

Name: _____ Period: _____ Date: _____

NOMENCLATURE NOTES HONORS CHEMISTRY

Directions: This packet will serve as your notes for this chapter. Follow along with the PowerPoint presentation and fill in the missing information. Important terms / ideas are in all capitals and bolded!

- **OCTET RULE:**

-**CATIONS** are formed when atoms _____ e- to complete the octet rule (_____)

- Ex: _____

- _____ valence electrons... easier to lose _____ than gain _____ so it forms what charge?

-**ANIONS** are formed when atoms _____ e- to complete the octet rule (_____)

- Ex: _____

- _____ valence electrons... easier to gain _____ than lose _____ so it forms what charge?

-Show the movement of electrons for each:

Cations

Anions

- **CHEMICAL BOND:**

-Types include _____, _____, or _____

-Differences in _____ determine the bond type

- **IONIC BOND:**

-Each atom achieves a _____ configuration (_____ valence shell)

-Usually between a _____ and a _____

-**FORMULA UNIT:**

- **MONATOMIC IONS:**

-Indicated by the _____ of the element and its _____ (Ex: _____)

-Naming:

- If _____: Keep their names followed by "ion"

(Ex: sodium ion, potassium ion, aluminum ion)

- If _____: Change ending to *-ide*

(Ex: oxide ion, sulfide ion)

-Examples: Write the name for the following monatomic ions.

Write the formula for the following ions.

-Transition Metals: can have _____ charges... name them with the charge as a Roman numeral in _____ (Ex: $\text{Cu}^{2+} =$ _____)

-Examples:

-Traditional Names: transition metals also can be named using an _____ system in which the name is determined by the _____

- Examples:

$\text{Cu}^{1+} =$ _____ / $\text{Cu}^{2+} =$ _____

$\text{Fe}^{2+} =$ _____ / $\text{Fe}^{3+} =$ _____

$\text{Pb}^{2+} =$ _____ / $\text{Pb}^{4+} =$ _____

$\text{Sn}^{2+} =$ _____ / $\text{Sn}^{4+} =$ _____

-Some Multi-Charged Metals:

Copper - Cu^{1+} , Cu^{2+}

Iron - Fe^{3+} , Fe^{2+}

Mercury - Hg^{1+} , Hg^{2+}

Lead - Pb^{2+} , Pb^{4+}

Tin - Sn^{2+} , Sn^{4+}

Chromium - Cr^{2+} , Cr^{3+}

Manganese - Mn^{2+} , Mn^{3+}

Cobalt - Co^{2+} , Co^{3+}

- **POLYATOMIC IONS:**

-Naming: they _____ their names no matter what!

-Usually end in _____ or _____

-Ex:

-POLYATOMIC IONS TO KNOW: ****MEMORIZE THESE!!!!!!****

Ammonium NH_4^{1+}	Hydrogen carbonate / bicarbonate HCO_3^{1-}	Carbonite CO_2^{2-}
Acetate $\text{C}_2\text{H}_3\text{O}_2^{1-}$		Chromate CrO_4^{2-}
Perchlorate ClO_4^{1-}	Iodate IO_3^{1-}	Dichromate $\text{Cr}_2\text{O}_7^{2-}$
Chlorate ClO_3^{1-}	Permanganate MnO_4^{1-}	Peroxide O_2^{2-}
Chlorite ClO_2^{1-}	Nitrate NO_3^{1-}	Sulfate SO_4^{2-}
Hypochlorite ClO^{1-}	Nitrite NO_2^{1-}	Sulfite SO_3^{2-}
Cyanide CN^{1-}	Hydroxide OH^{1-}	Phosphate PO_4^{3-}
	Oxalate $\text{C}_2\text{O}_4^{2-}$	Phosphite PO_3^{3-}
	Carbonate CO_3^{2-}	

- Naming Ionic Compounds

-To name an **IONIC** compound, ask yourself this question first...

Is the _____ in the compound _____? (in the d-block including Pb and Sn, but NOT Zn or Ag)

*EXCEPTIONS:

-All transition metals (d-block) are multi-charged except Ag is always _____ and Zn is always _____ so no Roman numerals are needed

- _____ and _____ behave like transition metals

-If the answer is **NO**...

1) Name the _____ (metal) first... remember it keeps its name

2) Then name the _____ (nonmetal)... ending in *-ide*

○ Example: Name the following compound: _____

-If the answer is **YES**...

- 1) Criss-cross the _____ and make them the charges (metals = "+" / nonmetals = "-")
- 2) Check the _____ on the anion (-) and see if it is correct... if it is **NOT**, multiply the "-" charge by a # to get the correct charge and then multiply the "+" charge by the same #
- 3) Write the name of the _____ with its charge in parentheses as a Roman numeral [I, II, III, IV] followed by the _____ with an "ide" ending
 - o Examples: Name the following compound: _____

Name the following compound: _____

-If the compound has a **POLYATOMIC ION**...

- 1) Follow all _____ rules, but the polyatomic ions get to _____ their name
 - o Examples: Name the following compound: _____

Name the following compound: _____

-If the compound is a **HYDRATE** (contains _____)...

- 1) Follow all previous rules
- 2) Attach the correct _____ to the word " _____ " to indicate the amount of _____ molecules present... put this right after the name

PREFIX	NUMBER	PREFIX	NUMBER
	1		6
	2		7
	3		8
	4		9
	5		10

- o Examples: Name the following compound: _____

Name the following compound: _____

- Naming Practice

-Examples: Write the names of the following ionic compounds.

- Chemical Formulas

-Like a _____... gives a list of the ingredients (_____) and the amount of each (_____)

-Ex:

-Atoms represented are _____ together!

-Two Types for Ionic:

- **BINARY COMPOUND** →
- **POLYATOMIC ION COMPOUNDS** →

- Ionic Compound Formulas

-Rules for writing formulas...

- 1) Write the _____ of each element or ion from the name (_____ is always written first followed by the _____)
- 2) Determine the _____ on each...
 - Multi-Charged**: it's in the _____
 - Polyatomic**: keeps its _____
 - Otherwise**: get from the _____
- 3) Criss-cross the charges and make them _____... simplify (reduce), if possible
 - Example: Write the formula for _____.

-If **POLYATOMIC IONS** are present...

- 1) Follow all _____ rules
- 2) Treat polyatomic ions as a _____... put in parentheses when _____ are used
 - Ex:
 - Example: Write the formula for _____.

-If the compound is a **HYDRATE** (contains _____)...

- 1) Follow all previous rules
- 2) Use the _____ in front of "hydrate" to indicate the number of _____ molecules... Write this after the name by adding " $\cdot \text{#H}_2\text{O}$ "
 - Example: Write the formula for _____.

- **Formula Practice**

-Examples: Write the formulas of the following ionic compounds.

- **ACID:**

-Less than _____ on the _____

-Must have at least one _____ in its formula and many usually start with an _____ atom

-_____ in the formula will determine the name

-Ex:

- **BASE:**

-Greater than ____ on the _____

-Feel _____

-Ex:

- Naming Acids

-Rules for naming **acids**:

1) Hydrogen atom connected to _____ that ends in *-ide* then it is named...

hydro- root of the element- *ic* acid

○ Examples:

2) Hydrogen atom connected to a _____ ending with *-ite* then it is named...

(root of the polyatomic ion)- *ous* acid

○ Examples:

3) Hydrogen atom connected to a _____ ending with *-ate* then it is named...

(root of the polyatomic ion)- *ic* acid

○ Examples:

- Acid Formulas

-Rules for writing formulas of **acids**:

1) _____ usually written first

2) Name indicates the _____ in the formula

3) Write the _____ for each symbol and criss-cross to get _____

○ Example:

- Acids Practice

-Examples: Write the names of the following acids.

-Examples: Write the formulas of the following acids.

- **COVALENT BOND:**

-Involves two _____

-Known as covalent or _____ compounds

-**MOLECULE:**

-**DIATOMIC MOLECULES:**

Ex: H_2 , N_2 , O_2 , F_2 , Cl_2 , Br_2 , and I_2

-How Does Diatomic H_2 Form?:

- Charged nuclei _____ each other
- Nuclei are _____ to the _____ and both atoms want a _____ valence configuration so they _____

***Nonmetals _____ give away their _____... must share!!**

- Naming Covalent Compounds

-Naming a **covalent** / **molecular** compound:

- 1) Write the name of the first _____
- 2) Change the _____ of the second element to *-ide*
- 3) Add correct _____ to each to indicate the number of atoms (no mono on **FIRST** element)

PREFIX	NUMBER	PREFIX	NUMBER
	1		6
	2		7
	3		8
	4		9
	5		10

- Examples: Name the following compound: _____

Name the following compound: _____

- Covalent Compound Formulas

-Rules for writing **covalent** / **molecular** formulas:

- 1) Write each element _____ from the name
- 2) Use _____ in the name to determine the _____ for each element...
DO NOT SIMPLIFY!!!

- Example: Write the formula for _____.

- Naming Practice

-Examples: Write the names of the following covalent compounds.

- Formula Practice

-Examples: Write the formulas of the following covalent compounds.

• **HYDROCARBONS:**

- _____ compounds... Three groups we will look at: Alkanes, Alkenes, and Alkynes

-Named with _____ based on the number of _____ atoms present:

PREFIX	# OF C	PREFIX	# OF C
	1		6
	2		7
	3		8
	4		9
	5		10

-ALKANES

- Have the generic formula: _____
- Contains all _____ bonds
- Naming: Use the correct prefix with _____ ending
- Formula: Prefix determines how many carbons... Do the math to determine the number of hydrogens
- Examples: Name the following compound: _____

Write the formula for _____.

-ALKENES

- Have the generic formula: _____
- Contains one _____ bond
- Naming: Use the correct prefix with _____ ending
- Formula: Prefix determines how many carbons... Do the math to determine the number of hydrogens
- Examples: Name the following compound: _____

Write the formula for _____.

-ALKYNES

- Have the generic formula: _____
- Contains one _____ bond
- Naming: Use the correct prefix with _____ ending
- Formula: Prefix determines how many carbons... Do the math to determine the number of hydrogens
- Examples: Name the following compound: _____

Write the formula for _____.

- Hydrocarbons Practice

-Examples: Write the names of the following compounds.

-Examples: Write the formulas of the following compounds.