SUMMER ASSIGNMENT IN CHEMISTRY

Welcome to AP Chemistry! You will quickly notice that things will be different than they were in Regents Chemistry. For one, you must memorize a lot of the information that was given to you on the Chemistry Reference Tables. This assignment will help us with some of the memorization, math skills, and basic topics that you will need to prepare for the AP Chemistry for ***SY 2019-2020***. As you progress through this assignment use the following sources for help;

- Helpful links are attached. Please take time to click all links to help you answer homework assignments.

Helpful Links

1) Sig Figs (https://www.youtube.com/watch?v=ExETL3IiRSw)
2) Net Ionic Equations (https://www.youtube.com/watch?v=EQIqcT9a7DY)
3) Effective Nuclear Charge (https://www.youtube.com/watch?v=TaYUOiEe6OA)
4) Electron Configuration (https://www.youtube.com/watch?v=hEhUNikSC90)
5) Limiting and excess reactant (https://www.youtube.com/watch?v=CK2yK_JTUH4)

Important Dates

- Due Date: Worksheets 1 & 2 are due the first day of class & there will be a quiz on the elements

and a quiz on the polyatomic ions.

What will you hand in?

- Worksheets 1 & 2 (if you need additional space for worksheet 1, you can turn in your own notebook paper, but it must be neat and *labeled correctly.*

NOTE: Working with Homework Assignments will be added as EXTRA CREDITS towards your Grade in the 1st Marking Period for the next SY 2019- 2020.

Task 1: Complete Worksheets 1 & 2(attached)

Task 2: Memorize the names of the elements and their corresponding symbols

- You need to know elements 1-56, plus Pt, Au, Hg, Pb, Rn, Fr, Ra, U, Pu
- Many of these elements you will already know
- Making flashcards is helpful!
- It's important to know these elements because the periodic table you are provided has only the symbols and not the names of the elements

Task 3: Memorize the ionic charges of the basic ions

- Think about the valence electrons!
- Think about the common elements/ions in that group

• Group 1 ions = +1	Zn = +2
• Group 2 ions = +2	Ag = +1
• Group 15 (5A) ions (N and P) = -3	Cu = +1 or +2
• Group 16 (6A) ions (O and S) = -2	Fe = +2 or +3
• Group 17 (7A)/ halogens = -1 Pb = +2 or +4	
• Sn = +2 or +4	

Task 4: Memorize the names, symbols, and charges of Polyatomic ions below:

* Oxyanions –polyatomic containing oxygen, names end in –ate or –ite
* -ate is used for the most common form
* -ite is used for the form with the same charge, but one less oxygen

Example:

- NO_3^- = nitrate
- NO_2^- = nitrite
- Prefixes are also used
  - Per-indicates one more oxygen than the –ate form (think "perfect = overachieving", ie = more)
  - Hypo-indicates one fewer oxygen than the –ite form

Example:

* ClO_4^-= perchlorate (b/c it has one more O than the –ate form)
* ClO_3^- = chlorate (b/c it is the most common)
* ClO_2^- = chlorite (b/c it has one less oxygen than –ate form)
* ClO_4^- = hypochlorite (b/c it has one less oxygen than the –ite form)
* F, Cl, Br, I all behave the same
*Therefore, if chlorate is ClO^{3-}, the bromate ion is... BrO_3^-!!!!
* Simply substitute one halogen for the other
* If you learn the chlorate series, you also automatically know the bromate, iodate, and fluorate series

- Hydrogen can be added to -2 or -3 ions to make a "new ion" i.e. $H_2PO_4^{-1}$is dihydrogen phosphate (note the –charge went up 1 for each H^+ added)

+1 ammonium, NH_4^+		
-1 acetate, $C_2H_3O_2^-$, or CH_3COO^- bromate, BrO_3^- chlorate, ClO_3^- chlorite, ClO_2^- cyanide, CN^- hydrogen carbonate, HCO_3^- (also called bicarbonate) hydroxide, OH^- hypochlorite, ClO^- iodate, IO_3^- nitrate, NO_3^- nitrite, NO_2^- permanganate, MnO_4^- perchlorate, ClO_4^- thiocyanate, SCN^-	-2 carbonate, CO_3^{-2} chromate, CrO_4^{-2} dichromate, $Cr_2O_7^{-2}$ oxalate, $C_2O_4^{-2}$ peroxide, O_2^{-2} sulfate, SO_4^{-2} sulfite, SO_3^{-2}	-3 phosphate, PO_4^{-3} phosphite, PO_3^{-3} arsenate, AsO_4^{-3}

Be able to name polyatomic ions using the rules above such as these below:

HPO_4^{-2} _____ HSO_3^{-1} _____

FO_3^{-1} _____ HCO_3^{-1} _____

Be able to write formulas for polyatomic ions using the rules above such as these below:

Bromite _____ periodate _____

Dihydrogen phosphite _____ hydrogen chromate _____

WOMEN'S ACADEMY OF EXCELLENCE

Dr. Arnette Crocker, Principal

Name: _____ Class: _____

Date/Period: _____ AP Chemistry/Mr. Comendador

Worksheet #1- Math Skills

Significant Figures

1. How many Sig Figs are in the following numbers?

   a) 0.0570 _____

   b) 6800 _____

   c) 6800. _____

   d) 4500.078 _____

2. Solve the following problems. Round your answer to the correct number of sig figs (and use the correct unit to answer)

   a) 235 cm x 25 cm x 0.3146 cm _____

   b) Divide 12.68 g by 3.2 mL _____

Density (round your answers to correct number of sig figs and show all work with units)

3. A cube of ruthenium metal 1.5 cm on a side has a mass of 42.0 g. What is the density in g/cm3? Will ruthenium metal float on water?

4. The density of bismuth metal is 9.8 g/cm^3. What is the mass of a sample of bismuth that displaces 65.8 mL of water?

Conversions (round answers correctly and show work with units)

5. Make the following conversions:

   a) 16.2 m to km

   b) 5.44 nL to mL

   c) 45.7 mL/s to kL/hr

6. What are the 7 diatomic elements? _____ _____ _____ _____ _____

   _____ _____

Average Atomic Mass

7. Magnesium consists of 3 naturally occurring isotopes with the masses 23.98504, 24.98584, and 25.98259 amu. The relative abundances of these three isotopes are 78.70%, 10.13 %, and 11.17% respectively. Calculate the average atomic mass.

Percent Composition

8. Calculate the percent composition of $C_{12}H_{22}O_{11}$(sugar). (Give Percent of each element.) Show all work.

Moles

9. Calculate the number of moles of the following: (SHOW WORK)

   a) 42.8 g of KNO_3

   b) 155.7 L of CO_2 at STP

   c) 9.25×10^{26} molecules of $CaCl_2$

Stoichiometry

10. Using the following equation: $2\ NaOH + H_2SO_4 \rightarrow 2\ H_2O + Na_2SO_4$

    How many grams of sodium sulfate will be formed if you start with 200 grams of sodium hydroxide and you have an excess of sulfuric acid?

11. Using the following equation: $Fe_2O_3 + 3H_2 \rightarrow 2\ Fe + 3\ H_2O$.

    Calculate how many grams of iron can be made from 16.5 grams of Fe_2O_3.

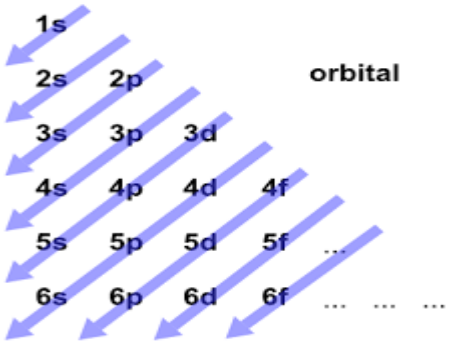
Limiting Reactant & Percent Yield

12. Determine the grams of sodium chloride produced when 10.0 g of sodium react with 10.0 g of chlorine gas according to the equation: $2\ Na + Cl_2 \rightarrow 2\ NaCl$

13. Determine the mass of lithium hydroxide produced when 50.0g of lithium are reacted with 45.0g of water according to the equation: $2Li + 2H_2O \rightarrow 2\ LiOH + H_2$.

14. Determine the percent yield of water produced when 68.3 g of hydrogen reacts with 85.4g of oxygen and 86.4g of water are collected. $2\ H_2 + O_2 \rightarrow 2\ H_2O$

Electron Configuration Practice Worksheet (Use Aufbau Principle)



In the space below, write the full (unabbreviated) electron configurations of the following elements:

1) sodium _____

2) iron _____

3) bromine _____

4) barium _____

5) neptunium _____

Effective Nuclear Charge (Z_{eff})

In order to understand the periodic trend of atomic radius across a row, we need to understand the concept of effective nuclear charge (Z_{eff}). Z is the charge that valence electrons experience after core electrons shield the nuclear charge. Valence electrons do not shield each other from the charge. Z is calculated using the following equation:

Z_{eff} = Atomic number(Z) - core electrons (S)

Valence electron(s) are electrons in the outermost energy level.

Complete the table and calculate Zeff for the following elements.

Atom/ Ion	Electronic Configuration	Z_{eff}	Atom/ Ion	Electronic Configuration	Z_{eff}	Atom/ Ion	Electronic Configuration	Z_{eff}
Mg			Cl			In		
Sr^{+}			Ba^{2+}			Br^{-}		
Al			Li			Na^{+}		
Al^{3+}			I^{-}			N^{3-}		

Naming Ionic Compounds (Practice Problems)

The cations in this first set are all of fixed oxidation state, so no Roman numerals are needed.

Write the correct name for:

1) $AlPO_4$

2) KNO_2

3) $NaHCO_3$

4) $CaCO_3$

5) $Mg(OH)_2$

6) Na_2CrO_4

These formulas involve the use of a polyatomic ion. The cations are all of variable oxidation state, so Roman numerals are needed.

Write the correct name for:

7) $Sn(NO_3)_2$

8) $FePO_4$

9) Cu_2SO_4

10) $Ni(C_2H_3O_2)_2$

11) $HgCO_3$

12) $Pb(OH)_4$

Naming Covalent Compounds

Write the names of the following *covalent* compounds:

1. SO_3 _____
2. N_2S _____
3. PH_3 _____
4. BF_3 _____
5. P_2Br_4 _____
6. CO _____
7. SiO_2 _____
8. SF_6 _____
9. NH_3 _____
10. NO_2 _____

Covalent compounds are combination of nonmetal and nonmetal (no metal present)

Writing and Naming Covalent Compounds

Note: Greek Prefixes are used to name covalent compounds

Rule

1. Name the first element without using mono if the number of atoms is only 1, then name the 2nd element with –ide ending. the prefix mono is allowed only for the second element.

Example: CO is named as carbon monoxide not monocarbon monoxide.

2) Use the prefixes below for other numbers and must be indicated first before its original name with –ide ending in the second element

Greek Prefixes

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

Example: N_2O_5 is named as

dinitrogen pentaoxide

Net Ionic Equation Worksheets

Directions: Write the complete and net ionic equations for the following reactions. If only the reactants are given, predict the products and balance the equation first. You also must include the states of matter. Consult the solubility rules to help you predict precipitates. Assume all reactants are aqueous unless stated otherwise. *Note: Items 1 and 3 are already balanced except for 2 and 4.*

1. $2NaCl(aq)$	+	$Pb(NO_3)_2(aq)$	$\rightarrow$	$PbCl_2(s)$	+	$2NaNO_3(aq)$
Complete Ionic:						
Net Ionic:						
Spectator Ions:						
2. $Mg(OH)_2(aq)$	+	$HCl(aq)$	$\rightarrow$	$MgCl_2(aq)$	+	$H_2O(l)$
Complete Ionic:						
Net Ionic:						
Spectator Ions:						
3. $2AgNO_3(aq)$	+	$MgI_2(aq)$	$\rightarrow$	$2AgI(s)$	+	$Mg(NO_3)_2(aq)$
Complete Ionic:						
Net Ionic:						
Spectator Ions:						
4. $FeCl_3(aq)$	+	$3Mg(s)$	$\rightarrow$	$MgCl_2(aq)$	+	$Fe(s)$
Complete Ionic:						
Net Ionic:						
Spectator Ions:						