

Carroll High School

Chemistry-PreAP

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Due Date: First Day of Class 2009-10

Assignment Value: Quiz Grade

See packet for completion instructions!

Pre-AP Chemistry

Summer Assignment

Carroll High School



Dear Students,

Welcome to PreAP Chemistry! You may be feeling a little anxiety about the upcoming year and perhaps a bit apprehensive about what will be expected of you. You will feel much more comfortable with the material and have a better experience in chemistry if you start early with memory work and practice with the skills.

PreAP-Chemistry starts the first day with this assignment .
You will have a quiz on day **two** of class over this summer assignment.

As you read through this assignment, you will notice it is mainly based on memorizing the ion list that is in this packet. I recommend you first make flash cards with the chemical symbol, name and ionic charge. It is important that you memorize the ions EXACTLY as they are typed. This includes capital or lowercase letters, subscripts, +/- charge and magnitude of charge. The spelling of the ion name must also be exactly correct- watch for subtle differences. Look for patterns (especially on the periodic table) to make the memorization easier.

Once you have the ions committed to memory go to the website www.chemteam.info.

Do the tutorials under **Nomenclature**:

- Binary compounds with fixed charge cations
- Binary compounds with variable charge cation (stock system)
- Covalent Binary Compound (two nonmetals)
- Polyatomics
- Miscellaneous- acid nomenclature

Once you have done these on-line tutorials, do the last pages (pages 6- 12) of this packet. **Completion of this activity will be your first chemistry grade (quiz grade) so bring it with you the first day of class.**

Besides reviewing nomenclature the first week of school, we will be reviewing chemistry lab safety rules and identifying lab equipment.

Have a GREAT summer and I look forward to having you in class next year☺

Sincerely,

Mrs. McCurley



ION MEMORIZATION LIST

Directions: Memorize this list of ions. It is important that you memorize the ions exactly AS THEY ARE TYPED. This includes capital or lowercase letters, subscripts, +/- charge, and magnitude of charge (superscript numbers). The spelling of the ion name must also be exactly correct. Even a one letter difference means the difference between sulfate (SO_4^{2-}) and sulfite (SO_3^{2-}). Look for patterns to make memorization easier.

You must understand these terms:

MONATOMIC ION = single atom with a charge.

POLYATOMIC ION = group of atoms with a charge.

MONATOMIC IONS (see periodic table)

Positive

1+	2+	3+	4+
H^+ Hydrogen	Be^{2+} Beryllium	B^{3+} Boron	C^{4+} Carbon
Li^+ Lithium	Mg^{2+} Magnesium		Si^{4+} Silicon
Na^+ Sodium	Ca^{2+} Calcium		
K^+ Potassium	Sr^{2+} Strontium		
Rb^+ Rubidium	Ba^{2+} Barium		
Cs^+ Cesium	Ra^{2+} Radium		
Fr^+ Francium			

Negative

(notice all monatomic negative ions end with -ide)

1-	2-	3-	4-
F^- Fluoride	O^{2-} Oxide	N^{3-} Nitride	C^{4-} Carbide
Cl^- Chloride	S^{2-} Sulfide	P^{3-} Phosphide	Si^{4-} Silicide
Br^- Bromide	Se^{2-} Selenide	As^{3-} Arsenide	
I^- Iodide	Te^{2-} Telluride		
At^- Astatide			
(H^-) Hydride			

MULTIPLE CHARGED MONATOMIC IONS

(notice Roman numerals)

Cu^+ Copper (I)	Fe^{2+} Iron(II)	Pb^{2+} Lead(II)
Cu^{2+} Copper (II)	Fe^{3+} Iron(III)	Pb^{4+} Lead(IV)
Sn^{2+} Tin (II)	Hg_2^{2+} Mercury (I)	
Sn^{4+} Tin (IV)	Hg^{2+} Mercury (II)	

CONSTANT CHARGE TRANSITION METAL IONS

(notice absence of Roman Numerals)

Ag^+	Silver
Al^{3+}	Aluminum
Cd^{2+}	Cadmium
Zn^{2+}	Zinc

POLYATOMIC IONS

Positive

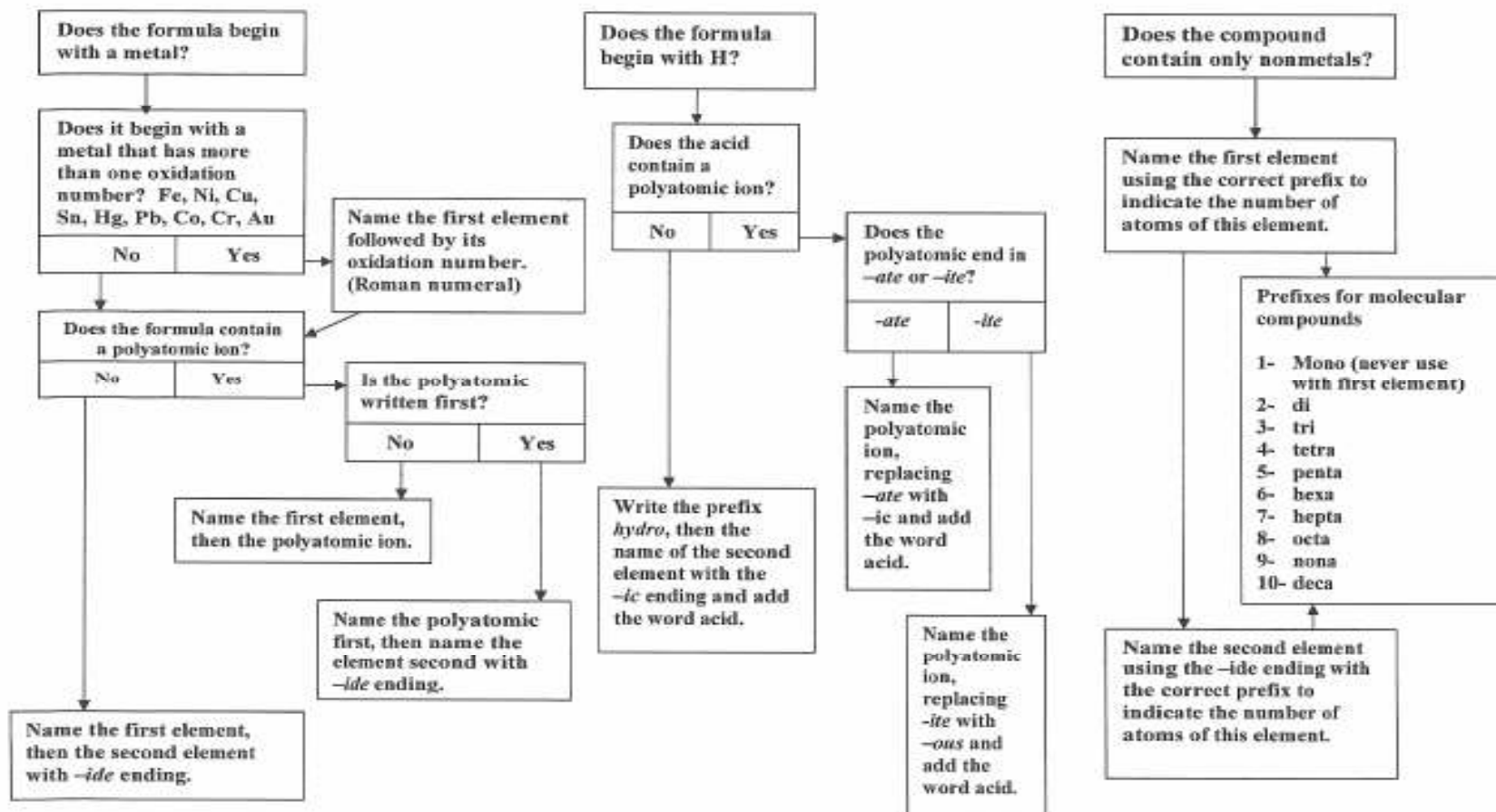
$(\text{NH}_4)^+$	Ammonium
$(\text{H}_3\text{O})^+$	Hydronium

Negative

1-	2-	3-
$(\text{C}_2\text{H}_3\text{O}_2)^-$ Acetate	$(\text{CO}_3)^{2-}$ Carbonate	$(\text{PO}_4)^{3-}$ Phosphate
$(\text{CH}_3\text{COO})^-$ Acetate*	$(\text{Cr}_2\text{O}_7)^{2-}$ Dichromate	
$(\text{OH})^-$ Hydroxide	$(\text{C}_2\text{O}_4)^{2-}$ Oxalate	
$(\text{NO}_3)^-$ Nitrate	$(\text{O}_2)^{2-}$ Peroxide	
$(\text{MnO}_4)^-$ Permanganate	$(\text{SO}_4)^{2-}$ Sulfate	
$(\text{ClO})^-$ Hypochlorite	$(\text{SO}_3)^{2-}$ Sulfite	
$(\text{ClO}_2)^-$ Chlorite		
$(\text{ClO}_3)^-$ Chlorate		
$(\text{ClO}_4)^-$ Perchlorate		
$(\text{HCO}_3)^-$ Hydrogen carbonate (bicarbonate)		
$(\text{CN})^-$ Cyanide		

*Acetate may be written either way. We will use the first one most of the time.

Naming Flow Chart



Name _____

Writing Chemical Formulas For Ionic Compounds

I. Atoms and Ions (Refer to Periodic Chart)

A. Atoms

1. Are always electrically neutral (protons = electrons)

B. Ions

1.

- a. Positive ions are called _____.
Ex.

- b. Negative ions are called _____.
Ex.

2. May be monatomic or polyatomic

- a. Monatomic ion is ____ atom with a charge
Ex.

- b. Polyatomic ion is a _____ bound together with an overall charge.
Ex.

Please note that ClO (the l is a lowercase L, not the number 1) is only two atoms. Cl is one atom and O is another. Uppercase represents the start of a new element.

II. Chemical Formulas

- Show the kinds and numbers of atoms in the smallest representative unit of the substance
- Number of each kind is shown by subscript

III. Ionic Compounds

A. Rules for writing the formula of an ionic compound

1. The _____ is always written first
Ex.
2. Net ionic charge of formula must = 0 That means that the subscript times the charge of the cation must equal the subscript times the charge of the anion.
3. Steps
 - a. Using the ion memorization list, write down the cation with its charge as shown and the anion with its charge as shown. Be sure you write it exactly as shown.
 - b. Once you've done this, ask yourself are the charges (superscripts) equal. If so, then erase the charges and you are done.
 - c. If the superscripts are not equal, then crisscross omitting the signs. Then erase the superscripts.

Ex. Copper (II) Sulfide

Ex. Calcium Iodide

Ex. Hydronium hypochlorite

Note: On the polyatomic ions, parentheses are very very important. Do not ever change the inside of the parentheses. If you find the polyatomic ion does not have a subscript, then you can erase the parenthesis.

Write the formula for the following compounds:

1. Magnesium chloride
2. Potassium oxide
3. Copper (I) chloride
4. Iron (III) oxide
5. Sodium iodide
6. Calcium sulfide
7. Aluminum bicarbonate
8. Barium sulfate
9. Sodium chlorate
10. Lead (IV) sulfate
11. Copper (II) phosphate

B. Rules for Naming Ionic Compounds

1. If the cation is not a multiple charged ion, ones located on the bottom left of your ion memorization list, then simply write the name.
2. If the cation is a multiple charged ion, you must determine the correct charge and then use a roman numeral in parentheses to indicate which ion is used. The Roman numeral represents the charge of the ion.

DO NOT USE ROMAN NUMERALS UNLESS THE ION HAS MORE THAN ONE POSSIBLE CHARGE.

- a. To determine the charge, look up the charge of the anion
If the charge of the anion is -1, then the charge can be found by reverse crisscrossing.
Ex. SnCl_2

- b. If the charge of the anion is not -1, then multiply the charge of the anion by the subscript. This is the number that the subscript of the cation times the charge of the cation must be equal to.

Ex. CuO

Ex. PbS₂

3. Using the ion memorization list, name the anion.

EXAMPLES

Name the following compounds

1. AlI₃
2. FeO
3. Cu₂S
4. Ca₃N₂
5. LiOH
6. Mg₃(PO₄)₂
7. Ca(C₂H₃O₂)₂
8. Fe(ClO₃)₂
9. Pb(SO₃)₂
10. (NH₄)₂SO₄

Formula Quiz	Name _____
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Chemistry

- | | | | |
|---------------------------|-------|----------------------------------|-------|
| 1. beryllium chloride | _____ | 11. $(\text{NH}_4)_2\text{SO}_3$ | _____ |
| 2. mercury (II) nitrate | _____ | 12. Rb_2O | _____ |
| 3. potassium permanganate | _____ | 13. SnCO_3 | _____ |
| 4. silver perchlorate | _____ | 14. Li_3PO_4 | _____ |
| 5. copper (II) sulfate | _____ | 15. NaF | _____ |
| 6. barium acetate | _____ | 16. PbI_2 | _____ |
| 7. lead (IV) oxalate | _____ | 17. $\text{Zn}(\text{ClO}_3)_2$ | _____ |
| 8. boron phosphide | _____ | 18. $\text{Al}(\text{ClO}_2)_3$ | _____ |
| 9. strontium dichromate | _____ | 19. CdO | _____ |
| 10. calcium hydroxide | _____ | 20. MgS | _____ |

Part II - Application

- (1) When should Roman numerals be used in a chemical name? Give examples to support your answer.
- (2) When should parentheses be used in a chemical formula? Give examples to support your answer.
- (3) Complete the following table by writing in the chemical **formulas** and the **names** for the compounds formed by combining the indicated positive and negative ions.

	bromide ion	carbonate ion	nitrate ion
hydrogen ion			
tin (IV) ion			
potassium ion			

- (4) In the list below, write the name for each compound.
- (a) S_2O_3
 - (b) BeO
 - (c) $FeCl_2$
 - (d) NF_5
 - (e) Na_2S
- (5) Name the following compounds:
- (a) $PbCl_2$
 - (b) P_2O_5
 - (c) K_2SO_4
 - (d) CuO
 - (e) PbO_2
- (6) Write the formulas for the following compounds :
- (a) barium chlorate
 - (b) sulfur hexabromide
 - (c) mercury (II) fluoride
 - (d) carbon diphosphide
 - (e) sodium permanganate