Writing Ternary Formulas

A ternary formula is a formula that contains three types of elements. A ternary formula is typically an ionically bonded compound that contains a polyatomic ion. To write the formula of a ternary ionic compound, you must know the charges of the ions that will form the compound. Remember that you can determine charge of a monatomic ion from the location on the periodic table of elements. Polyatomic ions are not so simple, you will have to memorize or look up the formula and charge. We still can to criss-cross the charges so that the overall charge of the compound is neutral

Steps:

- 1. Write the ion and polyatomic ion symbol with the ionic charge for the cation (+) and the anion (-).
- Determine the ratio that these must combine to cancel out the charge. (or _________________________________)
- Write the formula for the ternary compound with the cation (+) first and then the anion (-) second. Use subscripts after the element if there are more than 1. IF YOU CROSS A NUMBER DOWN ON A POLYATOMIC ION< PUT THE POLYATOMIC ION IN PARENTHESIS.
- 4. Reduce subscripts if possible. (BUT DON'T CHANGE THE SUBSCRIPTS OF THE POLYATOMIC ION.)

Write the formulas for the compounds formed from the following elements: (Hint: Polyatomicions are bold)

1.	Potassium & Nitrate	7. Ammonium & Cyanide
2.	Ammonium & Sulfur	8. Calcium & Hydroxide
3.	Sodium & Nitrite	9. Magnesium & Permanganate
4.	Ammonium & Sulfite	10. Hydrogen & Sulfate
5.	Lithium & Dichromate	11. Aluminum & Carbonate
6.	Potassium & Hydrogen Carbonate	12. Calcium & Acetate

Working Backwards: You can look at a formula and determine what ions are involved in the bond by "uncriss-crossing" the subscripts. (Be careful, some of them may have been reduced.) **Write the ions (with charges) that are involved in these bonds.**

13. H ₂ O, or H(OH) &	16. HC ₂ H ₃ O ₂ &
14. Mg(CN) ₂ &	17. Pb ₃ (PO ₄) ₂ &
15. HNO ₃ &	18. CaCr ₂ O ₇ &

Example:

Magnesium & Phosphate

Writing Ternary Formulas II - Write the formula in the box that is a result of the row intersecting the column. Remember that a polyatomic ion must stay intact and go in parentheses if a number gets criss-crossed down to it. You also need to reduce if you can.

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PO_4^{3-}											
${\rm SO_4}^{2-}$											
co ₃ ²⁻											
NO_3^{1-}											
OH^{1-}											
N ³⁻											
0 ²⁻											
Cl ¹⁻											
	H⁺	Na^{+}	${\sf Mg}^{2+}$	K^{+}	AI^{3+}	Ca ²⁺	NH_4^+	Pb^{2+}	Pb^{4+}	Fe ²⁺	Fe ³⁺