Name: _____ Period: _____ Date: _____

NOMENCLATURE NOTES
ADVANCED 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 (_____)

    o Ex: _____

    o _____ valence electrons… easier to lose _____ than gain _____ so it forms what charge?

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

    o Ex: _____

    o _____ 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:

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

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

    o   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: Cu^{2+} = _____)

-Examples:

-Some Multi-Charged Metals:

Copper - Cu^{1+} , Cu^{2+}	Tin - Sn^{2+} , Sn^{4+}
Iron - Fe^{3+} , Fe^{2+}	Chromium - Cr^{2+} , Cr^{3+}
Mercury – Hg^{1+} , Hg^{2+}	Manganese - Mn^{2+} , Mn^{3+}
Lead - Pb^{2+} , Pb^{4+}	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 $(NH_4)^{1+}$

Acetate $(C_2H_3O_2)^{1-}$

Perchlorate $(ClO_4)^{1-}$

Chlorate $(ClO_3)^{1-}$

Chlorite $(ClO_2)^{1-}$

Hypochlorite $(ClO)^{1-}$

Cyanide $(CN)^{1-}$

Hydrogen carbonate /
  bicarbonate $(HCO_3)^{1-}$

Iodate $(IO_3)^{1-}$

Permanganate $(MnO_4)^{1-}$

Nitrate $(NO_3)^{1-}$

Nitrite $(NO_2)^{1-}$

Hydroxide $(OH)^{1-}$

Oxalate $(C_2O_4)^{2-}$

Carbonate $(CO_3)^{2-}$

Carbonite $(CO_2)^{2-}$

Chromate $(CrO_4)^{2-}$

Dichromate $(Cr_2O_7)^{2-}$

Peroxide $(O_2)^{2-}$

Sulfate $(SO_4)^{2-}$

Sulfite $(SO_3)^{2-}$

Phosphate $(PO_4)^{3-}$

Phosphite $(PO_3)^{3-}$

- 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*

     o 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: _____

- 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:

  o **BINARY COMPOUND** ➔

  o **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

      o 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

      o Ex:

      o 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_2 Form?:

     o   Charged nuclei _____ each other

     o   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

     o   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!!!**

        o 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.

- **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

      o Examples:

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

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

      o Examples:

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

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

      o 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 _____

      o Example:

- Acids Practice

  -Examples: Write the names of the following acids.

  -Examples: Write the formulas of the following acids.