Name: _____ Period: _____ Date: _____

Physical Science – Bonding Unit Study Guide

Concept 1 - Stability and Bonding

Objectives

- Interpret chemical formulas.
- Use an element's location on the periodic table to determine its oxidation number and bonding tendencies.
- Draw electron dot diagrams for individual elements, and to show ionic bond formation.

Vocabulary – Please define the following terms:

1. Compound:
2. Chemical formula:
3. Octet rule:
4. Chemical bond:
5. Ionic bond:
6. Ions:
7. Oxidation number:

Practice:

1. Explain why elements form compounds, and what most elements need to achieve this. Include which elements do not tend to form compounds and why.

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Practice (continued):

2. List the number of atoms of each element in the compounds below.
   a. $CaCl_2$
   b. Na_2SO_4
   c. $Al_2(SO_4)_3$
   d. CCl_4

3. Explain the difference between a cation and an anion, including how each are formed and an example of each.

4. Draw an electron dot diagram for the following compounds.

   a. KI

   b. Ca_3P_2

   c. $AlBr_3$

Concept 2 – Naming Ionic Compounds

Objectives:

- Given the name of an ionic compound, determine its chemical formula, including those that contain polyatomic ions and/or transition metals.

- Given the chemical formula for an ionic compound, determine its name, including those that contain polyatomic ions and/or transition metals.

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Vocabulary - Please define the following term:

1- Polyatomic ions:

Practice:

5. Explain why an ionic bond forms, how it forms, the two parts that make it up, and the overall charge of the resulting compound.

6. Name the following ionic compounds:

a. $NaC_2H_3O_2$

b. $Mg(OH)_2$

c. Al_2O_3

d. MnOH

e. $(NH_4)_2SO_4$

f. $AuCO_3$

7. Determine the chemical formula for the following ionic compounds:

a. Lithium phosphate

b. Silver (I) chloride

c. Calcium chlorate

d. Iron (III) bromide

e. Magnesium hydroxide

f. Ammonium acetate

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Concept 3 – Naming Covalent Compounds

Objectives:

- Classify a compound as ionic or covalent.
- Draw electron dot diagrams to show covalent bond formation.
- Given the name of a covalent compound, determine its chemical formula.
- Given the chemical formula for a covalent compound, determine its name.

Vocabulary – Please define the following terms:

1. Covalent bond:

2. Molecule:

Practice:

8. Classify the following as atoms, ionic compounds, or molecules:

   a. Ne

   b. KCl

   c. H_2O

   d. NH_4Cl

9. Explain why a covalent bond forms, how it forms, and what types of elements form them.

10. Describe the difference between single, double, and triple bonds.

11. Differentiate between the properties of covalent compounds and ionic compounds.

12. Name the following covalent compounds:
    a. BBr_3
    b. CF_4
    c. P_2S_3
    d. NH_3
13. Determine the chemical formula for the following covalent compounds:
    a. Dinitrogen trioxide
    b. Sulfur dioxide
    c. Dinitrogen monosulfide
    d. Diboron tetrahydride
14. Draw an electron dot diagram for the following compounds:
    a. PCl_3

    b. CO_2

    c. N_2