**Part 3: Naming Ionic compounds composed of Polyatomic ions.**

What you have previously discovered for rules is used to name ionic compounds composed of main group elements and variable charge cations. However, there are many ionic compounds that contain polyatomic ions. These polyatomic ions are ions containing two or more atoms covalently bonded and having a charge.. This activity builds upon the previous experience you had converting patterns in formulas and names into a set of rules that can be used to name all types of ionic compounds.

**Observing the Patterns**

Consider the following formulas and their names. Examine the formulas and names carefully to identify patterns in how they are named. Use only your periodic table as a reference. Do not use any other outside sources.

**Chemical Formula Compound Name**

(NH4)2S ammonium sulfide

CoSO4 cobalt (II) sulfate

Fe(OH)3 iron (III) hydroxide

Ca3(PO4)2 calcium phosphate

NH4NO3 ammonium nitrate

**The Rules:**

Use the patterns you saw in Parts 1, 2, and 3 to construct a set of rules for the naming of all ionic compounds. Be sure that rules you come up with can be used to work from the chemical formula to the written form and from written form to chemical formula.

**Use the rules you have determined above to write the formulas of the ionic compounds below. Do these exercises without using any outside resources.**

1. iron (III) acetate 5. aluminum hydroxide
2. strontium sulfate 6. lead (II) sulfate
3. copper (I) sulfide 7. ammonium nitride
4. potassium cyanide 8. magnesium carbonate

**Use the rules you have determined to write the names of the following ionic compounds.**

1. Cu(OH)2 5. Zn3(PO4)2
2. Pb(NO3)2 6. NaHCO3
3. FeCO3 7. NH4F
4. MgSO4

**Analysis: Answer in Complete Sentences!**

1. Compare the rules you developed with the real rules. What were the differences? Did you include all rules? Did you miss any rules or details?

2. Review the real rules; go back and check if your names and formulas are correct. Circle 4 names and 4 formulas that you are confident are correct.