How to Calculate the Formula Weight

The periodic table provides you with individual atomic masses and not the masses of molecules/compounds. However, if you know the number and type of atoms in a molecule/compound you can add up the individual masses to find the molecule's/compound's mass. This is known as its formula weight.

- ☑ **Step One – List the symbols of the different types of atoms that make up the molecule/compound.**

Example 1 - H_2O_2

H →

O →

- ☑ **Step Two – List the total number of each type of atom next to the symbols.**

H → 2

O → 2

- ☑ **Step Three – Using your periodic table, find the mass of the listed atoms and write them down next to the appropriate symbol.**

H → 2 X 1 amu (μ)

O → 2 X 16 amu (μ)

- ☑ **Step Four – Multiply the number of atoms present by its appropriate atomic mass.**

H → 2 X 1 amu (μ) = 2 amu (μ)

O → 2 X 16 amu (μ) = 32 amu (μ)

- ☑ **Step Five – Add all of the atomic masses together.**

H → 2 X 1 amu (μ) = 2 amu (μ)

O → 2 X 16 amu (μ) = 32 amu (μ)

34 amu (μ)

One molecule of hydrogen peroxide weighs in at 34 amu (μ).

Example 2

The formula weight of calcium phosphate, $Ca_3(PO_4)_2$ would be calculated like this.

The molecule has 3 calcium (Ca) atoms, 2 phosphate (P) atoms, and 8 oxygen (O) atoms in it. Stop and verify this for yourself. The Ca has a subscript 3 with it. The P has an assumed 1 and the O has a 4. However the PO_4 group has a set of brackets around it with a subscript 2. The 2 means multiply everything inside the brackets by 2. So we end up with the 2 P and 8 O atoms.

Ca → 3 X 40 amu = 120 amu (μ)

P → 2 X 31 amu = 62 amu (μ)

O → 8 X 16 amu = 128 amu (μ)

310 amu (μ)

One molecule of calcium phosphate weighs 310 amu (μ)

Try this one on your own.

What is the formula weight of $C_6H_{12}O_6$?