NOMENCLATURE OF IONIC COMPOUNDS

Binary means two	e.g.	HCI, CO ₂ , NH ₃ , MgBr ₂
Diatomic means two		HCI O H

Elements that exist as diatomic gases are in the mnemonic HOFBrINCl. If you are asked to write the formula for them, you write X_2 . Any other element is written as a single atom, or the symbol by itself.

Valence is the bonding capacity of an element, or the number of electrons gained, lost, or shared, or the number of bonds it makes.

Ionic Binary Compounds

Naming:

Write the name of the metal, then the name of the non-metal, changing the ending of the non-metal name to "-ide".

e.g. LiF

MgS

Many transition metals have more than one valence. You must determine which valence it has in the compound and write the valence in brackets as Roman numerals after the metal name, with no space in between.

e.g. FeCl₃

PbO

Note: There are two polyatomic ions that end in "-ide", hydroxide OH- and cyanide CN-

Writing Formulas

- 1. Write the symbol of the metal cation then the symbol of the non-metal anion.
- 2. Write the valence of each above and to the right of the symbol.
- 3. Crossover the valences to make subscripts for the opposite element and reduce to lowest terms.
- e.g. potassium oxide

barium sulfide

<u>Ionic Ternary Compounds</u>

Names and formulas of polyatomic ions are on p.98 in your textbook. Read the Language Link on that page and start trying to remember these so that it takes less time to write names and formulas of compounds. Also note that all halogens follow the pattern of the chlorate, chlorite, etc., ions listed. e.g. bromate is BrO_3^-

The only positive polyatomic ion is ammonium, NH₄⁺. Memorize it.

Naming:

Write the cation name first and the anion name second.

e.g. Na₂SO₄

 $Ca_3(PO_3)_2$

Writing Formulas:

Use the crossover method, as for binary compounds, but if a polyatomic ion has a subscript given to it that is greater than 1, the ion must be in brackets, with the subscript outside the brackets.

e.g. barium nitrate

aluminum thiosulfate

ALCHEMIST METHOD (OUS-IC METHOD)

- Only used if a metal only has two common valences
- the Latin name of the metal is most often used
- if the **lower** of the valences is being used then the name of the metal is changed to end in **"ous"**.
- if the **higher** of the valences is being used then the name of the metal is changed to end in **"ic"**.
- you have to memorize the two valences for selected elements using the Periodic Table.

tin	Sn	2+ 4+	stannous stannic
lead	Pb	2+ 4+	plumbous plumbic
platinum	Pt	2+ 4+	platinous platinic
iron	Fe	2+ 3+	ferrous ferric
cobalt	Со	2+ 3+	cobaltous cobaltic
nickel	Ni	2+ 3+	nickelous nickelic
mercury	Нд	1+ 2+	mercurous mercuric
copper	Cu	1+ 2+	cuprous cupric
gold	Au	1+ 3+	aurous auric

NOMENCLATURE OF BINARY IONIC COMPOUNDS

4.	Write names for the following compounds.	
	a) Li ₂ O	b) MgF ₂
	c) CuI	d) Fe ₂ O ₃
	e) Na ₂ S	f) KBr
	g) HgCl ₂	h) SnBr ₂
	i) Ag ₂ O	j) ZnF ₂
	k) CuO	l) Sb ₂ S ₃
	m) Ba ₃ P ₂	n) CaBr ₂
	o) FeCl ₃	p) HgS
	q) Al ₂ O ₃	r) BaI ₂
	s) PtO ₂	t) Cr ₂ O ₃
2.	Write formulas for the following compounds.	
	a) sodium fluoride	b) silver sulfide
	c) tin(II) oxide	d) copper(II) chloride
	e) aluminum bromide	f) zinc chloride
	g) iron(II) oxide	h) iron(III) oxide
	i) zinc sulfide	j) potassium oxide
	k) tin(IV) oxide	I) mercury(I) iodide
	m) aluminum sulfide	n) cadmium chloride
	o) lead(II) oxide	p) antimony(V) oxide
	q) cesium sulfide	r) sodium carbide
	s) gold(III) nitride	t) nickel(II) iodide

NOMENCLATURE OF TERNARY IONIC COMPOUNDS

*	Write names for the following compo	unds.
	a) KNO ₃	b) (NH ₄) ₃ PO ₄
	c) Mg(ClO ₃) ₂	d) FeSO ₄
	e) Ca(C ₂ H ₃ O ₂) ₂	f) ZnSO ₃
	g) Ba(OH) ₂	h) NaHCO ₃
	i) K ₂ Cr ₂ O ₇	j) FeS ₂ O ₃
	k) NaBrO ₂	
2.	Write formulas for the following comp	oounds.
	a) mercury(II) cyanide	b) vanadium(III) carbonate
	c) potassium hypochlorite	d) copper(II) sulfate
	e) barium hydrogen sulfate	f) lithium hydroxide
	g) ammonium thiocyanate	h) sodium acetate
	i) aluminum phosphite	j) lead(II) periodate
	k) iron(III) nitrite	I) magnesium bromite
	A L CLIF	-MICT METUOD
	ALCHE	EMIST METHOD
Writ	te formulas for the following compounds	named by an outdated method.
	a) cuprous hydride	b) plumbous sulfide
	c) cobaltic chlorate	d) mercuric sulfate
	e) aurous oxide	f) ferrous fluoride
	g) plumbic nitrate	h) stannous acetate
	i) cupric iodide	j) ferric phosphite
	k) mercurous nitride	I) auric bromide

Reminder: You never use this method to name compounds.