

# CHEM U3 ASSIGNMENT #1

P1

Name

KEY

Period

Date

## Counting Atoms

The formula for a compound indicates the elements that make up the compound and the number of atoms of each element present in the compound. These numbers of atoms are indicated by the use of small numbers called subscripts. Sometimes groups of atoms act as a single atom. Such a group of atoms is called a radical. If a radical is used in a formula more than once, the radical is put in parentheses and the subscript appears outside the parentheses. When a subscript appears outside the parentheses, it indicates that all the elements inside the parentheses should be multiplied by that subscript. For example, the formula  $\text{Fe}(\text{OH})_3$  indicates the combination of one atom of iron,  $\text{Fe}$  = three atoms of oxygen (O) and three atoms of hydrogen (H).

In the following examples, list each element in the compound and the number of atoms of each element present. The first example has been done for you. You may already be familiar with some of the compounds.

NAME	USE	FORMULA	ATOMS IN FORMULA
Calcium Carbonate	Limestone	$\text{CaCO}_3$	Ca = 1 C = 1 O = 3
Aspirin	Pain Reliever	$\text{C}_9\text{H}_8\text{O}_4$	C = 9 H = 8 O = 4
Magnesium Hydroxide	Found in Milk of Magnesia	$\text{Mg}(\text{OH})_2$	Mg = 1 O = 2 H = 2
Paradichlorobenzene	Moth Balls	$\text{C}_6\text{H}_4\text{Cl}_2$	C = 6 H = 4 Cl = 2
Acetic Acid	Found in vinegar	$\text{C}_2\text{H}_4\text{O}_2$	C = 2 H = 4 O = 2
Trinitrotoluene (TNT)	Explosives	$\text{C}_7\text{H}_5(\text{NO}_2)_3$	C = 7    N = 3 H = 5    O = 6
Calcium dihydrogen phosphate	Fertilizer	$\text{Ca}(\text{H}_2\text{PO}_4)_2$	Ca = 1    P = 2 H = 4    O = 8
Pyrite	Fool's Gold	$\text{FeS}_2$	Fe = 1 S = 2
Sucrose	Sugar	$\text{C}_{12}\text{H}_{22}\text{O}_{11}$	C = 12 H = 22 O = 11
Cellulose	Found in pencil and paper, wood fibers	$\text{C}_6\text{H}_7\text{O}_2(\text{OH})_3$	C = 6    O = 5 H = 10

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P2

**Section B:** Write the name of the elements in order as they appear in the formula from left to right. If the element appears more than once, only write it once, then add its atoms together.

$3\text{Na}_2\text{SO}_4$ <p># of molecules <u>3</u> # of elements <u>3</u></p> <p>Name of element: # of atoms:  <u>Sodium (Na)</u> <u>6</u>  <u>sulfur (S)</u> <u>3</u>  <u>oxygen (O)</u> <u>12</u></p> <p>Total # of atoms <u>21</u></p> <p>The #3 is a <u>Coefficient</u> (coefficient or subscript)</p>	$2\text{ZnSO}_4$ <p># of molecules <u>2</u> # of elements <u>3</u></p> <p>Name of element: # of atoms:  <u>Zinc (Zn)</u> <u>2</u>  <u>sulfur (S)</u> <u>2</u>  <u>oxygen (O)</u> <u>8</u></p> <p>Total # of atoms <u>12</u></p> <p>The #4 is a <u>Subscript</u> (coefficient or subscript)</p>
$\text{K}_2\text{SO}_4$ <p># of molecules <u>1</u> # of elements <u>3</u></p> <p>Name of element: # of atoms:  <u>Potassium (K)</u> <u>2</u>  <u>Sulfur (S)</u> <u>1</u>  <u>oxygen (O)</u> <u>4</u></p> <p>Total # of atoms <u>7</u></p> <p>The #2 is a <u>Subscript</u> (coefficient or subscript)</p>	$\text{Ba}_3(\text{PO}_4)_2$ <p># of molecules <u>1</u> # of elements <u>3</u></p> <p>Name of element: # of atoms:  <u>Barium (Ba)</u> <u>3</u>  <u>Phosphorus (P)</u> <u>2</u>  <u>oxygen (O)</u> <u>8</u></p> <p>Total # of atoms <u>13</u></p> <p>The #2 is a <u>Subscript</u> (coefficient or subscript)</p>
$\text{Na}_2\text{CrO}_4$ <p># of molecules <u>1</u> # of elements <u>3</u></p> <p>Name of element: # of atoms:  <u>Sodium (Na)</u> <u>2</u>  <u>Chromium (Cr)</u> <u>1</u>  <u>oxygen (O)</u> <u>4</u></p> <p>Total # of atoms <u>7</u></p> <p>The #4 is a <u>Subscript</u> (coefficient or subscript)</p>	$4\text{Al}_2(\text{CO}_3)_3$ <p># of molecules <u>4</u> # of elements <u>3</u></p> <p>Name of element: # of atoms:  <u>Aluminum (Al)</u> <u>8</u>  <u>Carbon (C)</u> <u>12</u>  <u>oxygen (O)</u> <u>36</u></p> <p>Total # of atoms <u>56</u></p> <p>The #4 is a <u>Coefficient</u> (coefficient or subscript)</p>
$\text{Pb}(\text{NO}_3)_2$ <p># of molecules <u>1</u> # of elements <u>3</u></p> <p>Name of element: # of atoms:  <u>Lead (Pb)</u> <u>1</u>  <u>Nitrogen (N)</u> <u>2</u>  <u>oxygen (O)</u> <u>6</u></p> <p>Total # of atoms <u>9</u></p> <p>The #3 is a <u>Subscript</u> (coefficient or subscript)</p>	$4\text{Au}(\text{IO}_3)_3$ <p># of molecules <u>4</u> # of elements <u>3</u></p> <p>Name of element: # of atoms:  <u>Gold (Au)</u> <u>4</u>  <u>Iodine (I)</u> <u>12</u>  <u>oxygen (O)</u> <u>36</u></p> <p>Total # of atoms <u>52</u></p> <p>The #4 is a <u>Coefficient</u> (coefficient or subscript)</p>

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<p><b>CO<sub>2</sub></b>                      # of molecules <u>1</u>    # of elements <u>2</u></p> <p>Name of element:                      # of atoms:  <u>Carbon (C)</u>                                      <u>1</u>  <u>Oxygen (O)</u>                                      <u>2</u></p> <p style="text-align: right;">Total # of atoms                      <u>3</u></p> <p>The #2 is a <u>Subscript</u>  <small>(coefficient or subscript)</small></p>	<p><b>3CaCl<sub>2</sub></b>                      # of molecules <u>3</u>    # of elements <u>2</u></p> <p>Name of element:                      # of atoms:  <u>Calcium (Ca)</u>                                      <u>3</u>  <u>Chlorine (Cl)</u>                                      <u>6</u></p> <p style="text-align: right;">Total # of atoms                      <u>9</u></p> <p>The #3 is a <u>Coefficient</u>  <small>(coefficient or subscript)</small></p>
<p><b>Cr(NH<sub>3</sub>)<sub>6</sub>(NO<sub>3</sub>)<sub>3</sub></b>                      # of molecules <u>1</u>    # of elements <u>4</u></p> <p>Name of element:                      # of atoms:  <u>Chromium</u>                                      <u>1</u>  <u>Nitrogen</u>                                      <u>9</u>  <u>Hydrogen</u>                                      <u>18</u>  <u>Oxygen</u>                                      <u>9</u></p> <p style="text-align: right;">Total # of atoms                      <u>37</u></p> <p>The #6 is a <u>Subscript</u>  <small>(coefficient or subscript)</small></p>	<p><b>5Al(C<sub>2</sub>H<sub>3</sub>O<sub>2</sub>)<sub>2</sub></b>                      # of molecules <u>5</u>    # of elements <u>4</u></p> <p>Name of element:                      # of atoms:  <u>Aluminum (Al)</u>                                      <u>5</u>  <u>Carbon (C)</u>                                      <u>20</u>  <u>Hydrogen (H)</u>                                      <u>30</u>  <u>Oxygen (O)</u>                                      <u>20</u></p> <p style="text-align: right;">Total # of atoms                      <u>75</u></p> <p>The #3 is a <u>Subscript</u>  <small>(coefficient or subscript)</small></p>
<p><b>C<sub>4</sub>H<sub>8</sub>FCOOH</b>                      # of molecules <u>1</u>    # of elements <u>4</u></p> <p>Name of element:                      # of atoms:  <u>Carbon (C)</u>                                      <u>5</u>  <u>Hydrogen (H)</u>                                      <u>9</u>  <u>Fluorine (F)</u>                                      <u>1</u>  <u>Oxygen (O)</u>                                      <u>2</u></p> <p style="text-align: right;">Total # of atoms                      <u>17</u></p> <p>The #8 is a <u>Subscript</u>  <small>(coefficient or subscript)</small></p>	<p><b>2(NH<sub>4</sub>)<sub>3</sub>PO<sub>4</sub></b>                      # of molecules <u>2</u>    # of elements <u>4</u></p> <p>Name of element:                      # of atoms:  <u>Nitrogen</u>                                      <u>6</u>  <u>Hydrogen</u>                                      <u>24</u>  <u>Phosphorus</u>                                      <u>2</u>  <u>Oxygen</u>                                      <u>8</u></p> <p style="text-align: right;">Total # of atoms                      <u>40</u></p> <p>The #2 is a <u>Coefficient</u>  <small>(coefficient or subscript)</small></p>