

## Welcome to AP Chemistry 2017!!!!

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 7<sup>th</sup> 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 1<sup>st</sup> day of school in August at 7:30 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 1<sup>st</sup> 3 chapters (the 1<sup>st</sup> 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 graded 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...7:30 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. IT WILL NOT BE ACCEPTED LATE! NO EXCUSES!**
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](mailto: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 2017

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

<p>14 1<sup>st</sup> 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</p>	<p>15 Lab: Determining the Formula of a hydrate (Due 8/22)  HW: Atomic Theory WS #1 probs #6,7,8,12,13,14,16, 17,18,19,20</p>	<p>16 Collect lab data Questions from summer work??  HW: Atomic Theory Nomenclature WS #4 all Copy Thurs Lab</p>	<p>17 Lab: Determine the stoichiometry of a reaction (Final due date Mon Aug 28)  HW: Atomic Theory WS #5: #1, 7, 9, 10, 19, 20,24</p>	<p>18 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</p>
<p>21 Review 1-3  HW: Review Handout</p>	<p>22 FRQ portion of test  *****Lab #1 Final DUE DATE!</p>	<p>23 <b>Ch. 1-3 MC Test:</b> 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</p>	<p>24 Reading/HW quiz Ch 4 Sec 1-3</p>	<p>25  HW: Lab #2: Formula of hydrate FINAL due date Aug 29</p>

**\*\*Please note, the dates listed for labs 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



## 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.

*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 1<sup>st</sup> 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.*

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

### Rules for Naming an Acid

- 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
- 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.
- 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	$CO_3^{2-}$	-2
chromate	$CrO_4^{2-}$	-2
dichromate	$Cr_2O_7^{2-}$	-2
oxalate	$C_2O_4^{2-}$	-2
selenate	$SeO_4^{2-}$	-2
silicate	$SiO_3^{2-}$	-2
sulfate	$SO_4^{2-}$	-2
sulfite	$SO_3^{2-}$	-2
phosphate	$PO_4^{3-}$	-3
phosphite	$PO_3^{3-}$	-3

### Rules for Naming Ionic Compounds

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

# AP CHEM SOLUTIONS

1A		2A		3A		4A		5A		6A		7A	8A																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
1	H <sup>+</sup> 1.008	3	Li <sup>+</sup> 6.94	11	Na <sup>+</sup> 22.99	19	K <sup>+</sup> 39.10	27	Co <sup>2+</sup> 58.93	35	Br <sup>-</sup> 79.90	7	N <sup>3-</sup> 14.01	15	P <sup>3-</sup> 30.97	23	V <sup>5+</sup> 50.94	31	Ga <sup>3+</sup> 69.72	39	Y <sup>3+</sup> 88.91	47	Ag <sup>+</sup> 107.87	55	Cs <sup>+</sup> 132.91	63	Eu <sup>3+</sup> 152.07	71	Lu <sup>3+</sup> 174.97	79	Au <sup>3+</sup> 196.97	87	Fr <sup>+</sup> 223.02	95	Am <sup>3+</sup> 243.06	103	Lr <sup>+</sup> 262.11	111	Ro <sup>+</sup> 262.11	119	Uu <sup>+</sup> 262.11	127	Uu <sup>+</sup> 262.11	135	Uu <sup>+</sup> 262.11	143	Uu <sup>+</sup> 262.11	151	Uu <sup>+</sup> 262.11	159	Uu <sup>+</sup> 262.11	167	Uu <sup>+</sup> 262.11	175	Uu <sup>+</sup> 262.11	183	Uu <sup>+</sup> 262.11	191	Uu <sup>+</sup> 262.11	199	Uu <sup>+</sup> 262.11	207	Uu <sup>+</sup> 262.11	215	Uu <sup>+</sup> 262.11	223	Uu <sup>+</sup> 262.11	231	Uu <sup>+</sup> 262.11	239	Uu <sup>+</sup> 262.11	247	Uu <sup>+</sup> 262.11	255	Uu <sup>+</sup> 262.11	263	Uu <sup>+</sup> 262.11	271	Uu <sup>+</sup> 262.11	279	Uu <sup>+</sup> 262.11	287	Uu <sup>+</sup> 262.11	295	Uu <sup>+</sup> 262.11	303	Uu <sup>+</sup> 262.11	311	Uu <sup>+</sup> 262.11	319	Uu <sup>+</sup> 262.11	327	Uu <sup>+</sup> 262.11	335	Uu <sup>+</sup> 262.11	343	Uu <sup>+</sup> 262.11	351	Uu <sup>+</sup> 262.11	359	Uu <sup>+</sup> 262.11	367	Uu <sup>+</sup> 262.11	375	Uu <sup>+</sup> 262.11	383	Uu <sup>+</sup> 262.11	391	Uu <sup>+</sup> 262.11	399	Uu <sup>+</sup> 262.11	407	Uu <sup>+</sup> 262.11	415	Uu <sup>+</sup> 262.11	423	Uu <sup>+</sup> 262.11	431	Uu <sup>+</sup> 262.11	439	Uu <sup>+</sup> 262.11	447	Uu <sup>+</sup> 262.11	455	Uu <sup>+</sup> 262.11	463	Uu <sup>+</sup> 262.11	471	Uu <sup>+</sup> 262.11	479	Uu <sup>+</sup> 262.11	487	Uu <sup>+</sup> 262.11	495	Uu <sup>+</sup> 262.11	503	Uu <sup>+</sup> 262.11	511	Uu <sup>+</sup> 262.11	519	Uu <sup>+</sup> 262.11	527	Uu <sup>+</sup> 262.11	535	Uu <sup>+</sup> 262.11	543	Uu <sup>+</sup> 262.11	551	Uu <sup>+</sup> 262.11	559	Uu <sup>+</sup> 262.11	567	Uu <sup>+</sup> 262.11	575	Uu <sup>+</sup> 262.11	583	Uu <sup>+</sup> 262.11	591	Uu <sup>+</sup> 262.11	599	Uu <sup>+</sup> 262.11	607	Uu <sup>+</sup> 262.11	615	Uu <sup>+</sup> 262.11	623	Uu <sup>+</sup> 262.11	631	Uu <sup>+</sup> 262.11	639	Uu <sup>+</sup> 262.11	647	Uu <sup>+</sup> 262.11	655	Uu <sup>+</sup> 262.11	663	Uu <sup>+</sup> 262.11	671	Uu <sup>+</sup> 262.11	679	Uu <sup>+</sup> 262.11	687	Uu <sup>+</sup> 262.11	695	Uu <sup>+</sup> 262.11	703	Uu <sup>+</sup> 262.11	711	Uu <sup>+</sup> 262.11	719	Uu <sup>+</sup> 262.11	727	Uu <sup>+</sup> 262.11	735	Uu <sup>+</sup> 262.11	743	Uu <sup>+</sup> 262.11	751	Uu <sup>+</sup> 262.11	759	Uu <sup>+</sup> 262.11	767	Uu <sup>+</sup> 262.11	775	Uu <sup>+</sup> 262.11	783	Uu <sup>+</sup> 262.11	791	Uu <sup>+</sup> 262.11	799	Uu <sup>+</sup> 262.11	807	Uu <sup>+</sup> 262.11	815	Uu <sup>+</sup> 262.11	823	Uu <sup>+</sup> 262.11	831	Uu <sup>+</sup> 262.11	839	Uu <sup>+</sup> 262.11	847	Uu <sup>+</sup> 262.11	855	Uu <sup>+</sup> 262.11	863	Uu <sup>+</sup> 262.11	871	Uu <sup>+</sup> 262.11	879	Uu <sup>+</sup> 262.11	887	Uu <sup>+</sup> 262.11	895	Uu <sup>+</sup> 262.11	903	Uu <sup>+</sup> 262.11	911	Uu <sup>+</sup> 262.11	919	Uu <sup>+</sup> 262.11	927	Uu <sup>+</sup> 262.11	935	Uu <sup>+</sup> 262.11	943	Uu <sup>+</sup> 262.11	951	Uu <sup>+</sup> 262.11	959	Uu <sup>+</sup> 262.11	967	Uu <sup>+</sup> 262.11	975	Uu <sup>+</sup> 262.11	983	Uu <sup>+</sup> 262.11	991	Uu <sup>+</sup> 262.11	999	Uu <sup>+</sup> 262.11	1007	Uu <sup>+</sup> 262.11	1015	Uu <sup>+</sup> 262.11	1023	Uu <sup>+</sup> 262.11	1031	Uu <sup>+</sup> 262.11	1039	Uu <sup>+</sup> 262.11	1047	Uu <sup>+</sup> 262.11	1055	Uu <sup>+</sup> 262.11	1063	Uu <sup>+</sup> 262.11	1071	Uu <sup>+</sup> 262.11	1079	Uu <sup>+</sup> 262.11	1087	Uu <sup>+</sup> 262.11	1095	Uu <sup>+</sup> 262.11	1103	Uu <sup>+</sup> 262.11	1111	Uu <sup>+</sup> 262.11	1119	Uu <sup>+</sup> 262.11	1127	Uu <sup>+</sup> 262.11	1135	Uu <sup>+</sup> 262.11	1143	Uu <sup>+</sup> 262.11	1151	Uu <sup>+</sup> 262.11	1159	Uu <sup>+</sup> 262.11	1167	Uu <sup>+</sup> 262.11	1175	Uu <sup>+</sup> 262.11	1183	Uu <sup>+</sup> 262.11	1191	Uu <sup>+</sup> 262.11	1199	Uu <sup>+</sup> 262.11	1207	Uu <sup>+</sup> 262.11	1215	Uu <sup>+</sup> 262.11	1223	Uu <sup>+</sup> 262.11	1231	Uu <sup>+</sup> 262.11	1239	Uu <sup>+</sup> 262.11	1247	Uu <sup>+</sup> 262.11	1255	Uu <sup>+</sup> 262.11	1263	Uu <sup>+</sup> 262.11	1271	Uu <sup>+</sup> 262.11	1279	Uu <sup>+</sup> 262.11	1287	Uu <sup>+</sup> 262.11	1295	Uu <sup>+</sup> 262.11	1303	Uu <sup>+</sup> 262.11	1311	Uu <sup>+</sup> 262.11	1319	Uu <sup>+</sup> 262.11	1327	Uu <sup>+</sup> 262.11	1335	Uu <sup>+</sup> 262.11	1343	Uu <sup>+</sup> 262.11	1351	Uu <sup>+</sup> 262.11	1359	Uu <sup>+</sup> 262.11	1367	Uu <sup>+</sup> 262.11	1375	Uu <sup>+</sup> 262.11	1383	Uu <sup>+</sup> 262.11	1391	Uu <sup>+</sup> 262.11	1399	Uu <sup>+</sup> 262.11	1407	Uu <sup>+</sup> 262.11	1415	Uu <sup>+</sup> 262.11	1423	Uu <sup>+</sup> 262.11	1431	Uu <sup>+</sup> 262.11	1439	Uu <sup>+</sup> 262.11	1447	Uu <sup>+</sup> 262.11	1455	Uu <sup>+</sup> 262.11	1463	Uu <sup>+</sup> 262.11	1471	Uu <sup>+</sup> 262.11	1479	Uu <sup>+</sup> 262.11	1487	Uu <sup>+</sup> 262.11	1495	Uu <sup>+</sup> 262.11	1503	Uu <sup>+</sup> 262.11	1511	Uu <sup>+</sup> 262.11	1519	Uu <sup>+</sup> 262.11	1527	Uu <sup>+</sup> 262.11	1535	Uu <sup>+</sup> 262.11	1543	Uu <sup>+</sup> 262.11	1551	Uu <sup>+</sup> 262.11	1559	Uu <sup>+</sup> 262.11	1567	Uu <sup>+</sup> 262.11	1575	Uu <sup>+</sup> 262.11	1583	Uu <sup>+</sup> 262.11	1591	Uu <sup>+</sup> 262.11	1599	Uu <sup>+</sup> 262.11	1607	Uu <sup>+</sup> 262.11	1615	Uu <sup>+</sup> 262.11	1623	Uu <sup>+</sup> 262.11	1631	Uu <sup>+</sup> 262.11	1639	Uu <sup>+</sup> 262.11	1647	Uu <sup>+</sup> 262.11	1655	Uu <sup>+</sup> 262.11	1663	Uu <sup>+</sup> 262.11	1671	Uu <sup>+</sup> 262.11	1679	Uu <sup>+</sup> 262.11	1687	Uu <sup>+</sup> 262.11	1695	Uu <sup>+</sup> 262.11	1703	Uu <sup>+</sup> 262.11	1711	Uu <sup>+</sup> 262.11	1719	Uu <sup>+</sup> 262.11	1727	Uu <sup>+</sup> 262.11	1735	Uu <sup>+</sup> 262.11	1743	Uu <sup>+</sup> 262.11	1751	Uu <sup>+</sup> 262.11	1759	Uu <sup>+</sup> 262.11	1767	Uu <sup>+</sup> 262.11	1775	Uu <sup>+</sup> 262.11	1783	Uu <sup>+</sup> 262.11	1791	Uu <sup>+</sup> 262.11	1799	Uu <sup>+</sup> 262.11	1807	Uu <sup>+</sup> 262.11	1815	Uu <sup>+</sup> 262.11	1823	Uu <sup>+</sup> 262.11	1831	Uu <sup>+</sup> 262.11	1839	Uu <sup>+</sup> 262.11	1847	Uu <sup>+</sup> 262.11	1855	Uu <sup>+</sup> 262.11	1863	Uu <sup>+</sup> 262.11	1871	Uu <sup>+</sup> 262.11	1879	Uu <sup>+</sup> 262.11	1887	Uu <sup>+</sup> 262.11	1895	Uu <sup>+</sup> 262.11	1903	Uu <sup>+</sup> 262.11	1911	Uu <sup>+</sup> 262.11	1919	Uu <sup>+</sup> 262.11	1927	Uu <sup>+</sup> 262.11	1935	Uu <sup>+</sup> 262.11	1943	Uu <sup>+</sup> 262.11	1951	Uu <sup>+</sup> 262.11	1959	Uu <sup>+</sup> 262.11	1967	Uu <sup>+</sup> 262.11	1975	Uu <sup>+</sup> 262.11	1983	Uu <sup>+</sup> 262.11	1991	Uu <sup>+</sup> 262.11	1999	Uu <sup>+</sup> 262.11	2007	Uu <sup>+</sup> 262.11	2015	Uu <sup>+</sup> 262.11	2023	Uu <sup>+</sup> 262.11	2031	Uu <sup>+</sup> 262.11	2039	Uu <sup>+</sup> 262.11	2047	Uu <sup>+</sup> 262.11	2055	Uu <sup>+</sup> 262.11	2063	Uu <sup>+</sup> 262.11	2071	Uu <sup>+</sup> 262.11	2079	Uu <sup>+</sup> 262.11	2087	Uu <sup>+</sup> 262.11	2095	Uu <sup>+</sup> 262.11	2103	Uu <sup>+</sup> 262.11	2111	Uu <sup>+</sup> 262.11	2119	Uu <sup>+</sup> 262.11	2127	Uu <sup>+</sup> 262.11	2135	Uu <sup>+</sup> 262.11	2143	Uu <sup>+</sup> 262.11	2151	Uu <sup>+</sup> 262.11	2159	Uu <sup>+</sup> 262.11	2167	Uu <sup>+</sup> 262.11	2175	Uu <sup>+</sup> 262.11	2183	Uu <sup>+</sup> 262.11	2191	Uu <sup>+</sup> 262.11	2199	Uu <sup>+</sup> 262.11	2207	Uu <sup>+</sup> 262.11	2215	Uu <sup>+</sup> 262.11	2223	Uu <sup>+</sup> 262.11	2231	Uu <sup>+</sup> 262.11	2239	Uu <sup>+</sup> 262.11	2247	Uu <sup>+</sup> 262.11	2255	Uu <sup>+</sup> 262.11	2263	Uu <sup>+</sup> 262.11	2271	Uu <sup>+</sup> 262.11	2279	Uu <sup>+</sup> 262.11	2287	Uu <sup>+</sup> 262.11	2295	Uu <sup>+</sup> 262.11	2303	Uu <sup>+</sup> 262.11	2311	Uu <sup>+</sup> 262.11	2319	Uu <sup>+</sup> 262.11	2327	Uu <sup>+</sup> 262.11	2335	Uu <sup>+</sup> 262.11	2343	Uu <sup>+</sup> 262.11	2351	Uu <sup>+</sup> 262.11	2359	Uu <sup>+</sup> 262.11	2367	Uu <sup>+</sup> 262.11	2375	Uu <sup>+</sup> 262.11	2383	Uu <sup>+</sup> 262.11	2391	Uu <sup>+</sup> 262.11	2399	Uu <sup>+</sup> 262.11	2407	Uu <sup>+</sup> 262.11	2415	Uu <sup>+</sup> 262.11	2423	Uu <sup>+</sup> 262.11	2431	Uu <sup>+</sup> 262.11	2439	Uu <sup>+</sup> 262.11	2447	Uu <sup>+</sup> 262.11	2455	Uu <sup>+</sup> 262.11	2463	Uu <sup>+</sup> 262.11	2471	Uu <sup>+</sup> 262.11	2479	Uu <sup>+</sup> 262.11	2487	Uu <sup>+</sup> 262.11	2495	Uu <sup>+</sup> 262.11	2503	Uu <sup>+</sup> 262.11	2511	Uu <sup>+</sup> 262.11	2519	Uu <sup>+</sup> 262.11	2527	Uu <sup>+</sup> 262.11	2535	Uu <sup>+</sup> 262.11	2543	Uu <sup>+</sup> 262.11	2551	Uu <sup>+</sup> 262.11	2559	Uu <sup>+</sup> 262.11	2567	Uu <sup>+</sup> 262.11	2575	Uu <sup>+</sup> 262.11	2583	Uu <sup>+</sup> 262.11	2591	Uu <sup>+</sup> 262.11	2599	Uu <sup>+</sup> 262.11	2607	Uu <sup>+</sup> 262.11	2615	Uu <sup>+</sup> 262.11	2623	Uu <sup>+</sup> 262.11	2631	Uu <sup>+</sup> 262.11	2639	Uu <sup>+</sup> 262.11	2647	Uu <sup>+</sup> 262.11	2655	Uu <sup>+</sup> 262.11	2663	Uu <sup>+</sup> 262.11	2671	Uu <sup>+</sup> 262.11	2679	Uu <sup>+</sup> 262.11	2687	Uu <sup>+</sup> 262.11	2695	Uu <sup>+</sup> 262.11	2703	Uu <sup>+</sup> 262.11	2711	Uu <sup>+</sup> 262.11	2719	Uu <sup>+</sup> 262.11	2727	Uu <sup>+</sup> 262.11	2735	Uu <sup>+</sup> 262.11	2743	Uu <sup>+</sup> 262.11	2751	Uu <sup>+</sup> 262.11	2759	Uu <sup>+</sup> 262.11	2767	Uu <sup>+</sup> 262.11	2775	Uu <sup>+</sup> 262.11	2783	Uu <sup>+</sup> 262.11	2791	Uu <sup>+</sup> 262.11	2799	Uu <sup>+</sup> 262.11	2807	Uu <sup>+</sup> 262.11	2815	Uu <sup>+</sup> 262.11	2823	Uu <sup>+</sup> 262.11	2831	Uu <sup>+</sup> 262.11	2839	Uu <sup>+</sup> 262.11	2847	Uu <sup>+</sup> 262.11	2855	Uu <sup>+</sup> 262.11	2863	Uu <sup>+</sup> 262.11	2871	Uu <sup>+</sup> 262.11	2879	Uu <sup>+</sup> 262.11	2887	Uu <sup>+</sup> 262.11	2895	Uu <sup>+</sup> 262.11	2903	Uu <sup>+</sup> 262.11	2911	Uu <sup>+</sup> 262.11	2919	Uu <sup>+</sup> 262.11	2927	Uu <sup>+</sup> 262.11	2935	Uu <sup>+</sup> 262.11	2943	Uu <sup>+</sup> 262.11	2951	Uu <sup>+</sup> 262.11	2959	Uu <sup>+</sup> 262.11	2967	Uu <sup>+</sup> 262.11	2975	Uu <sup>+</sup> 262.11	2983	Uu <sup>+</sup> 262.11	2991	Uu <sup>+</sup> 262.11	2999	Uu <sup>+</sup> 262.11	3007	Uu <sup>+</sup> 262.11	3015	Uu <sup>+</sup> 262.11	3023	Uu <sup>+</sup> 262.11	3031	Uu <sup>+</sup> 262.11	3039	Uu <sup>+</sup> 262.11	3047	Uu <sup>+</sup> 262.11	3055	Uu <sup>+</sup> 262.11	3063	Uu <sup>+</sup> 262.11	3071	Uu <sup>+</sup> 262.11	3079	Uu <sup>+</sup> 262.11	3087	Uu <sup>+</sup> 262.11	3095	Uu <sup>+</sup> 262.11	3103	Uu <sup>+</sup> 262.11	3111	Uu <sup>+</sup> 262.11	3119	Uu <sup>+</sup> 262.11	3127	Uu <sup>+</sup> 262.11	3135	Uu <sup>+</sup> 262.11	3143	Uu <sup>+</sup> 262.11	3151

## 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.

- All matter is made of atoms. There are a limited number of types of atoms, these are the elements. EU 1.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
    - 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.**
  - 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
    - 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.**
    - 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.**
  - 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
    - LO 1.4: The student is able to connect the number of particles, moles, mass, & volume of substances to one another, both qualitatively & quantitatively.**
- The atoms of each element have unique structures arising from interactions between electrons & nuclei. EU 1.B
  - 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
- 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
  - 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, an 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
    - 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.**
    - 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.**
  - 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
    - LO 1.14: Student is able to use data from mass spectrometry to identify the elements & the individual atoms of a specific element.**
- Atoms are conserved in physical & chemical processes. EU 1.E
  - 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)**

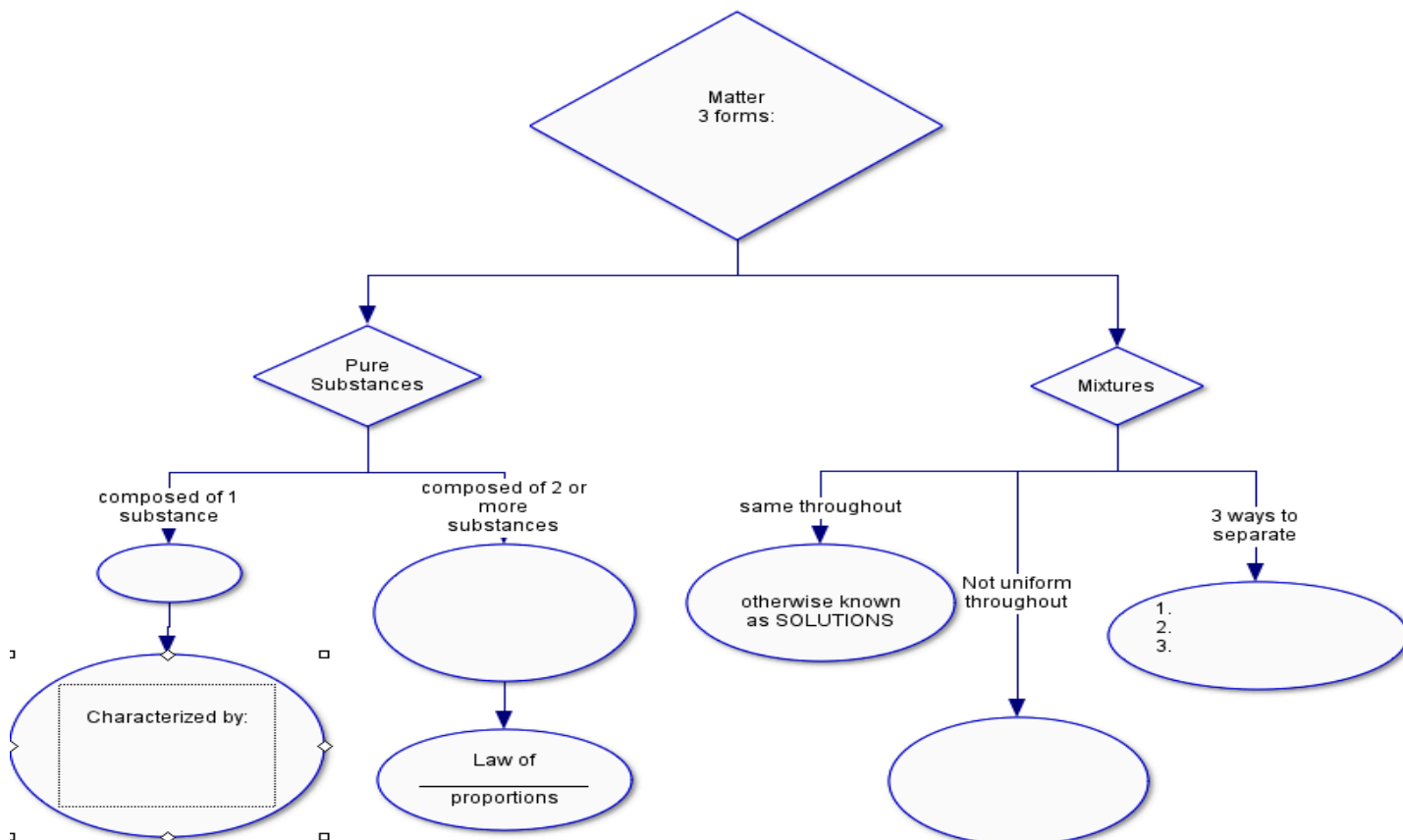
Big Idea 3: Changes in matter involve the rearrangement and/or reorganization of atoms and/or the transfer of electrons.

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 utilize 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	$\mu$	n	p

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

9. Derived units can not be DIRECTLY measured. 2 important examples are \_\_\_\_\_ and \_\_\_\_\_.

- The main units we'll use for volume include:
- The 2 main units we'll use for density include:
- From Figure 1.20, what are 5 tools we can use to measure volume?

10. Uncertainty in Measurement

- Study fig. 1.24: Explain how precision & accuracy differ.
- Significant figures: Two rules for counting them.
  - In #'s w/o a decimal: start counting w/ 1<sup>st</sup> non-zero # and count until the last non-zero #
  - In #'s w/ a decimal: start counting w/ 1<sup>st</sup> non-zero # & count until the last digit (even if it's a zero)
- Use of Sig Figs in math:
  - Multiplication & division: round to \_\_\_\_\_ # of sig figs in given #'s
  - Addition/subtraction: round to \_\_\_\_\_ decimal place everyone shares

11. Conversions Factors & Dimensional Analysis

- Dimensional analysis means you must use \_\_\_\_\_ with each number.
- Conversion facts allow you to express the same quantity, but with different \_\_\_\_\_.
- 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

- \_\_\_\_\_ 1<sup>st</sup> 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<sub>2</sub>O to H<sub>2</sub>O<sub>2</sub>

### 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<sup>0</sup> \_\_\_\_\_ 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 BrINClHOFl will help you! ;)
- The simplest ratio gives you the \_\_\_\_\_ formula, whereas a \_\_\_\_\_ formula may not be the simplest form

- Example:  $\text{H}_2\text{O}$  vs.  $\text{H}_2\text{O}_2$
- 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:  $\text{Fe}^{3+}$  \_\_\_\_\_,  $\text{Fe}^{2+}$  \_\_\_\_\_
  - Cations of nonmetal atoms: end w/ \_\_\_\_\_
    - $\text{NH}_4^+$  = \_\_\_\_\_ ion
    - $\text{H}_3\text{O}^+$  = \_\_\_\_\_ 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/  $\text{H}^+$  added to oxyanions, add
    - $\text{CO}_3^{2-} + \text{H}^+ \rightarrow$  \_\_\_\_\_
    - $\text{PO}_4^{3-} + \text{H}^+ \rightarrow$  \_\_\_\_\_
- 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
  - 2<sup>nd</sup> 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<sub>2</sub> around, \_\_\_\_\_ combustion occurs which yields \_\_\_\_\_ rather than CO<sub>2</sub>

### 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<sub>2</sub>O
  - 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<sup>23</sup> 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: 1<sup>st</sup> \_\_\_\_\_ by molar mass, 2<sup>nd</sup> \_\_\_\_\_ 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 1/2 numbers. If you get a 1/2, 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<sub>2</sub> → \_\_\_\_\_ of CO<sub>2</sub> → moles C → \_\_\_\_\_ C
    - g H<sub>2</sub>O : g of H<sub>2</sub>O → 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, ☺.