ADVANCED PLACEMENT CHEMISTRY
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WELCOME!

This course is designed to be the equivalent of the general chemistry course usually taken during the first college year. This is an academic, quantitative chemistry course. Chemistry is the study of atoms and molecules and how they interact according to physical laws. Such study is applicable to your everyday life and will be demonstrated repeatedly throughout the year. Topics of study include structure of matter, states of matter, reactions, descriptive chemistry, and chemical reactions.

Since this is a college level course taught in high school, it is very demanding both in time and effort required. Much of the work involves solving math-type word problems. It is highly recommended that AP Chemistry students be concurrently enrolled in one of the highest-level mathematics courses available.

AP Chemistry will challenge you to the limits of your academic ability. In the past you may have found classes "too easy," and therefore not stimulating you enough to do your very best. This will not be the case in AP Chemistry. AP Chemistry will teach you to think at higher levels. 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.

I am pleased that you will be in AP Chemistry this coming year. It will certainly be one of the most challenging and rewarding courses you take. Enclosed is the summer assignment, which includes information about the first day test. If you have any questions please do not hesitate to email me.

Sincerely,
Ms. Tooker

AP CHEMISTRY SUMMER ASSIGNMENT and First Day Test Material

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

1. Purchase the class textbook and required materials (information may be found online at the SBHS online bookstore, however they may be purchased elsewhere – ie. Amazon.com, Borders, Barnes & Noble, or the publisher Holt/McDougal, etc.):
   - Textbook: Chemistry 7th Edition, by Zumdahl (ISBN: 978-0-618-71370-7)
   - Supplemental Book: Study Guide for Chemistry 7th Edition, by Zumdahl (ISBN: 978-0-618-52849-3)
   - Lab Notebook: Scientific Lab Notebook – Chemistry Spiral Bound 100 pages, Hayden-McNeil Publishers (ISBN: 978-1-930882-74-4)
2. Purchase your own copy of 5 Steps to a 5 AP Chemistry, 2008-2009 Edition by John Moore and Richard Langley (available at Barnes & Noble, Borders, and Amazon.com)
3. Buy a few colored highlighters and colored pens.
4. Read and study Chapters 1 and 2 of 5 Steps to a 5 AP Chemistry. Highlight material that applies to you.
5. Take the Diagnostic Test in Chapter 3 of 5 Steps to a 5 (page 17). Go ahead and write in the book, I will make additional copies of this test for you to take before the AP Exam.
6. Read and study (highlight, take notes in the margin, etc.) and do all the review questions at the end of the chapter for Chapters 5 and 7 of 5 Steps to a 5.
   - Chapter 5: Basics
   - Chapter 7: Stoichiometry
7. Bring your highlighted books, notes, and diagnostic test to school the first day of class in August. Points will be assigned to you and then the book will be returned to you for your further enjoyment.

NO LATE ASSIGNMENTS WILL BE ACCEPTED!!

AP CHEMISTRY 1st 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 to do this!

The 1st day test will cover the following areas of memorization:

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

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
Phosphate	PO_3	-3

Rules for Naming Ionic Compounds

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

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
   example: Cl^- is the chlor<u>ide</u> ion, so HCl = *hydro*chlor*ic 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
   example: ClO_2^- is the chlor<u>ite</u> ion, so $HClO_2$ = chlor*ous 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
   example: ClO_3^- is the chlor<u>ate</u> ions, so $HClO_3$ = chlor*ic acid*

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 equals 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 any halogen 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, in which case it is -1.

6. The oxidation state of hydrogen in most of its compounds is +1, unless it is 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 numbers equal to the group number (+1,+2, and +3).
8. In compounds, the elements of groups 5, 6, and 7 have oxidation numbers that can be found by subtracting the group number from the number eight (-3, -2, -1).
9. Noble gases do not typically form compounds.
10. The sum of the oxidation numbers of all atoms in a neutral compound is 0.
11. The sum of the oxidation number of all atoms in a polyatomic ion equals the charge of the ion.

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