**A. Ions and Ionization**  
1. What is a cation? Give two examples.

2. What is an anion? Give two examples.

3. What is the valence shell?

4. How can you tell what number of valence electrons is from the periodic table (the valence number)?

5. What is the valence number for:

a. sodium

b. calcium

c. aluminum

d. nitrogen

e. sulfur

f. bromine

6. What does the oxidation state of an ion tell you?

7. How can you tell if an ion will most likely be positive or negative without looking at the periodic table?

8. What is the oxidation state for the following ions:  
a. sodium

b. calcium

c. aluminum

d. nitrogen

e. sulfide

f. bromide

g. iron(II)

h. iron(III)

9. What is the difference between a monoatomic ion and a polyatomic ion?

10. Give two examples of each:

a. monoatomic ion

b. polyatomic ion

11. Explain why group VIII elements (noble gases) do not ionize:

B. Ionic Bonds

1. What is an ionic bond?

2. Draw Bohr models for sodium and chlorine side by side, then use an arrow to show how these atoms ionize to form an ionic bond.

3. Draw the Lewis structure for sodium chloride:

4. Draw the Lewis structure for magnesium chloride:

5. Explain why ionic compounds have a high melting point:

6. Explain why ionic compounds are electrolytes (conduct electricity):

7. Metals always \_\_\_\_\_\_\_\_\_\_\_(gain or lose) electrons to form \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(cations or anions)

8. Nonmetals usually \_\_\_\_\_\_\_\_\_\_(gain or lose) electrons to form \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (cations or anions)

9. How do you name a cation?

10. How do you name an anion?

C. Naming Ionic Compounds  
1. In the name and formula of an ionic compound, which comes first – the cation or the anion?

2. Name the following ionic compounds:

a. NaCl

b. MgCl2

c. CaCO3

d. K3PO4

e. NH4Br

D. Writing Formulas of Ionic Compounds

1. The quantity of each ion is adjusted until the net charge of the compound = \_\_\_\_\_\_\_\_\_\_

2. Write formulas:  
a. lithium fluoride

b. sodium sulfide

c. potassium phosphide

d. calcium phosphate

e. aluminum carbonate

E. Single Replacement Reactions

1. This involves the reaction of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

2. Complete the following equation using names:

Sodium + magnesium chloride 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Complete the same equation using formulas:

Na + MgCl2 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Molar balance the above equation in the space below:

5. Write the balanced chemical equation for the reaction between magnesium and copper (I) sulfate:

F. Double Replacement Reactions

1. This involves the reaction of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

2. Complete the following equation using names:

Sodium carbonate + magnesium chloride 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Complete the same equation using formulas:

Na + MgCl2 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Molar balance the above equation in the space below:

5. Write the balanced chemical equation for the reaction between ammonium carbonate and silver chloride: