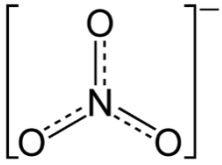
SNC2D
Ms. Kueh

Polyatomic Ions

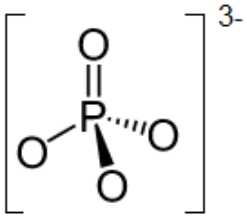
A polyatomic ion is a group of atoms with a net charge that act together as a group:

For Example:

Nitrate NO_3^{1-} has a net charge of ___



Phosphate PO_4^{3-} has a net charge of ___



Example 1 Name the compound KNO_3

Step One

Write out the elemental name from the formula and include all of the ion charges for each element. In this case you have to recognize that there is a polyatomic ion present:

KNO_3

Potassium Nitrate

Note: the second part in a binary compound is *always* negative

Step Two

Since there is only one ion charge (they are not multivalent) for each you write:

Example 2 Name the compound $FeCO_3$

If there is more than one ion charge (multivalent) for the metal you would have to use the rules for multivalent ions to determine which Roman numeral to use in the name.

Example 3 Name the compound $Ca(NO_3)_2$

The brackets around the **$(NO_3)_2$** are used to show the presence of _____ **NO_3^{1-}** groups, the net

charge on the two groups would be _____, which would balance the Ca^{2+}. The number of nitrate groups does not matter in the name since there must be exactly two nitrate groups, so the name is:

Table of Polyatomic Ions

+1 CHARGE		-1 CHARGE		-2 CHARGE		-3 CHARGE	
ion	*name*	*ion*	*name*	*ion*	*name*	*ion*	*name*
NH_4^+	**ammonium**	**NO_3^-**	**nitrate**	**CO_3^{2-}**	**carbonate**	**PO_4^{3-}**	**phosphate**
H_3O^+	**hydronium**	**ClO_3^-**	**chlorate**	**SO_4^{2-}**	**sulfate**		
		HCO_3^-	**hydrogen carbonate (bicarbonate)**	**SO_3^{2-}**	**sulfite**		
		OH^-	**hydroxide**				
		NO_2^-	**nitrite**				

<u>Formula to Names (Polyatomic Ions) – Practice Sheet</u>

Compound Formula	**<u>Step 1</u>** Write out the Name of the Elements with Ion Charges	**<u>Step 2</u>** Work out the Positive Ion Charge if multivalent	**<u>Step 3</u>** Add the proper Roman Numeral (If necessary)
$ZnSO_4$	Zinc $^{(2+)}$ Sulphate $^{(2-)}$	Zn is ot multivalent	Zinc Sulphate *(No Roman Numeral needed as Zn has only one ion charge)*
$Cu(NO_3)_2$	Copper $^{(1+,2+)}$ Nitrate $^{(1-)}$	2 ions x 1- = 2- only one Cu therefore ion charge must be 2+	Copper (II) Nitrate

Compound Formula	**<u>Step 1</u>** Write out the Name of the Elements with Ion Charges	**<u>Step 2</u>** Work out the Positive Ion Charge	**<u>Step 3</u>** Add the proper Roman Numeral (If necessary)
$Co(NO_2)_2$	Cobalt $^{(2+,\ 3+)}$ Nitr**ite** $^{(1-)}$		Cobalt (II) Nitrite
$AuPO_4$			
$Cd(NO_3)_2$			
$Pb(ClO_3)_4$			
$Sn_3(PO_4)_2$			
$Ca(NO_3)_2$			
$Al(OH)_3$			
$Sn(SO_4)_2$			

Compound Formula	**<u>Step 1</u>** Write out the Name of the Elements with Ion Charges	**<u>Step 2</u>** Work out the Positive Ion Charge	**<u>Step 3</u>** Add the proper Roman Numeral (If necessary)
$Bi(OH)_5$			
$CuClO_3$			
$CrPO_4$			
$Ni(NO_3)_3$			
K_3PO_4			
$Sb(NO_2)_5$			
$AgNO_3$			
Hg_2SO_4			