AP Summer Assignments:

Dear Student: Welcome to your second year of chemistry! I am excited to work and learn with you during the 2009-10 school year. As student and teacher, we are part of a team with one primary goal: to prepare you for AP Chemistry exam to be given in May of 2010. To get us started toward this goal, I am assigning some problems to be worked over the summer to keep your first year of chemistry "fresh" and to reinforce key topics.

1. Email Mr. Soderholm at *Scott_E_Soderholm@mcpsmd.org*. Please tell me you are in AP, and what chemistry class you have taken already. I will add you to the authors list for our class blog (see resources below for details).
2. Visit **http://chemistry2.csudh.edu/homeworkn7/hwintrocsn7.html** and answer the **review questions** I have assigned below. Continue answering questions until you have **five (5) questions answered correctly**. If you do not have access to a computer at home, please go to the nearest library and access it from there. **These problems are due by August 24 (a week BEFORE classes begin).** This assignment **will be assessed as your first quiz** (formative assessement).
3. On the back of this paper are some **facts that you will be expected to memorize** this year. Make a set of **flash cards** physical mnemonic device of at least the **ions list** and **solubility rules** to be scored as your **first practice homework assignment**. I strongly recommend you start using your cards now, since the material will be used during our first units.
   - Basic Concepts #0 (Significant Figures) NOTE: Use the online textbook to help with this.
   - Basic Concepts #2 (Direct and Inverse Relationships)
   - Basic Concepts #4 (Scientific Notation)
   - *Basic Concepts #5 (Smaller, Larger, or the Same?)*
   - *Basic Concepts #6 (Percentage)*
   - Basic Concepts #9 (Mass, density and volume) NOTE: The program will only accept answers in 2 significant figures.
   - *Conversions #24 (Converting Densities)*
   - *Conversions #25 (Converting Temperatures)*
   - Atoms and Elements #31 (Elements, moles and mass)
   - Gases #44 (Ideal Gas Law)
   - Solutions #53 (Molarity, mass and volume)
   - **To submit your scores:** Type your ***name*** followed by a ***comma*** and **"*AP*"** (ex: "Bob Vila, AP"). Select **"*Soderholm, S*"** from the instructors list and hit **"Submit Homework!"**
   - Again, please contact me or your peers if you have trouble with these assignments.

Resources:

- www.aehschemistry.bloggspot.com (A blog I have set up mainly for use by the AP and IB classes. You are able to post questions, answers, resources, thoughts, articles, etc once I have placed your email on the list of authors. **Don't forget to email me please!**
- http://preparatorychemistry.com/ (a free online general chemistry text, with tutorials)
- Your 1st year Chemistry notes
- Your peers: Email, telephone, in person, our class blog (above), etc.
- Mr. Soderholm's email: Scott_E_Soderholm@mcpsmd.org

STUFF I SHOULD KNOW FOR THE AP TEST BUT DO NOT KNOW YET

IONS LIST

acetate	$C_2H_3O_2^-$	ferric	Fe^{3+}	oxalate	$C_2O_4^{2-}$
aluminum	Al^{3+}	ferrous	Fe^{2+}	oxide	O^{2-}
ammonium	NH_4^+	fluoride	F^-	perbromate	BrO_4^-
barium	Ba^{2+}	hydrogen	H^+	perchlorate	ClO_4^-
bicarbonate	HCO_3^-	hydronium	H_3O^+	periodate	IO_4^-
bisulfate	HSO_4^-	hydroxide	OH^-	permanganate	MnO_4^- *(purple)*
bisulfide	HS^-	hypobromite	BrO^-	peroxide	O_2^{2-}
bisulfite	HSO_3^-	hypochlorite	ClO^-	phosphate	PO_4^{3-}
bromate	BrO_3^-	hypoiodite	IO^-	phosphide	P^{3-}
bromide	Br^-	iodate	IO_3^-	phosphite	PO_3^{3-}
bromite	BrO_2^-	iodide	I^-	potassium	K^+
calcium	Ca^{2+}	iodite	IO_2^-	silver	Ag^+
carbonate	CO_3^{2-}	lead	Pb^{2+}	sodium	Na^+
chlorate	ClO_3^-	lithium	Li^+	stannic	Sn^{4+}
chloride	Cl^-	magnesium	Mg^{2+}	stannous	Sn^{2+}
chlorite	ClO_2^-	manganese	Mn^{2+}	strontium	Sr^{2+}
chromate	CrO_4^{2-} (yellow)	mercuric	Hg^{2+}	sulfate	SO_4^{2-}
chromium	Cr^{3+}	mercurous	Hg_2^{2+}	sulfide	S^{2-}
cupric	Cu^{2+} (blue)	nickel	Ni^{2+} (green)	sulfite	SO_3^{2-}
cuprous	Cu^+ (blue)	nitrate	NO_3^-	thiocyanate	SCN^-
cyanide	CN^-	nitride	N^{3-}	thiosulfate	$S_2O_3^{2-}$
dichromate	$Cr_2O_7^{2-}$ (orange)	nitrite	NO_2^-	zinc	Zn^{2+}

SOLUBILITY RULES

Always soluble:

alkali metal ions (Li^+, Na^+, K^+, Rb^+, Cs^+), NH_4^+, NO_3^-, ClO_3^-, ClO_4^-, $C_2H_3O_2^-$

Generally soluble: (mnemonics)

Cl^-, Br^-, I^- Soluble except Ag^+, Pb^{2+}, Hg_2^{2+} (AP/H)

F^- Soluble except Ca^{2+}, Sr^{2+}, Ba^{2+}, Pb^{2+}, Mg^{2+} (CBS-PM)

SO_4^{2-} Soluble except Ca^{2+}, Sr^{2+}, Ba^{2+}, Pb^{2+} (CBS/PBS)

Generally insoluble:

O^{2-}, OH^- Insoluble except and alkali metals, and NH_4^+ Ca^{2+}, Sr^{2+}, Ba^{2+} (CBS) somewhat soluble

CO_3^{2-}, PO_4^{3-}, S^{2-}, SO_3^{2-}, $C_2O_4^{2-}$, CrO_4^{2-} Insoluble except alkali metals and NH_4^+

GASES THAT FORM

$\rightarrow$ **H_2CO_3** $\rightarrow$ **CO_2** + H_2O

$\rightarrow$ **H_2SO_3** $\rightarrow$ **SO_2** + H_2O

$\rightarrow$ **HNO_2** $\rightarrow$ **NO** + **NO_2** + H_2O

$\rightarrow$ **NH_4OH** $\rightarrow$ **NH_3** + H_2O

$\rightarrow$ **H_2S**

$\rightarrow$ **HCN**

WEAK ELECTROLYTES

Weak Acids (*esp.* $HC_2H_3O_2$ and HF)

(Memorize the 8 strong acids... all others are weak)

HCl	hydrochloric acid	HNO_3	nitric acid
HBr	hydrobromic acid	HIO_4	periodic acid
HI	hydroiodic acid	H_2SO_4	sulfuric acid
$HClO_4$	perchloric acid	$HClO_3$	chloric acid

Ammonium Hydroxide ($NH_4OH \approx NH_3(aq)$) Water (H_2O)

DRIVING FORCES — **Double Replacement**

- Insoluble Solid (Precipitate)
- Weak Electrolyte (H_2O or Weak Acid)
- Gas Formation

STRONG OXIDIZERS (**Oxidizing Agents**)

MnO_4^- in acid solution	$\rightarrow Mn^{2+} + H_2O$
MnO_2 in acid solution	$\rightarrow Mn^{2+} + H_2O$
MnO_4^- in neutral or basic sol'n	$\rightarrow MnO_2$
$Cr_2O_7^{2-}$ in acid solution	$\rightarrow Cr^{3+} + H_2O$
$Cr_2O_7^{2-}$ with a base	$\rightarrow CrO_4^{2-} + H_2O$
CrO_4^{2-} in basic solution	$\rightarrow CrO_2^- + H_2O$
HNO_3, concentrated	$\rightarrow NO_2 + H_2O$
HNO_3, dilute (e.g. 6 M)	$\rightarrow NO + H_2O$
H_2SO_4, hot, concentrated	$\rightarrow SO_2 + H_2O$
Free halogens (e.g. Cl_2)	$\rightarrow$ halide ions (Cl^-)
H_2O_2 in acid solution	$\rightarrow H_2O$
Note: H_2O_2 decomposes	$\rightarrow H_2O + O_2$
Na_2O_2	$\rightarrow NaOH$
$HClO_4$	$\rightarrow Cl^- + H_2O$

Other Oxidizers

Metal-"ic" ions (e.g. Sn^{4+}, Fe^{3+})	$\rightarrow$ "-ous" ions (Sn^{2+}, Fe^{2+})
H_2O	$\rightarrow H_2 + OH^-$

STRONG REDUCERS (**Reducing Agents**)

Halide ions (e.g. Cl^-)	$\rightarrow$ Free halogen (Cl_2)
Free metals	$\rightarrow$ metal ions
"ites" SO_3^{2-} or SO_2, NO_2^-	$\rightarrow$ "ates" SO_4^{2-}, NO_3^-
Free halogens, dil. basic sol'n	$\rightarrow$ hypohalite ions (ClO^-)
Free halogens, conc. basic sol'n	$\rightarrow$ halate ions (ClO_3^-)
$S_2O_3^{2-}$	$\rightarrow S_4O_6^{2-}$

Other Reducers

Metal-"ous" ions (e.g. Sn^{2+})	$\rightarrow$ "-ic" ions (Sn^{4+})
H_2O	$\rightarrow O_2 + H^+$