

1. Memorize the chemical symbols for elements with atomic numbers 1-38, 47-56 and 78-82 on the periodic table. Here is a link to the Periodic Table of Elements. <https://templatelab.com/wp-content/uploads/2016/07/printable-periodic-table-20.jpg>
2. Define *ion*.
3. Memorize the following polyatomic ions. You must know the names, elements, subscripts and charges.  
\*\*You are strongly encouraged to make flash cards and use the strategies shown on the next page.

Positive Ions	
1+ ions:	
Ammonium $\text{NH}_4^{+1}$	Hydronium $\text{H}_3\text{O}^{+1}$

Negative Ions				
1- ions:		2- ions:		3- ions:
Acetate	$\text{C}_2\text{H}_3\text{O}_2^-$	Carbonate	$\text{CO}_3^{-2}$	Phosphate $\text{PO}_4^{3-}$
Chlorate	$\text{ClO}_3^-$	Chromate	$\text{CrO}_4^{-2}$	
Chlorite	$\text{ClO}_2^-$	Dichromate	$\text{Cr}_2\text{O}_7^{-2}$	
Cyanide	$\text{CN}^-$	Hydrogen Phosphate	$\text{HPO}_4^{-2}$	
Dihydrogen Phosphate	$\text{H}_2\text{PO}_4^-$	Peroxide	$\text{O}_2^{2-}$	
Hydrogen Carbonate	$\text{HCO}_3^-$	Sulfate	$\text{SO}_4^{2-}$	
Hydrogen Sulfate	$\text{HSO}_4^-$	Sulfite	$\text{SO}_3^{2-}$	
Hydroxide	$\text{OH}^-$	Thiosulfate	$\text{S}_2\text{O}_3^{-2}$	
Hypochlorite	$\text{ClO}^-$			
Nitrate	$\text{NO}_3^-$			
Nitrite	$\text{NO}_2^-$			
Perchlorate	$\text{ClO}_4^-$			
Permanganate	$\text{MnO}_4^-$			
Thiocyanate	$\text{SCN}^-$			

## Strategies to help you memorize the polyatomic ions

All polyatomic ions from the list must be memorized, **symbol and charge**.

### The ones that end with -ate or -ite

Ate/ite suffix indicates the ion contains oxygen

ex. Sulfate contains sulfur and oxygen. Nitrate contains nitrogen and oxygen.

Name	Description	Example
Per___ate	Contains one more oxygen than ___ate	Perchlorate = $\text{ClO}_4^{-1}$
___ate	MEMORIZE these and derive the rest using the relationships between the prefixes and suffixes	Chlorate = $\text{ClO}_3^{-1}$
___ite	Contains one less oxygen than ___ate	Chlorite = $\text{ClO}_2^{-1}$
Hypo___ite	Contains one less oxygen than ___ite	Hypochlorite = $\text{ClO}^{-1}$

### The ones that start with hydrogen

You have already memorized ALL of the \_\_\_ate polyatomic ions, so now just put an H in front of the symbol and increase the charge by 1+.

___Ate	Symbol & charge	Hydrogen ones	Symbol & charge
Carbonate	$\text{CO}_3^{-2}$	Hydrogen carbonate	$\text{HCO}_3^{-1}$
Sulfate	$\text{SO}_4^{-2}$	Hydrogen sulfate	$\text{HSO}_4^{-1}$
Phosphate	$\text{PO}_4^{3-}$	Dihydrogen Phosphate ( <i>di</i> means 2)	$\text{H}_2\text{PO}_4^{-1}$