**Chemical Compounds
*How are Molecular Models Built?***

Scientists classify matter based on its chemical structure. ***Elements*** are substances in which all the atoms are alike.

***Compounds*** are made up of two or more elements that are chemically combined. Many common materials are compounds. For instance, water is a compound that is made up of hydrogen and oxygen atoms.

Most compounds are made up of molecules. A ***molecule*** is two or more atoms chemically bonded to each other. It is the smallest particle that has all the properties of that substance. For example, a molecule of ***water*** has ***2 hydrogen*** atoms and ***1 oxygen*** atom.Its chemical makeup is expressed in a ***chemical formula: H20*** in which:

* ***H2*** indicates that there are two atoms of hydrogen in a water molecule.
* The oxygen has ***no subscript*** indicating that there is only one atom in a water molecule.

Many of the chemical and physical properties of molecules are determined by their ***shape.***The 3-dimensional shapes of molecules can be pictured by using ***molecular models***.
To make a molecular model, you need to know two things:

* The chemical formula of the molecule
* The way the atoms in the molecule fit together

In this Virtual Lab, you will build molecular models of various elements and compounds, given their chemical formula. Some molecules have ***multiple bonds*** between their atoms:

* A ***double bond*** counts the same as ***two bonds.***

**Bonds of Elements**

* A ***triple bond*** counts the same as ***three bonds.***

Bonds always connect to two atoms; they do not attach to other bonds.

**Objectives:**

* Explain the concept of a molecule and a compound.
* Construct models of molecules based on their chemical formula.

**Instructions:**

1. Open Internet Explorer and go to:

http://www.glencoe.com/sites/common\_assets/science/virtual\_labs/E02/E02.html

1. Click on the information button to learn about the structure of the molecules.
2. Choose a molecule from the pull-down menu.
3. Drag atoms and bonds from the ***Atoms and Bonds*** clone pads to build a structural model of the molecule you chose.
4. Click the ***Check*** button to check your model.
5. If your model is correct, you can click the ***3-D Model*** button to see the three-dimensional model of the molecule.
6. Record your findings in the table on the opposite page.
7. Repeat steps 3-7 and build models of five different molecules.
8. When you have finished, answer the critical thinking question.

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| --- | --- | --- | --- | --- | --- |
| Molecule | No. HAtoms | No. OAtoms | No. NAtoms | No. CAtoms | Diagram of Molecular Model |
| **1. Name:**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Chemical Formula: |  |  |  |  |  |
| **2. Name:**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Chemical Formula: |  |  |  |  |  |
| **3. Name:**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Chemical Formula: |  |  |  |  |  |
| **4. Name:**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Chemical Formula: |  |  |  |  |  |
| **5. Name:**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Chemical Formula: |  |  |  |  |  |

**Critical Thinking:** Propose a hypothesis about the relationship between the position of a type of atom in a
 molecule and the number of bonds that atom forms.

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