

## What About Molecules?

There are just over a hundred different types of atoms, and some types join together to form compounds. If this did not happen there would only be a hundred or so different substances in the universe. In fact, there are millions of substances in the universe.

We have been studying about elements just by themselves such as oxygen and hydrogen. The smallest unit of an element is an atom. You also learned that atoms combine together to make compounds. The smallest unit of a compound is a molecule. For example, you have an atom of oxygen (O) or a molecule of water (H<sub>2</sub>O). A cup of water contains millions of molecules of H<sub>2</sub>O. How do we write how many molecules of a compound we have?

To indicate the number of molecules of a compound scientists use what is called a coefficient. This will always be a large number in front of the compound. So, molecules can have both coefficients and subscripts. We know that to count the number of atoms we must count the subscripts.

To find the number of atoms of an element when there is a coefficient in front of a compound you must multiply the coefficient times the subscript. See example below.



1. Circle the coefficient in the formula above.
2. Put a box around the subscript.
3. Multiply the coefficient times each subscript in the formula.

### Questions:

1. How many atoms of hydrogen are there? \_\_\_\_\_
2. How many atoms of oxygen are there? \_\_\_\_\_
3. How many molecules of water are there? \_\_\_\_\_



1. How many atoms of sodium are there? \_\_\_\_\_
2. How many atoms of hydrogen are there? \_\_\_\_\_
3. How many atoms of carbon are there? \_\_\_\_\_
4. How many atoms of oxygen are there? \_\_\_\_\_
5. How many molecules of baking soda are there? \_\_\_\_\_



1. How many atoms of hydrogen are there? \_\_\_\_\_
2. How many atoms of chlorine are there? \_\_\_\_\_
3. How many molecules of hydrogen chloride are there?  
\_\_\_\_\_



1. How many atoms of Iron are there? \_\_\_\_\_
2. How many atoms of Oxygen are there? \_\_\_\_\_
3. How many molecules of iron oxide are there? \_\_\_\_\_



1. How many atoms of calcium are there? \_\_\_\_\_
2. How many atoms of carbon are there? \_\_\_\_\_
3. How many atoms of oxygen are there? \_\_\_\_\_
4. How many molecules of calcium carbonate are there?  
\_\_\_\_\_



1. How many atoms of calcium are there? \_\_\_\_\_
2. How many atoms of chlorine are there? \_\_\_\_\_
3. How many molecules of calcium chloride are there?  
\_\_\_\_\_

**Materials:** Stickers of 7 different colors/patterns

**What to do:**

1. Make a key for the color of the stickers in the chart below.

Element	Sticker color	How many needed
Hydrogen	Red	4
Oxygen	Yellow	10
Sodium	Blue	1
Carbon	Green	2
Calcium	Purple	2
Iron	Orange	2
Chlorine	White	3

2. Write symbol of the element on each sticker.
3. In the boxes on the next page make a molecule of each of the compounds listed in the box with the stickers. Make sure each element touches at least one of the other elements in the box.
4. Cut the boxes on the next page apart.
5. When everyone is done you will need to work with the members of your class to make the number of molecules listed on the first two pages.
6. After your teacher checks your group's work glue your molecules into your notebook.

**Questions:**

1. How many people did it take to make the 5 molecules of  $\text{NaHCO}_3$ ? \_\_\_\_\_
2. How many people did it take to make the 4 molecules of  $\text{CaCl}_2$ ? \_\_\_\_\_
3. How many people did it take to make the 1 molecule of  $\text{CaCO}_3$ ? \_\_\_\_\_

$\text{H}_2\text{O}$	$\text{NaHCO}_3$
$\text{HCl}$	$\text{Fe}_2\text{O}_3$
$\text{CaCO}_3$	$\text{CaCl}_2$



Name \_\_\_\_\_ period \_\_\_\_\_

## EXIT TICKET

What About Molecules?

1. How many atoms of hydrogen are in the following compound?



\_\_\_\_\_

2. Circle the coefficients found in the list below.



3. How many molecules of water are found below?



\_\_\_\_\_

4. How many atoms of calcium are found in the compound below?



\_\_\_\_\_

5. How many different elements are found in the following compound?



\_\_\_\_\_



Name \_\_\_\_\_ period \_\_\_\_\_

## EXIT TICKET

*What About Molecules?*

1. How many atoms of calcium are found in the compound below?



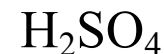
\_\_\_\_\_

2. How many different elements are found in the following compound?



\_\_\_\_\_

3. How many atoms of hydrogen are in the following compound?



\_\_\_\_\_

4. Circle the coefficients found in the list below.



5. How many molecules of water are found below?



\_\_\_\_\_