



Molecule Lab

Open the [Building a Molecule](#) simulation
(Begin part 1 on the next page)

Part 1 **Part 2** **Part 3** Molecule Collections (part 1)

Make Molecules Collect Multiple Larger Molecules

Molecule name
Chloromethane 3D

3D rendering

Construct your molecule

Chloromethane

Space Filling Ball and Stick

Refill Kit Get your atoms here... Kit #1

Hydrogen Carbon Chlorine

Your Molecules
Collection 2
N₂ (Nitrogen)
C₂H₂ (Acetylene) 3D
NO (Nitric Oxide) 3D
CH₃Cl (Chloromethane)
C₂H₄ (Ethylene)
Reset Collection
on off

A screen capture of your completed collection would look nice in your website portfolio!

Part 1 - Make Molecule

Directions: Build each molecule by connecting the correct atoms. Then drag the molecule over to "Collection 1". Make at least two more collections and list the molecules (Formula and Name) in the space below.



Your Molecules	
Collection 1	
<u>Formula</u>	<u>Name</u>
<u>H₂O</u>	<u>Water</u>
_____	_____
_____	_____
_____	_____

Your Molecules	
Collection 2	
<u>Formula</u>	<u>Name</u>
_____	_____
_____	_____
_____	_____
_____	_____

Your Molecules	
Collection 3	
<u>Formula</u>	<u>Name</u>
_____	_____
_____	_____
_____	_____
_____	_____

1. How many atoms of Hydrogen are in one molecule of H₂O? _____

2. How many atoms Carbon are in one molecule of CO₂? _____

Part 2 - Collect Multiple

A screen capture of your completed collection would look nice in your website portfolio!



Directions: Build each molecule according to its formula and drag them over to collection 1. Make at least two more collections and list the formula and name below for each molecule.

Your Molecules	
Collection 1	
<u>Formula</u>	<u>Name</u>
<u>2CO₂</u>	<u>Carbon Dioxide</u>
_____	_____
_____	_____
_____	_____

Your Molecules	
Collection 2	
<u>Formula</u>	<u>Name</u>
_____	_____
_____	_____
_____	_____
_____	_____

Your Molecules	
Collection 3	
<u>Formula</u>	<u>Name</u>
_____	_____
_____	_____
_____	_____
_____	_____

3. How many atoms of Hydrogen are in 2NH₃? _____

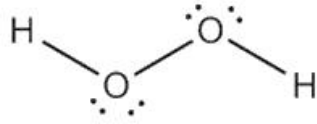

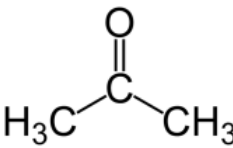
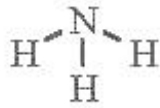
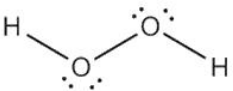
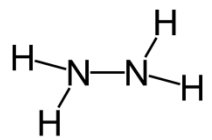
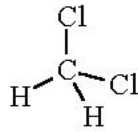
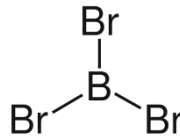
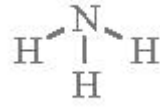
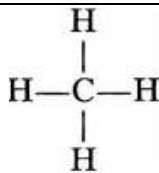
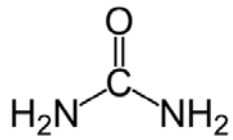
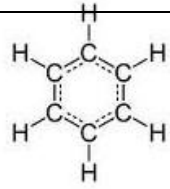
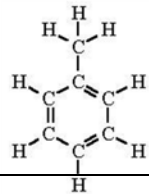
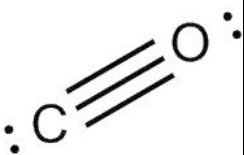
4. How many molecules of Ammonia are in 2NH₃? _____

Part 3 - Larger Molecules

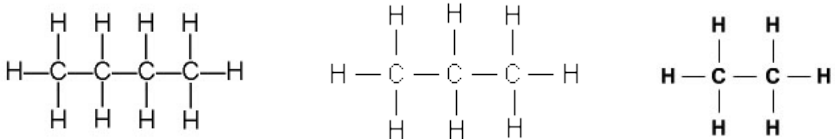
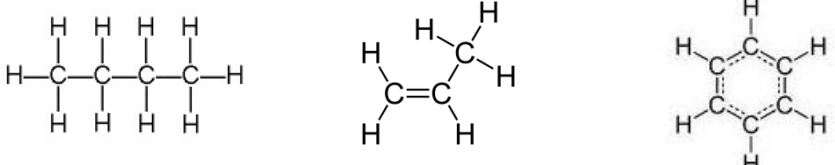
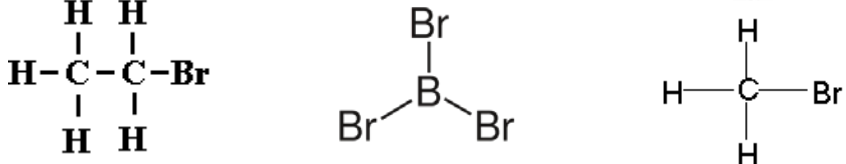
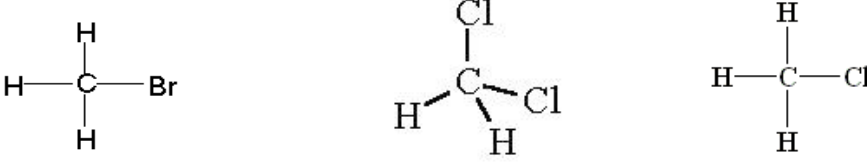
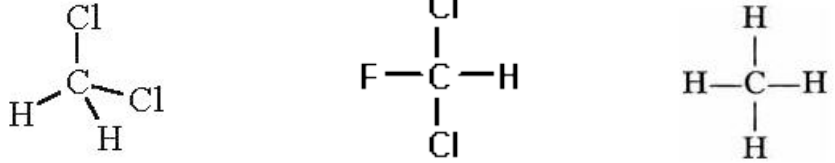
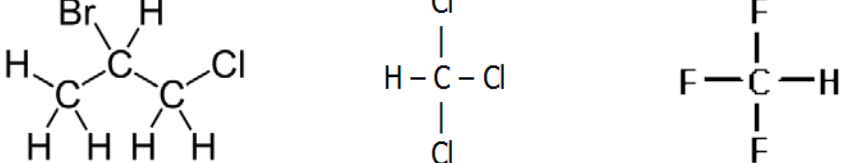
This would be a great activity to showcase on your website portfolio!!



Directions: Complete the chart by building the following molecules. Use the [PhET Build a Molecule](#) simulator to determine the missing information.

NAME OF COMPOUND	EMPIRICAL FORMULA	<div style="display: flex; justify-content: space-between; align-items: center;"> 3D STRUCTURAL FORMULA 3D </div> <p style="font-size: 0.8em; margin-top: 5px;">Choose the correct structural formula. Click the 3D button on the simulation for help.</p>
<p>Example:</p> <p style="font-size: 1.5em; color: red; text-align: center;">Water</p>	<p style="font-size: 2em; color: red; text-align: center;">H_2O</p>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>
	<p style="font-size: 2em; text-align: center;">H_2O_2</p>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>
	<p style="font-size: 2em; text-align: center;">HBr</p>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;"> <p style="font-size: 1.5em;">$H-Br$</p> </div> </div>
	<p style="font-size: 2em; text-align: center;">NH_3</p>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>
	<p style="font-size: 2em; text-align: center;">CO</p>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>

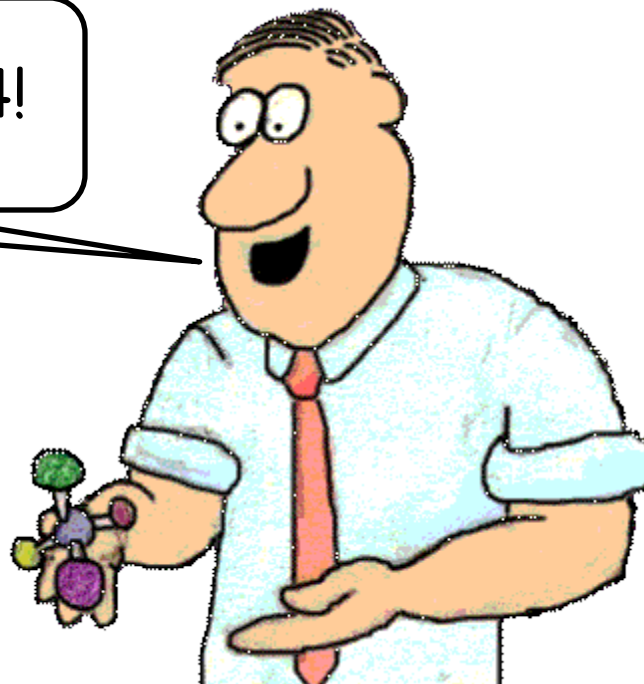
	CO_2			
	H_2CO_3			
	$HC_2H_3O_2$ also CH_3COOH			
	C_2H_6			
	CH_4			
	CH_3CH_2OH			

	C_3H_8	
	C_4H_{10}	
	CH_3Br	
	CH_3Cl	
	CH_2Cl_2	
(Chloroform)	$CHCl_3$	

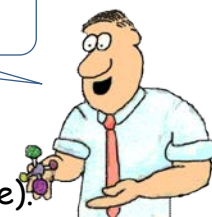
Can you make Fluoroform (CHF_3)?	CF_3	$\begin{array}{c} \text{F} \\ \\ \text{F}-\text{C}-\text{F} \\ \\ \text{F} \end{array}$	$\begin{array}{c} \text{F} \\ \\ \text{F}-\text{C}- \\ \\ \text{F} \end{array}$	$\begin{array}{c} \text{Cl} \\ \\ \text{F}-\text{C}-\text{H} \\ \\ \text{Cl} \end{array}$
	CF_4	$\begin{array}{c} \text{F} \\ \\ \text{F}-\text{C}-\text{F} \\ \\ \text{F} \end{array}$	$\begin{array}{c} \text{F} \\ \\ \text{F}-\text{C}- \\ \\ \text{F} \end{array}$	$\begin{array}{c} \text{Cl} \\ \\ \text{F}-\text{C}-\text{H} \\ \\ \text{Cl} \end{array}$
Dichlorofluoromethane	CHCl_2F	$\begin{array}{c} \text{F} \\ \\ \text{F}-\text{C}-\text{F} \\ \\ \text{F} \end{array}$	$\begin{array}{c} \text{F} \\ \\ \text{F}-\text{C}-\text{F} \\ \\ \text{F} \end{array}$	$\begin{array}{c} \text{Cl} \\ \\ \text{F}-\text{C}-\text{H} \\ \\ \text{Cl} \end{array}$

Can you make Dichloro(difluoro)methane (CCl_2F_2)?
A.K.A 'Freon'

You're almost done; just finish part 4!



This part is pretty cool. Make sure you ask if you don't understand what to do!!



Part 4 - Discover New Molecules

Directions: Using the 'Larger Molecule' tab, experiment to build new molecules (ones you have not already made). Each molecule should include one of the following elements. Fill in the chart.

Example:

NAME OF ELEMENT	NAME OF COMPOUND	EMPIRICAL FORMULA	WHAT IS IT?
Your molecule should include at least 1 atom of this element.	This is the name of the molecule	Do your best to figure this out from the molecular model you have built.	Google it!! Find out some uses for your molecular compound.
Chlorine	Chloroethane	C_2H_5Cl	Like other chlorinated hydrocarbons, ethyl chloride has been used as a refrigerant, an aerosol spray propellant, an anesthetic, and a blowing agent for foam packaging.
Nitrogen			
Fluorine			
Boron			
Silicon			
Phosphorus			
Bromine			

