

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 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

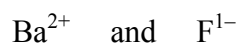
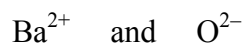
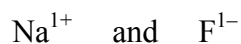
“Symbolic”

chemical formula:

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

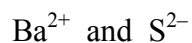
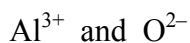
1.

2.



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

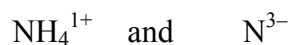
** Warning:



22-24 – Other examples

25 - Writing Formulas ^w/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

Fe₂O₃

CuBr

CuBr₂

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

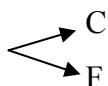
40 – Exceptions: Two exceptions to the simple *-ide* ending are the diatomic (polys) peroxide and superoxide ions, O_2^{2-} and O_2^{1-} .

[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

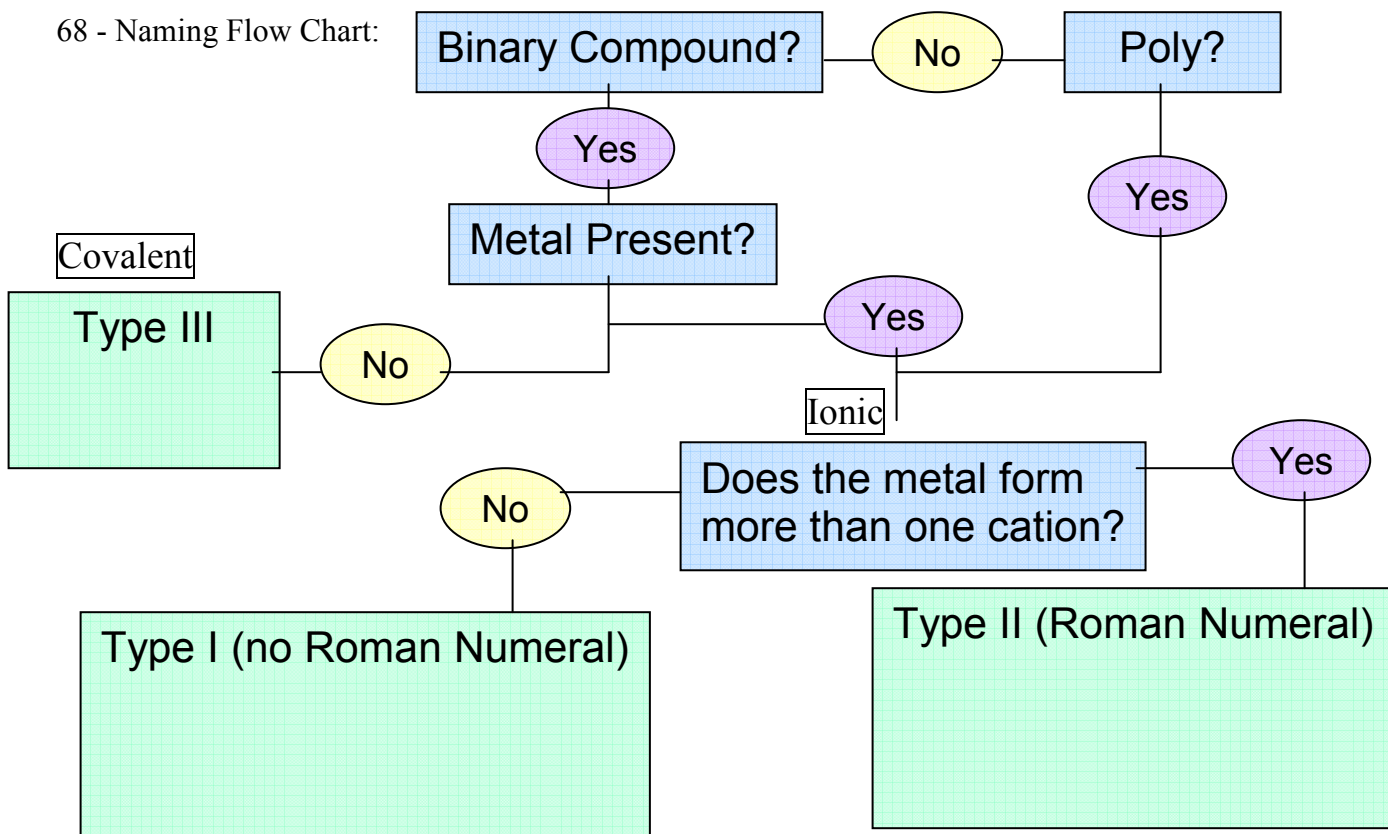
 dinitrogen trioxide
 N₂O₅

 carbon tetrachloride
 NI₃

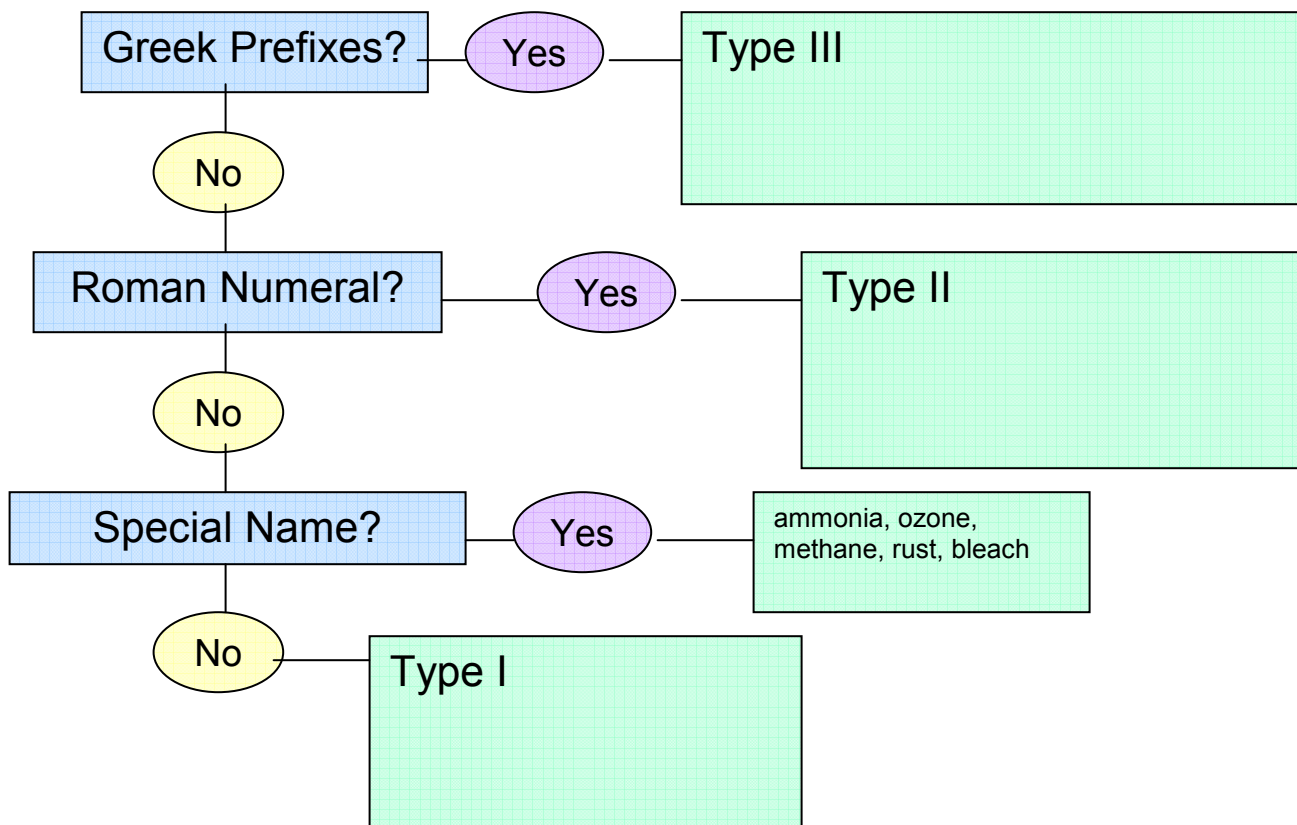
More examples:



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. NaClO₄, sodium perchlorate, is an oxysalt.

74 – The meaning of Suffixes

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