Chem I Name _____

Date _____ Per _____

Notes: Ions

The Goal: _____!

1. _____ for an atom means to to have its outer _____ and _____ orbitals filled. Atoms are most stable when they have _____ valence electrons.

a. When they do their electrons look like the nearest _____ _____.

2. In order to do this, atoms can either _____ or _____ one or more _____ (The number of protons in the nucleus has to _____ , of course).

a. Ex: Na _____ To look like a noble gas it has to _____ one electron. Its new electron configuration will be _____ When it does, it will have _____ protons and ____ electrons, giving it a charge of _____.

b. Ex: Br _____ To look like a noble gas it has to _____ one electron. This will make it _____ Now it will have _____ protons and ____ electrons, giving it a charge of _____.

Other examples: Will have a charge of:

Al _____ _____

O _____ _____

N _____ _____

3. The Pattern:

Group Number	Number of valence electrons	Will gain or lose how many electrons?	Final Charge
1: H, Li, Na, K, Rb, Cs, Fr			
2: Be, Mg, Ca, Sr, Ba			
13: B, Al, Ga			
15: N, P, As			
16: O, S, Se, Te			
17: F, Cl, Br, I, At			

4. All these single atom ions are called _____ ions (mono = _____)

5. There are two types of monatomic ions: positive ions (cations) and negative ions (anions). There is a different process for naming each type.

a. Naming Cations (ions with a positive charge)

i. Some metals can only form ions with one charge: +1, +2, or +3. (These are usually found in groups 1,2, and 13). Name these by using the element name followed by the word "ion"
Ex:

Symbol	Element Name	Ion Symbol	Cation Name
Na	Sodium		Sodium ion
Al	Aluminum		
Ca	Calcium		

ii. Some metals (especially transition metals, Sn, and Pb) can form more than one positive charge. This complicates the naming process. The different cations must be named differently. Use a Roman numeral after the element name to indicate the positive charge.

Note: Roman numerals: 1 = _____ 2 = _____ 3 = _____ 4 = _____ 5 = _____

6= _____ 7 = _____ 8 = _____ 9 = _____ 10 = _____

Ex:

Symbol	Element Name	Ion Symbol	Cation Name
Fe	Iron	Fe^{+2}	Iron (II) ion
Fe	Iron	Fe^{+3}	
Sn	Tin	Sn^{+2}	Tin (II) ion
Sn	Tin	Sn^{+4}	
Cu	Copper	Cu^{+1}	Copper (I) ion
Cu	Copper	Cu^{+2}	

b. Naming Anions (ions with a negative charge)

Anions are formed from non-metals in groups 15, 16, and 17 and are named using the stem/root of the element name followed by the -ide and the word "ion".

Ex:

Symbol	Element Name	Ion Symbol	Anion Name
Cl	Chlorine	Cl^{-1}	
Br	Bromine	Br^{-1}	
O	Oxygen	O^{-2}	