AP Chemistry Summer Packet

Memorization

- Charges of Ions based on the Periodic Table
- Diatomic molecules (there are seven of them)
- Strong Acids (names and formulas) (there are six of them)
- Strong Bases (names and formulas, they are typical ionic compounds) (there are 8 of them)
- The following variable charges / transition metals
  - Iron +2 or +3
  - Copper +1 or +2
  - Tin +2 or +4
  - Lead +2 or +4
- The following Polyatomic Ions (names and formulas and charges)
  You will need to look up the names

-1	**-2**	**-3**	**+1**
CH_3COO^- (or $C_2H_3O_2^-$)	CO_3^{-2}	PO_4^{-3}	NH_4^+
ClO_3^-	CrO_4^{-2}		H_3O^+
CN^-	$Cr_2O_7^{-2}$		Hg_2^{+2}
OH^-	O_2^{-2}		
NO_3^-	SO_4^{-2}		
MnO_4^-	HPO_4^{-2}		
SCN^-			
HCO_3^-			
HSO_4^-			
$H_2PO_4^-$			

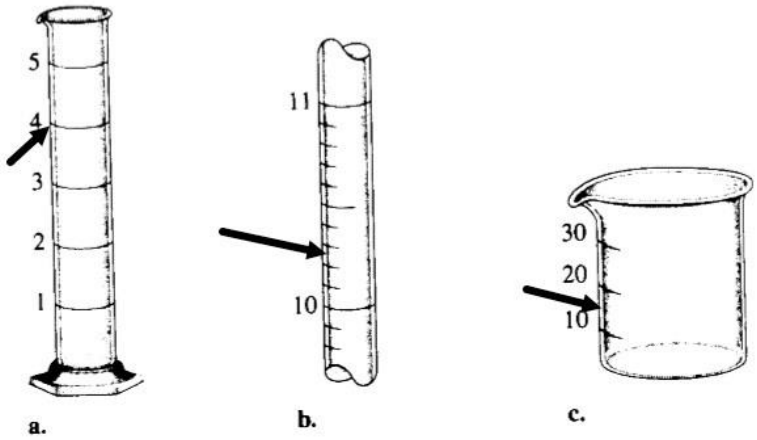
Practice Problems

→ In addition to acquiring the correct answers, be sure you <u>understand</u>.

→ Use significant figures throughout, unless you are solving for an integer.

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

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

4. 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

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

6. 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. $\frac{0.102 \times 0.0821 \times 273.5}{1.2}$
    d. (9.04 – 8.23 + 21.954 + 81.0) / 3.1416

8. 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

9. Convert the following Celsius temperatures to Kelvin.
    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

10. Taking the solubility of sugar to be 487g / 100g water at 100°C and 204g / 100g water at 20°C.
    a. Calculate the mass of water required to dissolve one hundred grams of sugar at 100°C.
    b. Calculate the g of sugar that remains in solution when the mixture in (a) is cooled to 20°C.

11. 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.

CHAPTER 2

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

2. What is an isotope?

3. How many protons and neutrons are contained in the nucleus of each of the following atoms?
    a. $^{42}_{22}Ti$
    b. $^{64}_{30}Zn$
    c. $^{76}_{62}Ge$
    d. $^{86}_{36}Kr$
    e. $^{75}_{33}As$
    f. $^{41}_{19}K$

4. Write the nuclear symbol for each of the isotopes below.
    a. Atomic number = 8, number of neutrons = 9
    b. Atomic number = 27, mass # = 60
    c. Number of protons = 26, number of neutrons = 31
    d. The isotope of Iodine with a mass number of 131

5. 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.

6. In the periodic table, what is the name of the following groups
    a. Group (1)
    b. Group (2)
    c. Group (17)
    d. Group (18)

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

8. 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

9. 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 d. Ba g. Al
    b. Sr e. I h. S
    c. P f. O

10. 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} d. Cs^{+1} g. Br^{-1}
    b. Fe^{+3} e. S^{-2} h. N^{-3}
    c. Ba^{+2} f. P^{-3}

11. 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 – You may use a generic periodic table but Do WITHOUT an ion chart! You need to have these memorized, unless it is a polyatomic ion NOT on the list.

1. Name each of the following compounds:
    a. NaCl h. AlI_3 o. $BaSO_3$
    b. Rb_2O i. Al_2O_3 p. $KMnO_4$
    c. $FeBr_3$ j. $ZnCl_2$ q. Sr_3P_2
    d. Cr_2O_3 k. Li_3N r. $Ca_3(PO_4)_2$
    e. $CaBr_2$ l. Ag_2S s. $Pb(NO_3)_2$
    f. CsF m. $KClO_3$ t. $BaCl_2 \cdot 2H_2O$
    g. CaS n. $Al_2(SO_4)_3$ u. $K_2Cr_2O_7$

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

3. Name each of the following compounds:
    a. HCl c. HNO_3
    b. HI d. H_3PO_4
    e. H_2SO_4

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_3
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. $NaSCN$
r. $BaCrO_4$
s. $(NH_4)_2HPO_4$
t. $NH_4H_2PO_4$
u. Sr_3N_2
v. $Al_2(SO_3)_3$
w. SnO_2
x. Na_2CrO_4
y. 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. Sodium oxide
   b. Sodium peroxide
   c. Potassium cyanide
   d. Copper (II) nitrate
   e. Silicon tetrafluoride
   f. Lead (II) sulfide
   g. Lead (IV) sulfide
   h. Lead (IV) sulfate
   i. Copper (I) chloride
   j. Zinc (II) sulfide
   k. Ammonium hydrogen phosphate
   l. Hydrobromic acid
   m. Perchloric acid
   n. Silicon dioxide
   o. Sodium sulfate
   p. Iron (III) Nitrate Pentahydrate

CHAPTER 3 – Stoichiometry

1. Balance the following equations:
   a. _____ CO + _____ O_2 → _____ CO_2

b. _____ N_2O_5 + _____ H_2O → _____ HNO_3
c. _____ PCl_5 + _____ H_2O → _____ H_3PO_4 + _____ HCl
d. _____ CH_4 + _____ Br_2 → _____ CBr_4 + _____ HBr
e. _____ $C_5H_{10}O_2$ + _____O_2 → _____ CO_2 + _____ H_2O
f. _____ $Cr(OH)_3$ + _____ $HClO_4$ → _____ $Cr(ClO_4)_3$ + _____ H_2O
g. _____ KNO_3 → _____ KNO_2 + _____ O_2
h. _____ La_2O_3 + _____ H_2O → _____ $La(OH)_3$
i. _____ NCl_3 + _____ H_2O → _____ NH_3 + _____ HOCl
j. _____ Mg_3N_2 + _____ HCl → _____ $MgCl_2$ + _____ NH_4Cl
k. _____ $AgNO_3$ + _____ K_2SO_4 → _____ Ag_2SO_4 + _____ KNO_3
l. _____ $Al(OH)_3$ + _____ H_2SO_4 → _____$Al_2(SO_4)_3$ + _____ H_2O
m. _____ CH_3NH_2 + _____ O_2 → _____ CO_2 + _____ H_2O + _____ N_2
n. _____ $(NH_4)_2Cr_2O_7$ → _____ Cr_2O_3 + _____ N_2 + _____ H_2O

2. Write balanced chemical equations to correspond to each of the following descriptions. (include states) ***Also, pay attention to what is happening in each. These are great to have in your toolbox of known reactions.**
   a. When solid ammonium carbonate is heated it decomposes to form gaseous ammonia, carbon dioxide, water.
   b. Zinc metal reacts with hydrochloric acid to form hydrogen gas and an aqueous solution of zinc(II) chloride.
   c. Nitrogen gas and hydrogen gas react to form ammonia gas.
   d. Aqueous hydrogen peroxide with a catalyst decomposes into liquid water and oxygen gas.
   e. Aqueous sodium chloride reacts with aqueous silver(I) nitrate to form solid silver(I) chloride and aqueous sodium nitrate.
   f. Methane gas reacts in air to form gaseous carbon dioxide and water vapor.
   g. Hydrochloric acid reacts with aqueous sodium hydroxide to form water and aqueous sodium chloride.
   h. Glucose and Oxygen react to form carbon dioxide and water.

   2b. Where have you seen the reactions in the previous question before:

rxn b.	(Hint: think about 1st year labs)
rxn e.	(Hint: think about precipitates)
rxn f.	(Hint: think about 1st year labs)
rxn g.	(Hint: think about acid/base and 1st year labs)
rxn h.	(Hint: think about yourself)

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 compound.
    80.0% carbon, 20.0% hydrogen, molar mass = 30.0 g/mol

10. Calculate the % oxygen (by mass) in SO_2.

11. $4\ FeCr_2O_7 + 8\ K_2CO_3 + O_2 \rightarrow 2\ Fe_2O_3 + 8\ K_2CrO_4 + 8\ CO_2$
    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. An experiment is run and actually produces 79.10 g of Fe_2O_3 from 300.0 g $FeCr_2O_7$. Calculate the % yield?

12. $6\ NaOH + 2\ Al \rightarrow 2\ Na_3AlO_3 + 3\ H_2$
    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.

15. Marathon Problem: A pleasant smelling liquid organic compound with a mass of 12.00 grams that was known to contain the elements carbon, hydrogen, and oxygen was burned producing 21.4 grams of carbon dioxide gas and 8.76 grams of water vapor. The energy from this reaction caused the temperature of 1.00 kg of water to rise from 20.8°C to 77.0°C.
    a Give the molar mass of water and carbon dioxide.
    b How many molecules of carbon dioxide were formed?
    c How many atoms of hydrogen were in the original liquid?
    d Give the Lewis structure of water and carbon dioxide.
    e How many grams of oxygen were in the original liquid?
    f Determine the empirical (simplest) formula of the original compound.
    g If the 12.00 grams of liquid was vaporized at a temperature of 70°C and a pressure of 1.05 atm it would occupy 4.34 liters. Determine the molar mass of this unknown.
    h What is the molecular formula of the unknown?
    i Determine the amount of heat (in kJ) released by the 12.00 grams of unknown when it burned.
    j Determine the heat of combustion, ΔH, for the unknown in kJ/mol.
    k There are two possible structural formulas for this unknown. Give each along with their correct organic class.
    l Based on the properties of this unknown. Which of the two molecules is it?

MATH PRACTICE

Perform the following calculations, check answers, and if needed rework until you figure it out.
Note: ln is "natural log," a button on your calculator. It is based on the number 2.71 . . . ., instead of 10.
Note: some of the techniques may be new, we will cover in class as needed.

1. $-879.35 = [3(-241.8) + 4(0)] - [2(-46.1) + 3(x)]$

2. $x = -147.1 + (8.31 \times 10^{-3})\ (298)\ \ln(9.87 \times 10^{6})$

3. solve for n (just whole number)
$$\frac{11.0 = k\,[.150]^{m}\,[.600]^{n}\,[.350]^{p}}{9.19 = k\,[.150]^{m}\,[.500]^{n}\,[.350]^{p}}$$

4. solve for p (just whole number)
$$\frac{2.81 = k\,[.250]^{m}\,[.500]\,[.150]^{p}}{5.67 = k\,[.250]^{m}\,[.300]\,[.275]^{p}}$$

5. $\ln [68.0 / x] = (.037)\ (25.0)$

6. $$.64 = \frac{[x]\ [x]}{[.100\text{-}x]\ [.100\text{-}x]}$$

7. $3.0 \times 10^{-30} = (x)\ (3x)^{3}$

8. $x = -\log 2.00 \times 10^{-5}$

9. $x = 10^{-2.77}$

10. $$x = .152 - \frac{.0257}{4} \ln \frac{1}{(.10)^{4}\,(.10)^{4}}$$

11. $$1.21 = 1.561 - \frac{.0257}{2} \ln \frac{1}{(x)^{2}}$$

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

ADDENDUMS: Things to think about!!

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: 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: Almost.* Most numbers without units have no purpose. Exceptions are pH and equilibrium constants, however you should still say what the item is. (example, pH = 4.3)

DESIRED QUALITIES OF AN 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 Mr. J 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, Mr. J 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**: Mr. J 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. 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. Mr. J 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. If we slow down to make the course easier, or allow students to catch up, we will not cover the required subject matter. 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 Mr. J 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 outside of school. If you are cannot dedicate to this, you should not take this course! I WILL be available almost every day before school to help. Students are encouraged to form study groups to get many of their questions answered.

6. **PRECEPTION**: Mr. J doesn't really expect us to do a summer assignment.
   REALITY: I am serious about this—the summer assignment is mainly a review of first year chemistry. This early work will allow us to spend additional time later on more difficult topics. There will be an exam the second week of school to encourage you to take the summer assignment seriously.

7. **PRECEPTION:** I have always been a "straight A" student and always will be.
   REALITY: AP Chemistry can mess up a 4.0 grade average. 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 think this is an interesting course, but it comes with WORK.
Mr. Jones

REASONS TO TAKE AP CHEMISTRY

Bunsen burners.

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…"

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

Carefully controlled explosions.

It is fascinating, of course.

SOME REAL WORLD REASONS

1) If you pass the National AP exam given in May, you may receive **college credit**. However, it depends on the college, your major, and your score on the exam.

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!

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.
    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. Teaching is my 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.

5) AP Chemistry will teach you to think at higher levels. You will 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 future classes, college, and life.