

## Unit 6: Chemical Formulas & Names

Name: \_\_\_\_\_

2 - Unit Objectives:

- 1.
- 2.
- 3.
- 4.

### 3 – 5 - Two Types of Compounds

Binary compounds

1. Ionic

- a. Metals with single charges
- b. Metals with multiple charges
  - i. Traditional and Stock system names

**2. Covalent**

Ternary compounds

1. Ionic with polyatomic ions

6 - Chemical Bond:

**What holds atoms together?**

7 - Chemical Formulas:

Ionic

Covalent

8-10 – Types of Bonds	Ionic	Covalent	Metallic
Bond Formation			
Type of Structure			
Physical State			
Melting Point			
Solubility			
Conductivity			
Other			

### **13 – Other types of Bonds**

covalent compounds = molecular compounds (molecules)

- ***Metallic Bonds***                      In metals, valence shells of atoms overlap, so val.  $e^-$  are free to travel between atoms through material.

#### ***Properties of Metals***

- ***Other Types of Bonds***

dipole-dipole forces, hydrogen bonds, London dispersion forces; & ion-dipole forces

### **14 - Chemical Bonding**

- ***Ionic Bonds***: atoms give up or gain  $e^-$  and are attracted to each other by coulombic attraction

ionic compounds = salts

where  $\text{NO}_3^{1-}$  is a polyatomic ion:

#### ***19 - Properties of Salts***

1. very hard –
2. high melting points –
3. brittle –

## **20 - Writing Formulas of Ionic Compounds**

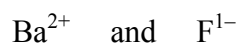
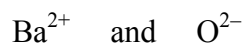
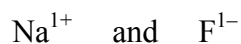
“Symbolic”

chemical formula:

To write an ionic compound’s formula, we need:

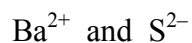
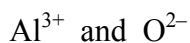
1.

2.



**21 - criss-cross rule:** charge on cation / anion “becomes” subscript of anion / cation

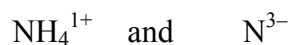
\*\* Warning:



## **22-24 – Other examples**

### **25 - Writing Formulas <sup>w</sup>/Polyatomic Ions**

Parentheses are required only when you need more than one “bunch” of a particular polyatomic ion.



## 26 – Polyatomic Ions To Memorize:

## 27 – Pattern to Memorizing Ionic Nomenclature (naming)

Generic IC	name that goes with Y	example compound	example name
XY (e.g. X = Sodium)	-ide	e.g. if , Y = chlorine	sodium chloride



## **31 - Naming Binary Compounds**

- *Ionic Compounds (cation/anion combos)*

### Single-Charge Cations (fixed oxidation states) with Elemental Anions

The single-charge cations are:

33- A. To name, given the formula:

1. Use name of cation.
2. Use name of anion (it has the ending “ide”).



33 - B. To write formula, given the name:

1. Write symbols for the two types of ions.
2. Balance charges to write formula.

sodium bromide

strontium fluoride

cesium fluoride

### 35 - Multiple-Charge Cations (multiple oxidation states) with Elemental Anions

The multiple-charge cations are:

38 - A. To name, given the formula:

1. Figure out charge on cation.
2. Write name of cation.
3. Write Roman numerals in ( ) to show cation's charge.
4. Write name of anion.

FeO

Fe<sub>2</sub>O<sub>3</sub>

CuBr

CuBr<sub>2</sub>

39. B. To find the formula, given the name:

1. Write symbols for the two types of ions.
2. Balance charges to write formula.

cobalt (III) chloride

tin (IV) oxide

tin (II) oxide

40 – Exceptions: Two exceptions to the simple *-ide* ending are the diatomic (polys) peroxide and superoxide ions,  $O_2^{2-}$  and  $O_2^{1-}$ .

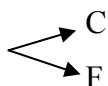
[CHEMICAL BONDING ACTIVITY WORKSHEET]

Pre-lab notes:

52 - COVALENT BONDING FORMULAS AND NOMENCLATURE

***Covalent Bonds***

...atoms share  $e^-$  to get a full valence shell



54 - Diatomic Molecules:

56 - Fluorine model

**57 - Covalent Compounds**-- contain two types of nonmetals

Key:

What to do:

Use Greek prefixes to indicate  
how many atoms of each element,  
but **don't use "mono" on first element.**

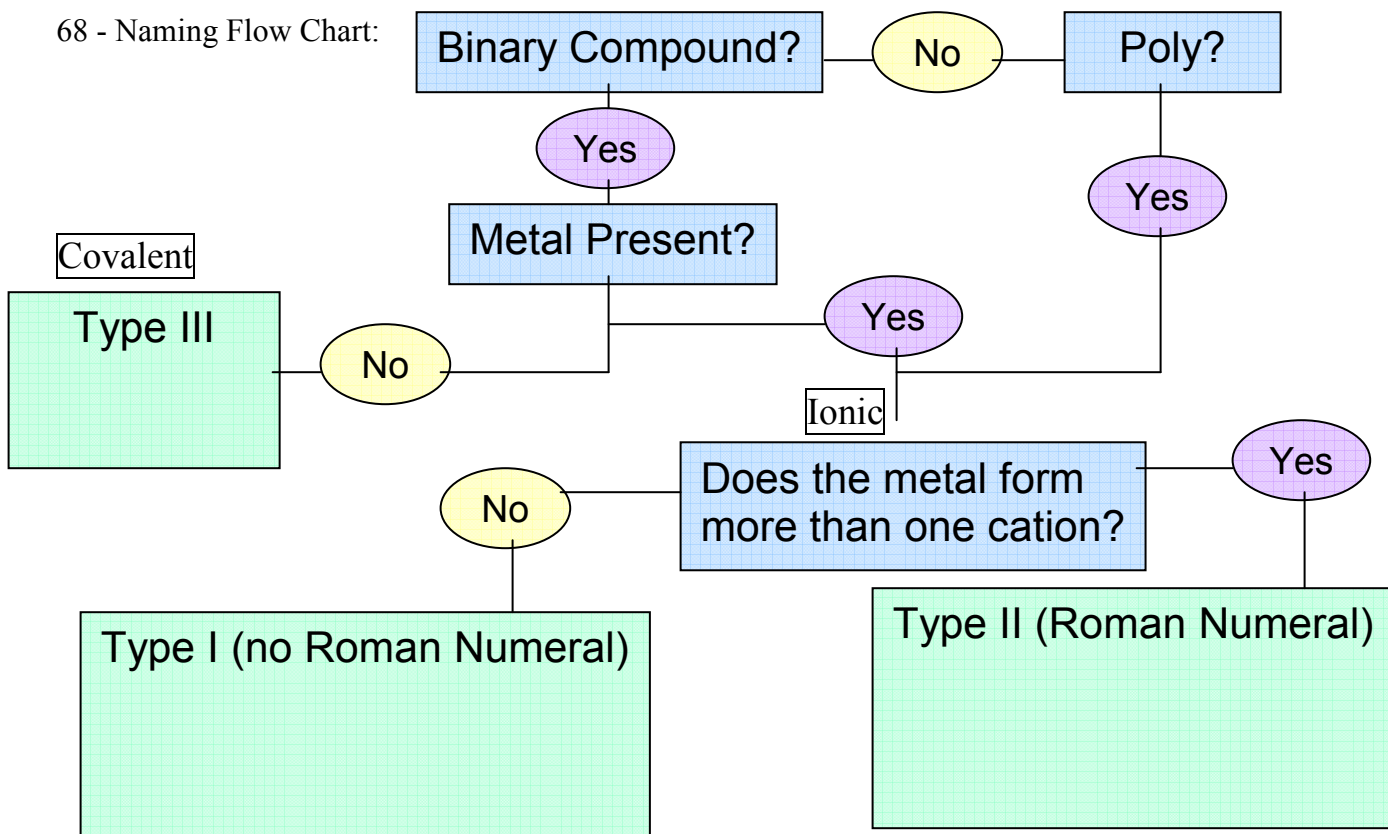
1 -	6 -
2 -	7 -
3 -	8 -
4 -	9 -
5 -	10 -

EXAMPLES:      carbon dioxide  
                         CO  
  
                         dinitrogen trioxide  
                         N<sub>2</sub>O<sub>5</sub>  
  
                         carbon tetrachloride  
                         NI<sub>3</sub>

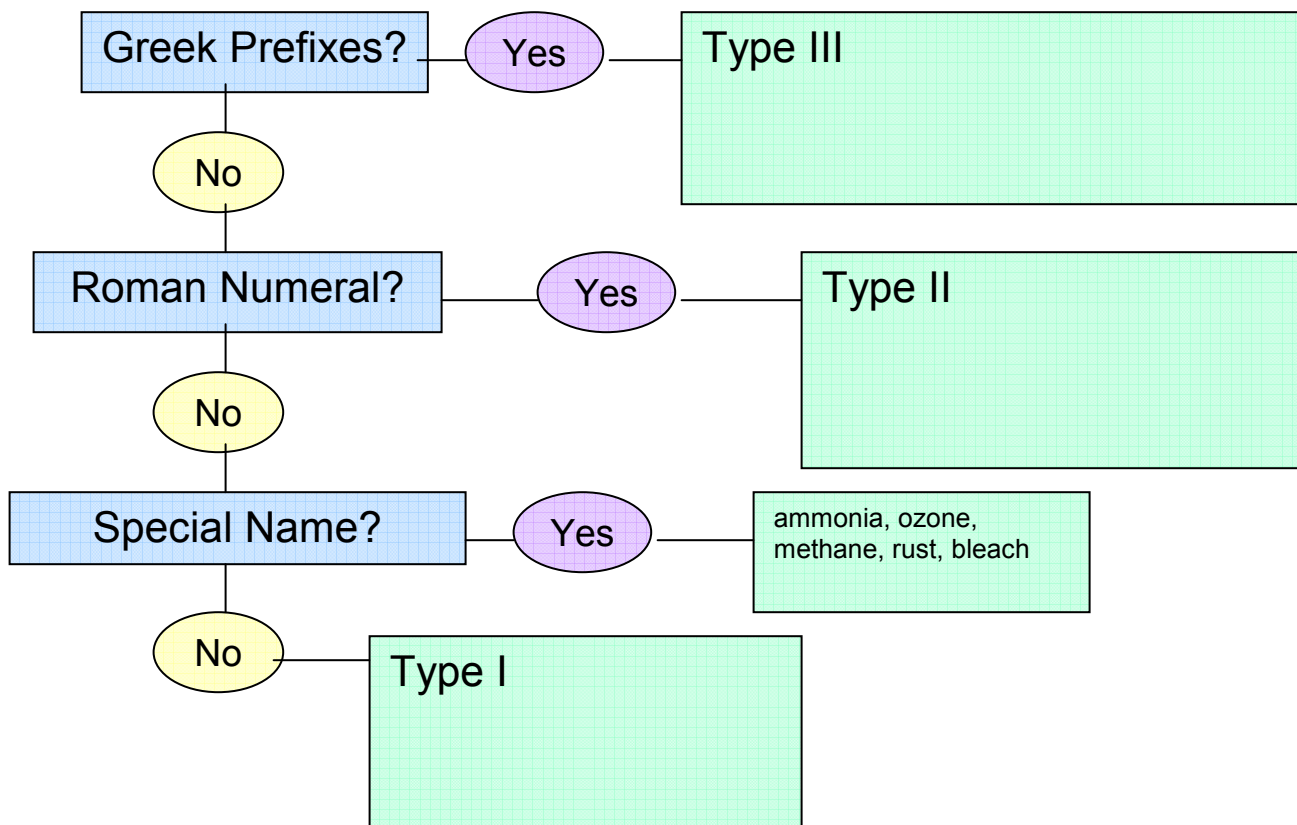
**More examples:**



68 - Naming Flow Chart:



Formula (from name) Flow Chart:



## 69 - Naming Acids

The prefix *hydro-* is used to represent hydrogen, followed by the name of the **nonmetal** with its ending replaced by the suffix ***-ic*** and the word **acid** added.

## 70 – Oxyacids!

perchloric  
sulfuric  
phosphoric  
nitric

## 71 – RIC ATE OUS RITE!?!?!?

## 72 – OXYACIDS – OXYSALTS

If you replace hydrogen with a metal, you have formed an oxysalt. A *salt* is a compound consisting of a metal and a non-metal. If the salt consists of a metal, a nonmetal, and oxygen it is called an oxysalt. NaClO<sub>4</sub>, sodium perchlorate, is an oxysalt.

## 74 – The meaning of Suffixes

- “-ide”
- “-ite”
- “-ate”
- “-ol”
- “-ose”
- “-ase”