** Vista Ridge High School**

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Dear AP Chemistry Student & Parents,

I look forward to having you as a part of my AP Chemistry class for the 2014-2015 school year. This letter contains information that pertains to your AP Chemistry Summer assignment. Each of the following must be completed. AP Chemistry is a fast-paced course that begins with new material in the very first week. This assignment must be completed so that you do not fall behind at the very beginning of the course. We will have a summer assignment quiz on the first day of class.

As difficult as AP Chemistry is, you will find that it will never be easier to learn College Freshman-level Chemistry than it is now! There are several reasons for this:

a) High school classes are generally smaller than college classes. It is not unusual for freshman college classes to have 200 or more students! In this situation, it is nearly impossible to ask a question during class or get any individual attention after class. In AP Chemistry, we always take time for questions and answers, and I am almost always available for after school help – and often on weekends and breaks too!

b) Many college professors don't regard teaching Freshman Chemistry as a priority for their job – many concentrate on their research, and consider teaching to be an interruption and distraction to that end. In extreme cases, a college instructor may not speak English such that it can be easily understood. At our school, teaching is our Number 1 priority and we do it well!

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. This can result in a large portion of students in freshman chemistry flunking the course! At our school we don't have these kinds of pressures, and all students are encouraged to become successful.

d) AP Chemistry will teach you to think at higher levels. Learning will rarely be of the "parrot-back" variety (ie. where the teacher gives a lecture, and the student is expected to give back the same information on a test-similar to a parrot!) In AP Chemistry, you will be forced to think and apply concepts to new situations, and even derive your own theories from application. This is excellent preparation for the higher levels of thinking required in college.

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) **PERCEPTION**: I have always been a "straight A" student, and always will be.

**REALITY**: AP Chemistry can mean death to a 4.0 grade point average. Although there are several "A" 's (about one fourth of the class), there are also "B"’s, "C"’s, "D"’s and "F"‘s. And all of these students were top students in their First Year Chemistry class!!! 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 to get an "A" in.

2) **PERCEPTION**: 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 do expect that!!!) You cannot expect to just “figure it out for yourself” or get help from a friend – the material is just too difficult. Therefore you will have to say "no" to things that will take you out of class such as field trips, band trips, student council, and the multitude of other "excuses" for missing class. Families are asked to take vacations during school holidays only. You have GOT to get to a college level of maturity ­where even though you have a legal excuse to miss class, you choose not to.

3) **PERCEPTION:** Like all teachers, Mrs. Maze 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. I can provide you with a list if you wish.

4) **PERCEPTION**: Mrs. Maze is making this class a lot tougher than it really needs to be.

**REALITY**: Never forget, this is a college level course, NOT an advanced high school course! If I am doing my job, students in this course should learn as much as they would if they were taking freshman chemistry at any college or university in the United States. From feedback I have received from former students, that goal is being achieved. A second goal is to properly prepare students for the AP Exam in May. I cannot make the course easier and still accomplish these goals. Every former student who has taken freshman college chemistry has found that (s)he 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!

5) **PERCEPTION**: If the majority of the class falls behind, Mrs. Maze will just have to slow down so that we can catch up.

**REALITY**: I can’t! You will find that time is of the essence in this course. As much as I may like to and as much as the students may need it, our schedule cannot be adjusted to accommodate those who cannot keep up. Students will be expected to study the text on their own, and class time will be used more for clearing up questions than for introducing new material. There is really no other way to cover the vast amount of material required by the AP exam. If we slow down to make the course easier, or allow students to catch up, we will not cover the required subject matter, and students will have to face exam questions on material not covered. As a result, I will make a schedule that will allow us to complete all requirements 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, including the weekends. 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.

6) **PERCEPTION**: All this work Mrs. Maze 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 in class after school, either getting help on an assignment, completing lab work, or reviewing for tests. If you are NEVER available immediately after school to do chemistry work, you should not take this course. Occasionally labs will require us to meet 30 – 60 minutes after school gets out (4th Block AP Chem) in order to have a two-hour lab block. If you are unable to make this commitment, you will not be able to take this course. Late-comers for lab will NOT be admitted to the room for safety reasons. I am often available for help before school or during lunch, and almost every day after school. We also form study groups that meet on Saturdays at Starbucks or at school, especially when there are Monday holidays built in to the school calendar. Students will be encouraged to form their own study groups to get many of their questions answered.

7) **PERCEPTION**: Mrs. Maze doesn't really expect us to do a summer assignment, and she isn't really going to give us a test the first day of class in August.

**REALITY**: I am serious about this - just ask students who have already taken the course. The summer assignment is mainly a review of first year Chemistry. The test will encourage you to do most of the memorization for the course before the school year begins. This early work will allow us to spend more time later on more difficult topics. You will find the summer assignment and the review for the "first day test" at the end of this letter.

Now that I have scared all of you, I will say that there is fun to be had in this course, as well as the satisfaction of challenging yourself to the limit of your academic ability. We have a creative way of providing donuts for the early morning lab sessions, and in the past we have had class field trips and parties. I hope you have a great summer-don't forget your summer assignment/first day test- and I'll see you in the fall!

1. **Check out an AP Chemistry Book from the library BEFORE THE END OF THE SCHOOL YEAR! You will need this for the reading assignment in July.**
2. Please **complete this form online** <http://goo.gl/forms/sSrLrZF3ry> so I can get in touch with you over the summer and throughout the school year if necessary.
3. **Memorize Formulas, Charges, and Names for all of the Ions given on the handout**. The list includes both the polyatomic and monatomic ions. Make sure that you know names and formulas. Also, for the monatomic ions make sure you know both the stock and classical names. You must know how to write correct chemical formulas using these ions.
4. **Memorize Solubility Rules for the Soluble and Insoluble Ionic Compounds**. You need to be able to look at the formula for a compound and know if that compound will be soluble or insoluble in a solution.
5. **Memorize Formulas and Common Names for the Certain Acids and Compounds**:
	1. Hydrochloric Acid – HCl
	2. Sulfuric Acid – H2SO4
	3. Phosphoric Acid – H3PO4
	4. Acetic Acid – HC2H3O2
	5. Carbonic Acid – H2CO3
	6. Nitric Acid – HNO3
	7. AlK(SO4)2·12H2O alum
	8. CH4 methane
	9. C6H6 benzene
	10. C10H8 naphthalene (mothballs)
	11. CHCl3 chloroform
	12. CH3OH methyl alcohol or methanol (wood alcohol)
	13. C2H5OH ethyl alcohol or ethanol (drinking alcohol)
	14. CH3COCH3 acetone
	15. C3H5(OH)3 glycerin
	16. C6H8O6 L-ascorbic acid (vitamin C)
	17. CaCO3 chalk, marble, limestone
	18. CaO quicklime
	19. Ca(OH)2 slaked lime (lime water)
	20. CaSO4 gypsum, plaster of paris
	21. Fe3O4 or Fe2O3 rust
	22. HCHO formaldehyde
	23. H2O water
	24. Hg quicksilver
	25. K2CO3 potash
	26. MgO magnesia
	27. MgSO4 epsom salts
	28. NH3 ammonia
	29. N2O laughing gas
	30. Na2CO3 soda ash
	31. NaCl table salt
	32. NaHCO3 baking soda
	33. NaNO3 saltpeter
	34. NaOCl bleach
	35. NaOH caustic soda or lye
	36. SiO2 sand, quartz
6. **Mid- July: Outline Chapters 1 & 2 in your textbook and complete the AP Chemistry Summer Assignment Worksheet** to make sure that you are ready for the quiz on our first day**.**

## You will have a quiz on the first day of class when you return from break. Please do not put this assignment off until the last minute. You will not be able to get it done. A failing grade on this test will tell me that you are not ready to do the work necessary in AP Chemistry and you will be asked to attend mandatory tutoring for the first two weeks of the semester. Please do not hesitate to contact me if you have any questions. I can be reached by e-mail or phone. Thank you in advance for your cooperation and hard work. I look forward to having you in class! It will be a blast…sometimes quite literally!

Sincerely,

Jennifer Maze

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Follow on Twitter @JenGrayScience and/or @VRAPChem

**Chemistry Study Sheet: Ions and Prefixes**

|  |  |
| --- | --- |
| Monatomic Cations | Molecular Compounds |
| Element | **Formula** | **Element** | **Formula** | 1= mono |
| Aluminum | Al3+ | Lead(II)/Plumbous | Pb2+ | 2 = di |
| Barium | Ba2+ | Lead(IV)/Plumbic | Pb4+ | 3 = tri |
| Cadmium | Cd2+ | Maganese(II)/Manganous | Mn2+ | 4 = tetra |
| Calcium | Ca2+ | Maganese(III)/Manganic | Mn3+ | 5 = penta |
| Cesium | Cs+ | Magnesium | Mg2+ | 6 = hexa |
| Chromium(II)/Chromous | Cr2+ | Mercury(I)/Mercurous | Hg22+ | 7 = hepta |
| Chromium(III)/Chromic | Cr3+ | Mercury(II)/Mercuric | Hg2+ | 8 = octo |
| Cobalt(II)/Cobaltous | Co2+ | Nickel (II)/Nickelic | Ni2+ | 9 = nano |
| Cobalt(III)/Cobaltic | Co3+ | Potassium | K+ | 10 = deca |
| Copper(I)/Cuprous | Cu+ | Rubidium | Rb+ | **\*\*Drop Double Vowels** |
| Copper(II)/Cupric | Cu2+ | Silver | Ag+ |  |
| Gold | Au+ | Sodium | Na+ |  |
| Hydrogen | H­+ | Strontium | Sr2+ |  |
| Iron(II)/Ferrous | Fe2+ | Tin(II)/Stannous | Sn2+ |  |
| Iron(III)/Ferric | Fe3+ | Tin(IV)/Stannic | Sn4+ |  |
| Lithium | Li+ | Zinc | Zn2+ |  |
|  |  |
| Polyatomic Cations |  |
| Ammonium | NH4+ |  |  |  |
| Hydronium | H3O+ |  |  |  |

|  |  |
| --- | --- |
| **Monatomic Anions** | **Polyatomic Anions** |
| **Element** | **Formula** | **Name** | **Formula** | **Name** | **Formula** |
| Hydride\* | H- | Aresenate | AsO43- | Hypochlorite | ClO- |
| Fluoride\* | F- | Borate | BO33- | Iodate | IO3- |
| Chloride\* | Cl- | Bromate | BrO3- | Nitrate | NO3- |
| Bromide\* | Br- | Carbonate | CO­32- | Nitrite | NO2- |
| Iodide\* | I- | Chlorate | ClO3- | Oxalate (ethanedioate) | C2O42- |
| Oxide\* | O2- | Chlorite | ClO2- | Perchlorate | ClO4- |
| Sulfide | S2- | Chromate | CrO42- | Permanganate | MnO4- |
| Nitride\* | N3- | Cyanide | CN- | Peroxide | O22- |
| \*Exists as diatomic molecules | Dichromate | Cr2O72- | Phosphate | PO43- |
| **Naming Acids** | Dihydrogen Phosphate | H2PO4- | Phosphite | PO33- |
| **Monatomic Anion** | Ethanoate | CH3CO2-or C2H3O2- | Silicate | SiO32- |
| \*Name starts with hydro- | Hydrogen Carbonate (bicarbonate) | HCO3- | Sulfate | SO42- |
| Ion has –ic at the end and add “acid” | Hydrogen Phosphate (biphosphate) | HPO42- | Sulfite | SO32- |
| **Polyatomic Anion** | Hydrogen Sulfate (bisulfate) | HSO4- | Tetraborate | B4O72- |
| \*No hydro in name | Hydroxide | OH- | Thiocyanate | SCN- |
| If ion ends in –ite change it to –ous and add “acid” |  |  | Thiosulfate | S2O32- |
| If ion ends in –ate change it to –ic and add acid |  |  |  |  |
| Remember: “I –ate something –icky” | \*\*Hydrate (combine w prefix) | H2O |  |  |

Solubility Rules

**Circle all the ionic compounds that are INSOLUBLE (these are the precipitates)**

**Name ONE or more compounds in each row**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MgF2 | CuSO4 | NH4Cl | Fe(OH)3 | CsF |
| AgCl | CdS | CuF2 | PbSO4 | Ba(OH)2 |
| Na2SO4 | NH4OH | Sr(NO3)2 | Hg2I2 | Na2CrO4 |
| BaCO3 | PbBr2 | CaC2O4 | HC2H3O2 | MgO |



**AP Chemistry Summer Assignment**

**The following assignment is to be completed and brought with you on the first day of class.**

**Nomenclature**

Name the following binary compounds

1. IF7
2. N2O5
3. XeF2
4. N2O4
5. As4O10
6. SF6
7. PCl3
8. S2Cl2

Name these binary compounds with a fixed charge metal.

1. AlCl3
2. MgO­­­­­­­­­­­­­­
3. BaI2
4. KI
5. SrBr2
6. Na2S
7. CaF2 ­­­­­­­­­
8. Al2O3

Name these binary compounds of cations with variable charge.

1. CuCl2
2. Fe2O3
3. SnO
4. PbCl4
5. Cu2S
6. HgS
7. AuI3
8. CoP

Name these compounds with polyatomic ions.

1. Fe(NO3)3
2. NaOH­­­­­­­­
3. Cu2SO4
4. Ca(ClO3)2
5. KNO2
6. NaHCO3
7. NH4NO2
8. Cu2Cr2O7

Name these binary acids

1. HCl
2. HI

35. HF

Name these acids with polyatomic ions.

1. HClO4
2. H2SO4
3. HC2H3O2
4. H3PO4
5. HNO2
6. H2CrO4
7. H2C2O4
8. H2CO3

Name these compounds appropriately.

1. CO
2. NH4CN
3. HIO3
4. NI3
5. AlP
6. OF2
7. LiMnO4
8. HClO
9. HF
10. SO2
11. CuCr2O7
12. K2O­­
13. FeF3
14. KC2H3O2
15. MnS

Write the formulas.

1. Tin (IV) phosphide
2. Copper (II) cyanide
3. Magnesium hydroxide
4. Sodium peroxide
5. Sulfurous acid
6. Lithium silicate
7. Potassium nitride
8. Chromium (III) carbonate
9. Gallium arsenide
10. Cobalt (II) chromate
11. Zinc fluoride
12. Dichromic acid

**Solubility rules**

Review solubility rules and identify each of the following compounds as soluble or insoluble in water.

1. Na2CO3
2. CoCO3
3. Pb(NO3)2
4. K2S­­­­­­­­­
5. BaSO4
6. (NH4)2S
7. AgI
8. Ni(NO3)2
9. KI­­­­­­­­­­­
10. FeS
11. PbCl2
12. CuSO4

Predict whether each of these double replacement reactions will give a precipitate or not based on the solubility of the

products. If yes, identify the precipitate.

1. silver nitrate and potassium chloride
2. magnesium nitrate and sodium carbonate
3. strontium bromide and potassium sulfate
4. cobalt (III) bromide and potassium sulfide
5. ammonium hydroxide and copper (II) acetate
6. lithium chlorate and chromium (III) fluoride

**Balancing Equations**

Balance the following equations with the lowest whole number coefficients.

1. S8 + O2 🡪 SO3
2. C10H16 + Cl2 🡪 C + HCl
3. Fe + O2 🡪 Fe2O3
4. C7H6O2 + O2 🡪 CO2 + H2O
5. KClO3 🡪 KCl + O2
6. H3AsO4 🡪 As2O5 + H2O
7. V2O5 + HCl 🡪 VOCl3 + H2O
8. Hg(OH)2 + H3PO4 🡪 Hg3(PO4)2 + H2O

**Stoichiometry and Limiting Factor**

102. Given the equation below, what mass of water would be needed to react with 10.0g of sodium oxide?

Na2O + H2O 🡪 2NaOH

103. What mass of sodium choride is formed along with 45.0g of oxygen gas?

2NaClO3 🡪 2NaCl + 3O2

104. What mass of water will be produced when 100.0g of ammonia is reacted with excess oxygen?

4NH3 + 5O2 🡪 4NO + 6 H2O

105. If the reaction in #104 is done with 25.0g of each reactant, which would be the limiting factor?

106. Na2S + 2AgNO3 🡪 Ag2S + 2NaNO3

 a. If the above reaction is carried out with 50.0g of sodium sulfide and 35.0g of silver nitrate, which is the limiting factor?

 b. What mass of the excess reactant remains?

 c. What mass of silver sulfide would precipitate?

107. What volume of hydrogen gas (measured at STP) would result from reacting 75.0g of sodium hydroxide with 50.0g of

 aluminum?

6NaOH + 2Al 🡪 2Na3AlO3 + 3H2