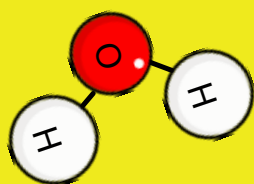
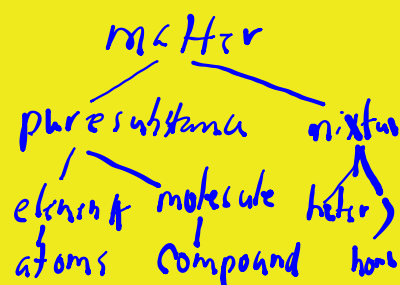


## Atoms and Molecules Page 46



## Recall

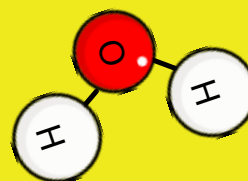


**Atom:** a particle in an element.

Example: In water there are two hydrogen atoms and one oxygen atom.

**Molecule:** a combination of two or more atoms.

Molecules can be made up of all the same kind of atom like  $O_2$  or different atoms like  $H_2O$ .



## Naming Elements Assignment

1) Using your periodic table, write the element's name that is associated with the symbols.

a) S Sulfur

f) Na Sodium

b) F Fluorine

g) H Hydrogen

c) Al Aluminum

h) Fe Iron

d) Cu Copper

i) O Oxygen

e) Br Bromine

j) Li Lithium

2) Given the following elements name's write the symbol that is associated with them.

a) Calcium \_\_\_\_\_

f) Chlorine \_\_\_\_\_

b) Carbon \_\_\_\_\_

g) Gold \_\_\_\_\_

c) Nickel \_\_\_\_\_

h) Magnesium \_\_\_\_\_

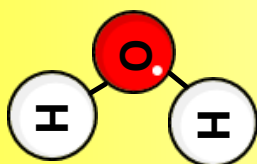
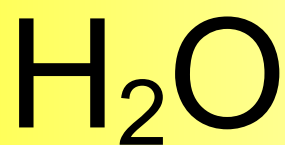
d) Neon \_\_\_\_\_

i) Nitrogen \_\_\_\_\_

e) Silver \_\_\_\_\_

j) Potassium \_\_\_\_\_

LETS VISUALIZE SOME MOLECULES AND COMPOUNDS



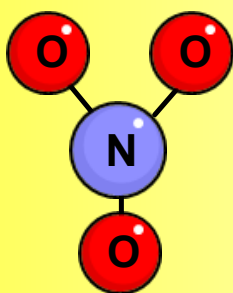
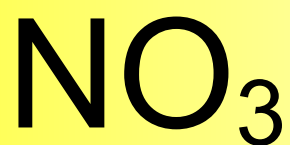
This Molecule contains:

2 Hydrogen atoms  
1 oxygen atom

---

Total atoms: 3 atoms

LETS VISUALIZE SOME MOLECULES AND COMPOUNDS



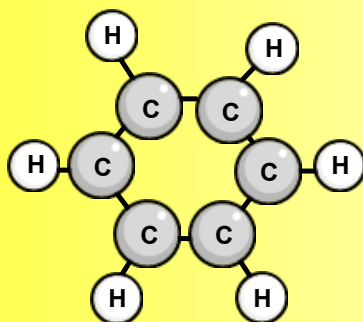
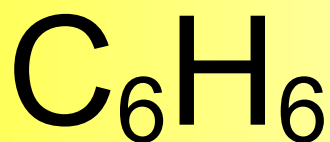
This Molecule contains:

1 Nitrogen atom  
3 oxygen atoms

---

Total atoms: 4 atoms

LETS VISUALIZE SOME MOLECULES AND COMPOUNDS



This Molecule contains:

6 Carbon atoms

6 Hydrogen atoms

---

Total atoms: 12 atoms

## RULES FOR COUNTING ATOMS

**1) SUBSCRIPTS** only refer to the atom that they are **BEHIND**.

Example: **H<sub>2</sub>S**

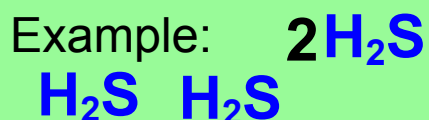
Contains:  
2 Hydrogen atoms  
1 Sulfur atoms

---

Total atoms: 3 atoms

## RULES FOR COUNTING ATOMS

**2) COEFFICIENTS** apply to the entire compound. You **MULTIPLY** the coefficients and **SUBSCRIPTS**.



IF THERE ISN'T A SUBSCRIPT BEHIND AN ELEMENT, ASSUME THERE IS ONLY ONE ATOM OF THAT ELEMENT!

Contains:

4 Hydrogen atoms  
2 Sulfur atoms

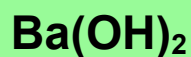
---

Total atoms: 6 atoms



## RULES FOR COUNTING ATOMS

3) If elements or compounds are inside of **BRACKETS**, then the **SUBSCRIPT** behind the parentheses applies to everything inside.

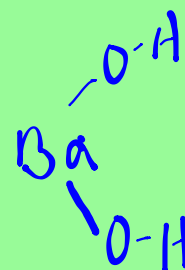


Example:

ATOMS OF BARIUM:	1
ATOMS OF OXYGEN:	2
ATOMS OF HYDROGEN:	2

---

Total of Atoms= 5



LET'S PRACTICE!



Atoms of Magnesium: 1

Atoms of Chlorine: 2

---

Total of Atoms = 3

LET'S PRACTICE!



Atoms of Aluminum: 2

Atoms of Sulfur: 3

---

Total of Atoms = 5

LET'S PRACTICE!



Atoms of Hydrogen: 2

Atoms of Sulfur: 1

Atoms of Oxygen: 4

---

Total of Atoms = 7

LET'S PRACTICE!



Atoms of Carbon:

Atoms of Hydrogen:

Atoms of Oxygen:

---

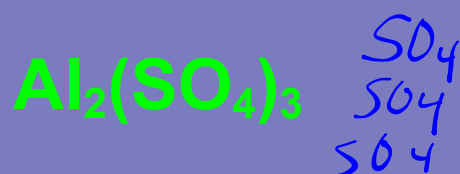
Total of Atoms =

1  
4  
1  
6

**LET'S PRACTICE!**

Atoms of Calcium:	3
Atoms of Phosphorus:	2
Atoms of Oxygen:	8
<hr/>	
Total of Atoms =	13

## LET'S PRACTICE!



Atoms of Aluminum: 2

Atoms of Sulfur: 3

Atoms of Oxygen: 12

---

Total of Atoms = 17

# LET'S PRACTICE!



Atoms of Calcium: 6  
Atoms of Phosphorus: 4  
Atoms of Oxygen: 16

---

Total of Atoms = 26

Atoms of Calcium: 3  
Atoms of Phosphorus: 2  
Atoms of Oxygen: 8

---

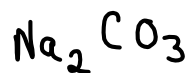
Total of Atoms = 26

Coef  
2  
x



# Assignment Time





$$\text{Na (sodium)} \rightarrow 2$$

$$\text{C (carbon)} \rightarrow 1$$

$$\text{O (oxygen)} \rightarrow 3$$

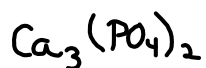
$$\text{Total} = 6$$



$$\text{Ba} \rightarrow 3$$

$$\text{Cl} \rightarrow 6$$

$$\text{Total} = 9$$



$$\text{Ca} \rightarrow 3$$

$$\text{P} \rightarrow 2$$

$$\text{O} \rightarrow 8$$

$$\text{Total} = 13$$



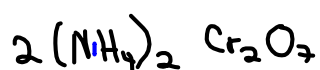
$$\text{N} \rightarrow 1$$

$$\text{H} \rightarrow 7$$

$$\text{C} \rightarrow 2$$

$$\text{O} \rightarrow 2$$

$$\text{Total} = 12$$



$$\text{N} \rightarrow 4$$

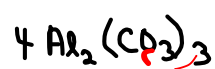
$$\text{H} \rightarrow 16$$

$$\text{Cr} \rightarrow 4$$

$$\text{O} \rightarrow 14$$

38 atoms

$$\text{Total} =$$



$$\text{Al} \rightarrow 8$$

$$\text{C} \rightarrow 12$$

$$\text{O} \rightarrow 36$$

$$\text{Total} = 56 \text{ atoms}$$

NAME: \_\_\_\_\_

BLOCK: \_\_\_\_\_

DATE: \_\_\_\_\_

**CHEMISTRY: COUNTING ATOMS IN COMPOUNDS WORKSHEET #7.0.1**

INSTRUCTIONS: Write the quantity of atoms of each element opposite the formula of the compound for the quantity of formula units and molecules shown:

For example:  $5\text{P}_2\text{O}_3$       P =  $(5 \times 2 =) 10$       O =  $(5 \times 3 =) 15$

For example:  $4\text{Zn}(\text{NO}_3)_2$       Zn =  $(4 \times 1 =) 4$       N =  $(4 \times 1 \times 2 =) 8$       O =  $(4 \times 3 \times 2 =) 24$

1.  $4\text{K}_2\text{CO}_3$       K = 8      C = 4      O = 12      Total = 24

2.  $2\text{Sr}_3(\text{PO}_4)_2$       Sr = 6      P = 4      O = 16      Total = 26

3.  $3\text{N}_4\text{O}_{10}$       N = 12      O = 30      Total = 42

4.  $2(\text{NH}_4)_3\text{N}$       N = 8      H = 24      Total = 32

5.  $8\text{Cl}_2\text{O}$       Cl = 16      O = 8      Total = 24

6.  $\text{Ca}(\text{C}_2\text{H}_3\text{O}_2)_2$       Ca = 1      C = 4      H = 6      O = 4      Total = 15

7.  $12\text{NaBr}$       Na = 12      Br = 12      Total = 24

8.  $4\text{Al}(\text{OH})_3$       Al = 4      O = 12      H = 12      Total = 28

9.  $3\text{NaHCO}_3$       Na = 3      H = 3      C = 3      O = 9      Total = 18

10.  $5\text{Ga}_2(\text{Cr}_2\text{O}_7)_3$       Ga = 10      Cr = 30      O = 105      Total = 145

11.  $7\text{C}_2\text{S}_2$       C = 14      S = 14      Total = 28

12.  $4\text{Fe}_2\text{O}_3$       Fe = 8      O = 12      Total = 20

13.  $6\text{Ba}(\text{MnO}_4)_2$       Ba = 6      Mn = 12      O = 48      total = 66

14.  $3\text{V}_2\text{O}_5$       V = 6      O = 15      total = 21

15.  $2\text{KNO}_3$       K = 2      N = 2      O = 6      Total = 10

16.  $9\text{MgSO}_4$       Mg = 9      S = 9      O = 36      Total = 54

17.  $5\text{Al}_2(\text{SiO}_3)_2$       Al = 10      Si = 10      O = 30      Total = 50

18.  $4\text{Au}(\text{IO}_3)_3$       Au = 4      I = 12      O = 36      Total = 52

(Continued)

- 2 -

**INSTRUCTIONS:** Write the quantity of atoms of each element opposite the formula of the compound for the quantity of formula units and molecules shown:

For example:  $5\text{P}_2\text{O}_3$       P =  $(5 \times 2 =)$  10      O =  $(5 \times 3 =)$  15

For example:  $4\text{Zn}(\text{NO}_3)_2$       Zn =  $(4 \times 1 =)$  4      N =  $(4 \times 1 \times 2 =)$  8      O =  $(4 \times 3 \times 2 =)$  24

19.  $8\text{SnCl}_4$       Sn = 8      Cl = 32      Total: 40
20.  $6\text{Cu}_2\text{SeO}_4$       Cu = 12      Se = 6      O = 24      Total: 42
21.  $3\text{AsBr}_3$       As = 3      Br = 9      Total: 12
22.  $2\text{H}_2\text{SO}_4$       H = 4      S = 2      O = 8      Total: 14
23.  $\text{SBr}_2$       S = 1      Br = 2      Total: 3
24.  $4\text{Ca}(\text{OH})_2$       Ca = 4      O = 8      H = 8      Total: 20
25.  $5\text{Mg}_3(\text{PO}_4)_2$       Mg = 15      P = 10      O = 40      Total: 65
26.  $12\text{H}_2\text{O}$       H = 24      O = 12      Total: 36
27.  $5\text{N}_2\text{O}_4$       N = 10      O = 20      Total: 30
28.  $3\text{ClF}$       Cl = 3      F = 3      Total: 6
29.  $7\text{P}_2\text{O}_5$       P = 14      O = 35      Total: 49
30.  $2\text{KrCl}_6$       Kr = 2      Cl = 12      Total: 14
31.  $5\text{Al}(\text{C}_2\text{H}_3\text{O}_2)_2$       Al = 5      C = 20      H = 30      O = 20      Total: 75
32.  $3(\text{NH}_4)_2\text{Cr}_2\text{O}_7$       N = 6      H = 24      Cr = 6      O = 21      Total: 57
33.  $5\text{Fe}_3(\text{PO}_4)_2$       Fe = 15      P = 10      O = 40      Total: 65
34.  $2\text{NH}_4\text{NO}_3$       N = 4      H = 8      O = 6      Total: 18
35.  $5\text{BaC}_4\text{H}_4\text{O}_6$       Ba = 5      C = 20      H = 20      O = 30      Total: 75
36.  $4\text{Cu}(\text{HSO}_3)_2$       Cu = 4      H = 8      S = 8      O = 24      Total: 44
37.  $9\text{Au}(\text{NO}_2)_2$       Au = 9      N = 18      O = 36      Total: 63
38.  $3\text{K}_2\text{ZnO}_2$       K = 6      Zn = 3      O = 6      Total: 15
39.  $3\text{Sr}(\text{MnO}_4)_2$       Sr = 3      Mn = 6      O = 24      Total: 33
40.  $4\text{Al}_2(\text{CO}_3)_3$       Al = 8      C = 12      O = 36      Total: 56