**Part 2: Naming Ionic compounds composed of Variable charge Elements.**

What you have previously discovered for rules is used to name ionic compounds composed of main group elements. However, there are many ionic compounds that contain transition metals or metals from the lower portion of some other groups of the periodic table. These elements can have different charges on the cation. 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**

Fe2O3 iron (III) oxide

FeCl2 iron (II) chloride

PbO2 lead (IV) oxide

CuSe copper (II) selenide

KCl potassium chloride

SnF4 tin (IV) fluoride

NbCl5 niobium (V) chloride

**The Rules:**

Use the patterns you see 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. cobalt (III) chloride 5. lithium arsenide
2. platinum (IV) fluoride 6. nickel (II) sulfide
3. chromium (III) oxide 7. beryllium nitride
4. titanium (II) chloride 8. iron (III) iodide

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

1. MnF2 5. Ni3P2
2. PbS2 6. Cs2S
3. ScCl3 7. MgI2
4. PbS 8. CuSe

**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? Answer all of these questions for each of the 3 types of ionic compounds.

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.