Welcome to AP Chemistry 2018!!!!

Hopefully you are all ready for hard work and dedication, as well as some fun and LOTS of chemistry! I LOVE CHEMISTRY and I am really looking forward to teaching AP Chemistry again! There are some things I'd like you to know before we head into summer:

1. ***AP Chemistry labs require extra time***. Your class is 7th period & you will need to stay after school to complete labs. **If that's a problem, please drop, as it is necessary to finish the labs. There is no chance of earning college credit without the lab component being in place and college level labs cannot be completed in 50 minutes. ** Labs are always scheduled ahead of time. *Lab notebooks need to be purchased. $13.00 each***
2. You WILL have a *significant summer assignment* that includes 3 chapters (outline, problems). It will be passed out today and posted on the school website. **It is due on the 1st day of school in August at 7:25 am, no exceptions.**
3. You will need to *MEMORIZE* certain things (such as ions, solubility rules, etc.) These must remain MEMORIZED throughout the year. Reviewing them daily or weekly should be enough. Pop quizzes on this material will be given all year. Many formulas will also need to be memorized. The AP formula sheet will be provided for tests questions, as it is for the exam.
4. There will be a **TEST on the very FIRST day of school in August** over the material you need to memorize. A second test will follow soon after-on the 1st 3 chapters (the 1st week of school).
5. Success in AP Chemistry will only be achieved *through hard work, commitment & dedication to studying*. You should be able to designate **1-hour minimum per night** to review/study **and additional time for homework/labs**. I am much less concerned with your grade than I am with your learning and ability to pass the AP exam. Please don't take this course if you are hoping for an easy A to boost your GPA. This will not be an easy A, but it **is** possible to get an A. If you or your parents will not accept less than an A, you should reevaluate your enrollment in this course. MANY A students earn their first B in AP Chemistry!
6. Don't expect curves...they may/may not happen at all. (I don't curve so that students who don't study & fail tests will pass my class.)
7. Grading: **70% tests/quizzes, 30% labs/assignments**. Homework problems are designed to help you succeed on tests, not to cushion your grades. HW is grades for correctness or completeness-sporadically. Labs are graded for correctness, not completion. Extra credit is rare and is never given individually. If it's offered, it's offered to everyone. Bonus questions may appear on quizzes/tests. ***ALL MAKE UP assessments are FRQ only.***
8. **All assignments will be due before school starts...7:25 in class or on Canvas. Due dates are FINAL due dates for labs or multiple day assignments. You have a calendar, so keep up with the work and turn it in early if at all possible. NO EXCUSES! A LATE LAB or PROJECT is 50% of grade earned!**
9. **I use Canvas**. I will try to do as much as I can with Canvas--homework posted there instead of copies, practice quizzes, virtual labs perhaps.
10. **I want to see you succeed & enjoy the course**. My goal is to help prepare you for success beyond this class including college and life in general. I expect you to be responsible, honest, work hard, and have the desire to succeed. Without these things from you, we will not have a successful year. ***In other words, your success is not solely dependent on me, the teacher, it is largely dependent on how you, the student, approach the class & dedicate yourself to your schoolwork.***
11. **Summer help**: If you encounter problems, feel free to send me an email-jhallwas@pasco.k12.fl.us or a remind message. I won't promise to check it daily, it is summer after all, but I will check it weekly and respond.

Sincerely,

Julie Hallwas

First Weeks of School Calendar-Chapters 1-3 August 2018

Homework is due by 7:30 on paper in the room or via Canvas.

13 1st day Test: Memorization of ions, acids, solubility rules. This isn't a joke…it will not be moved, so BE READY. SAFETY **Ch. 1-3 Pkts are due by 7:30 am…welcome to AP Chem! ☺** **HW: Copy lab for tomorrow into lab notebook**	14 *Lab*: Determining the Formula of a hydrate (Due 8/20) HW: Atomic Theory WS #1 probs #6,7,8,12,13,14,16, 17,18,19,20	15 Collect lab data Questions from summer work?? HW: Atomic Theory Nomenclature WS #4 all Copy Thurs Lab	16 *Lab*: Gravimetric Analysis (**Final due date Mon Aug 27**) HW: Atomic Theory WS #5: #1, 7, 9, 10, 19, 20,24	17 Go over week's HW/questions answered Pkt from summer?'s HW: Atomic Theory WS #6: #2, 4, 5, 6, 7, 8, 9, 13, 14
20 Review 1-3 *****Lab #1 Final DUE DATE! HW: Review Handout	21 FRQ portion of test	22 ***Ch. 1-3 MC Test:*** HW: Read Ch. 4 Sec 1-3 Probs: 4.1,4.3,4.8,4.14,4.16, 4.18,4.24,4.30, 4.32,4.38,4.42	23	24 HW: Lab #2: Formula of hydrate FINAL due date Aug 27

Please note, the dates listed for labs/projects as "final due date" is the LAST day that they will be accepted. You may always turn them in earlier. Avoid waiting until the night before they are due to complete labs as they often require an EXTENSIVE amount of time and are 100 points.

AP CHEMISTRY SUMMER ASSIGNMENT
and First Day Test Material

Please note: This assignment is a requirement, and is NOT for extra credit!!!

1. Read the 3 assigned chapters, complete the outlines/notes, and do the assigned problems for each chapter. **We will have a test during the first week on this material.**
2. Memorize the information on the following pages. You will be tested on the 1st day of class on this material!
3. If this seems like too much for you, remember, AP Chemistry is a college level course and will require your dedication & hard work daily throughout the entire year. I would expect 45 minutes of study time (during the school year) daily in addition to any assigned homework.

AP CHEMISTRY FIRST DAY TEST

AP Chemistry is a difficult course. It is not all about memorization; however, having these items memorized is essential for success in learning the concepts covered in the course. Make flashcards, have your friends and family quiz you, take the lists with you on vacation, or do whatever it takes to get this information firmly planted in your head. Do not wait until the night before school begins.

The first day test will cover six areas of memorization:

1. Polyatomic Ions (including name, symbol and charge)
2. Variable Valences for Transition Metals
3. Rules for Naming Acids
4. Rules for Naming Ionic Compounds
5. The Solubility Rules
6. Determining Oxidation Numbers

If this seems like too much work for the summer, please drop the course. Advanced Placement Chemistry is a college level course. You will need to be dedicated and work very hard if you are to be successful.

Rules for Determining Oxidation Number

Oxidation Number: A number assigned to an atom in a molecular compound or molecular ion that indicates the general distribution of electrons among the bonded atoms.

1. The oxidation number of any uncombined element is 0.
2. The oxidation number of a monatomic ion equal the charge on the ion.
3. The more electronegative element in a binary compound is assigned the number equal to the charge it would have if it were an ion.
4. The oxidation number of fluorine in a compound is always -1
5. Oxygen has an oxidation number of -2 unless it is combined with F, when it is +2, or it is in a peroxide, when it is -1.
6. The oxidation state of hydrogen in most of its compounds is+1 unless it combined with a metal, in which case it is -1.
7. In compounds, the elements of groups 1 and 2 as well as aluminum have oxidation number of +1, +2, and +3, respectively
8. The sum of the oxidation numbers of all atoms in a neutral compound is 0.
9. The sum of the oxidation number of all atoms in a polyatomic ion equals the charge of the ion.

Solubility Rules

1. Alkali metal compounds are always soluble.
2. Ammonium is soluble with everything.
3. Nitrates are always soluble.

Variable Valences for Transition Metals

Name	Symbol	Charge	Stock Name
Chromium	Cr	+2 +3	Chromium (II) Chromium (III)
Manganese	Mn	+2 +3	Manganese (II) Manganese (III)
Iron	Fe	+2 +3	Iron (II) Iron (III)
Cobalt	Co	+2 +3	Cobalt (II) Cobalt (III)
Copper	Cu	+1 +2	Copper (I) Copper (II)
Lead	Pb	+2 +4	Lead (II) Lead (IV)
Mercury	Hg	+1 +2	Mercury (I) Mercury (II)
Tin	Sn	+2 +4	Tin (II) Tin (IV)
Gold	Au	+1 +3	Gold (I) Gold (III)
Silver	Ag	+1 +2(rarely)	Silver Silver (II)
Bismuth	Bi	+3 +5	Bismuth (III) Bismuth (V)
Antimony	Sb	+3 +5	Antimony (III) Antimony (V)
Cadmium	Cd	+2	Cadmium
Zinc	Zn	+2	Zinc

Rules for Naming an Acid

1. When the name of the anion ends in –ide, the acid name begins with the prefix hydro-, the stem of the anion has the suffix –ic and it is followed by the word acid.
   -ide becomes hydro _____ic Acid
   Cl^- is the Chloride ion so HCl = hydrochloric acid

2. When the anion name ends in –ite, the acid name is the stem of the anion with the suffix –ous, followed by the word acid.
   -ite becomes _____ous Acid
   ClO_2^- is the Chlorite ion so $HClO_2$ = Chlorous acid.

3. When the anion name ends in –ate, the acid name is the stem of the anion with the suffix –ic, followed by the word acid.
   -ate becomes _____ic Acid
   ClO_3^- is the Chlorate ion so $HClO_3$ = Chloric acid.

Polyatomic Ions

Name	Symbol	Charge
ammonium	NH_4	+1
acetate	$C_2H_3O_2$	-1
bromate	BrO_3	-1
chlorate	ClO_3	-1
chlorite	ClO_2	-1
cyanide	CN	-1
dihydrogen phosphate	H_2PO_4	-1
hypochlorite	ClO	-1
hydrogencarbonate(bicarbonate)	HCO_3	-1
hydrogen sulfate (bisulfate)	HSO_4	-1
hydrogen sulfite (bisulfite)	HSO_3	-1
hydroxide	OH	-1
iodate	IO_3	-1
nitrate	NO_3	-1
nitrite	NO_2	-1
perchlorate	ClO_4	-1
permanganate	MnO_4	-1
thiocyanate	SCN	-1
carbonate	CO_3	-2
chromate	CrO_4	-2
dichromate	Cr_2O_7	-2
oxalate	C_2O_4	-2
selenate	SeO_4	-2
silicate	SiO_3	-2
sulfate	SO_4	-2
sulfite	SO_3	-2
phosphate	PO_4	-3
phosphite	PO_3	-3

Rules for Naming Ionic Compounds

1. Balance Charges (charges should equal zero)
2. Cation is always written first (in name and in formula)
3. Change the ending of the anion to -ide

AP CHEM SOLUTIONS

1A	2A											3A	4A	5A	6A	7A	8A
1 H^+ 1.008																1 H^- 1.008	2 He 4.00
3 Li^+ 6.94	4 Be^{2+} 9.01											5 B 10.81	6 C 12.01	7 N^{3-} 14.01	8 O^{2-} 16.00	9 F^- 19.00	10 Ne 20.18
11 Na^+ 22.99	12 Mg^{2+} 24.31											13 Al^{3+} 26.98	14 Si 28.09	15 P^{3-} 30.97	16 S^{2-} 32.07	17 Cl^- 35.45	18 Ar 39.95
19 K^+ 39.10	20 Ca^{2+} 40.08	21 Sc^{3+} 44.96	22 Ti^{4+} Ti^{3+} 47.88	23 V^{5+} V^{4+} 50.94	24 Cr^{3+} Cr^{2+} 52.00	25 Mn^{2+} Mn^{4+} 54.94	26 Fe^{3+} Fe^{2+} 55.85	27 Co^{2+} Co^{3+} 58.93	28 Ni^{2+} Ni^{3+} 58.69	29 Cu^{2+} Cu^+ 63.55	30 Zn^{2+} 65.39	31 Ga^{3+} 69.72	32 Ge^{4+} 72.61	33 As^{3-} 74.92	34 Se^{2-} 78.96	35 Br^- 79.90	36 Kr 83.80
37 Rb^+ 85.47	38 Sr^{2+} 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (97.9)	44 Ru 101.07	45 Rh 102.91	46 Pd^{2+} Pd^{4+} 106.42	47 Ag^+ 107.87	48 Cd^{2+} 112.41	49 In^{3+} 114.82	50 Sn^{4+} Sn^{2+} 118.71	51 Sb^{3+} Sb^{5+} 121.76	52 Te^{2-} 127.60	53 I^- 126.90	54 Xe 131.29
55 Cs^+ 132.91	56 Ba^{2+} 137.33	71 Lu^{3+} 174.97	72 Hf 178.49	73 Ta 180.95	74 W 183.85	75 Re 186.21	76 Os 190.23	77 Ir 192.22	78 Pt^{4+} Pt^{2+} 195.08	79 Au^{3+} Au^+ 196.97	80 Hg^{2+} Hg^+ 200.59	81 Tl^+ Tl^{3+} 204.38	82 Pb^{2+} Pb^{4+} 207.2	83 Bi^{3+} Bi^{5+} 208.98	84 Po^{2+} Po^{4+} (209)	85 At^- (210)	86 Rn (222)
87 Fr^+ 223.02	88 Ra^{2+} 226.03	103 Lr 262.11	104 Rf (261)	105 Db (262)	106 Sg (266)	107 Bh (264)	108 Hs (269)	109 Mt (268)									

Acetate	CH_3COO^-
Ammonium	NH_4^+
Bicarbonate	HCO_3^-
Carbonate	CO_3^{2-}
Chlorate	ClO_3^-
Dichromate	$Cr_2O_7^{2-}$
Hydroxide	OH^-
Nitrate	NO_3^-
Permanganate	MnO_4^-
Phosphate	PO_4^{3-}
Sulfate	SO_4^{2-}

57 La 138.91	58 Ce^{3+} 140.12	59 Pr^{3+} 140.91	60 Nd^{3+} 144.24	61 Pm^{3+} (145)	62 Sm^{3+} 150.36	63 Eu^{3+} Eu^{2+} 152.97	64 Gd^{3+} 157.25	65 Tb^{3+} 158.93	66 Dy^{3+} 162.50	67 Ho^{3+} 164.93	68 Er^{3+} 167.26	69 Tm^{3+} 168.93	70 Yb^{3+} 173.04
89 Ac^{3+} 227.03	90 Th^{4+} 232.04	91 Pa^{5+} 231.04	92 U^{6+} U^{4+} 238.03	93 Np^{5+} 237.05	94 Pu^{4+} Pu^{6+} (240)	95 Am^{3+} 243.06	96 Cm^{3+} (247)	97 Bk^{3+} (248)	98 Cf^{3+} (251)	99 Es 252.08	100 Fm 257.10	101 Md (257)	102 No 259.10

Strong Acids	
HI	$HClO_4$
HBr	HNO_3
HCl	H_2SO_4

ION	Cl^-, Br^-, I^-	SO_4^{2-}	SO_3^{2-}, CO_3^{2-}, PO_4^{3-}	OH^-, S^{2-}
Insoluble	Ag^+, Pb^{2+}, Hg_2^{2+}	Pb^{2+}, Hg_2^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+}	MOST	MOST
Soluble	MOST	MOST	Group 1A, NH_4^+	Group 1A, NH_4^+, Ca^{2+}, Sr^{2+}, Ba^{2+}

Unit 1: Measurement, Atoms, Stoichiometry Learning Goals

Big Idea 1: The chemical elements are fundamental building materials of matter & all matter can be understood in terms of arrangements of atoms. These atoms retain their identity in chemical reactions.

1. All matter is made of atoms. There are a limited number of types of atoms, these are the elements. EU 1.A
    a. Molecules are composed of specific combinations of atoms, different molecules are composed of combinations of different elements & of combination of the same elements in different amounts & proportions. EA 1.A.1
        i. **LO 1.1: The student can justify the observation that the ratio of the masses of the constituent elements in any pure sample of that compound is always identical on the basis of the atomic molecular theory.**
    b. Chemical analysis provides a method for determining the relative number of atoms in a substance, which can be used to identify the substance or determine its purity. EA 1.A.2
        i. **LO 1.2: The student is able to select & apply mathematical routines to mass data to identify or infer the composition of pure substances or mixtures.**
        ii. **LO 1.3: The student is able to select/apply mathematical relationships to mass data in order to justify a claim regarding the identity and/or estimated purity of a substance.**
    c. The mole is the fundamental unit for counting numbers of particles on the macroscopic level & allows quantitative connections to be drawn between laboratory experiments, which occur at the macroscopic level, & chemical processes, which occur at the atomic level. 1.A.3
        i. **LO 1.4: The student is able to connect the number of particles, moles, mass, & volume of substances to one another, both qualitatively & quantitatively.**
2. The atoms of each element have unique structures arising from interactions between electrons & nuclei. EU 1.B
    a. The atom is composed of negatively charged electrons, which can leave the atom, and a positively charged nucleus that is made of protons & neutrons. The attraction of the electrons to the nucleus is the basis of the structure of the atom. Coulomb's law is qualitatively useful for understanding the structure of the atom. 1.B.1
3. Atoms are so small that they are difficult to study directly; atomic models are constructed to explain experimental data on collections of atoms. EU 1.D
    a. As is the case with all scientific models, any model of the atom is subject to refinement & change in response to new experimental results. In that sense, at atomic model is not regarded as an exact description of the atom, but rather a theoretical construct that fits a set of experimental data. 1.D.1
        i. **LO 1.12: Student is able to explain why a given set of data suggests or does not suggest the need to refine the atomic model from a classical shell model with the quantum mechanical model.**
        ii. **LO 1.13: Given information about a particular model of the atom, the student is able to determine if the model is consistent with specified evidence.**
    b. An early model of the atom stated that all atoms of an element are identical. Mass spectrometry data demonstrate evidence that contradicts this early model. 1.D.2
        i. **LO 1.14: Student is able to use data from mass spectrometry to identify the elements & the individual atoms of a specific element.**
4. Atoms are conserved in physical & chemical processes. EU 1.E
    a. Physical & chemical processes can be depicted symbolically; when this is done, the illustration must conserve all atoms of all types. 1.E.1

i. LO 1.17: Student is able to express the law of conservation of mass quantitatively & qualitatively using symbolic representations and particulate drawings.

b. Conservation of atoms makes it possible to compute the masses of substances involved in physical & chemical processes. Chemical processes result in the formation of new substances, and the amount of these depends on the number & the types & masses of elements in the reactants; as well as the efficiency of the transformation. 1.E.2

i. LO 1.18: Student is able to apply conservation of atoms to the rearrangement of atoms in various processes.

ii. LO 1.19: Student can design, and/or interpret data from, an experiment that uses gravimetric analysis to determine the concentration of an analyte in a solution. (LAB)

iii. LO 1.20: The student can design, and/or interpret data from, an experiment that uses titration to determine the concentration of an analyte in a solution. (LAB)

Big Idea 3: Changes in matter involve the rearrangement and/or reorganization of atoms and/or the transfer of electrons.

1. Chemical changes are represented by a balanced chemical equation that identifies the ratios with which reactants react & products form. EU 3.A

a. Quantitative information can be derived from stoichiometric calculations that utililze the mole ratios from the balanced chemical equations. The role of stoichiometry in real-world applications is important to note, so that it does not seem to be simply an exercise done only by chemists. 3.A.2

i. LO 3.1: Students can translate among macroscopic observations of change, chemical equations, and particulate views.

ii. LO 3.3: Student is able to use stoichiometric calculations to predict the results of performing a reaction in the laboratory and/or to analyze deviations from the expected results.

iii. LO 3.4: Student is able to relate quantities (measured mass, etc.) to identify stoichiometric relationships for a reaction, including situations involving limiting reactants & situations in which the reaction has gone to completion.

2. Chemical reactions can be classified by considering what the reactants are, what the products are, or how they change from one into the other. Classes of chemical reactions include synthesis, decomposition, acid-base, and oxidation-reduction. EU 3.B

a. Synthesis reactions are those in which atoms and/or molecules combine to form a new compound. Decomposition is the reverse of synthesis, a process whereby molecules are decomposed, often by the use of heat. 3.B.1

i. LO 3.5: Student is able to design a plan in order to collect data on the synthesis or decomposition of a compound to confirm the conservation of matter & the law of definite proportions. (LAB/DEMO)

ii. LO 3.6: Student is able to use data from synthesis or decomposition of a compound to confirm the conservation of matter & law of definite proportions. (LAB/DEMO)

iii. LO 3.8: Student is able to identify redox reactions & justify the identification in terms of electron transfer.

3. Chemical & physical transformations may be observed in several ways & typically involve a change in energy. EU 3.C

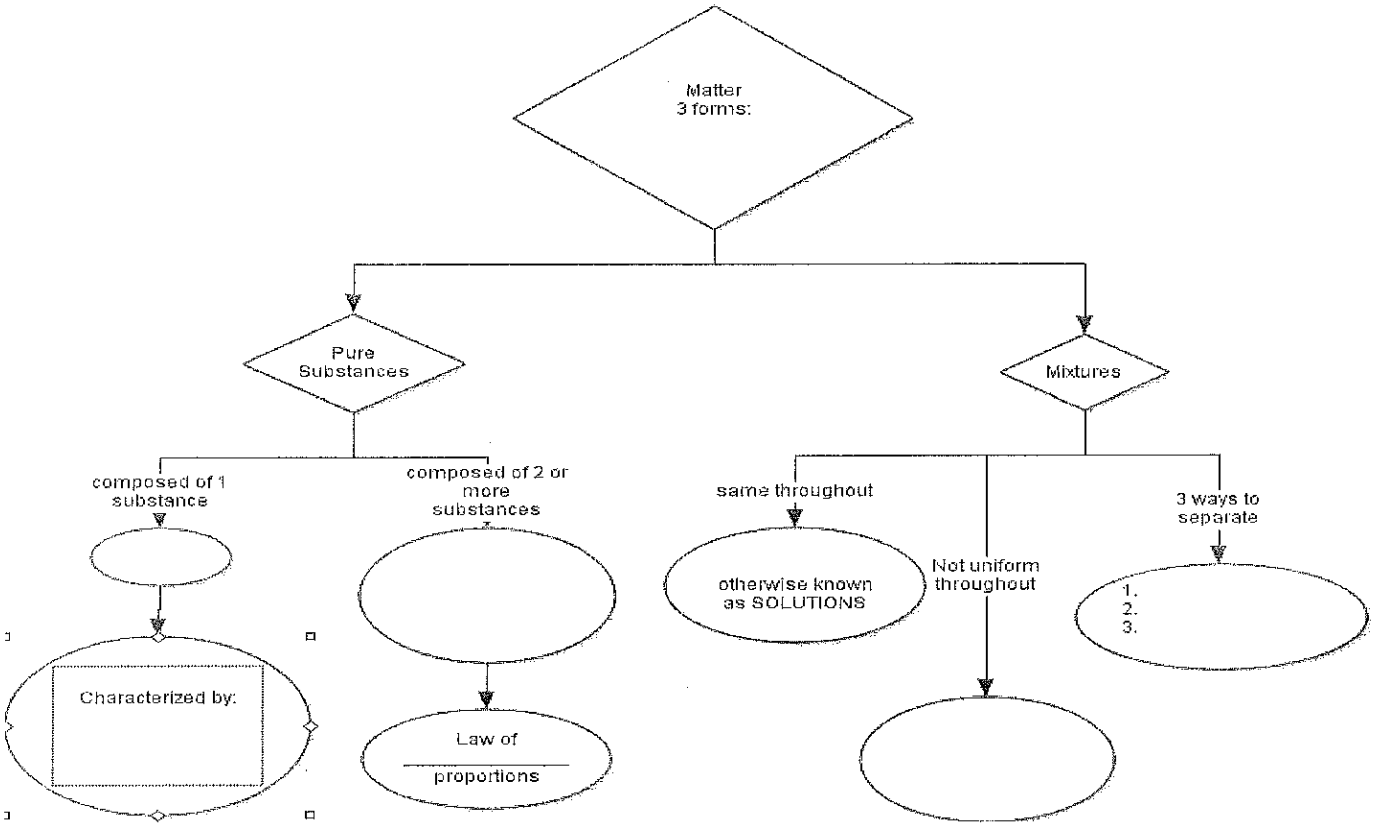
a. Production of heat or light, formation of a gas, and formation of a precipitate and/or color change are possible evidences that a chemical change has occurred. 3.C.1

i. LO 3.10: Student is able to evaluate the classification of a process as a physical change, chemical change, or ambiguous change based on both macroscopic observations & the distinction between rearrangement of covalent interactions & non-covalent interactions.

AP Chemistry Chapter One Notes

Complete as you READ the text. Yes, I DO expect you to READ this textbook! It will aid in your review/understanding of material!

1. Complete



2. Distinguish between physical & chemical properties. Give an example or 2 of each.

3. Compare/Contrast intensive & extensive properties. Give an example of each.

4. How are physical & chemical changes different? Give examples of each.

5. State the steps of the scientific method.
   Make observations → _____ → conduct _____ → gather _____ → draw conclusions → formulate _____ or laws

6. Metric system: _____ data involves numbers!
   Fill out the following table:

SI base unit	Unit abbreviation	What unit represents
	Kg	
		Meter
Time		
	K	
		Mole
Current		

7. Prefixes to know:

M	k	d	c	m	μ	n	p

8. What formulas is used to convert from Celsius to Kelvin?

9. Derived units can not be DIRECTLY measured. 2 important examples are _____ and _____.
   a. The main units we'll use for volume include:

   b. The 2 main units we'll use for density include:

   c. From Figure 1.20, what are 5 tools we can use to measure volume?

10. Uncertainty in Measurement
    a. Study fig. 1.24: Explain how precision & accuracy differ.

    b. Significant figures: Two rules for counting them.
       1. In #'s w/o a decimal: start counting w/ 1st non-zero # and count until the last non-zero #
       2. In #'s w/ a decimal: start counting w/ 1st non-zero # & count until the last digit (even if it's a zero)
    c. Use of Sig Figs in math:
       1. Multiplication & division: round to _____ # of sig figs in given #'s
       2. Addition/subtraction: round to _____ decimal place everyone shares
11. Conversions Factors & Dimensional Analysis
    a. Dimensional analysis means you must use _____ with each number.
    b. Conversion facts allow you to express the same quantity, but with different _____.
    c. You may flip conversion factors over, but each number **must** stay w/ it's own unit!

Problems to do for Chapter One p. 31-35: Show ALL work for problems!
1.1, 1.2, 1.11, 1.19, 1.26c, 1.29, 1.30a, 1.34, 1.40, 1.72, 1.78

AP Chemistry Chapter 2 Notes/Outline

Complete as you read the chapter. Do the problems at the end.

2.1 Atomic Theory

- _____ 1st used the word atom to describe tiny, indivisible particles
- John Dalton used the scientific method to develop his ideas
  - 1. _____ are made of _____.
  - 2. Atoms of 1 element are _____ and different from atom's of another element
  - 3. Atoms _____ change form in ordinary chemical reactions. Atoms can not be _____ nor destroyed.
  - 4. _____ result from combos of multiple elements; there are always the same _____ /kind of atoms in a given compound
  - The law of _____ relates to postulate 4
  - The law of _____ relates to postulate 3
  - He also predicted the law of _____ which can be seen by comparing H_2O to H_2O_2

2.2 Atomic structure discoveries

- *** particles of _____ charge repel, particles of _____ charge attract, DUH! ☺
- Complete the following table:

Scientist	Experiment	What they discovered
	Cathode ray tube	Model:
		Charge/ _____ of e-
Becquerel	n/a	
		Nucleus contained _____ of the mass and _____ of the volume, was VERY _____ & very _____
	n/a	Proton
Chadwick	n/a	

2.3 Current Atomic Theory

- 3 subatomic particles: _____
- In neutral atoms the _____ # is = to the _____ #
- Actual charge of proton: _____, but we use +1 (e- opp.)
- Masses of particles: p+ _____ amu, n^0 _____ amu; e- _____ (basically zero)
- Write the 3 part symbol for Carbon-12 here:

- _____ are atoms of the same element that differ in # of _____ and therefore mass #. Carbon-12 vs. Carbon-14

2.4 Atomic weights

- Today these are based on the _____ isotope which is assigned a value of exactly 12 amu
- Atomic weight can also be called _____ mass
- The apparatus that aids in measuring isotopes is the mass _____, it measures both mass & _____. The lighter isotopes are bent _____ than the heavier particles.

2.5 Periodic Table

- Elements are in order of increasing _____
- The P.T. is arranged by _____ (columns) & _____ (rows)
- _____ show similarities and are also known as families
- Table 2.3: you should know the family names here!
  - 1A:
  - 2A:
  - 6A:
  - 7A:
  - 8A:
- There are 3 types of elements:
  - _____ are found to the left of the P.T. they are _____ conductors, exhibit luster & are mostly _____ at room temperature
  - _____ are found to the right; they can be _____
  - Metalloids are intermediates and found along the _____ line; They include _____ (7 elements)

2.6 Molecules & Molecular Compounds

- Usually composed of 2 _____
- 2 or more atoms bonded together
- There are 7 diatomics you should know: Professor BrINClHOF will help you! ;)
- The simplest ratio gives you the _____ formula, whereas a _____ formula may not be the simplest form

- Example: H_2O vs. H_2O_2
- Study the 4 ways to represent formulas from Fig. 2.21
  - We'll commonly use structural, a 2D representation

2.7 Ions/Compounds

- Metals usually form _____ when electrons are _____
- Nonmetals usually form _____ when e- are _____
- _____ ions form when atoms joined by covalent bonds have a NET charge
- Fig. 2-22: you should know all of these by looking at a P.T.
- Ionic compounds form from _____ + _____
- We only write _____ formulas for ionic compounds and determine _____ by criss crossing charges
- The 6 elements most important to life: _____

2.8 Naming Inorganic Compounds

- Cations
  - Metals capable of 1 charge: do NOTHING
  - Metals w/ different cations: add a _____
    - Old style: the higher charge got the _____ ending and the lower charge got the _____ ending
    - Example: Fe^{3+} _____, Fe^{2+} _____
  - Cations of nonmetal atoms: end w/ _____
    - NH_4^+ = _____ ion
    - H_3O^+ = _____ ion
- Anions
  - End w/ _____ ; Example chlorine→ chloride
  - Polyatomics usually end w/ _____ or _____
    - The _____ always has one less _____
    - 1 more O than the –ate = _____ in front and _____ at end
    - 1 less O than –ite = add _____ in front & end is still _____
  - Anions w/ H^+ added to oxyanions, add
    - CO_3^{2-} + H^+ → _____
    - PO_4^{3-} + H^+ → _____
- YOU SHOULD MEMORIZE TABLE 2.5
- Acids occur when _____ is given up in solution
  - Anion ends with –ide = Hydro _____ic acid
  - Anion ends w/ -ate = _____ ic acid
  - Anion ends w/ -ite = _____ ous acid
  - Examples

- Molecular Compounds
  - Elements to the _____ are always named _____, unless it's O, which is always named _____ unless combined with _____
  - If both are in same group, name one with _____ first
  - 2nd elements always ends w/ -_____
  - Greek prefixes: Table 2.6 Know these!!!
    - We don't add _____ to the first element, why?? Who knows, it is the rule!
  - Name H containing compounds as if _____

2.9 Organics

- Alkanes
  - Contain all C-C single bonds
  - Will always end in _____
  - Prefixes to use
    - 1C _____
    - 2C _____
    - 3C _____
    - 4C: But-
    - 5+: Use greek prefixes, hexa, hepta, octa, etc.
  - Alcohols (a functional group)
    - Consists of -_____ joined to a carbon
    - Instead of methane, we'd call it _____
    - Use a # to tell which C the –OH is coming off of
    - Draw an example here

1-propanol 2-propanol

Why wouldn't you need a # for Ethanol????

Problems to do:

2.2, 2.5, 2.8, 2.20, 2.24cd, 2.26, 2.31, 2.36, 2.44ac, 2.50, 2.54, 2.58, 2.60, 2.68efg, 2.72bc, 2.76, 2.78, 2.97, 2.101, 2.103

AP Chemistry-Chapter 3 Stoichiometry

Please complete the following outline as you read chapter. Again, this chapter should be review. The assigned problems follow the outline. Show ALL work for the problems and use significant figures in your answers.

- In order to use stoichiometry, you must be able to use/understand 3 things
  - 1.
  - 2.
  - 3.

3.1 Equations

- An example of a chemical equation for water should be written here
- This equation should be read out loud as: _____ molecules of Hydrogen _____ 1 _____ of oxygen _____ 1 molecule of _____
- Reactants: Found to the _____ of the arrow, Products: Found to the _____ of the arrow
- _____ are written in front of the chemical formula and represent the number of _____
- The law of conservation of _____ must be followed. *What goes in must come out!*
- Make sure to always use the _____ whole # ratio for coefficients

3.2 Patterns of Reactivity

- Synthesis or _____ reactions occur when 2 or more reactants become _____ product. Generic equation: _____
  - Write an example equation from the reading below:
  - When a _____ and _____ react they form an **ionic solid**.
- _____ reactions are the opposite of combination reactions. In these, 1 _____ breaks down to become 2 or more _____. General eqn._____
  - Write an ex. Eqn. below.
  - Metal carbonates decompose to form _____ & _____.
- Combustion equations: Hydrocarbons (C, H, & sometimes O) will burn in _____ to produce _____ & _____
  - Example equation:
  - If there is not enough O_2 around, _____ combustion occurs which yields _____ rather than CO_2

3.3 Formula weights---please round to _____ (use my atomic mass sheet)

- Formula weight is the _____ of the atomic weights of _____ in the compound. (Therefore, you'll need a chemical formula to determine a formula weight, ☺)

- We call it a _____ weight when we're dealing w/ a molecule, such as H_2O
  - What is the molecular weight of water? Show work below.

- When we have ions, we call it a _____ weight
- % composition:
  - Formula: _____ x 100 = % composition

  - All the components of a formula when added should be equal to 100

- Moles can be compared to a _____ (think eggs) because there are always _____ x 10^{23} particles in a mole of something
  - The something can be ions, _____, atoms, but NEVER GRAMS
  - If 1 mole of pennies were lined up end-to-end, they would circle the _____ times! WOW!
  - Do Practice 3.8 below, show work.

- Molar mass: Always numerically equivalent to _____
  - Unit is _____
  - To go from mass to moles: _____ by molar mass
  - To go from moles to mass: _____
  - To go from mass to particles: 1st _____ by molar mass, 2nd _____ by Avogadro's #, vice versa for particles to moles

3.5 Empirical formulas (EF)—Lab for this one!! ☺

- Steps to determine:
  - 1. Make _____ into _____ by assuming a 100 g sample
  - 2. _____ by each element's _____ (round to 3 decimal places)
  - 3. _____ by the smallest # of moles in step 2, round to whole or ½ numbers. If you get a ½, double EVERY #
  - Tada! These numbers are your _____ for the empirical formula!
- Molecular Formula from Empirical Formula
  - Do all steps to find EF first
  - Take the given _____ weight ÷ by _____ molecular weight = new subscripts (not necessarily the smallest whole # ratio)
- Combustion analysis
  - Material is _____ & masses of _____ & _____ are measured, turned to _____, and therefore the EF is found
  - Sample 3.15
    - g C: g of CO_2→_____ of CO_2 → moles C→ _____ C
    - g H_2O : g of H_2O → moles _____ → _____ H → g H
    - To find mass of _____, take mass of sample – (mass C + mass of H) you just calculated
    - NOW proceed as if doing EF w/o a 100 g sample
    - DO the practice problem a on p. 98 right here!

3.6 Quantitative Info from Balanced Eqns.

- _____ tell the _____ of molecules/mols
- grams _____ → _____ A → moles _____ → g B or any part of this can be used (MOLE DIAGRAM)
- How does insulin relate to glucose? P. 102

3.7 Limiting Reagents (Reactants)

- The Limiting Reagent is the one that is _____ used up! The _____ has an amount left over when the reaction is done!
  - Pay attention to the bread analogy....it works!
- Look over sample problem 3.18 and 3.19 to refresh yourself on this important topic! Do a practice problem if you want as the answer is given.
- Theoretical Yields:
  - Formula: _____ x 100 = % yield
  - The one you get from doing the lab is the _____ yield. It will always be _____ than the theoretical yield which comes from doing _____ problems.

Problems to do for Chapter 3:

3.4, 3.8, 3.12, 3.14, 3.18, 3.20, 3.24bc,3.26c, 3.30, 3.36bd, 3.37, 3.44b, 3.50b, 3.51b, 3.60, 3.66abc, 3.74

This chapter really gets back into the "meat" of chemistry. Some of you may want to get out your honors notes to help you do the problems. If there are any concepts/problems that you feel sketchy on (need more practice), do a problem or two in red. The red problems have answers in the back of the book, ☺.