

# Student Handout 3 of 3: Chemical Bonding

Cations					Anions		
6+	4+	3+	2+	1+	1-	2-	3-
Cr <sup>6+</sup>	Sn <sup>4+</sup>	Al <sup>3+</sup>	Group IIA ions	Group IA ions	H <sup>-</sup> (H <sub>2</sub> O <sub>2</sub> )	CO <sub>3</sub> <sup>2-</sup>	AsO <sub>4</sub> <sup>3-</sup>
	Pb <sup>4+</sup>	Cr <sup>3+</sup>	Mn <sup>2+</sup>	Cu <sup>+</sup>	C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> <sup>-</sup>	CrO <sub>4</sub> <sup>2-</sup>	N <sup>3-</sup>
		Fe <sup>3+</sup>	Fe <sup>2+</sup>	Ag <sup>+</sup>	Halogen ions	Cr <sub>2</sub> O <sub>7</sub> <sup>2-</sup>	PO <sub>4</sub> <sup>3-</sup>
		Bi <sup>3+</sup>	Co <sup>2+</sup>	NH <sub>4</sub> <sup>+</sup>	ClO <sup>-</sup> , BrO <sup>-</sup> , IO <sup>-</sup>	O <sup>2-</sup>	
			Ni <sup>2+</sup>		ClO <sub>2</sub> <sup>-</sup> , BrO <sub>2</sub> <sup>-</sup> , IO <sub>2</sub> <sup>-</sup>	S <sup>2-</sup>	
			Cu <sup>2+</sup>		ClO <sub>3</sub> <sup>-</sup> , BrO <sub>3</sub> <sup>-</sup> , IO <sub>3</sub> <sup>-</sup>	SO <sub>3</sub> <sup>2-</sup>	
			Zn <sup>2+</sup>		NO <sub>2</sub> <sup>-</sup>	SO <sub>4</sub> <sup>2-</sup>	
			Cd <sup>2+</sup>		NO <sub>3</sub> <sup>-</sup>		
			Sn <sup>2+</sup>		CN <sup>-</sup>		

\*Know the names of all these, especially the polyatomic ions. Make up a list of the names up for yourself, you'll remember it better than if it was just given to you.

## Naming Compounds

- Ionic compounds:** Groups IA, IIA and Transition Metals attached to monatomic (Groups VA, VIA or VIIA) or polyatomic anions. Know the charges of each ion (oxidation numbers for monatomic species, charges for polyatomics) and put things together so that the net charge is zero or whatever it needs to be if the molecule is an ion. Since metals can have more than one oxidation state, use Roman numerals to indicate which oxidation state it is. Cations keep their name, monatomic anions change to the suffix "ide" and polyatomic anions keep their names.
- Molecular Compounds:** Use Greek prefixes to indicate how many atoms of each element are present in the compound.

mono = 1	tetra = 4	hepta = 7	deca = 10
di = 2	penta = 5	octa = 8	
tri = 3	hexa = 6	nona = 9	

- Acids:** Hydrogen is always the cation
  - Binary compounds (H plus a monatomic ion):

**Prefix**  
 ↓  
**hydro** + **(anion name)** + **Change Suffix**  
 ↓  
**(ide goes to ic)** + **acid**

ex.) HCl is **hydrochloric acid**

- Polyatomic ions: anion name

**(anion name)** + **Change Suffix**  
 ↓  
**(ate goes to ic)** + **(ite for to ous)** + **acid**

ex.) H<sub>2</sub>SO<sub>4</sub> is **Sulfuric acid**