HOW TO COUNT ATOMS

Background Information:

- **subscripts** – the little numbers that tell how many atoms there are (ex: In $3H_2O$, the $_2$ is the subscript)
- **coefficients** – regular-sized numbers that tell how many molecules there are (ex: In $3H_2O$, the **3** is the coefficient)

Example: $3H_2O$

- The subscript $_2$ in the example above comes after the H.
  This means there are **two H's** (hydrogen atoms) in **each** molecule.
- The coefficient **3** shows that there are **three** of the H_2O molecules.

We could draw each molecule to help show us how many atoms are present.

Now we can count the number of H's and the number of O's.

$3H_2O$ has **6 hydrogen atoms** and **3 oxygen atoms**.

However, drawing out each equation is **NOT PRACTICAL.** The number of atoms can be counted **without** having to draw it out.

To find out the number of atoms: **MULTIPLY all the SUBSCRIPTS in the molecule by the COEFFICIENT. (This will give you the number of atoms of each element.)**

To mathematical find the number of elements that make up $3H_2O$, we multiply the $_2$ by the coefficient 3 to find that there are 6 H's. Then we multiply the $_1$ by the coefficient 3 to find that there are 3 O's.

NOTE: Although the $_1$ is usually not written, $3H_2O$ can be written as $3H_2O_1$.
(In other words, $3H_2O$ and $3H_2O_1$ are the **same thing**.)

HOW TO COUNT ATOMS IN A CHEMICAL FORMULA

(5 Easy Steps)

Step 1: **Write** the chemical formula

Step 2: **List** all the atoms

Step 3: **Count** the number of atoms of each element in **1** molecule.

Step 4: **Multiply** the number of atoms of each by the **coefficient**.

Step 5: Make sure your answer **makes sense**.

Practice Examples

$6\ C_2H_5OH$ (Ethanol)

C - 2*6=12
H - 6*6=36
O - 1*6=6

$4\ C_6H_{12}O_6$ (Glucose - Sugar)

C - 6*4=24
H - 12*4=48
O - 6*4=24

$5\ Ca(OH)_2$ (Calcium Hydroxide)

Ca - 1*5=5
O - 2*5=10
H- 2*5=10