Basic Chemical Nomenclature Lab (CHE110)

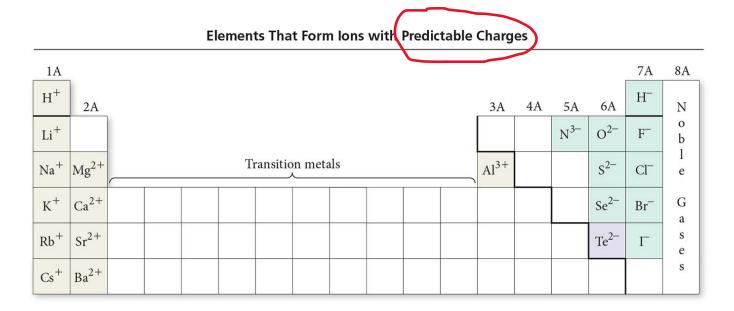
I) The alphabet of the chemical language is the periodic table.

	Main-g eleme			Transition elements					Main-group elements									
	1A	Group number																8A
1	1 H (2A 2											3A 13	4A 14	5A 15	6A 16	7A 17	18 2 He
2	3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
3	11 Na	12 Mg	3B 3	4B 4	5B 5	6B 6	7B 7	8	– 8B – 9	10	1B 11	2B 12	13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
Periods 4	19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
5	37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
6	55 Cs	56 Ba	57 La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
7	87 Fr	88 Ra	89 Ac	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113	114 Fl	115	116 Lv	117	118

Let's become familiar with the ones in the red boxes, especially the first 36 elements. Know their names and symbols. Give the correct symbol for each of the below elements.

calcium	carbon	sodium
potassium	neon	oxygen
nitrogen	nickel	nitrogen
silicon	silver	germanium
tin	manganese	bromine
lead	magnesium	barium
iron	titanium	gold
cobalt	strontium	sulfur
copper	fluorine	phosphorus
bromine gallium		lithium
iodine mercury		beryllium

II) There are a lot more compounds in the world than elements. Elements combine to form compounds. An important compound group is call IONIC compounds because they are formed from ions.



Elements that form multiple ions – more difficult to predict 1A 18 H+ 4A 5A 6A 2A 3A these must be memorized! N^{3-} O^{2-} Li+ A13+ Na+ Mg²⁺ C1-3 5 7 11 6 8 10 12 Cr3+ Mn2+ Fe2+ Co3+ V^{3+} Cu+ Mn⁴⁺ Fe³⁺ Co²⁺ Ni²⁺ Ga³⁺ K+ Ca²⁺ Sc³⁺ Se²⁻ Br⁻ V^{5+} Sn²⁺ Te²⁻ Rb+ Sr2+ I-T1+ Pb²⁺ Cs⁺ Ba²⁺ Hg²⁺ Tl³⁺ Pb⁴⁺

Let's practice how to put an *ionic compound* involving two *monatomic ions* together:

Ions	Chloride Cl ⁻	Nitride N ³⁻	Oxide O ²⁻	Bromide Br-	Iodide I ⁻	Sulfide S ²⁻
Sodium Na ⁺						
Magnesium Mg ²⁺						
Aluminum Al ³⁺						
Potassium K ⁺						
Lithium Li ⁺						
Calcium Ca ²⁺						
Zinc Zn ²⁺						
Copper (I) Cu ⁺						
Iron (III) Fe ³⁺						

And l	And how to break an ionic compound apart into its constituent IONS							
1)	Fe_2O_3							
2)	$CuBr_2$							
3)	Cr_2S_3							
3)	C12S3							
4)	Hg ₂ Cl ₂							
5)	$HgCl_2$							
6)	7n.N.							

And go back and forth with them – given name, write formula; given formula, write name					
Lithium oxide	beryllium fluoride				
Magnesium nitride	potassium sulfide				
Calcium phosphide	aluminum bromide				
Barium chloride	nickel iodide				
Silver oxide	lead (II) fluoride				
Zinc oxide	mercury (II) chloride				
Chloric acid	Tin (II) nitride				
Copper (I) oxide	manganese (III) sulfide				
Iron (II) phosphide	manganese (II) nitride				

Now let's see if you've grasped the essence of identifying the charges on an ion from its compound. Given the below formulas, write the ion symbol for *X* in each case.

MgBr₂

CoCl₂

 $\underline{V_2O_3}$

PbS₂

AgX	Ag_2X
<u>ZnX</u>	MgX_2
Ca_3X_2	AlX
<u>XBr₂</u>	XO_2
<u>XI</u>	X_3N_2

III. Acids and Their Anion Formulas – one step closer towards "polyatomic ions ""

"hydro	"hydro ic" Acids and their "ide" ions				"ic" acids and their "ate" ions (aka, OXY-acids)				
Name	Formula	Anion Name	Anion Formula	Name	Formula	Anion Name (s)	Anion Formula (s)		
Hydrofluoric acid				Nitric acid					
Hydrochloric acid				Sulfuric acid					
Hydrobromic acid				Carbonic acid					
Hydroiodic acid				Chloric acid					
Hydrosulfuric acid				Phosphoric acid					
Hydrocyanic acid				Acetic acid					
				Bromic acid					
				Iodic acid					

VI. More Oxy-acids and their Anions Derived From the "...ic" Acids

ic acid		l + 10 give .ic acid		d - 10 gives us acid		acid - 20 givesous acid
Chloric acid	Name	Formula	Name	Formula	Name	Formula
	Anion name	Anion formula	Anion name	Anion formula	Anion name	Anion formula
Bromic acid	Name	Formula	Name	Formula	Name	Formula
	Anion name	Anion formula	Anion name	Anion formula	Anion name	Anion formula
Iodic acid	Name	Formula	Name	Formula	Name	Formula
	Anion name	Anion formula	Anion name	Anion formula	Anion name	Anion formula
Nitric acid			Name	Formula		Ranama fa
	N	lot	Anion name	Anion formula		Become fa acids and anions. W to tackle
Sulfuric acid	appl	icable	Name	Formula		ions and h put togeth ionic com
			Anion name	Anion formula		ionic com

Become familiar with these acids and their resultant anions. We are now ready to tackle most polyatomic ions and how to use them to put together more complex ionic compounds.

Without looking at the cheat sheets too much, write the polyatomic ions for each of the following

nitrate	nitrite			
sulfate	sulfite	hydrogen sulfate	hydrogen sulfite	
carbonate	bicarbonate			
chlorate	chlorite	hypochlorite	perchlorate	
bromate	bromite	hypobromite	perbromate	
phosphate	phosphite	dihydrogen phosphate	hydrogen phosphate	
acetate				

Without looking at the cheat sheets too much, write the formulas for the following compounds:

barium nitrate	potassium chlorate
sodium phosphate	ammonium dihydrogen phosphate
calcium perchlorate	zinc hydrogen phosphate
perbromic acid	potassium hydrogen carbonate
Lead (II) bisulfate	silver nitrate
copper (II) bromate	hypoiodous acid
nickel phosphate	aluminum chlorite
carbonic acid	hydrochloric acid
chromium (III) sulfate	nitrous acid
lead (II) chromate	manganese (IV) sulfite