AP Chemistry Summer Assignment

I know, I know….no one REALLY wants a summer assignment. But I DO know that you kids want to pass your AP exam and get college credit for all your hard work! So to make that happen, I need you to review what you learned in Honors/Regular Chemistry this summer and be ready to jump into new material when school starts in August! ☺

***AP Chemistry Tentative Schedule:***

Monday, August 15 Math Quiz (no calc on ½ of AP exam, so basic skills are necessary)

Tuesday, August 16 Issue books for first reading assignment and quiz; review

Wednesday, August 17 Summer Assignment Review

Thursday, August 18 Test over the Polyatomic Ions/ Summer Assignment Due

Friday, August 19 Continue Summer Assignment Review

Monday, August 22 Quiz - Chapters 1-3 (from summer review)

Here is your assignment:

1. ***Memorize the Polyatomic Ions List*** (symbol and charge) for the ions on the page attached. There will be a test over this material in the first week of school! Make a Quizlet, make note cards, make lists…whatever it takes for you to succeed! Don’t wait until August 18th! Slow and steady wins the race! ☺ Test on 8/19
2. **Complete the attached questions** which includes simple chemistry terminology, as well as naming compounds and a review of some basic chemistry. You may write the answers on this paper or a separate paper. This assignment will be due 8/19 (Thursday)

If you need a solid resource, try Rice University’s Open Stax (found here: <https://openstax.org/books/chemistry-2e/pages/1-introduction>

That’s it!! You can do this. I’m here for you, as well!

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1. Differentiate between physical and chemical properties.
2. Differentiate between physical and chemical changes.
3. Describe the differences between these 3 ways to separate mixtures:

Distillation separates mixtures by differences in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Filtration separates mixtures by differences in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ & Chromatography separates mixtures by differences in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Name the SI units for the following:

Mass—

Length—

Time—

Temperature—

Amount of substance—

1. How does one convert between K and Celsius temperature scales?
2. What is density and what are TWO possible units?
3. Differentiate between precision and accuracy.
4. How many significant figures are in the following numbers?

2.002 \_\_\_\_\_ 0.0040 \_\_\_\_\_\_\_ 5.04 x 1023 \_\_\_\_\_\_\_

200,000 \_\_\_\_\_\_\_\_ 200,001 \_\_\_\_\_\_\_\_ 6 x 10200 \_\_\_\_\_\_\_\_\_

1. What is the rule for adding and subtracting in relation to significant figures?
2. According to the rules of adding and subtracting SF’s, what are the following?

2.002 + 4 = \_\_\_\_\_\_\_\_ 6.9999 – 4.2 = \_\_\_\_\_\_\_\_\_

4.000 + 7.01 + 9 = \_\_\_\_\_\_\_\_ 15-7.4329 = \_\_\_\_\_\_\_\_\_\_

1. What is the rule for multiplying and dividing, in relation to significant figures?
2. According to the rules for multiplying and dividing SF’s, what are the following?

2.00 x 4.00 = \_\_\_\_\_\_ 16/2.0 = \_\_\_\_\_\_\_\_\_

1. Use dimensional analysis to convert 3.25 m/s to mi/hr (1 mi = 1.6093 km)
2. Where are protons found? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ What charge do they have? \_\_\_\_\_\_\_\_\_\_\_
3. Where are neutrons found? \_\_\_\_\_\_\_\_\_\_\_\_\_\_ What charge do they have? \_\_\_\_\_\_\_\_\_\_\_
4. Where are electrons found? \_\_\_\_\_\_\_\_\_\_\_\_\_\_ What charge do they have? \_\_\_\_\_\_\_\_\_\_\_
5. How is the neutron number found using the mass number and the atomic number? Why?
6. Why are the atomic mass numbers on the periodic table numbers with decimal places?
7. Naturally occurring chlorine is 75.78% Cl-35 (atomic mass 34.969 amu) and 24.22% Cl-37 (atomic mass 36.966 amu). Calculate (MUST SHOW WORK) the average atomic mass of chlorine.
8. What are the 7 diatomic elements? List them in their diatomic form.
9. Differentiate between a cation and an anion.
10. What is an ionic compound?
11. How are ionic compounds named?
12. Name the following ionic compounds. Write the following formulas.

NaCl sodium fluoride

K2S lithium nitride

Li2NO3 strontium oxide

MgO magnesium chloride

Al2O3 sodium bromide

1. What is special about naming ionic compounds that include transition metals?
2. Name the following ionic compounds that contain transition metals; write formulas.

Fe2O3 nickel (II) oxide

CuSO4 silver(I) carbonate

Ag2S cadmium (II) chlorate

CrO2 manganese (II) chlorite

1. What are covalent compounds made of?
2. How are covalent compounds named?
3. Name the following covalent compounds. Write formulas for covalent cmpds.

N2O5 tetracarbon pentasulfide

CO2 octaphosphorus monochloride

CO disulfur monoxide

P3F3 hexanitrogen septafluoride

1. How are binary acids named?
2. How are ternary acids named? What polyatomic ion endings are changed?
3. What does (aq) mean?
4. Name the following acids. Write formulas for acids.

HCl (aq) sulfuric acid

H2C2O4(aq) carbonic acid

HI (aq) hydrofluoric acid

HClO4(aq) acetic acid

**AP Chemistry—Polyatomic Ions**

**\*You must know the name, formula and charge ☺**

-1 Charge -2 Charge -3 Charge

**Formula Name Formula Name Formula Name**

CH3COO- acetate C2O4-2 oxalate PO4-3 phosphate

HCO3- hydrogen carbonate CO3-2 carbonate PO3-3 phosphite

 or bicarbonate

HSO4- hydrogen sulfate CrO4-2 chromate AsO4-3  arsenate

 or bisulfate

HSO3- hydrogen sulfite SO4-2 sulfate AsO3-3  arsenite

ClO- hypochlorite SO3-2 sulfite

SCN- thiocyanate Cr2O7-2 dichromate

OCN- cyanate SiO3-2 silicate

NH2- amide S2O3-2 thiosulfate

N3- azide HPO4-2  hydrogen phosphate

ClO2- chlorite IO4-2 periodate

ClO3- chlorate C7H5O2-2 benzoate

ClO4- perchlorate

BrO3- bromate

OH- hydroxide **+1 Charge**

NO3- nitrate NH4+ ammonium

NO2- nitrite

CN- cyanide

MnO4- permanganate

H2PO4- dihydrogen phosphate

IO3- iodate

**Molecular Masses**

1. Determine the molar mass of each of the following compounds. For extra math practice, don’t use a calculator - remember you can’t use one on the multiple choice section of the exam.
	1. N2O5
	2. FeCO3
	3. silicon hexabromide
2. Calculate the percentage by mass of oxygen in the following compounds.
	1. NO2
	2. Cr(NO3)3
	3. H2CO3
3. The empirical formula of a compound is CH. If the molar mass of this compound is about 78g, what is the molecular formula?
4. Find empirical formulas of the following compounds with the following compositions:
	1. 40.1 % C, 6.6% H, 53.3% O
	2. 18.4% C, 21.5 % N, 60.1 % K

**Balancing Equations**

1. Balance the following equations:



**Stoichiometry**

Show your work and box or circle your final answer please. Keep in mind that your first step with stoichiometry is ALWAYS to make sure your equation is balanced (if there is an equation)!!

1. How many molecules of ethane (C2H6) are present in 0.334 g ethane?
2. How many moles of cobalt (Co) atoms are there in 6.00 X 109 cobalt atoms?
3. How many moles of calcium (Ca) atoms are in 77.4 g of calcium?
4. How many atoms are present in 3.14 g copper (Cu)?
5. How many moles of oxygen are necessary to react completely with four moles of propane (C3H8)?

 C3H8 + O2 → CO2 + H2O

1. The fermentation of glucose, C6H12O6, produces ethyl alcohol, C2H5OH and CO2 as shown here:

 C6H12O6 → 2 C2H5OH (aq) + 2CO2 (g)

1. How many moles of CO2 are produced when 0.300 mol of C6H12O6 fully reacts?
2. How many grams of C6H12O6 are needed to form 2.00 g of C2H5OH?
3. How many molecules of CO2 form when 2.00 g of C2H5OH are produced?

12. How many grams of Al(OH)3 (molar mass 78.0 g/mol) can be produced from the reaction of 48.6 mL of 0.15 M KOH with excess Al2(SO4)3?

 Al2(SO4)3 + 6KOH → 2Al(OH)3 + K2(SO4)

13. If 20 L of oxygen are consumed in this reaction, how many liters of carbon dioxide are produced?

 C3H8 + 5O2 → 3 CO2 + 4H2O