

**Unit 3: Writing Chemical Formulas for Ionic Bonds**

Name: \_\_\_\_\_

Use a periodic table to complete the following table relating to ionic bonds.

<b><i>Metallic Element</i></b>	<b><i>Nonmetallic Element</i></b>	<b><i>Symbol and Oxidation #</i></b>	<b><i>Chemical Formula</i></b>	<b><i>Chemical Name</i></b>
Magnesium	Chlorine	Mg <sup>2+</sup> Cl <sup>1-</sup>	MgCl <sub>2</sub>	Magnesium chloride
Copper (II)	Oxygen			
Potassium	Bromine			
Aluminum	Chlorine			
Iron (III)	Oxygen			
Sodium	Chlorine			
Beryllium	Fluorine			
Cesium	Nitrogen			
Calcium	Phosphorous			
Magnesium	Sulfur			
Lithium	Oxygen			
Zinc (II)	Sulfur			
Beryllium	Bromine			
Aluminum	Oxygen			
Nickel (II)	Fluorine			

*Complete the following:*

1. Metallic ions have what charge? \_\_\_\_\_ Do they gain or lose their valence electrons? \_\_\_\_\_
2. Nonmetallic ions have what charge? \_\_\_\_\_ Do they gain or lose their valence electrons? \_\_\_\_\_
3. When ionic bonds form, the valence electrons from the metallic element are \_\_\_\_\_ to the nonmetallic elements and a bond is formed.

### Unit 3: Basic Bonding Review – Worksheet

Using your periodic table – complete the questions below.

*Part 1: Determine the # of valence electrons for each element.*

Phosphorus \_\_\_\_\_ Bromine \_\_\_\_\_

Xenon \_\_\_\_\_ Magnesium \_\_\_\_\_

Lithium \_\_\_\_\_ Beryllium \_\_\_\_\_

Boron \_\_\_\_\_ Iodine \_\_\_\_\_

*Part 2: Determine the Oxidation # for each element.*

Phosphorus \_\_\_\_\_ Bromine \_\_\_\_\_

Xenon \_\_\_\_\_ Magnesium \_\_\_\_\_

Lithium \_\_\_\_\_ Beryllium \_\_\_\_\_

Boron \_\_\_\_\_ Iodine \_\_\_\_\_

Oxygen \_\_\_\_\_ Chlorine \_\_\_\_\_

Atomic # 11 \_\_\_\_\_ Atomic # 13 \_\_\_\_\_

Halogens \_\_\_\_\_ Akali metals \_\_\_\_\_

*Part 3: Label each element as a metal (M) or a nonmetal (NM). Remember – cations are metals and anions are nonmetals.*

Chlorine \_\_\_\_\_ Calcium \_\_\_\_\_

Rhubidium \_\_\_\_\_ Aluminum \_\_\_\_\_

Argon \_\_\_\_\_ Lithium \_\_\_\_\_

Barium \_\_\_\_\_ Oxygen \_\_\_\_\_

Sodium \_\_\_\_\_ Carbon \_\_\_\_\_

Neon \_\_\_\_\_ Potassium \_\_\_\_\_

Name: \_\_\_\_\_

*Part 4: Draw the Lewis Dot Structure for each element.*

Chlorine \_\_\_\_\_ Calcium \_\_\_\_\_

Rubidium \_\_\_\_\_ Aluminum \_\_\_\_\_

Argon \_\_\_\_\_ Lithium \_\_\_\_\_

Barium \_\_\_\_\_ Oxygen \_\_\_\_\_

Sodium \_\_\_\_\_ Carbon \_\_\_\_\_

Neon \_\_\_\_\_ Potassium \_\_\_\_\_

Identify the following compounds as ionic (I) or Metallic (M). If the metal is a transition metal add a T to the I. Identify the molecules as covalent (C)

FeI<sub>2</sub> \_\_\_\_\_ Cu - Cu \_\_\_\_\_

NaCl \_\_\_\_\_ P<sub>4</sub>O<sub>10</sub> \_\_\_\_\_

P<sub>4</sub>S<sub>3</sub> \_\_\_\_\_ CuS \_\_\_\_\_

MnF<sub>3</sub> \_\_\_\_\_ SeO<sub>2</sub> \_\_\_\_\_

PCl<sub>3</sub> \_\_\_\_\_ K<sub>2</sub>O \_\_\_\_\_

CO \_\_\_\_\_ KCl \_\_\_\_\_

BeO \_\_\_\_\_ SO<sub>2</sub> \_\_\_\_\_

Use a periodic table to complete the following table relating to ionic bonds.

<b>Metallic Element</b>	<b>Nonmetallic Element</b>	<b>Symbol and Oxidation #</b>	<b>Chemical Formula</b>	<b>Chemical Name</b>
Magnesium	Chlorine	Mg <sup>2+</sup> Cl <sup>1-</sup>	MgCl <sub>2</sub>	Magnesium chloride
Copper (II)	Oxygen	Cu <sup>2+</sup> O <sup>2-</sup>	Cu <sub>2</sub> O <sub>2</sub>	copper(II) oxide
Potassium	Bromine	K <sup>1+</sup> Br <sup>1-</sup>	KBr	potassium bromide
Aluminum	Chlorine	Al <sup>3+</sup> Cl <sup>1-</sup>	AlCl <sub>3</sub>	aluminum chloride
Iron (III)	Oxygen	Fe <sup>3+</sup> O <sup>2-</sup>	Fe <sub>2</sub> O <sub>3</sub>	iron(III) oxide
Sodium	Chlorine	Na <sup>1+</sup> Cl <sup>1-</sup>	NaCl	sodium chloride
Beryllium	Fluorine	Be <sup>2+</sup> F <sup>1-</sup>	BeF <sub>2</sub>	beryllium fluoride
Cesium	Nitrogen	Cs <sup>1+</sup> N <sup>3-</sup>	Cs <sub>3</sub> N	cesium nitride
Calcium	Phosphorous	Ca <sup>2+</sup> P <sup>3-</sup>	Ca <sub>3</sub> P <sub>2</sub>	calcium phosphide
Magnesium	Sulfur	Mg <sup>2+</sup> S <sup>2-</sup>	Mg <sub>2</sub> S <sub>2</sub>	magnesium sulfide
Lithium	Oxygen	Li <sup>1+</sup> O <sup>2-</sup>	Li <sub>2</sub> O	lithium oxide
Zinc (II)	Sulfur	Zn <sup>2+</sup> S <sup>2-</sup>	Zn <sub>2</sub> S <sub>2</sub>	zinc(II) sulfide
Beryllium	Bromine	Be <sup>2+</sup> Br <sup>1-</sup>	BeBr <sub>2</sub>	beryllium bromide
Aluminum	Oxygen	Al <sup>3+</sup> O <sup>2-</sup>	Al <sub>2</sub> O <sub>3</sub>	aluminum oxide
Nickel (II)	Fluorine	Ni <sup>2+</sup> F <sup>1-</sup>	NiF <sub>2</sub>	nickel(II) fluoride

Complete the following:

- Metallic ions have what charge? + Do they gain or lose their valence electrons? lose
- Nonmetallic ions have what charge? - Do they gain or lose their valence electrons? gain
- When ionic bonds form, the valence electrons from the metallic element are transferred to the nonmetallic elements and a bond is formed.

### Unit 3: Basic Bonding Review – Worksheet

Using your periodic table – complete the questions below.

Part 1: Determine the # of valence electrons for each element.

Phosphorus	<u>5</u>	Bromine	<u>7</u>
Xenon	<u>8</u>	Magnesium	<u>2</u>
Lithium	<u>1</u>	Beryllium	<u>2</u>
Boron	<u>3</u>	Iodine	<u>7</u>

Part 2: Determine the Oxidation # for each element.

Phosphorus	<u>3<sup>-</sup></u>	Bromine	<u>1<sup>-</sup></u>
Xenon	<u>0</u>	Magnesium	<u>2<sup>+</sup></u>
Lithium	<u>1<sup>+</sup></u>	Beryllium	<u>2<sup>+</sup></u>
Boron	<u>3<sup>+</sup></u>	Iodine	<u>1<sup>-</sup></u>
Oxygen	<u>2<sup>-</sup></u>	Chlorine	<u>1<sup>-</sup></u>
Atomic # 11	<u>1<sup>+</sup></u>	Atomic # 13	<u>3<sup>+</sup></u>
Halogens	<u>1<sup>-</sup></u>	Akali metals	<u>1<sup>+</sup></u>

Part 3: Label each element as a metal (M) or a nonmetal (NM). Remember – cations are metals and anions are nonmetals.

Chlorine	<u>NM</u>	Calcium	<u>M</u>
Rubidium	<u>M</u>	Aluminum	<u>M</u>
Argon	<u>NM</u>	Lithium	<u>M</u>
Barium	<u>M</u>	Oxygen	<u>NM</u>
Sodium	<u>M</u>	Carbon	<u>NM</u>
Neon	<u>NM</u>	Potassium	<u>M</u>

Name: \_\_\_\_\_

Part 4: Draw the Lewis Dot Structure for each element.

Chlorine	<u><math>:\ddot{\text{Cl}}:</math></u>	Calcium	<u><math>\text{Ca}:</math></u>
Rubidium	<u><math>\text{Rb}\cdot</math></u>	Aluminum	<u><math>\cdot\ddot{\text{Al}}\cdot</math></u>
Argon	<u><math>:\ddot{\text{Ar}}:</math></u>	Lithium	<u><math>\text{Li}\cdot</math></u>
Barium	<u><math>\text{Ba}:</math></u>	Oxygen	<u><math>:\ddot{\text{O}}:</math></u>
Sodium	<u><math>\text{Na}\cdot</math></u>	Carbon	<u><math>\cdot\ddot{\text{C}}\cdot</math></u>
Neon	<u><math>:\ddot{\text{Ne}}:</math></u>	Potassium	<u><math>\text{K}\cdot</math></u>

Identify the following compounds as ionic (I) or Metallic (M). If the metal is a transition metal add a T to the I. Identify the molecules as covalent (C).

$\text{FeI}_2$	<u>IT</u>	$\text{Cu} - \text{Cu}$	<u>M</u>
$\text{NaCl}$	<u>I</u>	$\text{P}_4\text{O}_{10}$	<u>C</u>
$\text{P}_4\text{S}_3$	<u>C</u>	$\text{CuS}$	<u>IT</u>
$\text{MnF}_3$	<u>IT</u>	$\text{SeO}_2$	<u>C</u>
$\text{PCl}_3$	<u>C</u>	$\text{K}_2\text{O}$	<u>I</u>
$\text{CO}$	<u>C</u>	$\text{KCl}$	<u>I</u>
$\text{BeO}$	<u>I</u>	$\text{SO}_2$	<u>C</u>