Bonding Basics Review Name _____

1. Complete the chart using your knowledge of atoms.

Element	Atomic Symbol	Total # of Electrons	# of Valence Electrons	# of Electrons Gained or Lost	Oxidation Number
Bromine					
Lithium					
Calcium					
Sulfur					
Boron					
Silicon					
Phosphorus					

2. Ionic Bonds - Draw the Lewis structures for each atom, draw arrows to show the transfer of electrons, write the charge for each ion, and then write the chemical formula.

(A) Potassium + Iodine (B) Magnesium + Oxygen (C) Lithium + Nitrogen

3. Covalent Bonds – Draw the Lewis structures for each atom, draw circles to show the electrons that are shared, and then write the bond structure and chemical formula.

(A) Fluorine + Fluorine (B) 3 Hydrogen + 1 Phosphorus (C) 2 Hydrogen + 1 Sulfur

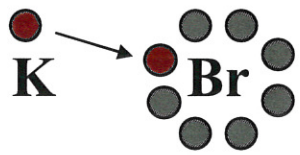
Bonding Basics Review **ANSWER KEY**

1. Complete the chart using your knowledge of atoms.

Element	Atomic Symbol	Total # of Electrons	# of Valence Electrons	# of Electrons Gained or Lost	Oxidation Number
Bromine	Br	35	7	Gain 1	1-
Lithium	Li	3	1	Lose 1	1+
Calcium	Ca	20	2	Lose 2	2+
Sulfur	S	16	6	Gain 2	2-
Boron	B	5	3	Lose 3	3+
Silicon	Si	14	4	Gain/Lose 4	4+ 4-
Phosphorus	P	15	5	Gain 3	3-

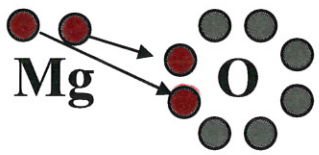
2. Ionic Bonds - Draw the Lewis structures for each atom, draw arrows to show the transfer of electrons, write the charge for each ion, and then write the chemical formula.

(A) Potassium + Bromine



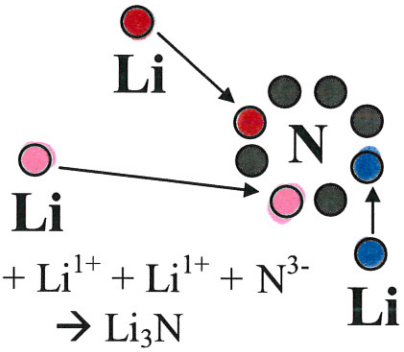
$K^{1+} + Br^{1-} \rightarrow KBr$

(B) Magnesium + Oxygen



$Mg^{2+} + O^{2-} \rightarrow MgO$

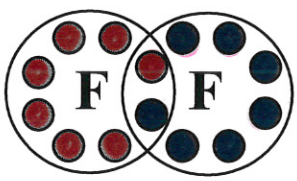
(C) Lithium + Nitrogen



$Li^{1+} + Li^{1+} + Li^{1+} + N^{3-} \rightarrow Li_3N$

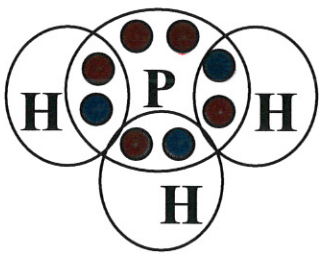
3. Covalent Bonds – Draw the Lewis structures for each atom, draw circles to show the electrons that are shared, and then write the bond structure and chemical formula.

(A) Fluorine + Fluorine



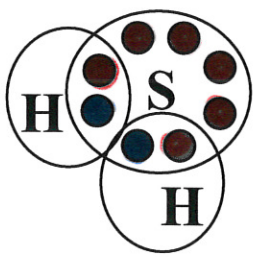
F—F F_2

(B) 3 Hydrogen + 1 Phosphorus



H—P—H
H H_3P

(C) 2 Hydrogen + 1 Sulfur



H—S—H H_2S

* H only needs 2 e- to have outer valence shell filled

... others need 8!

Name_____Date_____Per_____

WORKSHEET: Chemical Bonding – Ionic & Covalent!

REMEMBER...

Ionic Bond	between a Metal and Non-Metal	(M + NM)
Covalent Bond	between a Non-Metal and Non-Metal	(NM + NM)

PART 1: Determine if the elements in the following compounds are metals or non-metals. Describe the type of bonding that occurs in the compound.

Compound	Element 1 (metal or non-metal?)	Element 2 (metal or non-metal?)	Bond Type
NO_2	N = non-metal	O = non-metal	covalent
NaCl			
SO_2			
PI_3			
$MgBr_2$			
CaO			
H_2O			
K_2O			
AlF_3			
O_2			
$CuCl_2$			
NO_2			
CO_2			
HF			
Rb_2S			
NBr_3			
Fe_2O_3			
CCl_4			

PART 2: Use Lewis dot structures to show the ionic bonding in the following pairs of elements. Show the transfer of electrons using arrows. Write the correct chemical formula for the ionic compound that forms.

1) barium oxide (Ba and O)

Formula:_____

2) calcium chloride (Ca and Cl)

Formula:_____

3) aluminum oxide (Al and O)

Formula:_____

4) sodium oxide (Na and O)

Formula:_____

5) sodium nitride (Na and N)

Formula:_____

6) magnesium phosphide (Mg and P)

Formula:_____

PART 3: Use Lewis dot structures to show the covalent bonding in the following pairs of elements. Once you have determined the structure for the molecule, write its structural formula in the space provided; use a dash to represent a shared pair of electrons, and dots to show unshared electrons.

1) nitrogen triiodide (NI_3)

Show work here...HINT: nitrogen is in the middle!

Final Answer:

2) carbon tetrabromide (CBr_4)

Show work here...HINT: carbon is in the middle!

3) dihydrogen monoxide (H_2O)

Show work here..HINT: oxygen is in the middle!

Name_____Date_____Per_____

WORKSHEET: Chemical Bonding – Ionic & Covalent!

REMEMBER...

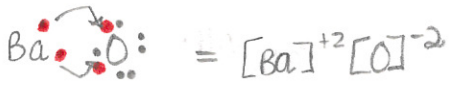
Ionic Bond	between a Metal and Non-Metal	(M + NM)
Covalent Bond	between a Non-Metal and Non-Metal	(NM + NM)

PART 1: Determine if the elements in the following compounds are metals or non-metals. Describe the type of bonding that occurs in the compound.

Compound	Element 1 (metal or non-metal?)	Element 2 (metal or non-metal?)	Bond Type
NO_2	N = non-metal	O = non-metal	covalent
NaCl	Na - Metal (M)	Cl = Nonmetal (NM)	I
SO_2	S = NM	O = NM	C
PI_3	P = NM	I = NM	C
$MgBr_2$	Mg = M	Br = NM	I
CaO	Ca = M	O = NM	I
H_2O	H = NM	O = NM	C
K_2O	K = M	O = NM	I
AlF_3	AL = M	F = NM	I
O_2	O = NM	O = NM	C
$CuCl_2$	Cu = M	Cl = NM	I
NO_2	N = NM	O = NM	C
CO_2	C = NM	O = NM	C
HF	H = NM	F = NM	C
Rb_2S	Rb = M	S = NM	I
NBr_3	N = NM	Br = NM	C
Fe_2O_3	Fe = M	O = NM	I
CCl_4	C = NM	Cl = NM	C

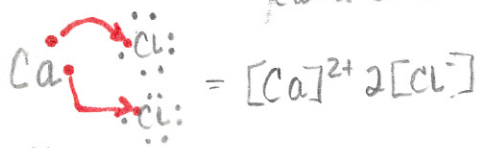
PART 2: Use Lewis dot structures to show the ionic bonding in the following pairs of elements. Show the transfer of electrons using arrows. Write the correct chemical formula for the ionic compound that forms.

1) barium oxide (Ba and O) Valence electrons Ba = 2 O = 6



Formula: BaO

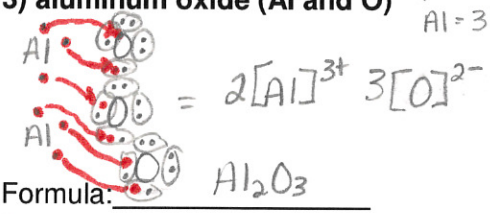
2) calcium chloride (Ca and Cl) Valence electrons Ca = 2 Cl = 7



Formula: $CaCl_2$

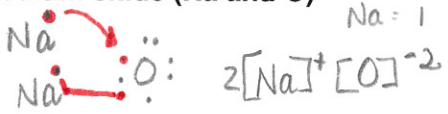
*Tricky [Bonus]

3) aluminum oxide (Al and O) Valence e⁻ Al = 3 O = 6



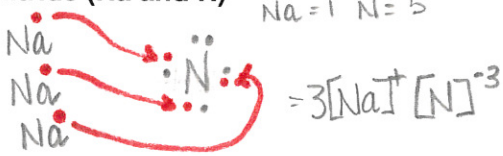
Formula: Al_2O_3

4) sodium oxide (Na and O) Valence e⁻ Na = 1 O = 6



Formula: Na_2O

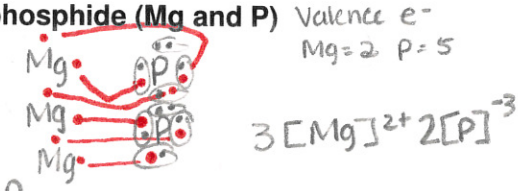
5) sodium nitride (Na and N) Valence e⁻ Na = 1 N = 5



Formula: Na_3N

*Tricky [Bonus]

6) magnesium phosphide (Mg and P) Valence e⁻ Mg = 2 P = 5

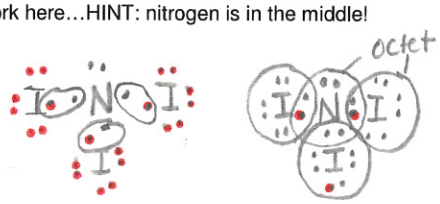


Formula: Mg_3P_2

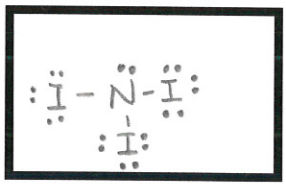
PART 3: Use Lewis dot structures to show the covalent bonding in the following pairs of elements. Once you have determined the structure for the molecule, write its structural formula in the space provided; use a dash to represent a shared pair of electrons, and dots to show unshared electrons.

1) nitrogen triiodide (NI_3) Valence e⁻ N = 5 I 7

Show work here...HINT: nitrogen is in the middle!

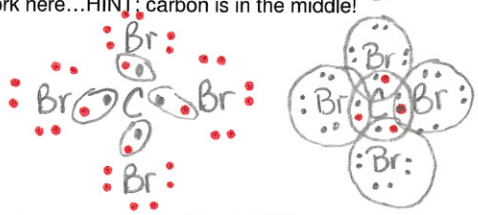


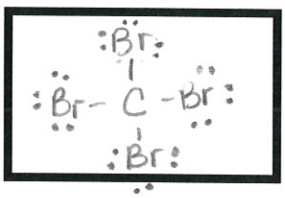
Final Answer:



2) carbon tetrabromide (CBr_4) Valence e⁻ C = 4 Br = 7

Show work here...HINT: carbon is in the middle!





3) dihydrogen monoxide (H_2O)

Show work here..HINT: oxygen is in the middle! Valence e⁻ O = 6 H = 1