

AP Summer Assignments:

Dear Student: Welcome to your second year of chemistry! I am excited to work and learn with you during the 2011-12 school year. As students 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 2012. To get us started toward this goal, I am assigning a few tasks to keep your first year of chemistry "fresh," to give you a start learning material you should know, and get you to think about how Chemistry connects to everything else in the world.

1. Log in to Turnitin.com, and enroll in next year's class. Course ID: 4062330. Password: chaps (get it? Chemistry AP's? Ha?) Click the "discussion" tab and post an introduction (your name and a fun fact), then check the chemistry news discussion topic for a simple and hopefully fun assignment you need to complete.
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** in each topic. 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 19 (a week BEFORE classes begin)**. This assignment **will be assessed as your first quiz** (formative assessment).
3. I have created a class and a set of flash cards on StudyBlue.com to help you begin learning your ions and some other facts, which will be used on your early quizzes and through the year. Check out class # 241603 to access them.
 - o Basic Concepts #0 (Significant Figures) NOTE: Use the online textbook to help with this.
 - o Basic Concepts #2 (Direct and Inverse Relationships)
 - o Basic Concepts #4 (Scientific Notation)
 - o *Basic Concepts #5 (Smaller, Larger, or the Same?)*
 - o *Basic Concepts #6 (Percentage)*
 - o Basic Concepts #9 (Mass, density and volume) NOTE: The program will only accept answers in 2 significant figures.
 - o *Conversions #24 (Converting Densities)*
 - o *Conversions #25 (Converting Temperatures)*
 - o Atoms and Elements #31 (Elements, moles and mass)
 - o Gases #44 (Ideal Gas Law)
 - o Solutions #53 (Molarity, mass and volume)
 - o **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!"**
 - o Again, please contact me or your peers if you have trouble with these assignments.

Resources:

- Turnitin.com summer work/help discussion – Post any questions, answers, or resources you've found. Don't forget to post a short news story summary and comment on your peers' summaries also please.
- <http://preparatorychemistry.com/> (a free online general chemistry text, with tutorials)
- Your 1st year Chemistry notes
- KhanAcademy.org (under Watch → Chemistry) has many video lectures you may find useful. If the math itself is giving you trouble, try the math videos and progressive practice problems!
- 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 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

→ H_2CO_3 → CO_2 + H_2O → NH_4OH → NH_3 + H_2O

→ H_2SO_3 → SO_2 + H_2O → H_2S

→ HNO_2 → NO + NO_2 + H_2O → 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 → Mn^{2+} + H_2O

MnO_2 in acid solution → Mn^{2+} + H_2O

MnO_4^- in neutral or basic sol'n → MnO_2

$Cr_2O_7^{2-}$ in acid solution → Cr^{3+} + H_2O

$Cr_2O_7^{2-}$ with a base → CrO_4^{2-} + H_2O

CrO_4^{2-} in basic solution → CrO_2^- + H_2O

HNO_3 , concentrated → NO_2 + H_2O

HNO_3 , dilute (e.g. 6 M) → NO + H_2O

H_2SO_4 , hot, concentrated → SO_2 + H_2O

Free halogens (e.g. Cl_2) → halide ions (Cl^-)

H_2O_2 in acid solution → H_2O

Note: H_2O_2 decomposes → H_2O + O_2

Na_2O_2 → $NaOH$

$HClO_4$ → Cl^- + H_2O

Other Oxidizers

Metal-"ic" ions (e.g. Sn^{4+} , Fe^{3+}) → "-ous" ions (Sn^{2+} , Fe^{2+})

H_2O → H_2 + OH^-

STRONG REDUCERS (Reducing Agents)

Halide ions (e.g. Cl^-) → Free halogen (Cl_2)

Free metals → metal ions

"ites" SO_3^{2-} or SO_2 , NO_2^- → "ates" SO_4^{2-} , NO_3^-

Free halogens, dil. basic sol'n → hypohalite ions (ClO^-)

Free halogens, conc. basic sol'n → halate ions (ClO_3^-)

$S_2O_3^{2-}$ → $S_4O_6^{2-}$

Other Reducers

Metal-"ous" ions (e.g. Sn^{2+}) → "-ic" ions (Sn^{4+})

H_2O → O_2 + H^+