Student Name: _____

AP Chemistry
Summer Work Packet

All students taking Honors or AP science courses are required to complete a review packet prior to the start of the course. Each course's packet is designed to help the student review material that was learned in prerequisite science classes. The material is necessary for the student to successfully begin the honors/AP course that he/she has chosen. A pretest will be administered the first week of class to assess the students' knowledge of the science concepts covered in the packet. This pretest **will** be reflected on the marking period grade, and the work done in the summer packet **may** be graded.

The teacher will personally consult with the parent/student to discuss their future in the class if:

1. the student does not show adequate knowledge of the subject material covered on the pretest.
2. the student does not complete the summer work packet by the first day of class.
3. the student does not hand in the summer work packet on the first day of class.

If you have any questions, please call the high school office at 838-1331.

I have read and understand the information written above.

Student signature: _____

Parent/guardian signature: _____

I attest that all of the work contained in this packet is my own. *This does not mean that you can't work together on this, I HIGHLY SUGGEST IT, however this means that you did not just copy someone's work.*

Student signature: _____

AP CHEMISTRY SUMMER PACKET
PALMYRA AREA HIGH SCHOOL

Mrs. Grissinger
kim_grissinger@pasd.us - feel free to email me with questions over the summer! **Because I am making myself available to you throughout the summer, excuses of "I didn't understand how to do ….. for the summer work assignment" will be inexcusable. This work will count for a significant grade, and all work turned in must be your own.**

WELCOME to AP chemistry! The AP curriculum includes all of the topics and the labs that we need to complete before the AP test in early May. All of you will find AP chemistry to be challenging, some of you will find it to be down-right hard. There is a lot to cover and while we can do it we will all need to work very hard. **You should expect this class to be SIGNIFICANTLY more difficult than your first chemistry class.** This means that we cannot slow down if you don't understand a topic. You need to make sure that you are staying up with all assignments, and coming in for help if you need extra help.

We need to use our class time effectively so the goal of this summer packet is that you will have reviewed much of the material from your first chemistry class. We will not just review material from before.

This assignment should be completed and ready to turn in by the **FIRST day of class**, no excuses. We will have take-home work over all academic year breaks (Thanksgiving, Winter, and Spring) this will be to cover and review material without wasting class time.

WHY DO WE HAVE TO DO SUMMER WORK?

- It is a review of basic content covered in chemistry I, which you may not have seen for over a year.
- It provides the necessary fundamentals you will need to be successful in AP chemistry. To not do the summer assignment or to do it poorly is to seriously endanger your prospects of being successful in AP chemistry.
- There will not be enough time before the AP exam in May to cover the necessary content without this head start.

Students are encouraged to work together to complete the summer assignment. THAT DOES NOT MEAN COPY! You should spread the out the following assignments over several weeks. Do not try to cram them in towards the end of the summer or you will get stressed out before school starts.

AP Chemistry will be taught with the assumption that all students are taking the AP exam in the spring.

AP Chemistry First Week Test – will consist of the following areas, be cool = be prepared!

1) polyatomic ions (including name, symbol, and charge)
2) Variable charges for transition metals
3) Naming Acids
4) Naming Ionic Compounds
5) Naming Covalent Compounds
6) Using sig. figs appropriately
7) Normal stoichiometry

SO WHAT IS THE SUMMER WORK? All work should be done neatly and clearly on paper and organized in the order it was assigned. All work for every problem **including units throughout** is necessary for AP. This is an expectation on the AP exam in the spring and we want to get into the good habit early

_____ Part 1 – Why are you taking this course?

- A short concise paragraph answering the following questions
  - (1) Why are you taking this course?
  - (2) What do you hope/expect to get out of the course?
  - (3) Interests
  - (4) Employment
  - (5) Career/College Aspirations
- Email this to Mrs. Grissinger at kim_grissinger@pasd.us (my preferred email) by ***August 1st! This is worth 20 points.***

_____ Part 2 - Memorize Charges of Common Ions

- If you know me or had me before you know I am not a big memorization person however this is a vital part of AP chemistry. They **will not** give you an ion chart so it is essential that you have this done prior to school beginning. I suggest notecards and lots of practice. ***This will be on your test!***

_____ Part 3 – Read and Review Pages in Book

– *Reading implies taking notes on any topics you are not familiar with or do not understand so that you will have them to study from AND/OR to ask me questions in the fall.* ***This is worth 30 points.***

GET USED TO READING CRITICALLY! This is ABSOLUTELY necessary for AP Chemistry! Chapter breakdowns should be completed for ALL chapters 1-3!!

There are forms to fill out at the end of this packet for each chapter.

- Chapter 1: Matter and Measurement
  - Everything in this chapter is basic but important. You may skim through if you find it easy. Learn all of table 1.4 (S.I. Base units) except Luminous intensity, and table 1.5.
  - Make sure you know the names of the common devices in figure 1.20 on page 17.
  - Pay particular attention to rules for significant figures.

- Chapter 2: Atoms, Molecules, and Ions
  - Simple review. All sections are important.

- Chapter 3: Stoichiometry: Calculations with Chemical Formulas
  - Be sure to know general types of reaction and how to balance.
  - Be able to perform all types of math.
  - Get general idea of mass spectrometry on page 78.

- It is recommended that you do advanced reading and note-taking on chapter 4,5, and 6 as well as these will be near the beginning of the course and will be covered very quickly because they are a review of chemistry I.

_____ Part 4 – Review Videos Due the first day of school. The play times for each video are listed in parentheses next to them. Write down any four pieces of information (in FULL sentences) of your choosing while watching them in the attached worksheet at the end of the packet.
http://www.bozemanscience.com/matter (9:16)
http://www.bozemanscience.com/scientific-method watch ONLY from 4:49 until end (approx. 6:00)
http://www.bozemanscience.com/significant-digits (11:18)
http://www.bozemanscience.com/factor-label-method (9:50)
http://www.bozemanscience.com/history-of-the-atom (9:09)
http://www.bozemanscience.com/a-tour-of-the-periodic-table (9:28)
http://www.bozemanscience.com/atoms-the-periodic-table (9:14)
http://www.bozemanscience.com/naming-compounds-part-1 (5:39)
http://www.bozemanscience.com/naming-compounds-part-2 (5:38)

_____ Part 5 – Complete your FIRST Chemistry Literature Review (see guidelines at end of packet) – during the year we will do one of these a month but for the summer simply do ONE!

- Email this to Mrs. Grissinger at kim_grissinger@pasd.us (my preferred email) by ***August 1st! This is worth 20 points.***

_____ Part 6 – Read through the various handouts regarding work ethic and requirements at the end of this packet!!

_____ Part 7 – Complete the practice problems provided. ***This is worth 30 points!***

_____ Part 8 – LAST PART – Come to school in the fall with

- your COMPLETED Summer packet
  - chapter breakdowns for 1-3
  - watch Bozeman review videos and fill out worksheet
  - practice problems
- Scientific calculator. It does not *need* to be a graphing calculator, though you are welcome to use a graphing calculator if you already have one.
- a LARGE notebook (2 or 3 inches) to be designated **exclusively** to AP CHEMISTRY
- **I HIGHLY RECOMMEND HAVING an** AP exam review workbook. Any will do. Pick one that you feel comfortable with or talk to me about it when you get to school.
- **Fun/Optional:** *The Cartoon Guide to Chemistry*, by Larry Gonick and Craig Criddle. This book is an easy read and describes the basics of all of the topics covered in AP Chemistry.
- **Fun/Optional:** The Disappearing Spoon, by Sam Kean. An excellent book on the history of elements.
- ENTHUSIASM AND A GREAT WORK ETHIC!!!!
- If you have issues acquiring any of these things please let me know

Remember on the AP exam you must show all work including units or you will lose points. If you get the correct answer but do not show work you will not receive any points. ***(Accordingly, in this class and this packet credit will NOT be given for answer-only responses!***)

SO. . . you need to show all work for every problem including

- equation you will be using (if applicable)
- knowns/unknowns (if applicable)
- plugged in equation and any algebraic work

AP Required Memorization – Charges of Ions

POSITIVE IONS: - periodic table connections

+1		**+2**		**+3**		**+4**		**+5**	
Group 1		**Group 2**		**Group 13**		**Group 14**		**Group 15**	
Alkali		Alkaline Earth		Boron		Carbon		Nitrogen	
Li^{+1}	Lithium	Be^{+2}	Beryllium	Al^{+3}	Aluminum	Si^{+4}	Silicon(IV)	As^{+5}	Arsenic (V)
Na^{+1}	Sodium	Mg^{+2}	Magnesium	Ga^{+3}	Gallium	Ge^{+4}	Germanium(IV)	Bi^{+5}	Bismuth(V)
K^{+1}	Potassium	Ca^{+2}	Calcium						
Rb^{+1}	Rubidium	Sr^{+2}	Strontium						
Cs^{+1}	Cesium	Ba^{+2}	Barium						
Fr^{+1}	Francium	Ra^{+2}	Radium						

NEGATIVE IONS: - periodic table connections

-4		**-3**		**-2**		**-1**	
Group 14		**Group 15**		**Group 16**		**Group 17**	
Carbon		Nitrogen		Oxygen		Halogens	
C^{-4}	Carbide	N^{-3}	Nitride	O^{-2}	Oxide	F^{-1}	Fluoride
		P^{-3}	Phosphide	S^{-2}	Sulfide	Cl^{-1}	Chloride
				Se^{-2}	Selenide	Br^{-1}	Bromide
						I^{-1}	Iodide

VARIABLE CHARGES/TRANSITION METALS:

Hydrogen	+1 or -1	Chromium (II) or (III)	+2 or +3
Iron (II) or (III)	+2 or +3	NO ROMAN NUMERALS	
Copper (I) or (II)	+1 or +2	Silver	+1
Mercury (I) or (II)	+1 or +2	Zinc	+2
Tin (II) or (IV)	+2 or +4	Cadmium	+2
Lead (II) or (IV)	+2 or +4	Nickel	+2
Cobalt (II) or (IV)	+2 or +4		
Manganese (II) or (IV)	+2 or +4		

POLYATOMICS IONS

+1

ammonium	NH_4^{+1}
hydronium	H_3O^{+1}

-1

Acetate	$C_2H_3O_2^{-1}$ or CH_3COO^{-1}	Hydroxide	OH^{-1}
		Nitrate	NO_3^{-1}
Azide	N_3^{-1}	Nitrite	NO_2^{-1}
Bromate	BrO_3^{-1}	Perchlorate	ClO_4^{-1}
Cyanide	CN^{-1}	Chlorate	ClO_3^{-1}
Dihydrogen phosphate	$H_2PO_4^{-1}$	Chlorite	ClO_2^{-1}
Bicarbonate or Hydrogen carbonate	HCO_3^{-1}	Hypochlorite	ClO^{-1}
		Iodate	IO_3^{-1}
Bisulfate or Hydrogen sulfate	HSO_4^{-1}	Permanganate	MnO_4^{-1}
		Thiocyanate	SCN^{-1}

-2

Carbonate	CO_3^{-2}	Oxalate	$C_2O_4^{-2}$
Chromate	CrO_4^{-2}	Silicate	SiO_3^{-2}
Dichromate	$Cr_2O_7^{-2}$	Tetraborate	$B_4O_7^{-2}$
Hydrogen phosphate	HPO_4^{-2}	Peroxide	O_2^{-2}
Sulfate	SO_4^{-2}	Selenate	SeO_4^{-2}
Sulfite	SO_3^{-2}	Tartrate	$C_4H_4O_6^{-2}$
Thiosulfate	$S_2O_3^{-2}$		

-3

Phosphate	PO_4^{-3}
Phosphite	PO_3^{-3}
Arsenate	AsO_4^{-3}
Borate	BO_3^{-3}

**Reminder NH_3 = ammonia*

Prefixes for naming molecular (covalent) compounds – Greek

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

Elements that exist as diatomic molecules

BrINClHOF	Br_2	I_2	N_2	Cl_2	H_2	O_2	F_2
Other weirdos	P_4 and S_8						

Naming Acids

Binary acids – named after anion

Hydro-(element)-ic acid	Ex.	HBr	**hydro**brom**ic acid**

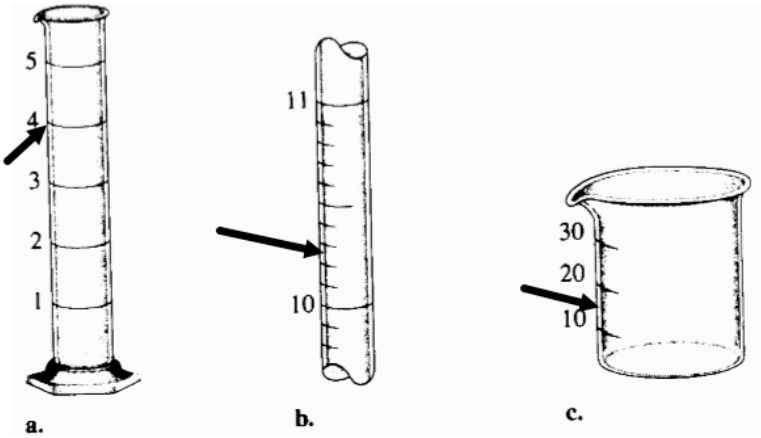
Oxyacids – named after polyatomic anion, no hydro prefix

-ate becomes –ic acid	Ex.	H_3PO_4	phosphor**ic acid**
-ite becomes –ous acid	Ex.	H_2SO_3	sulfur**ous acid**

Practice Problems

CHAPTER 1

1. For each of the following pieces of glassware, provide a sample measurement at arrow and discuss the number of significant figures and uncertainty.



2. A student performed an analysis of a sample for its calcium content and got the following results: 14.92%, 14.91%, 14.88%, and 14.91%
   The actual amount of calcium in the sample is 15.70%. What conclusion can you draw about the accuracy and precision of these results?

3. Calculate the percent error for the following measurements.
   a. The density of an aluminum block determined in an experiment was 2.64 g/cm^3. (Accepted value = 2.70 g/cm^3)
   b. The experimental determination of iron in ore was 16.48%. (Accepted value was 16.12%)

4. How many significant figures are in each of the following?
   a. 12
   b. 1098
   c. 2001
   d. 2.001 x 10^3
   e. 100
   f. 0.0000101
   g. 1000.
   h. 22.04030
   i. 1.00 x 10^3

5. Round of each of the following numbers to two significant figures, and write the answers in scientific notation.
   a. 0.00031254
   b. 31,254,000
   c. 35,900
   d. 0.00000399

6. Use scientific notation to express the number 480 to
   a. One significant figure
   b. Two significant figures
   c. Three significant figures

7. Perform the following mathematical operations, and express each result to the correct number of significant figures.
   a. 97.381 + 4.2502 + 0.99195
   b. 171.5 + 72.915 – 8.23
   c. $\dfrac{0.102 \times 0.0821 \times 273.5}{1.2}$
   d. (9.04 – 8.23 + 21.954 + 81.0) / 3.1416

8. Precious metals and gems are measured in troy weights in the English system:

24 grains = 1 pennyweight (EXACT)
20 pennyweights = 1 troy ounce (EXACT)
12 troy ounces = 1 troy pound (EXACT)
1 grain = 0.0648 gram
1 carat = 0.200 gram

   a. Diamonds are measured in carats. If a lucky girl receives a 5 carat diamond how many pennyweights is it?
   b. What is the mass of 2.3 troy ounces of gold in grams?
   c. The density of gold is 19.3 g/cm^3. What is the volume of a troy pound of gold?

9. Apothecaries (druggists) use the following set of measures:

20 grains ap = 1 scruple (EXACT)
3 scruples = 1 dram ap (EXACT)
8 dram ap = 1 oz. ap (EXACT)
1 dram ap = 3.888 g

   a. An aspirin table contains 5.00 x 10^2 mg of active ingredient. How many grains ap of active ingredient does it contain?
   b. From (a) how many scruples?
   c. What is the mass of 1.00 scruple in grams?

10. The world record for the hundred meter dash is 9.79 s. What is the corresponding speed in units of m/s, km/hr, ft/s, and mi/hr?
    a. At this speed how long would it take to run a mile (5,820 ft)?

11. You're planning to buy a new car. One model that you're considering gets 32 miles per gallon of gasoline in highway travel. The one that your spouse likes gets 14 kilometers to the liter. Which car has the better gas mileage? (1 gal = 4 qt., 1.057 qt = 1 L)

12. You pass a road sign saying "New York – 112 km." If you drive at a constant speed of 65 mi/hr., how long should it take you to reach New York?
    a. If your car gets 28 miles to the gallon, how many liters of gasoline are necessary to travel 112 km?

13. You have a 1.0 cm^3 sample of lead and a 1.0 cm^3 sample of glass. You drop each in separate beakers of water. How do the volumes of water displaced by each sample compare? Explain.
    Density of lead = 11.35 g/cm^3
    Density of glass = 3.00 g/cm^3

14. A person has a temperature of 102.5 F. What is this temperature on the Celsius scale?
    a. On the Kelvin scale?

15. Convert the following Celsius temperatures to Kelvin and to Fahrenheit degrees.
    a. The boiling-point temperature of ethyl alcohol, 78.1 C
    b. A cold winter day, -25 C
    c. The lowest possible temperature, -273 C
    d. The melting-point temperature of sodium chloride, 801 C

16. The density of diamond is 3.51 g/cm^3. What is the volume of a 4.5 carat diamond? 1 carat = 0.200 g

17. The volume of a diamond is found to be 2.8 mL. What is the mass of the diamond in carats? (See question #16)

18. A sample containing 33.42 g of metal pellets is poured into a graduated cylinder initially containing 12.7 mL of water, causing the water level in the cylinder to rise to 21.6 mL. Calculate the density of the metal.

19. Two spherical objects have the same mass. One floats on water; the other sinks. Which object has the greater diameter? Explain your answer.

20. What are some of the differences between a solid, a liquid, and a gas?

21. What is the difference between homogeneous and heterogeneous matter?

22. Classify each of the following as homogeneous or heterogeneous.
    a. soil
    b. the atmosphere
    c. a carbonated soft drink
    d. gasoline
    e. gold
    f. a solution of ethanol and water

23. Classify each of the following as a mixture or a pure substance. Of the pure substances, which are elements and which are compounds?
    a. Water
    b. Blood
    c. The oceans
    d. Iron
    e. Brass
    f. Uranium
    g. Wine
    h. Leather
    i. Table salt (NaCl)

24. Distinguish between physical and chemical changes.

25. List four indications that a chemical change (reaction) has occurred.

26. If you place a glass rod over a burning candle, the glass appears to turn black. What is happening to each of the following (physical change, chemical change, both, or neither) as the candle burns? Explain each answer
    a. the wax
    b. the wick
    c. the glass rod

27. The properties of a mixture are typically averages of the properties of its components. The properties of a compound may differ dramatically from the properties of the elements that combine to produce the compound. For each process described below, state whether the material being discussed is most likely a mixture or a compound, and state whether the process is a chemical change or a physical change.
    a. An orange liquid is distilled, resulting in the collection of a yellow liquid and a red solid.
    b. A colorless, crystalline solid is decomposed, yielding a pale yellow-green gas and a soft, shiny metal.
    c. A cup of tea becomes sweeter as sugar is added to it.

CHAPTER 2

1. Describe Dalton's atomic theory.

2. What discoveries were made by J.J. Thomson, Henri Becquerel, and Lord Rutherford? How did Dalton's model of the atom have to be modified to account for these discoveries?

3. What is the distinction between atomic number and mass number?

4. What is the difference between atomic mass and average atomic mass?

5. What is an isotope?

6. How many protons and neutrons are contained in the nucleus of each of the following atoms?
   a. $_{22}Ti^{42}$
   b. $_{30}Zn^{64}$
   c. $_{32}Ge^{76}$
   d. $_{36}Kr^{86}$
   e. $_{33}As^{75}$
   f. $_{19}K^{41}$

7. Write the isotopic symbol for each of the isotopes below.
   a. Atomic number = 8, number of neutrons = 9
   b. The isotope of chlorine in which mass = 37
   c. Atomic number = 27, mass = 60
   d. Number of protons = 26, number of neutrons = 31
   e. The isotope of I with a mass number of 131
   f. Atomic number = 3, number of neutrons = 4

8. The element copper has naturally occurring isotopes with mass number of 63 and 65. The relative abundance of the isotopes are 69.2% for mass = 62.93 amu, and 30.8% for mass = 64.93 amu. Calculate the average atomic mass of copper.

9. An element consists of 1.40% of an isotope with mass 203.973 amu, 24.10% of an isotope with mass 205.9745 amu, 22.10% of an isotope with mass 206.9759 amu, and 52.40% of an isotope with mass 207.9766 amu. Calculate the average atomic mass and identify the element.

10. Distinguish between the terms *family* and *period* in connection to the periodic table. For which of these terms is the term *group* also used?

11. In the periodic table, what is the name of the following groups
    a. Group (2)
    b. Group (18)

12. An ion contains 50 protons, 68 neutrons, and 48 electrons. What is its symbol and charge?

13. Which of the following sets of elements are all in the same group in the periodic table?
    a. N, P, O
    b. C, Si, Ge
    c. Rb, Sn
    d. Mg, Ca

14. Identify each of the following elements:
    a. A member of the same family as oxygen whose most stable ion contains 54 electrons
    b. A member of the alkali metal family whose most stable ion contains 36 electrons
    c. A noble gas with 18 protons in the nucleus
    d. A halogen with 85 protons and 85 electrons

15. Would you expect each of the following atoms to gain or lose electrons when forming ions? What ion is the most likely in each case?
    a. Na
    b. Sr
    c. P
    d. Ba
    e. I
    f. O
    g. Al
    h. S

16. For each of the following ions, indicate the total number of protons and electrons in the ion. For the positive ions, predict the formula of the simplest compound formed between itself and oxide. For the negative ions predict the simplest compound formed between itself and aluminum.
    a. Fe^{+2}
    b. Fe^{+3}
    c. Ba^{+2}
    d. Cs^{+1}
    e. S^{-2}
    f. P^{-3}
    g. Br^{-1}
    h. N^{-3}

17. An element's most stable ion forms an ionic compound with bromine, having the formula XBr_2. If the ion of element X has a mass number of 230 and 86 electrons, what is the identity of the element, and how many neutrons does it have?

Writing Formulas and Naming Compounds – Do WITHOUT an ion chart! You need to have these memorized.

1. Name each of the following compounds:
   a. $NaCl$
   b. Rb_2O
   c. $FeBr_3$
   d. Cr_2O_3
   e. $CaBr_2$
   f. CsF
   g. CaS
   h. AlI_3
   i. Al_2O_3
   j. $ZnCl_2$
   k. Li_3N
   l. Ag_2S
   m. $KClO_4$
   n. $Al_2(SO_4)_3$
   o. $BaSO_3$
   p. $KMnO_4$
   q. Sr_3P_2
   r. $Ca_3(PO_4)_2$
   s. $Pb(NO_3)_2$
   t. $NaNO_2$
   u. $K_2Cr_2O_7$

2. Name each of the following compounds:
   a. NI_3
   b. PCl_3
   c. SO_2
   d. ICl_3
   e. SF_2
   f. N_2F_4
   g. P_2S_5
   h. N_2O_4

3. Name each of the following compounds:
   a. HCl
   b. H_3PO_4
   c. HIO_3
   d. HNO_2
   e. HI
   f. H_2SO_3

4. Name each of the following compounds:
   a. HgO
   b. CuI
   c. CuI_2
   d. CoI_2
   e. Na_2CO_3
   f. $NaHCO_3$
   g. $HC_2H_3O_2$
   h. NH_4NO_2
   i. Co_2S_3
   j. ICl
   k. $Pb_3(PO_4)_2$
   l. KIO_3
   m. $Ca(OH)_2$
   n. CoS
   o. S_3N_4
   p. SF_6
   q. $NaClO$
   r. $BaCrO_4$
   s. NH_4NO_3
   t. H_2SO_4
   u. Sr_3N_2
   v. $Al_2(SO_3)_3$
   w. SnO_2
   x. Na_2CrO_4
   y. $HClO$
   z. NO

5. Write the formula for each of the following compounds:
   a. Cesium bromide
   b. Barium sulfate
   c. Chlorine trifluoride
   d. Ammonium chloride
   e. Beryllium oxide
   f. Chlorine monoxide
   g. Magnesium fluoride
   h. Sulfur difluoride
   i. Sulfur hexafluoride
   j. Sodium dihydrogen phosphate
   k. Silicon tetrachloride
   l. Lithium nitride
   m. Chromium (III) carbonate
   n. Tin (II) fluoride
   o. Ammonium acetate
   p. Ammonium hydrogen sulfate
   q. Cobalt (III) nitrate
   r. Copper (I) sulfide
   s. Potassium chlorate
   t. Lithium tartrate

6. Write the formula for each of the following compounds:
   a. A. sodium oxide
   b. Sodium peroxide
   c. Potassium cyanide
   d. Copper (II) nitrate
   e. Silicon tetrafluoride
   f. Lead (II) sulfide
   g. Lead (IV) sulfide
   h. Copper (I) chloride
   i. Cadmium selenide
   j. Zinc sulfide
   k. Ammonium hydrogen phosphate
   l. Hydrobromic acid
   m. Bromous acid
   n. Perchloric acid
   o. Silicon dioxide
   p. Sodium sulfate
   q. Aluminum hydrogen sulfate

CHAPTER 3 – Stoichiometry

1. Balance the following equations:
   a. _____ CO + _____ $O_2 \rightarrow CO_2$
   b. _____ N_2O_5 + _____ $H_2O \rightarrow$ _____ HNO_3
   c. _____ PCl_5 + _____ $H_2O \rightarrow$ _____ H_3PO_4 + _____ HCl
   d. _____ CH_4 + _____ $Br_2 \rightarrow$ _____ CBr_4 + _____ HBr
   e. _____ $C_5H_{10}O_2$ + _____$O_2 \rightarrow$ _____ CO_2 + _____ H_2O
   f. _____ $Cr(OH)_3$ + _____ $HClO_4 \rightarrow$ _____ $Cr(ClO_4)_3$ + _____ H_2O
   g. _____ $KNO_3 \rightarrow$ _____ KNO_2 + _____ O_2
   h. _____ La_2O_3 + _____ $H_2O \rightarrow$ _____ $La(OH)_3$
   i. _____ NCl_3 + _____ $H_2O \rightarrow$ _____ NH_3 + _____ $HOCl$
   j. _____ Mg_3N_2 + _____ $HCl \rightarrow$ _____ $MgCl_2$ + _____ NH_4Cl
   k. _____ $AgNO_3$ + _____ $K_2SO_4 \rightarrow$ _____ Ag_2SO_4 + _____ KNO_3
   l. _____ $Al(OH)_3$ + _____ $H_2SO_4 \rightarrow$ _____$Al_2(SO_4)_3$ + _____ H_2O
   m. _____ CH_3NH_2 + _____ $O_2 \rightarrow$ _____ CO_2 + _____ H_2O + _____ N_2
   n. _____ $(NH_4)_2Cr_2O_7 \rightarrow$ _____ Cr_2O_3 + _____ N_2 + _____ H_2O

2. Write balanced chemical equations to correspond to each of the following descriptions.
   a. When solid potassium chlorate is heated it decomposes to form solid potassium chloride and oxygen.
   b. Solid zinc metal reacts with sulfuric acid to form hydrogen gas and an aqueous solution of zinc sulfate.
   c. When liquid phosphorous trichloride is added to water, it reacts to form aqueous phosphorous acid, and hydrochloric acid.
   d. When hydrogen sulfide gas is passed over solid hot iron (III) hydroxide, the resultant reaction produces solid iron (III) sulfide and water vapor.

3. The molecular formula of aspartame, the artificial sweetener marketed as Nutrasweet, is $C_{14}H_{18}N_2O_5$.
   a. What is the molar mass of aspartame?
   b. How many moles of aspartame are present in 3769.4 grams of aspartame?
   c. How many molecules of aspartame are present in 345.9 grams of aspartame?
   d. How many oxygen atoms are present in 23.6 grams of aspartame?

4. How many moles of ammonium ions are in 0.557 g of ammonium carbonate?

5. What is the mass, in grams, of 0.0438 moles of iron (III) phosphate?

6. What is the mass, in grams, of 2.69×10^{23} molecules of aspirin, $C_9H_8O_4$?

7. What is the molar mass of diazepam (Valium) if 0.05570 mol has a mass of 15.86 g?

8. Determine the empirical formulas of the following compounds.
   a. 10.4 % C, 27.8 % S, and 61.7% Cl
   b. Monosodium glutamate (MSG), a flavor enhancer in certain foods, 35.51 g C, 4.77 g H, 37.85 g O, 8.29 g N, 13.60 g Na

9. Find the molecular formulas of the following compounds.
   a. 73.8% carbon, 8.7% hydrogen, 17.5% nitrogen, molar mass = 166.0 g/mol
   b. 80.0% carbon, 20.0% hydrogen, molar mass = 30.0 g/mol

10. $4\ FeCr_2O_7 + 8\ K_2CO_3 + O_2 \rightarrow 2\ Fe_2O_3 + 8\ K_2CrO_4 + 8\ CO_2$
    a. How many grams of $FeCr_2O_7$ are required to produce 44.0 g of CO_2?
    b. How many grams of O_2 are required to produce 100.0 g of Fe_2O_3?
    c. If 300.0 g of $FeCr_2O_7$ react, how many grams of O_2 will be consumed?
    d. How many grams of Fe_2O_3 will be produced from 300.0 g of $FeCr_2O_7$?
    e. How many grams of K_2CrO_4 are formed per gram of K_2CO_3 used?
11. Given the reaction: $S + O_2 \rightarrow SO_2$

a. How many grams of sulfur must be burned to give 100.0 g of SO_2?
b. How many grams of oxygen must be required for the reaction in part (a)?

12. 6 NaOH + 2 Al → 2 Na_3AlO_3 + 3 H_2
    a. How much aluminum is required to produce 17.5 g of hydrogen?
    b. How much Na_3AlO_3 can be formed from 165.0 g of sodium hydroxide?
    c. How many moles of NaOH are required to produce 3 g of hydrogen?
    d. How many moles of hydrogen can be prepared from 1 gram of aluminum?

13. The following *unbalanced* reaction takes place at high temperatures.

$$Cr_2O_{3\,(s)} + Al_{(l)} \rightarrow Cr_{(l)} + Al_2O_{3\,(l)}$$

If 42.7 g Cr_2O_3 and 9.8 g Al are mixed and reacted until one of the reactants is used up.
    a. Which reactant will be left over?
    b. How much will be left?
    c. How many grams of chromium will be formed?

14. Calculate the mass of water produced when 42.0 g of propane, C_3H_8, is burned with 115 g of oxygen.

CONGRATULATIONS, you have made it! Be proud of yourself, and get ready for a fun-filled and challenging year which will push you to your limits, but make you a better student, get you very prepared for college, and prove to yourself how brilliant you really are!

Remember, I am on your side, and just want to help! I am trying to give you the tools to succeed, and I pledge I will not ever give you an assignment or make you learn something that is not necessary for your success.

If you need anything please do not hesitate to email me! Don't be a stranger!

See you in the fall!

Mrs. G

ADDENDUM 1: Lit Review Requirements

AP Chemistry
MONTHLY ASSIGNMENT
Literature Review

Name _____

Period _____ Date _____

Objectives:

- To strengthen your reading and writing skills, which are exceedingly important in all your courses, not to mention life.
- To keep you informed of current research or trends in science.
- To recognize that science surrounds you and has an impact on your life.
- To convey a thorough understanding of what you have read.

Article Requirements:

- Select **one chemistry**-related current event of your choice. Articles must be no older than 6 months**.**
- Select articles about a CURRENT EVENT, not just a summary or blurbs. Remember, you will need to write a fair amount about this article. Articles must be at least 1 page long, but I suggest using articles that are 2 pages or longer.
- Select an article you understand. Do not try to impress me with an article from a source such as a medical journal if you cannot make sense of what the authors wrote.
- You may NOT use newspaper articles because most of them do not provide enough depth for this assignment. The only exception is the New York Times, which publishes an extensive science and technology section on Tuesdays.
- You may NOT use segments from encyclopedias, since they do not present CURRENT events.
- You may select science articles from the following sources:

Time	Smithsonian Magazine
Newsweek	Discover
Popular Science	Scientific American
Popular Mechanics	Science News
National Geographic	

If you find an article in another source, please check with me before your being working.

The Written Assignment:

1. Each article may only be used by one student.
2. Typed in a font of no larger than 12 and double spaced. I expect 1 to 1 1/2 pages for each article you read.
3. *Use your own words!* Plagiarized assignments will not earn any points and will be turned in to school officials. You have already learned about plagiarism in English class and those expectations are still valid for this assignment. If you have questions whether your writing adheres to those guidelines, please ask!
4. At least **1-2 paragraphs summarizing** or describing the article you read.
5. At least **1 paragraph of a personal reaction** toward the current event. (How does it make your feel? Does it raise any questions? Does it spark your interest? Is it controversial?)
6. At least **1 paragraph describing why this research or event it important**. What impact will it have on people's live?

   HINT: If you answer, "I don't care," "this won't impact anyone's life," or "it is unimportant," please select another article which you have stronger feelings toward.
7. Must attach a copy of the article you read with each reactionary piece.

ADDENDUM 2: Some Preliminary Notes from Chapters 1-3

AP Chemistry – BACKGROUND NOTES

Chapter 1 – Introduction: Matter and Measurement

Chemistry – study of the properties of materials and the changes that materials undergo

Matter – anything that has mass and occupies space

Atoms – building blocks of matter

Molecules – atoms combine to form these

A. Classifications of Matter

1. States of Matter
    a. Gas (vapor)
        i. Has no fixed volume or shape
        ii. Takes the shape of its container
        iii. Can be compressed or expanded
        iv. Molecules are far apart and moving at high speeds
    b. Liquid
        i. Definite volume, Cannot be compressed
        ii. Takes the shape of its container
        iii. Molecules are much closer than in gas but still move rapidly (they can slide past each other)
    c. Solid
        i. Definite shape and volume, cannot be compressed
        ii. Molecules are held tightly together, typically in definite arrangements

2. Pure Substances and Mixtures
    a. Pure substance – matter that has a fixed composition and distinct properties
        i. Two Types
            1. **elements** – substances that cannot be decomposed into simpler substances
            2. **compounds** – composed of two or more elements chemically bonded together
                a. **Law of Constant Composition** – (Joseph Proust) the makeup of compounds is always the same
    b. Mixtures – combinations of two or more substances in which each substance retains its own chemical identity and properties
        i. Properties can vary
            1. example – adding sugar to coffee is a mixture, you can make it very sweet, add a little, or none at all
        ii. Two Types
            1. **heterogeneous** – different composition throughout
                a. rocks, sand, wood, chocolate chip cookies
            2. **homogeneous aka solutions**– uniform composition throughout
                a. air (gaseous solution), gasoline (liquid solution), brass (solid solution)
    c. Separation of Mixtures
        i. **filtration** – separating a solid component from a liquid component using a funnel and gravity
        j. **distillation** – separating liquid components utilizing different boiling points
        k. **chromatography** – separating substances by how they adhere to surfaces (used frequently for ink)

3. Properties of Matter
    a. Physical properties – description of what something looks like
        i. Ex – color, odor, density, melting point, boiling point, hardness
    b. Chemical properties – how a chemical reacts with other chemicals
        i. Ex – flammability, reactivity with other chemicals

4. Changes in Matter
    a. Physical changes – physical appearance is changed
        i. Ex – ripping up paper, melting wax, **ALL CHANGES OF STATE (boiling, evaporating)**
    b. Chemical changes (reactions) – chemically transformed into a new substance
        i. Ex – sodium metal reacts with chlorine gas to form salt

B. Units of Measurement

1. Metric System/ Significant Figures/Dimensional Analysis
    a. you should ALREADY know this

Chapter 2 – Atoms, Molecules, Ions

A. The Atomic Theory of Matter

1. History of the Atom
    a. Democritus – first person to speculate that matter was mass of atoms, Greek philospher
        a. Plato and Aristotle refuted this idea, atomic theory faded for many centuries
    b. John Dalton – came up with first atomic theory, English schoolteacher
        a. Each element is composed of extremely small particles called atoms.
        b. All atoms of a given element are identical; the atoms of different elements are different and have different properties (including different masses.)
        c. Atoms of an element are not changes into different types of atoms by chemical reactions; atoms are neither created nor destroyed in chemical reactions.
        d. Compounds are formed when atoms of more than one element combine; a given compound always has the same relative number and kind of atom.

Dalton thought that atoms could not be broken down any further, this was expressed in the atomic model – Billiard Ball Model.

Laws from this time period

Law of Constant Composition – see chapter 1 notes
Law of Conservation of Mass (LeChatelier) – matter and energy cannot be created or destroyed
Law of Multiple Proportions – if elements combine to form more than one compound they must be different by whole numbers

Example – carbon monoxide, CO, carbon dioxide, CO_2

c. Cathode Rays – a high voltage electricity passed through partially evacuated tubes produced radiation and mass glass fluoresce, called cathode rays because they originated from the cathode
    a. Rays were deflected by electric and magnetic fields, suggesting that the rays were charged
    b. J.J. Thomson – observed that the rays were the same no matter what type of material was used, concluded that the rays were actually particles with mass, these particles were called electrons
        i. Able to calculate the charge to mass ratio of an electron, 1.76×10^8 Coulombs/gram
        ii. *Came up with second atomic model – Plum-Pudding Model*

d. Robert Millikan – performed the oil drop experiment and determined the charge of an electron (1.60×10^{-19} C) and then determined the mass of an electron (9.11×10^{-28} g)

e. Henri Becquerel – studied an ore of uranium called pitchblende and discovered the spontaneous emission of radiation called **radioactivity**
    a. Marie Curie and her husband, Pierre also studied this
f. Ernest Rutherford – studied radiation and discovered three types of radiation: alpha (α), beta (β), and gamma (γ)
    a. Utilizing alpha particles Rutherford performed the Gold Foil Experiment an determined that the atom had a nucleus
    b. Also discovered protons
g. James Chadwick – discovered neutrons

2. Modern View of Atomic Structure
    a. Atoms are made of protons, neutrons, and electrons
    b. Electronic charge is measured in Coulombs (C)
        i. Electrons have a charge of -1.60×10^{-19} C
        ii. Protons have a charge of $+1.60 \times 10^{-19}$ C
        iii. For simplicity we change this to –1 and +1, but you should still know what the real value is
        iv. Neutrons have no charge
    c. Atoms are typically neutral, which means they have the same number of protons and electrons
    d. Protons and neutrons are in the nucleus, electrons circle around
    e. Vast majority of an atom's volume is the space where the electrons are
    f. **Isotopes** – atoms of a given element that differ in the number of neutrons
    g. **Protons** – all atoms of an element have the same number of protons in the nucleus, aka, **atomic number**
    h. **Mass number** – number of protons + number of neutrons

3. Periodic Table
- You should know the general layout of periodic table (groups, rows, where the metals, nonmetals, and metalloids are)

4. Writing Chemical Formulas
    a. Covalent (aka Molecular) Compounds
        a. Contain only nonmetals
        b. Prefixes are used to name them, first element only has a prefix if needed, **second element ALWAYS has a prefix**

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

example: CCl_4 = carbon tetrachloride S_2O = disulfur monoxide

    b. Ionic Compounds
        a. Composed of an cation (+) and an anion (-)
        b. Can contain polyatomic ions (ions that have more than one atom in them)
        c. Make sure you balance charges

    c. Naming Acids
        a. Two Types
            i. Binary Acids – hydrogen and another elements
                1. **Hydro-**_____**-ic acid** ex. H_2S = hydrosulfuric acid
            ii. Oxy Acids – contain oxygen, need to look at anion
                1. if anion ends in **–ate** ate goes to ic ex. HNO_3 = nitrate = nitric acid
                2. if anion ends in **–ite** ite goes to ous ex. HNO_2 = nitrite = nitrous acid
                3. only exception is HCN = hydrocyanic acid

Chapter 3 – Stoichiometry: Calculations with Chemical Formulas and Equations

1. All chemical equations need to be written correctly and balanced appropriately (kind of redundant I know)
2. We will go over all of the types of chemical reactivity but below are some for review
    a. Combusion – rapid reactions that produce a flame
        a. Most common involve oxygen as a reactant
        b. Often involve hydrocarbons (compounds that contain hydrogen and carbon) ex. C_3H_8
    b. Synthesis – when two or more reactants come together to form one product
    c. Decomposition – one substance undergoes a reaction to form two or more products
3. Atomic and Molecular Weights
        a. Atomic Mass Scale – is based off of Carbon-12, mass of carbon-12 = 12 amu
        b. Amu = atomic mass unit, 1 g = 6.022×10^{23} amu
4. Average Atomic Masses
    a. the masses listed on the periodic table are weighted averages based on the abundance in nature
    b. see example problems in book (pages 75-76)
5. Percent Composition from Formulas
    a. part/whole X 100%
    b. used to determine how much of a compound is a particular kind of element
6. The Mole
    a. used to convert between the microscopic and macroscopic
    b. Avogadro's Number = 6.02×10^{23}
7. Problems – review your chem. I notes for this as we covered it in more detail

It is expected that you know this all the FIRST day of school. If you have questions you need to contact me and/or get together with others to study and figure it out. This is ALL review from chemistry I. Be prepared to work!

AP CHEMISTRY NAME _____ CHAPTER **1** SECTIONS _____

CHAPTER NAME:

VOCABULARY TERMS:

MAJOR EQUATIONS

MAJOR CONCEPTS, with brief explanation of each, you must at least have something for EACH section in the chapter, use the front and back of this paper as necessary, include all relavent information

AP CHEMISTRY NAME _____ CHAPTER **2** SECTIONS _____

CHAPTER NAME:

VOCABULARY TERMS:

MAJOR EQUATIONS

MAJOR CONCEPTS, with brief explanation of each, you must at least have something for EACH section in the chapter, use the front and back of this paper as necessary, include all relavent information

AP CHEMISTRY NAME _____ CHAPTER **3** SECTIONS _____

CHAPTER NAME:

VOCABULARY TERMS:

MAJOR EQUATIONS

MAJOR CONCEPTS, with brief explanation of each, you must at least have something for EACH section in the chapter, use the front and back of this paper as necessary, include all relavent information

Graphic Organizer for Bozeman Videos

Mattter

- 1.
- 2.
- 3.
- 4

Scientific Method

- 1.
- 2.
- 3.
- 4

Sig. Digits

- 1.
- 2.
- 3.
- 4

Factor Label

- 1.
- 2.
- 3.
- 4

History of the Atom

- 1.
- 2.
- 3.
- 4

Tour of Per. Table

- 1.
- 2.
- 3.
- 4

Atoms & the Periodic Table

- 1.
- 2.
- 3.
- 4

Naming Compounds

- 1.
- 2.
- 3.
- 4

Naming Compounds

- 1.
- 2.
- 3.
- 4

Requirements for the course and things to think about!!

SHOW YOUR WORK

What does SHOW YOUR WORK even mean? You see it everywhere. It means different things to different people. But when in Chemistry, SHOW YOUR WORK means something very specific.

When showing work, you're describing a narrative, giving a step by step recipe for solving a problem. Even if you know how to solve the problem in your head, SHOW YOUR WORK means that you need to know how to express that know-how onto paper. It's a way of explaining your thought processes- even the ones you don't realize that you have. It is a systematic way of describing your work. And on top of that, if a person grading your work does not understand what it is you're trying to do, they will give up and you won't get to take part in any of that sweet partial credit everyone always talks about. Often times, poorly shown work will even result in a loss of credit, all because
SHOW YOUR WORK is a very specific statement.

I'll use an example, and you may not understand the problem, but the step by step process is how to solve it.

How many moles of Sodium are in a 120.0g sample of Sodium?

Step 1: Identify Variables and Constants
To perform this calculation, write out what you're given and identify what dimension the value measures. Include units and give the number as written (to keep significant figures).

Mass = 120.0 g

Also, other information is provided. Though you will learn about it this year, with the periodic table, knowing that the substance is sodium will give you that the Molar Mass of Sodium is 22.99 g/mol. Even though this isn't a variable, it is a constant (or tabulated value) so you should list it as well:

Mass = 120.0 g **Molar Mass = 23.0 g/mol (we always round our molar masses to one decimal)**

Last, identify what it is you're trying to find. You can do this by writing the dimension you're looking for and signal it's the missing one with a "?".

Mass = 120.0 g Molar Mass = 23.0 g/mol **n (moles) = ??**

So now you've listed out your 'givens,' you can either use this to identify what equation to use, or you can simply state the equation. Write the equation out that you're going to use.

Mass = 120.0 g Molar Mass = 23.0 g/mol n (moles) = ??	**Molar Mass = mass/moles**

In this case, we're using the Molar Mass equation where Molar Mass equals mass over moles.

Now, beneath the used equation, rearrange the equation to solve for the unit you're trying to find. Do this BEFORE you input your numbers in, so that you can see the proper rearrangement of the equation before it becomes a mess:

Mass = 120.0 g	Molar Mass = mass/moles
Molar Mass = 23.0 g/mol	**Moles = mass/molar mass**
n (moles) = ??	

This requires algebra, but it's easier to do algebra with letters than with numbers and units.

Once you have the variables declared and the equation solved for the variable you want to find, plug the numbers in:

Mass = 120.0 g	Molar Mass = mass/moles
Molar Mass = 23.0 g/mol	Moles = mass/molar mass
n (moles) = ??	**Moles = $\frac{120.0\ g}{23.0\ g/mol}$**

With the problem clearly described, the numbers clearly entered, it is time to check your work by checking the units. This is a form of dimensional analysis. If your units don't come out right, then something went wrong.

To check this, cross out the units that cancel out in the numerator and denominator. In this case, grams cancels with grams and moles is left in the denominator of a denominator (This means it goes to the numerator. Check your algebra books for this if this confuses you.)

Mass = 120.0 g	Molar Mass = mass/moles
Molar Mass = 23.0 g/mol	Moles = mass/molar mass
n (moles) = ??	**Moles = $\frac{120.0\ \cancel{g}}{23.0\ \cancel{g}/mol}$**

Finally, give your answer to the correct number of significant figures (in this case, 4 based on the measurement given in the original problem) and the correct unit.

Mass = 120.0 g	Molar Mass = mass/moles
Molar Mass = 23.0 g/mol	Moles = mass/molar mass
n (moles) = ??	Moles = $\frac{120.0\ \cancel{g}}{23.0\ \cancel{g}/mol}$ **Moles = 5.217391304347 = 5.217 moles Na**

Often times, units should include substances. Think logically on these counts. If you say "5.220 moles," the question is 'moles of what?' Say moles of Sodium or "mol Na" to be clear.

SHOW YOUR WORK FAQ

Q: Do I have to show my work all the time?
A: When there is math or conversions involved, yes, it is appropriate to show your work.

Q: If I don't, can I lose points?
A: Frequently, and this also goes for work that is not coherent and clear. Don't make a grader search for the answer.

Q: What if that's how I solve a problem?
A: Unfortunately, SHOW YOUR WORK doesn't include the following:
· Cross multiplying. This is not work, it's unsolved algebra problems

· Long division or addition/subtraction/multiplication that is written out. Use a calculator for these.
Show me what the operation is neatly and then grab the calculator.
· A mess of numbers and lines that Pablo Picasso couldn't make sense of. Just writing it on the
page doesn't count. Again: Don't make the grader search for the answer.

Q: Is this always how I should show my work?
A: Different teachers may expect different things from students, but this is the clearest and most evident way of showing your thought process, so you should get used to it.

Q: Should every number have a unit?
A: Yes. Always.* A number without a unit is nothing.

*There are exceptions to this rule, but you will be directed to when this is the case.

DESIRED QUALITIES OF AN HONORS/AP STUDENT

· Intelligence
This quality is not just about being "smart". It is being "smart" enough to identify what you do not know or understand and then actively seeking sources of help. This also includes knowing when you "get it", and when you need to stay after/ask for help.

· Self-Motivation
This quality describes your attitude. Enrollment in this "honor" level class is voluntary. Your desire to learn the material should be your chief motivation. You understand that the teacher will not cajole, plead, beg, etc. an honors level student to do the assigned work. You should be ready and willing to learn each day.

· Integrity / Character
This quality is about doing the right thing in all situations. If you have integrity, you do not cheat on any assignment, be it a test, quiz, project or homework. You do your own work. If you have integrity it means you do not help others to cheat, be it providing homework for someone to copy or providing the questions / answers for a test or quiz in class or for another class.

· Work Ethic / Industriousness
This quality means that the work you turn in is of your highest quality. You show complete and organized work on all assignments (tests, quizzes, homework, projects) clearly identifying how you arrived at the solutions. Showing just answers does not show any work ethic at all and is unacceptable.

Industriousness means that you use all available time to learn and improve. This could simply be starting your homework if there is time left in class. It could mean asking questions about a concept of which you are unsure. When given an extended problem / project / reading assignment industriousness means that you start on the assignment promptly and not wait until the night before the test or due date. This quality means you do not do work for another class or play games on your calculator during class time.

· Safety
Honors students treat the lab and lab materials with respect. While they may not yet know all the safety regulations, they do know that horsing around or misbehaving in the lab can potentially cause injury or worse to themselves and their peers. Honors students do not need to be told how to behave properly in a lab, or when to appropriately observe safe and correct lab techniques. Honors students ensure the lab is cleaner than when they found it. Labs should be read, at a minimum, the night before. You should highlight and write notes on your procedure. All prelab assignments should be done promptly and if there are questions you should discuss those with Mrs. G BEFORE the class period in which you are supposed to perform the lab.

· Inquisitiveness
This quality means that if you have a question you ask the question as soon as possible. An honors student does not just sit there and take notes, they think: Did I understand? Does it make sense? What if? Do not make the mistake of assuming that a concept you do not understand now in class will all make sense later on. Being inquisitive also means taking advantage of all opportunities to help yourself including:
Your teacher in class
Your teacher out of class
Your textbook!
Other students who may have a grasp of the concept

· Ingenuity
This quality is about applying knowledge, not just rote memorization. An honors student is able to devise solutions to problems they have never seen before. They are able to take what they have cumulatively learned in this class and all of their current and previous classes and apply it toward the solution of a new problem.

AP Chemistry Class Perception and Reality

Students need to be realistic about the expectations for this course. Many students THINK they are ready for college level work, but really don't know what that means. In order to get a more realistic view of this course, I have included some perceptions entering students have, and the reality of the situation.

1. **PRECEPTION**: I can miss class (sports, activities, family vacations, jobs, field trips, etc.) and catch up on my own. I always have before.
   REALITY: You can't!!! In AP Chemistry, you have to give up a lot to get a lot. Missing class is the number one reason why students fall behind, get lost, give up, and either drop the class or get a low grade. You cannot be gone for three days, and expect to get caught up with a 10 minute session after school. I cannot teach in 10 minutes what it took 3 hours to teach earlier. (Amazingly some students expect that!)

2. **PRECEPTION**: Like all teachers, Mrs. G is exaggerating about how much work there is, and how tough it really is.
   REALITY: I'm not exaggerating. Probably the best way to check this is to talk with students who have taken the class before.

3. **PRECEPTION**: Mrs. G is making this class a lot tougher than it really needs to be.
   REALITY: Never forget-this is a college level course. NOT an advanced high school course. If I am doing my job, students in this course should learn as much as they would if they were taking Freshman Chemistry at any college or university in the United States. A second goal is to properly prepare students for the AP Exam in May. I cannot make the course easier and still accomplish the above goals. Every former student who has taken Freshman College Chemistry has found he or she had a tremendous advantage over other students. I have NEVER had former students come back and say they wish I hadn't made it so tough.

4. **PRECEPTION**: If the majority of the class falls behind. Mrs. G will just have to slow down so that we can catch up.
   REALITY: I can't!!! You will find that time is of the essence in this course. As much as I may like to and as much as the students may need it, our schedule cannot be adjusted to accommodate those who cannot keep up. Students will be expected to study the text on their own, and class time will be use more for clearing up questions than for introducing new material. There is really no other way to cover the vast amount of material required by the AP exam. If we slow down to make the course easier, or allow students to catch up, we will not cover the required subject matter, and students will have to face exam questions on material not covered in class. As a result I will make a schedule that will allow us to complete all required material prior to the exam, and students MUST keep to this schedule. Chemistry topics build on each other, and students who get behind have a (nearly) impossible task in catching up. Students can expect to spend about one hour outside of class time just in the study of chemistry each night. Certainly any students who have after-school jobs, or who are heavily involved in after-school activities will have to budget their time very carefully.

5. **PRECEPTION**: All this work Mrs. G is talking about must be just for the "dummies" I'm smarter than that!
   REALITY: All students who are successful in this course will have to spend time after

school—either by getting help on an assignment, completing lab work, or reviewing for tests. If you are never available immediately after school to do chemistry work, you should not take this course! I WILL be available almost every day before and after school. Students will be encouraged to form study groups to get many of their questions answered.

6. **PRECEPTION**: Mrs. G doesn't really expect us to do a summer assignment, and she isn't really going to give us a test the first day of class in September.
   REALITY: I am serious about this—the summer assignment is mainly a review of first year chemistry. The test will encourage you to do most of the memorization for the course before the school year begins. This early work will allow us to spend additional time later on more difficult topics. You will find the summer assignment and information regarding the "first day test" at the end of this sheet.

7. **PRECEPTION:** I have always been a "straight A" student and always will be.
   REALITY: AP Chemistry can mean death to a 4.0 grade average. Although there are many "A's (often as many as 1/3 to ½ the class) there are also "B's " C's "D's and "F's If your main purpose in taking this class is to collect one more "A" you are taking the class for the wrong reason, and may be disappointed. There are easier classes in which to get an "A".

I will say that this is a very fun course, but it comes with WORK.
You should be proud that you are challenging yourself to the limit of your academic ability.

Mrs. G

TOP FOURTEEN REASONS TO TAKE AP CHEMISTRY

14) Bunsen burners and magnesium.

13) All day lab "field trips" are a lot of fun.

12) Math has problems. Chemistry has solutions.

11) You really understand that if you are not part of the solution, you're part of the precipitate.

10) It looks great on your college applications.

9) Your parents won't be able to hassle you about not working hard enough.

8) That certain someone you **don't** want to date will actually believe you when you say, "I'm sorry, I can't—I've got AP Chem homework to do…"

7) No one will ever claim you're not smart enough to hold a political office.

6) It will make that first chemistry class you took seem *really* easy, and make your freshman chem. class in college *really* easy.

5) It only hurts for a little while.

4) Making ice cream as a lab isn't half bad.

3) The solutions you use in lab come in pretty colors.

2) It will excite your electrons.

And the number one reason to take AP Chemistry is:

1) Carefully controlled explosions are a real blast!!

SOME REAL WORLD REASONS

1) One of the most obvious benefits to this course is that when you take and pass the National AP exam given in May, you will receive **college credit** at most colleges and universities in the United States. This will save students both time and money. In the past students who have taken and passed AP courses in several subjects have been able to begin college with enough credits to be placed in the middle of their freshman or sophomore year!

2) Regardless of whether or not a student passes the national exam, he/she may choose to take freshman chemistry in college anyway. Those who opt for this find that they have a tremendous advantage over others who have not taken AP Chemistry. Often these students are finding most of the material presented a review and as a result find themselves in the top 10% of their class with only modest effort.

3) AP Chemistry looks great on your high school transcript! Many of the most prestigious universities in the US are looking for ways in which students have distinguished themselves during their high school career. One way of doing this is by taking AP courses.

4) As difficult as AP Chemistry is, you will find that it will never be as easy to learn Freshman Chemistry as it is now! There are several reasons for this:

    a. High school classes are generally smaller than college classes. It is not unusual for freshmen college classes to have 200 or more students! In this situation, it becomes nearly impossible to ask a question during class, or get any individual attention after

class. In AP Chemistry, we always take time for questions and answers, and I am almost always available for after school help.

b. Most college professors don't regard teaching Freshman Chemistry as a job priority. Many are concentrated on their research, and consider teaching to be an interruption and distraction. At Palmyra teaching is our number one priority.
c. At times Freshman Chemistry is used to "weed out" students. Most colleges prefer not to have large class sizes in their upper division courses. Therefore the grades and difficulty level of the freshman courses are adjusted so that only small numbers of very outstanding students will be able to move on. At Palmyra we don't have these kinds of pressures and all students are encouraged to become successful.

5) AP Chemistry will teach you to think at higher levels. You will be forced to think and apply concepts to new situations or even derive your own theories from application. This is excellent preparation for the higher levels of thinking required in college.