

# CHEMISTRY DAILY PLAN

**Class:**

**Date:**

**Subject:** Naming Chemical Compounds

**Time:**

Let us examine the nomenclature of ionic and covalent compounds one by one.

## 1. Metal - Nonmetal Compounds

In naming metal - nonmetal compounds, the name of the metal written first, then the name of the nonmetal comes ending with -ide.

Name of Metal + Name of Non-Metal + ide			
Formula	Name	Formula	Name
NaCl	Sodium chloride	AlCl <sub>3</sub>	Aluminum chloride
CaBr <sub>2</sub>	Calcium bromide	BaF <sub>2</sub>	Barium fluoride
MgI <sub>2</sub>	Magnesium iodide	KI	Potassium iodide
Na <sub>2</sub> O	Sodium oxide	CaO	Calcium oxide
Ca <sub>3</sub> N <sub>2</sub>	Calcium nitride	Na <sub>3</sub> N	Sodium nitride
Mg <sub>3</sub> P <sub>2</sub>	Magnesium phosphide	K <sub>3</sub> P	Potassium phosphide
CaC <sub>2</sub>	Calcium carbide	KH	Potassium hydride
MgC <sub>2</sub>	Magnesium carbide	CaH <sub>2</sub>	Calcium hydride
CaS	Calcium sulfide	Al <sub>2</sub> S <sub>3</sub>	Aluminum sulfide

## 2. Metal - Polyatomic Ion Compounds

When metal - polyatomic anion compounds are named, first the name of the metal then the name of polyatomic anion are written.

Name of Metal + Name of Polyatomic Ion			
Formula	Name	Formula	Name
NaOH	Sodium hydroxide	CaCO <sub>3</sub>	Calcium carbonate
KNO <sub>3</sub>	Potassium nitrate	KMnO <sub>4</sub>	Potassium permanganate
MgSO <sub>4</sub>	Magnesium sulfate	Al <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>	Aluminum phosphate
CaSO <sub>3</sub>	Calcium sulfite	Na <sub>2</sub> CrO <sub>4</sub>	Sodium chromate

## 3. Compounds of Metals with Variable Oxidation Numbers

Some metals may have more than one oxidation number in their compounds. These elements are transition metals. For example, iron may form two different compounds with chlorine, FeCl<sub>2</sub> and FeCl<sub>3</sub>. Both of them are iron chloride, but since they are different compounds they have different properties and their names must be different. Therefore, in naming such compounds, we have to indicate the oxidation number of metal as in the following examples.

Name of Metal + Oxidation Number + Name of Nonmetal			
Formula	Name	Formula	Name
FeO	Iron (II) oxide	Fe <sub>2</sub> O <sub>3</sub>	Iron (III) oxide
Fe(OH) <sub>2</sub>	Iron (II) hydroxide	Fe(OH) <sub>3</sub>	Iron (III) hydroxide
CuO	Copper (II) oxide	Cu <sub>2</sub> O	Copper (I) oxide
HgS	Mercury (II) sulfide	Hg <sub>2</sub> S	Mercury (I) sulfide
PbCl <sub>2</sub>	Lead (II) chloride	PbCl <sub>4</sub>	Lead (IV) chloride
MnS	Manganese (II) sulfide	MnO <sub>2</sub>	Manganese (IV) oxide
SnO	Tin (II) oxide	SnO <sub>2</sub>	Tin (IV) oxide

#### 4. Hydrates

Some ionic compounds contain water molecules. In naming these compounds, we have to indicate the number of water molecule by using names of the number in latin and add hydrate as suffix.

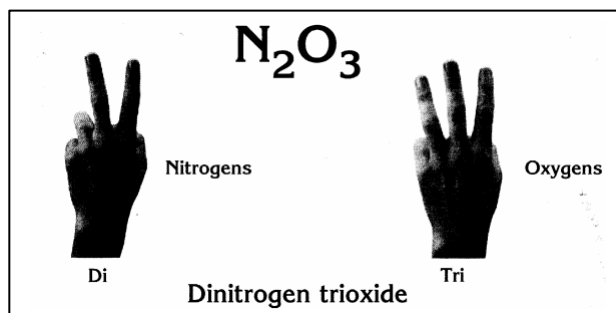
**Name of Anhydrous Compound + Number of Hydrate in Latin + hydrate**

Latin Numbers	Formula	Name	Name
One Mono			
Two Di	MgSO <sub>4</sub> 7H <sub>2</sub> O	Magnesium sulfate heptahydrate	Epsom Salts
Three Tri			
Four Tetra	CaSO <sub>4</sub> 2H <sub>2</sub> O	Calcium sulfate dihydrate	Gypsum
Five Penta			
Six Hexa	KAl(SO <sub>4</sub> ) <sub>2</sub> 12H <sub>2</sub> O	Potassium aluminum sulfate dodecahydrate	Alum
Seven Hepta			
Eight Octa	CaCO <sub>3</sub> 10H <sub>2</sub> O	Calcium carbonate decahydrate	Washing soda
Nine Nona			
Ten Deca	CuSO <sub>4</sub> 5H <sub>2</sub> O	Copper (II) sulfate pentahydrate	Blue vitriol

#### 5. Naming Covalent Compounds

In naming covalent compounds, the name and the number of atoms of elements are written in Latin language. If the number of first element is one, there is no need to indicate as mono.

**Example:** The compound NO<sub>2</sub> is named as Nitrogen dioxide instead of Mono nitrogen dioxide.



Formula	Name	Formula	Name
CO	Carbon monoxide	CO <sub>2</sub>	Carbon dioxide
CS <sub>2</sub>	Carbon disulfide	SCl <sub>2</sub>	Sulfur dichloride
PCl <sub>3</sub>	Phosphorus trichloride	PCl <sub>5</sub>	Phosphorus pentachloride
N <sub>2</sub> O	Dinitrogen monoxide	NO	Nitrogen monoxide
N <sub>2</sub> O <sub>3</sub>	Dinitrogen trioxide	N <sub>2</sub> O <sub>4</sub>	Dinitrogen tetroxide
N <sub>2</sub> O <sub>5</sub>	Dinitrogen pentoxide	CCl <sub>4</sub>	Carbon tetrachloride
SO <sub>2</sub>	Sulfur dioxide	SO <sub>3</sub>	Sulfur trioxide
P <sub>2</sub> O <sub>3</sub>	Diphosphorus trioxide	P <sub>2</sub> O <sub>5</sub>	Diphosphorus pentoxide

Some compounds have common names. For example; the compound formulated as H<sup>+</sup>O is called water. It is not called as dihydrogen oxide even though it is right usage. Some of these compounds are given below.

Formula	Name	Formula	Name
NH <sub>3</sub>	Ammonia	H <sub>2</sub> O	Water
C <sub>2</sub> H <sub>2</sub>	Acetylene	PH <sub>3</sub>	Phosphine
AsH <sub>3</sub>	Arsine	COCl <sub>2</sub>	Phosgene