Part A: Naming *Type I Binary Ionic Compounds*

1. We are starting our naming with *Type I binary ionic compounds*. What does each part of this classification tell you?

   Type I:

   Binary:

   Ionic:

   Compound:

Look at Table 5.3 of Type I ions on page 137 of your textbook.

2. The charges of most of the ions in Table 5.3 can be predicted by the location of its corresponding metal on the periodic table. Give a specific example of such a metal and clearly explain (i.e. pretend you are teaching this to someone who doesn't know) how you could figure out its charge from its position on the periodic table.

3. For which metals in Table 5.3 is it not possible to predict the charge by looking at the periodic table? Come up with a simple way to memorize these important exceptions and their charges.

To help us understand how to name *Type I binary ionic compounds*, let's use the examples in Table 1 below to work backwards and derive the underlying naming rules. Being able to do this is useful, because if you ever forget the rules, you will have learned how to figure them out starting with some simple examples.

Table 1:

Formula	**Name**
NaCl	sodium chloride
Li_3N	lithium nitride

4. In Table 1 above, where are the metal cations positioned in the formulas and in the names? **FIRST** **LAST**
5. What did we do to the names of the cations when they went from being pure elements to being part of a compound?

6. In Table 1 above, where are the nonmetal anions positioned in the formulas and in the names? **FIRST** **LAST**
7. What did we do to the names of the anions when they went from being pure elements to being part of a compound?

8. Based on what you came up with in questions 4-7, complete Table 2 below by providing the name for the following *Type I binary ionic compounds:*

Table 2:

Formula	**Name**
KBr	
ZnF_2	
Al_2O_3	

9. While naming *Type I binary ionic compounds* is pretty straightforward, we also have to make sure the formulas are correct based on balancing their ion charges so that the overall compound has no net charge (i.e. it is neutral). Briefly explain why each of the three formulas in Table 2 are correct in terms balancing the ion charges.

Part B: Naming *Type II binary ionic compounds*

10. Now we will be naming *Type II binary ionic compounds*. We already know what they "*binary ionic compound*" part of this classification means. What does the "*type II*" part mean?

To help us understand how to name *Type II binary ionic compounds*, we'll again use examples to work backwards and derive the underlying naming rules.

Table 3:

Formula	Name
CuI_3	copper(III) iodide
SnS_2	tin(IV) sulfide

11. Do the rules you figured out in questions 4-7 still apply to the examples with *type II* metals in Table 3? Briefly explain.

Naming ionic compounds with *type II* metals is harder than naming those with *type I* metals because (a) we need to figure out the unknown charge on the metal cation and (b) we need to indicate the cation's charge in the name of the compound.

12. Looking ONLY at the formulas in Table 3, use the known charges on the nonmetal anions to determine the charges on each of the metals ions. Briefly explain your answers mathematically. Think back to question #9 if you are stuck.

    charge on Cu = explanation:

    charge on Sn = explanation:

13. Now look at the names in Table 3, how are the charges you found in question 12 specified in these names?

Part C: Check your current knowledge

14. Complete the table below by (a) identifying the metal as *type I* or *type II* and (b) filling in either the missing formula or the missing name.

Type of metal	Formula	Name
	MgF_2	
	MnF_2	
		iron(II) sulfide
		iron(III) sulfide
	$PbCl_2$	
	$PbCl_4$	
		strontium chloride
		silver iodide

15. Some of the formula/name pairs in the table below are correct, but some have errors. If the formula is possible and it is paired with the correct name, then put a check in the "correct" column. If the formula is not possible, cross it out and fill in the correct formula to go with the provided name. If the formula is possible, but paired with the incorrect name, cross out the name and fill in the correct one. The first one has been done for you: $CaBr_3$ is not possible (the ratio of ions doesn't make sense given their charges), so it had been crossed out and corrected.

Correct?	Formula	Name
	~~$CaBr_3$~~ $CaBr_2$	calcium bromide
	ZnO	zinc(II) oxide
	PbO_2	lead(IV) oxide
	Cl_2Ba	barium chloride
	Ni_3N_2	nickel(III) nitride
	CrF_2	chromium fluoride
	Ag_2S	silver sulfide