

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 -  $\text{Cu}^{1+}$ ,  $\text{Cu}^{2+}$

Iron -  $\text{Fe}^{3+}$ ,  $\text{Fe}^{2+}$

Mercury -  $\text{Hg}^{1+}$ ,  $\text{Hg}^{2+}$

Lead -  $\text{Pb}^{2+}$ ,  $\text{Pb}^{4+}$

Tin -  $\text{Sn}^{2+}$ ,  $\text{Sn}^{4+}$

Chromium -  $\text{Cr}^{2+}$ ,  $\text{Cr}^{3+}$

Manganese -  $\text{Mn}^{2+}$ ,  $\text{Mn}^{3+}$

Cobalt -  $\text{Co}^{2+}$ ,  $\text{Co}^{3+}$

- **POLYATOMIC IONS:**

-Naming: they \_\_\_\_\_ their names no matter what!

-Usually end in \_\_\_\_\_ or \_\_\_\_\_

-Ex:

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

Ammonium  $\text{NH}_4^{1+}$

Acetate  $\text{C}_2\text{H}_3\text{O}_2^{1-}$

Perchlorate  $\text{ClO}_4^{1-}$

Chlorate  $\text{ClO}_3^{1-}$

Chlorite  $\text{ClO}_2^{1-}$

Hypochlorite  $\text{ClO}^{1-}$

Cyanide  $\text{CN}^{1-}$

Hydrogen carbonate /  
bicarbonate  $\text{HCO}_3^{1-}$

Iodate  $\text{IO}_3^{1-}$

Permanganate  $\text{MnO}_4^{1-}$

Nitrate  $\text{NO}_3^{1-}$

Nitrite  $\text{NO}_2^{1-}$

Hydroxide  $\text{OH}^{1-}$

Oxalate  $\text{C}_2\text{O}_4^{2-}$

Carbonate  $\text{CO}_3^{2-}$

Carbonite  $\text{CO}_2^{2-}$

Chromate  $\text{CrO}_4^{2-}$

Dichromate  $\text{Cr}_2\text{O}_7^{2-}$

Peroxide  $\text{O}_2^{2-}$

Sulfate  $\text{SO}_4^{2-}$

Sulfite  $\text{SO}_3^{2-}$

Phosphate  $\text{PO}_4^{3-}$

Phosphite  $\text{PO}_3^{3-}$

- 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 " $\cdot \#H_2O$ "
  - Example: Write the formula for \_\_\_\_\_.

- **Formula Practice**

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

- **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<sub>2</sub> 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.

- **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.