	Line Structure (Instructional video)	3-D Molecular Structure (VMK website) VMK (instruction)
 <p>#4 HCOOH = Formic Acid</p>		<p>H C O Cl N</p>	
 <p>#5 CH_3COOH = Acetic Acid</p>		<p>H C O Cl N</p>	
 <p>#6 $\text{CH}_3\text{CHOHCOOH}$ = Lactic Acid</p>		<p>H C O Cl N</p>	

Check your answers (and learn about the use of organic acids in Chicken Farming) by accessing:

Organic Acids used in Chickenfeed: <https://tinyurl.com/chickens92651>

Part C: Extra for Experts : Nature's Way: "Infinite" variation

You are asked to use 2-Dimensional Models to find different ways of arranging a given set of **ATOMS** bonded to form one or more **MOLECULES**. You must "use up" all the atoms in each arrangement and you must make **COMPLETE MOLECULES**.

The atoms given to you are:

1 CARBON ATOM, 4 HYDROGEN ATOMS, 4 OXYGEN ATOMS

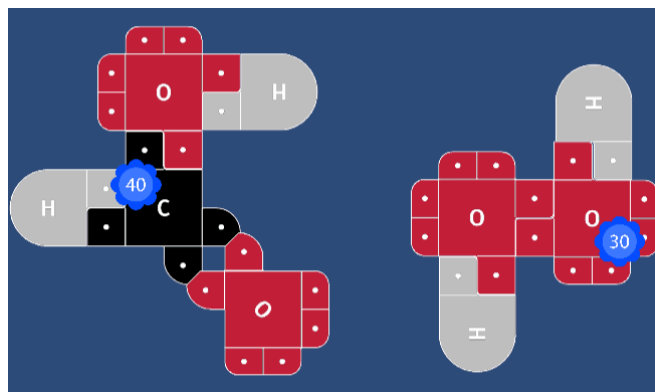
Use the **FREE PLAY Option (Scene 5)** from the InteractiveChemistry Dropdown menu

5 = Free Play

Arrangement A = ONE, single molecule
(containing 1 C, 4 H and 4 O)

Arrangement B = TWO molecules
(containing a TOTAL of 1 C, 4 H and 4 O)

Example done for you:



Formic acid and hydrogen peroxide

Arrangement C = THREE molecules
(containing a TOTAL of 1 C, 4 H and 4 O)

Arrangement D = FOUR molecules
(containing a TOTAL of 1 C, 4 H and 4 O)

Molecular Structures of Complex Molecules: Paste in screenshots from the VMK of the three dimensional structures of	
Caffeine	Morphine