# **Chapter 7 Chemical Formulas**

**7-1 What is a chemical formula?**

* Remember chemical symbols are used to represent elements
* Chemical formulas use symbols to show compounds

-Subscripts are used to show the number of atoms for each element in a molecule of the compound.

-if there is only 1 atom of an element in a molecule, the 1 is not written

(example H2O)

* When writing chemical formulas, the symbol for the metal is written first
* Often common names are given for compounds that don’t have anything to do with the elements that make them up. Example; Ammonia NH4

## 7-2 What is an Oxidation Number?

-Oxidation numbers show how many electrons an atom gains, loses or shares while bonding.

 Example; Sodium Chloride (NaCl)

Cl has an oxidation number of 1-

 Na has an oxidation number of 1+

Therefore, when they bond to form sodium chloride (salt), chlorine gains an electron and sodium loses one electron

\*Metals tend to lose electrons, therefore have positive oxidation numbers

\*Non-metals tend to gain electrons, therefore have negative oxidation numbers

Some elements such as copper and iron have more than one oxidation number. For these elements, in the name of the compound, a Roman Numeral is used to show which oxidation number is used.

For example;

Write the formula for Iron (II) Chloride

FeCl2

# **7-3 How are chemical compounds named?**

Two different elements that are chemically combined form a binary compound.

The name begins with the positive oxidation number element. For the second element with a negative oxidation number, drop the ending and add –ide.

 Example; NaCl

 Sodium has a 1+ and is written first,

 Chlorine 1- is written second and

 the ending changed

For elements that have numerous oxidation numbers, the oxidation number is written in Roman Numerals in parentheses.

 Examples; FeCl2 is Iron (II) Chloride

 FeCl3 is Iron (III) Chloride

**7-4 What is a polyatomic ion?**

Polyatomic Ions-groups of atoms that act as charged atoms or ions when combining with other atoms.

Examples; Hydroxide OH (Has an overall charge of 1-)

 Sulfate SO4 (Has an overall charge of 2-)

 Ammonium NH4 (Has an overall charge of 1+)

To write formulas for compounds containing polyatomic ions, follow the same rules, however you must use parentheses when assigning a subscript to the polyatomic ion.

Example….. Calcium Hydroxide

Ca (OH)2

**7-5 What is a diatomic molecule?**

**Diatomic molecule**-molecule made up of only two atoms.

 Examples; H2, which is hydrogen gas

 O2, which is oxygen gas

 CO, which is carbon monoxide

Ozone is O3, which is known as a triatomic molecule.

**7-6 What is formula mass?**

**Formula Mass**-the sum of the mass numbers of all the atoms in a molecule or ions in an ionic compound.

In order to determine the formula mass of a molecule or an ionic compound follow these steps:

* Write the chemical formula of the compound
* Determine the atomic mass of each element
* If the element has a subscript, multiply the subscript times the atomic mass
* Add the masses together