Science 9
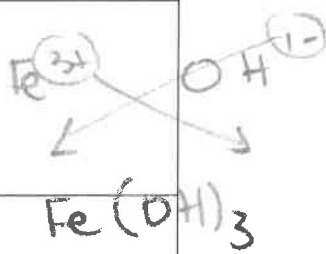## Names and Formulas of Ionic Compounds Continued

Steps for writing formulas of **ionic compounds with polyatomic ions:**

Steps	Example 1:Iron (III) hydroxide
1.Identify each **ion** and its appropriate **charge**	**Iron (III)** = **Fe^{3+}** **Hydroxide** = **OH^{1-}**
2.Determine the total charges needed to **balance** positive and negative ions (or use the **criss-cross** method)	**Fe^{3+}** :**+3** = **+3** **OH$^-$** :**-1-1-1** = **-3**
3.Note the **ratio** of positive ions to negative ions	**1 Fe^{3+}** **3 OH^{1-}**
4.Use ratio as **subscripts**, be sure to protect the polyatomic ion by placing it in **brackets**	**Fe (OH)$_3$**

Fe$^{(3+)}$ OH$^{(1-)}$

Fe (OH)$_3$

Example 2: Ammonium carbonate
1.
2.   NH$_4$$^{\oplus}$ CO$_3$$^{(2-)}$
3.   NH$_4^+$ / NH$_4^+$ = +2
4.   CO$_3^{2-}$ = -2

2:1

∴ (NH$_4$)$_2$CO$_3$

Example 3: Iron (III) nitrate
1.
2.   Fe^{3+} NO$_3^-$
3.
4.   Fe^{3+} = +3
     NO$_3^-$ / NO$_3^-$ / NO$_3^-$ = -3

1:3

∴ Fe(NO$_3$)$_3$

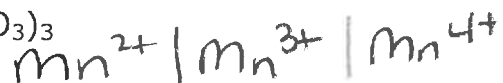**Now do Practice Problems page 91 #2 a – j**

Steps for writing the **name of ionic compounds with polyatomic ions**:

Steps	Example 1. $Cu_3(PO_4)_2$
1.Identify the **metal** and list the possible **ion charges**	**Cu^{1+} or Cu^{2+}**
2.Identify the **ratio** of the ions in the formula	**3 Cu for every 2 PO_4**
3.Identify the **charge** on the non-metal ion	**$PO_4{}^{3-}$**
4.The positive and negative charges must **balance**! Determine what the charge on the metal ion must be to balance the non-metal	**Cu^{1+} : +1 +1 +1 = +3** **Cu^{2+} : +2 +2 +2 = +6** **$PO_4{}^{3-}$: -3-3 = -6**
5.Write out the compound name with the appropriate metal ion charge written as a **roman numeral**	**Copper (II) phosphate**

Example 2. $Mn(CO_3)_3$

1. $Mn^{2+} \mid Mn^{3+} \mid Mn^{4+}$
2. $2\ Mn^0$ for every $3\ CO_3{}^{2-}$
3. $CO_3{}^{2-} \times 3 = -6$
4. $\boxed{3+} \times 2 = -6$

5. $\therefore$ Manganese (III) Carbonate

Example 3. NH_4OH

1. $NH_4{}^+$
2. $1\ NH_4{}^+$ for every $1\ OH^-$
3. $+1 = -1$
4. Ammonium hydroxide

5.

Now do Practice Problems page 91 #1 a-j