**3.1 Compounds**

* Compounds are pure substances made \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ joined together. The atoms are held together with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Compounds come in two basic types:

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.

* To determine whether a compound is covalent

or ionic, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is required.

**Covalent Compunds.**

* Covalent compounds are

made up of two \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* Covalent compounds \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 to form molecules. Example: water.

**Ionic Compounds.**

* Ionic compounds are made up

of a \_\_\_\_\_\_\_ and a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* In ionic compounds, atoms \_\_\_\_\_\_\_\_\_\_\_\_ or

\_\_\_\_\_\_\_\_\_\_\_ to form ions. Example: NaCl.

* Ionic solids exist as a solid in the form of an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* The positive ions \_\_\_\_\_\_\_\_\_\_\_\_\_\_ all of the negative ions, and vice versa. In the example of table salt (NaCl) the one-to-one ratio of ions results in a simple square-shaped ionic \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:

**Polyatomic Ions.**

* Covalent and ionic bonds can occur \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* A molecule can gain or lose electrons to become charged,

forming a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* Polyatomic ions form \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ like other ions.
	+ Example: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



**3.2 Names and Formulas of Ionic Compounds.**

**Naming Simple Ionic Compounds.**

* Rules for naming simple ionic compounds:
	1. Write the name of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	2. Write the name of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	3. Change the ending of the non-metal ion to “\_\_\_\_\_\_\_\_\_\_\_\_\_.”
* Examples:
* Li3N \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* MgBr2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Ag2O \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* CdS \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Writing Formulas for Simple Ionic Compounds.**

* Rules for writing formulas for ionic compounds:

STEP ONE: Write the \_\_\_\_\_\_\_\_\_\_\_ for the more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Then, write the symbol for the non-metallic element.

STEP TWO: Write the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for the elements. Ignore the + and – charges. *\*If there is* \_\_\_\_\_\_\_\_\_\_\_*, the combining capacity is* \_\_\_\_\_*.*

STEP THREE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the combining capacities to get the subscripts.

* Examples:
* Barium phosphide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Aluminum nitride \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Zinc oxide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Rubidium bromide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Multivalent Metal Compounds.**

* Many metals are multivalent, meaning the metals form two or more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with different charges.
* For example, the atom iron forms two ions \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* To distinguish different ions for the same metal, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are

added to their name. For example, Fe3+ would be named “iron(III)”**Writing Formulas for Ionic Compounds Containing Multivalent Metals.**

* It is \_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for multivalent ionic compounds, because they \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ so you don’t need to look on the periodic table.
* Examples:
	+ Iron (II) phosphide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Manganese (II) oxide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Tin (II) sulfide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Lead (IV) chloride \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Naming Ionic Compounds Containing Multivalent Metals.**

* It is a little \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a multivalent ionic compound, because you have to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to figure out which combining capacity was used. Remember to use a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Examples:
	+ Fe2O3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ PbF4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ MnS \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ TiS2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Naming Ionic Compounds Containing Polyatomic Ions.**

* When you are naming compounds with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, you are dealing with a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. All you need to do is \_\_\_\_\_\_\_\_ it in the chart so you can name your compound.
1. If the polyatomic ion group has a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (+) it acts like a \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the name.
2. If the polyatomic ion group has a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (-) it acts like a \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the name.
* Examples:
* Fe(OH)3  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Mg3(PO4)2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* (NH4)3P \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Ca(CH3COO)2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Writing Formulas for Ionic Compounds Containing Polyatomic Ions.**

* Each polyatomic ion \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that should be used when writing a chemical formula.
* USE BRACKETS AROUND THE POLYATOMIC IONS!!
* Examples:
* Sodium chromate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Ammonium nitrate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Lead (II) perchlorate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Tin (II) cyanide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**3.3 Physical and Chemical Changes.**

* In \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a substance changes, but the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ holding the substance together do not change.
	+ Examples: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* In \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, new substances are produced in the process of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_and forming new ones.
* Evidence of chemical change:
* Colour change
* Heat, light, sound produced or consumed
* Bubbles of gas form
* Formation of a precipitate
* The change is difficult to reverse

**Energy Changes.**

* In both physical and chemical changes,

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ take place. This energy

change can mean \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 energy from the environment.

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ involve the

overall \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the form of heat and light.



* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ involve the

overall \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Applications of Chemical Changes.**

* Some chemical changes present \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,

while others provide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a major problem for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	+ By protecting steel surfaces, the chemical reaction of iron with oxygen can be prevented.
* First nations people of the Pacific Coast have used smoking as a means

of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Smoke causes chemical changes in meat

that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.