CONCEPT: POLYATOMIC IONS

- **Polyatomic Ions** are tightly bound groups made of multiple elements that possess an overall _____.

Polyatomic Oxyanions

- Negatively charged polyatomic ions that end with oxygen.
  - □ **Trioxides**: When their name ends with –ate they possess _____ oxygens.
  - □ **Tetraoxides**: When their name ends with –ate they possess _____ oxygens.

Number of Oxygens

	3A (3)	4A (4)	5A (5)	6A (6)	7A (7)	8A (8)
1						
2	BO__	CO__	NO__			
3		SiO__	PO__	SO__		
4						

Charge Distribution

	3A (3)	4A (4)	5A (5)	6A (6)	7A (7)	8A (8)
1						
2	BO□__	CO□__	NO□__			
3		SiO□__	PO□__	SO□__		
4						

Trioxides			
Bor**ate** _____	Carbon**ate** _____	Nitr**ate** _____	Silic**ate** _____

Tetraoxides	
Phosph**ate** _____	Sulf**ate** _____

Deriving Oxyanions

- Decreasing the number of oxygens by 1 changes the ending to –_____, while keeping the overall charge the same.

$SO^{\square}$__ _____ $SO^{\square}$__ _____

EXAMPLE: Give the formal or systematic name for the following polyatomic ion: PO_3^{3-}

PRACTICE: Give the systematic name for the following polyatomic ion.

NO_2^-

CONCEPT: POLYATOMIC IONS

PRACTICE: Give the systematic name for the following polyatomic ion.

CO_2^{2-}

PRACTICE: Give the systematic name for the following polyatomic ion.

AsO_4^{2-}

PRACTICE: The formula for the sulfate ion, SO_4^{2-}. If the term of "thio" means the replacement of an oxygen by a sulfur, what is the formula for the thiosulfate ion?

CONCEPT: POLYATOMIC IONS

Halogen Oxyanions

- Polyatomic ions containing **halogens** are referred to as _____ or **halogen** oxyanions.
  - □ The **Base Name** is the beginning of the nonmetal's name that is unchanged.
  - □ The number of oxygens in these polyatomic ions affect either the prefix and/or suffix.
  - □ All the **halogen** oxyanions possess a charge of _____.

Halogen	Base Name
Fluorine (F)	_____
Chlorine (Cl)	_____
Bromine (Br)	_____
Iodine (I)	_____

# of Oxygens	Base Name
_____	per_____ate
_____	_____ate
_____	_____ite
_____	hypo_____ite

EXAMPLE: Name each of the following compounds: **a.** ClO_4^- **b.** BrO_2^-

Polyatomic Cations

- Most polyatomic ions are negatively charged except for the NH_4^+ ion and the Hg_2^{2+} ion.
  - □ **NH_4^+**: the _____ ion is the only major polyatomic ion with a +1 charge.
  - □ **Hg_2^{2+}**: the _____ ion is composed of 2 mercury ions that are bonded together.

The Other Polyatomic Ions

- The other polyatomic ions don't fit into predictable patterns and so must be memorized.

The Other Tetraoxides		
Permanganate _____	Chromate _____	Oxalate _____

The Other Polyatomic Ions		
Cyanide _____	Hydroxide _____	Peroxide _____
Dichromate _____	Cyanate _____	Acetate _____

EXAMPLE: Based on your understanding of the polyatomic oxyanions, provide the structure for the thiocyanate ion.

CONCEPT: POLYATOMIC IONS

PRACTICE: Give the systematic name for the following polyatomic ion.

FO^-

PRACTICE: Give the systematic name for the following polyatomic ion.

IO_3^-

PRACTICE: The silicate ion is the silicon version of the carbonate ion. Based on this description, provide the structure of the silicate ion.