

## Science 10

### Notes: Formulas of Ionic Compounds

Review:

Ionic compounds are formed between metal and non-metal  
The compound is formed as an attraction between: positive cations and negative anions

#### Naming Compounds

Rules:

- metal (left) is said first
- The nonmetal (right) is given the suffix "-ide"
- It doesn't matter how many of each atom there is in an ionic compounds, prefixes are never used  
- chemical formula → lowest terms.

Names and Symbols of non-metals ions	
Fluoride	$\text{F}^-$
Chloride	$\text{Cl}^-$
Bromide	$\text{Br}^-$
Iodide	$\text{I}^-$
Oxide	$\text{O}^{2-}$
Sulfide	$\text{S}^{2-}$
Selenide	$\text{Se}^{2-}$
Nitride	$\text{N}^{3-}$
Phosphide	$\text{P}^{3-}$

Write the names for ionic compounds that form between the following:

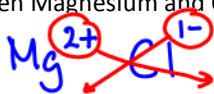
Magnesium and phosphorous: magnesium phosphide  
Calcium and Chlorine: calcium chloride.  
Sodium and Iodine: sodium iodide.  
Aluminum and Oxygen: aluminum oxide.

#### Chemical Formulas of Ionic Compounds

- Ionic charge is important for indicating how many of each ion are involved in the compound

Eg: What compound forms between Magnesium and Chlorine?

① write ions

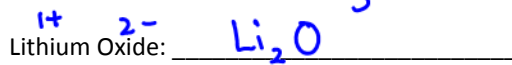
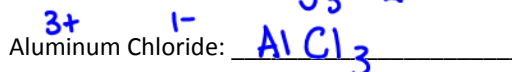
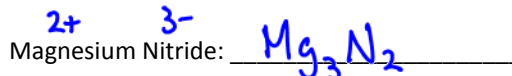
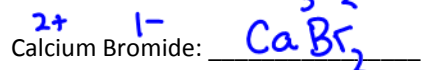
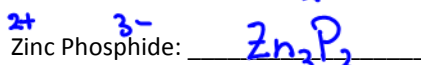
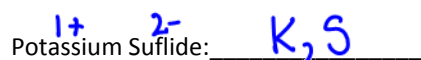
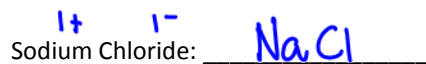


② criss cross charges



③ reduce to lowest terms.  $\text{MgCl}_2$

Write the formulas for the following:



## Multivalent Metals

eg  $Fe^{3+}$  or  $Fe^{2+}$

- There are some metals that have different valence numbers
- The properties that they form are different from each other

Eg: Copper (atomic number 29) can form either  $Cu^+$  or  $Cu^{2+}$

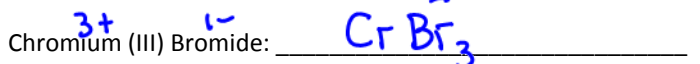
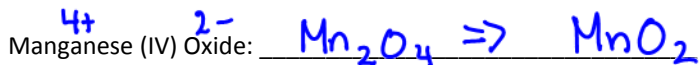
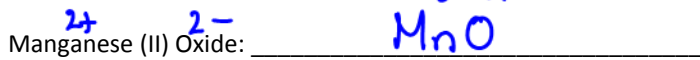
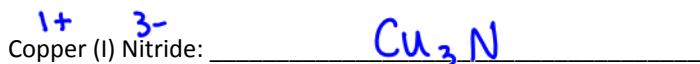
- Roman numerals are used to distinguish between the possible valences.

I, II, III, IV, V, VI

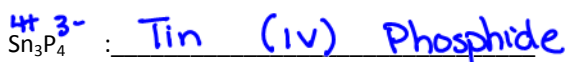
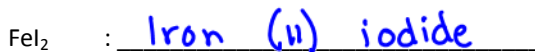
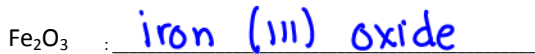
Eg: Write the formulas for all possible compounds that can form between Copper and Chlorine:



Write formulas for each compound:



Name each of the following compound:



use reverse criss cross



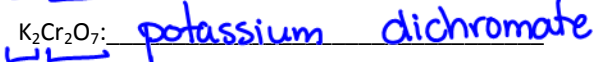
$AlCl_3 =$  aluminum chloride  
 - aluminum is not multivalent  
 so no roman numeral needed

## Polyatomic Ions

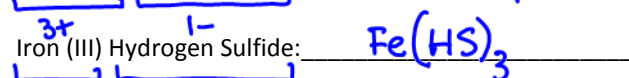
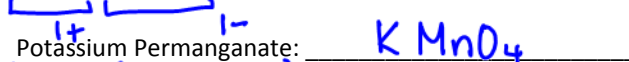
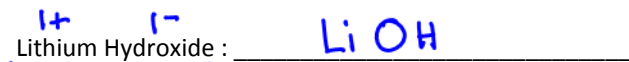
- Sometimes a special group of atoms can react as a single ion:

↳ look for metal and non metal part.

Write the names of the following:



Give the formulas for the following:



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Table 4.11 Names, Formulas, and Charges of Some Polyatomic Ions

Positive Ions		Negative Ions	
$NH_4^+$ ammonium	$CH_3COO^-$ acetate	$HCO_3^-$ hydrogen carbonate, bicarbonate	$NO_2^-$ nitrite
	$CO_3^{2-}$ carbonate	$HSO_4^-$ hydrogen sulfate, bisulfate	$ClO_4^-$ perchlorate
	$ClO_3^-$ chlorate	$HS^-$ hydrogen sulfide, bisulfide	$MnO_4^-$ permanganate
	$ClO_2^-$ chlorite	$HSO_3^-$ hydrogen sulfite, bisulfite	$PO_4^{3-}$ phosphate
	$CrO_4^{2-}$ chromate	$OH^-$ hydroxide	$PO_3^{3-}$ phosphite
	$CN^-$ cyanide	$ClO^-$ hypochlorite	$SO_4^{2-}$ sulfate
	$Cr_2O_7^{2-}$ dichromate	$NO_3^-$ nitrate	$SO_3^{2-}$ sulfite