




WKS
PhET Simulations
Build a Molecule

Name _____
Period _____ Date _____

In this activity you will investigate the structures and names of covalently-bonded molecules. These compounds consist entirely of nonmetals. Go to the PhET simulation, *Build a Molecule – Atoms, Molecules, Molecular Formula*: <http://phet.colorado.edu/en/simulation/build-a-molecule>. Click on ‘Run Now’ and when the simulation opens make sure you are on the ‘Make Molecules’ Tab. Turn off the sound at the lower right.

- 1) Build all of the molecules for Collection 1. If you put something together incorrectly, you can break all of the bonds with the  button or just break one bond (between two molecules) by hovering over that bond until you see the  button, then clicking. In the table below, write the name of each molecule and draw the molecules that you have built. Be sure to click on the  button to look at the *space filling* and *ball and stick* models of each molecule to see the actual arrangement of the atoms.

| | |
|---------------------|--------------------|
| a. H ₂ O | b. O ₂ |
| c. H ₂ | d. CO ₂ |
| e. N ₂ | |

- 2) Move on to Collection 2 and beyond. Build as many molecules as you can and enter at least 10 of them in the table below. Include the formula, name, and drawing, as above.

| | |
|----|----|
| a. | b. |
| c. | d. |
| e. | f. |

| | |
|----|----|
| g. | h. |
| i. | j. |

3) Now switch over to the “Large Molecules” tab. Find the appropriate kits to build molecules with the following structures. Name and draw each molecule in the space provided.

| | |
|----|---|
| a. | $ \begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array} $ |
| b. | $ \begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{O}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array} $ |
| c. | $ \begin{array}{c} \text{H} \quad \quad \quad \text{H} \\ \quad \quad \quad / \\ \text{H}-\text{C}-\text{N}-\text{C}-\text{H} \\ \quad \quad \quad \\ \text{H} \quad \quad \quad \text{H} \\ \quad \quad \quad \\ \quad \quad \quad \text{H}-\text{C}-\text{H} \\ \quad \quad \quad \\ \quad \quad \quad \text{H} \end{array} $ |
| d. | $ \begin{array}{c} \text{H} \quad \quad \quad \text{O} \\ \quad \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{O}-\text{H} \\ \quad \quad \quad \\ \text{H} \quad \quad \quad \text{H} \end{array} $ |
| e. | $ \begin{array}{c} \text{F} \quad \quad \quad \text{F} \\ \diagdown \quad \diagup \\ \text{C}=\text{C} \\ \diagup \quad \diagdown \\ \text{F} \quad \quad \quad \text{F} \end{array} $ |