

# Common Ions

**Memorize the names and formulas for these ions NOW! Pop quizzes all year long starting in September!**

You do not need to memorize the old-fashioned names in parentheses and italics. They are only there in case you stumble across them on an assignment or online during the year. The roman numerals after some names are required parts of the name! Do not add them to others, and do not forget them on ones that have them.

## +++ Positive Ions – Cations +++

1+		2+		3+		4+	
Hydrogen	H <sup>+</sup>	Cadmium	Cd <sup>2+</sup>	Chromium (III)	Cr <sup>3+</sup>	Lead (IV) <i>(Plumbic)</i>	Pb <sup>4+</sup>
Ammonium	NH <sub>4</sub> <sup>+</sup>	Chromium (II)	Cr <sup>2+</sup>	Cobalt (III)	Co <sup>3+</sup>	Manganese (IV)	Mn <sup>4+</sup>
Copper (I) <i>(Cuprous)</i>	Cu <sup>+</sup>	Cobalt (II)	Co <sup>2+</sup>	Gold (III)	Au <sup>3+</sup>	Carbon cation	C <sup>4+</sup>
Silver	Ag <sup>+</sup>	Copper (II) <i>(Cupric)</i>	Cu <sup>2+</sup>	Iron (III) <i>(Ferric)</i>	Fe <sup>3+</sup>	Silicon (IV)	Si <sup>4+</sup>
Gold (I)	Au <sup>+</sup>	Iron (II) <i>(Ferrous)</i>	Fe <sup>2+</sup>	Manganese (III)	Mn <sup>3+</sup>	Tin(IV) <i>(Stannic)</i>	Sn <sup>4+</sup>
<b>And all elements in Group IA</b>		Lead (II) <i>(Plumbous)</i>	Pb <sup>2+</sup>	Nickel (III)	Ni <sup>3+</sup>	<b>And Group 4A can potentially make 4+</b>	
		Manganese (II)	Mn <sup>2+</sup>	Boron	B <sup>3+</sup>		
		Mercury (II) <i>(Mercuric)</i>	Hg <sup>2+</sup>	Aluminum	Al <sup>3+</sup>		
		Nickel (II)	Ni <sup>2+</sup>	Gallium	Ga <sup>3+</sup>		
		Tin (II) <i>(Stannous)</i>	Sn <sup>2+</sup>	Indium	In <sup>3+</sup>		
		Zinc	Zn <sup>2+</sup>				
		Mercury (I) <i>(Mercurous)</i>	Hg <sub>2</sub> <sup>2+</sup>				
		<b>And all elements in Group 2A</b>					

## --- Negative Ions – Anions ---

1-		2-		3-		4-	
Acetate	C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> <sup>-</sup>	Carbonate	CO <sub>3</sub> <sup>2-</sup>	Borate	BO <sub>3</sub> <sup>3-</sup>	Carbon anion	C <sup>4-</sup>
Bicarbonate	HCO <sub>3</sub> <sup>-</sup>	Peroxide	O <sub>2</sub> <sup>2-</sup>	Phosphate	PO <sub>4</sub> <sup>3-</sup>	<b>And Group 4A can potentially make 4-</b>	
Chlorate	ClO <sub>3</sub> <sup>-</sup>	Sulfate	SO <sub>4</sub> <sup>2-</sup>	Phosphide	P <sup>3-</sup>		
Chlorite	ClO <sub>2</sub> <sup>-</sup>	Sulfite	SO <sub>3</sub> <sup>2-</sup>	Phosphite	PO <sub>3</sub> <sup>3-</sup>		
Cyanide	CN <sup>-</sup>	Chromate	CrO <sub>4</sub> <sup>2-</sup>	Arsenate	AsO <sub>4</sub> <sup>3-</sup>		
Hydride	H <sup>-</sup>	Dichromate	Cr <sub>2</sub> O <sub>7</sub> <sup>2-</sup>	<b>And all elements in Group 5A</b>			
Hydroxide	OH <sup>-</sup>	Oxalate	C <sub>2</sub> O <sub>4</sub> <sup>2-</sup>				
Hypochlorite	ClO <sup>-</sup>	Thiosulfate	S <sub>2</sub> O <sub>3</sub> <sup>2-</sup>				
Nitrate	NO <sub>3</sub> <sup>-</sup>	<b>And all elements in Group 6A</b>					
Nitrite	NO <sub>2</sub> <sup>-</sup>						
Perchlorate	ClO <sub>4</sub> <sup>-</sup>						
Permanganate	MnO <sub>4</sub> <sup>-</sup>						
Thiocyanate	SCN <sup>-</sup>						
<b>And all elements in Group 7A (Halogens)</b>							

The “monatomic” anions (made of only one type of atom) from groups 5A, 6A, 7A are named by dropping the ending on the neutral atom’s name and replacing it with -ide. Because they follow such a dependable pattern, they are not individually named on this common ion list.

Examples:  
 F fluorine → F<sup>-</sup> fluoride  
 O oxygen → O<sup>2-</sup> oxide  
 N nitrogen → N<sup>3-</sup> nitride

## Other things to Memorize

We do not need these until later in the year – you will be told when to memorize these.

Prefixes				Common Molecular Gases	Common Acids		Diatomic Elements	
One	mono	Six	hexa	F <sub>2</sub> , Cl <sub>2</sub> , H <sub>2</sub> , N <sub>2</sub> , O <sub>2</sub> , SO <sub>2</sub> ,	Hydrochloric	HCl	Hydrogen	H <sub>2</sub>
Two	di	Seven	hepta	SO <sub>3</sub> , CO, CO <sub>2</sub> , H <sub>2</sub> S,	Sulfuric	H <sub>2</sub> SO <sub>4</sub>	Nitrogen	N <sub>2</sub>
Three	tri	Eight	octa	NO, NO <sub>2</sub> , NH <sub>3</sub> , P <sub>2</sub> O <sub>3</sub> ,	Nitric	HNO <sub>3</sub>	Oxygen	O <sub>2</sub>
Four	tetra	Nine	nona	P <sub>2</sub> O <sub>5</sub> , SiF <sub>4</sub> , HCl, HBr,	Phosphoric	H <sub>3</sub> PO <sub>4</sub>	Fluorine	F <sub>2</sub>
Five	penta	Ten	deca	HI, HF, N <sub>2</sub> O <sub>5</sub> , N <sub>2</sub> O <sub>3</sub> , N <sub>2</sub> O	Common Bases		Chlorine	Cl <sub>2</sub>
					Ammonia	NH <sub>3</sub>	Bromine	Br <sub>2</sub>
					Sodium hydroxide	NaOH	Iodine	I <sub>2</sub>

## Strong Acid, Strong Base Handout

Memorize these 15, ALL ELSE ARE considered WEAK

7 Strong Acids (H <sup>+</sup> ) All other acids are weak	
Hydrochloric acid	HCl
Hydrobromic acid	HBr
Hydroiodic	HI
Perchloric acid	HClO <sub>4</sub>
Chloric acid	HClO <sub>3</sub>
Nitric acid	HNO <sub>3</sub>
Sulfuric acid	H <sub>2</sub> SO <sub>4</sub>

8 Strong Bases (OH <sup>-</sup> ) All other bases are weak	
Lithium hydroxide	LiOH
Sodium hydroxide	NaOH
Potassium hydroxide	KOH
Rubidium hydroxide	RbOH
Cesium hydroxide	CsOH
Calcium hydroxide	Ca(OH) <sub>2</sub>
Strontium hydroxide	Sr(OH) <sub>2</sub>
Barium hydroxide	Ba(OH) <sub>2</sub>

## Pattern for Some Polyatomic Ion Names, and Some Acid Names

If this is helpful to you then great! If not, then just memorize them! 😊

Polyatomic Ions Containing Oxygen*		Acid Nomenclature**	
Per-.....-ate	Greatest number of oxygens	Per-.....-ic	Greatest number of oxygen atoms
.....-ate	Greater	.....-ic	Greater
.....-ite	Smaller	.....-ous	Smaller
Hypo.....-ite	Smallest number of oxygens	Hypo.....-ous	Smallest number of oxygen atoms

\*Names of polyatomic ions containing oxygen- some elements form several polyatomic ions with oxygen.

A series of suffixes and prefixes is used to specify the relative number of oxygen atoms.

\*\*Acids – Acids are molecular compounds that contain hydrogen bonded to a nonmetal to a group of atoms that behave like a nonmetal. Acids can be either binary or ternary compounds. The names of binary acids have the form Hydro-...-ic acids. The names of ternary acids use a series of prefixes and suffixes to specify the relative number of oxygen atoms in the molecule.