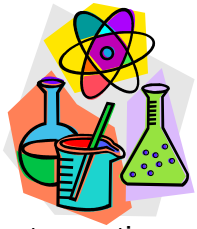
Welcome to AP Chemistry!



Dear AP Chemistry Student & Parents,

I'm excited that you have chosen to take AP Chemistry next year and am eager to continue our work together in this fall. Until then, this letter and packet contains information about the AP Chemistry Summer Assignment. As you can expect of any AP course, AP Chemistry is a fast paced, *college-level* course that begins with new material in the very first week of school. You will learn as much as any freshman taking chemistry at a college or university. The class will be challenging, but the biggest factor in determining your success will be the amount of effort you put into the class. If you complete the class assignments and seek help when needed, you can definitely be successful in the class and ultimately on the AP exam. One of the expectations so that you are prepared for such a challenging course is that the summer assignment **MUST** be completed so that you are ready to succeed in AP chemistry. The selected summer assignment problems will review the concepts and skills which you have spent a *year* learning in chemistry so that we can build upon those ideas in more depth at the start of AP Chemistry.

AP Chemistry Summer Assignment:

On the following pages is a checklist of concepts and skills that you have *already* learned in chemistry and should be confident in demonstrating PRIOR to beginning AP Chemistry in the fall.

1) **Self-assess your progress on the skills checklist** by checking off ☑ concepts/ skills that you are already confident in demonstrating. **Bolded ideas** are *especially important* skills.

2) **Improve your understanding of any concepts/ skills that you need to review by:**
   - reading the assigned textbook pages (an outline/notes may be helpful) *and/or*
   - seeking other resources (videos, tutorials, practice problems) on my school website: http://www.wlps.org/WLHS/Class/132-Ms-Verissimo/3802-AP-Summer.html

   For the summer, you can access the e-book or see me before school ends for a textbook.
   e-book access: www.PeasonSchool.com/Access
   textbook: "*Brown/LeMay/Bursten, Chemistry: The Central Science 12e AP Edition*"
   register (code: ssnast-sunup-skelf-turvy-begot-aides) to create a personal login

3) **Solve the selected problem set for each unit of learning. Please show your work!**

4) **Personal Statement**

Lastly, please be prepared to be assessed on the summer assignment during the first week back to school. If you are not prepared for the quizzes, you will be asked to seek extra help after school during the first two weeks of the semester. **Most important, *please do not hesitate to contact me if you have any questions*.** If it would be helpful, I can try to arrange a study session over the summer. Thank you in advance for your dedication and hard work. Enjoy the summer and I look forward to working with you in class! It will be a blast…sometimes quite literally!

Sincerely,

Ms. Verissimo
sverissimo@wlps.org

AP CHEMISTRY Summer Assignment: Skills Checklist

I can…

Ch 1: Matter and Measurement

- ☐ distinguish between atoms, elements, and compounds, ions, molecules, and mixtures (pg. 4-11)
- ☐ ***memorize*** the names and symbols of common elements (pg 8)
    - see attached periodic table and flashcards
- ☐ recognize physical versus chemical changes and intensive versus extensive properties (pg 11-12)
- ☐ measure and calculate in *metric* units (pg 14-19)
- ☐ distinguish between precision and accuracy (pg 20-22)
- ☐ measure and report calculated answers using **significant figures (pg 22-25)**
- ☐ problem solve using **dimensional analysis** (pg 25-29)
- ☐ calculate experimental error
- ☐ recognize lab safety rules

Please complete the following Exercises (pgs 31-37):

1.1, 1.2, 1.8, 1.12, 1.14, 1.24, 1.36, 1.37, 1.38, 1.39, 1.40, 1.42, 1.46, 1.48, 1.60, 1.64, 1.70, 1.75

***For any multi- part question, solve only a & b*
If you need extra practice with a particular skill, you may want to solve additional problems

Ch 2: Atoms, Molecules, and Ions

- ☐ describe the structure of an atom (pg 40-48)
- ☐ describe the organization (properties and locations) of elements on the periodic table (pg 49-51)
    - Group 1A (Alkali Metals)
    - Group 2A (Alkaline Earth Metals)
    - Group 7A (Halogens)
    - Group 8A (Noble Gases/inert gases)
    - metals, nonmetals, and metalloids
- ☐ list the 7 diatomic elements ("HONClBrIF") (pg 53)
- ☐ recognize vocabulary: cation, anion, chemical formula, structural formula (pg 52-56)
- ☐ compare/ contrast ionic and molecular compounds
- ☐ ***memorize*** the names and charges of monatomic and polyatomic ions (pg 60-63)
    - see attached ion chart and flashcards
- ☐ **write formulas and name ionic and covalent (molecular) compounds (pg 56-66)**
- ☐ write and name simple organic compounds (pg 66-67)
    - *memorize* organic functional groups

Please complete the following Exercises (pgs 69-75):

2.3, 2.4, 2.5, 2.6, 2.7, 2.20, 2.22, 2.24, 2.26, 2.38, 2.46, 2.48, 2.50, 2.52, 2.56, 2.58, 2.60, 2.66, 2.68, 2.72, 2.74, 2.76, 2.80, 2.94, 2.97, 2.99, 2.103

***For any multi- part question, solve only a & b*
If you need extra practice with a particular skill, you may want to solve additional problems

Ch 3: Stoichiometry

- ☐ balance and interpret chemical reactions (pg 78-81)
- ☐ classify basic reaction types (pg 82-84)
- ☐ calculate formula weights/ molar masses (pg 85-89)
- ☐ calculate percent composition (pg 85-86)
- ☐ recognize the **MOLE** as a chemical unit and Avogadro's Number (6.02×10^{23} particles) (pg 86-87)
- ☐ **convert between moles, mass, particles** (pg 90-92)
- ☐ calculate empirical and molecular formulas (pg 92-95)
- ☐ apply **STOICHIOMETRY** to analyze quantities of substances in a chemical reaction (pg 96-103)
- ☐ identify limiting and excess reactants and calculate theoretical and percent yields (pg 99-103)

Please complete the following Exercises (pgs 105-113):

3.9, 3.12, 3.14, 3.16, 3.18, 3.20, 3.22, 3.24, 3.26, 3.27, 3.34, 3.36, 3.38, 3.44, 3.46, 3.50, 3.52, 3.54, 3.58, 3.62, 3.63, 3.64, 3.66, 3.68, 3.72, 3.76, 3.78

For any multi- part question, solve only a & b
If you need extra practice with a particular skill, you may want to solve additional problems

Ch 4: Reactions in Aqueous Solution

- ☐ define solute, solvent, and solution (pg 115-116)
- ☐ distinguish between the types of compounds that are electrolytes (pg 116-119)
- ☐ ***memorize*** the solubility rules (pg 121)
  - see attached chart
- ☐ predict the products of double replacement precipitation reactions (pg 119-122)
- ☐ distinguish between acids and bases (pg 124-128)
- ☐ ***memorize*** the 7 strong acids and 8 strong bases (pg 124)
- ☐ solve problems using Molarity as a unit of concentration (pg 139-143)

Please complete the following Exercises (pgs 150-153):

4.2, 4.16, 4.20, 4.22, 4.36, 4.38, 4.62, 4.68, 4.74, 4.76

For any multi- part question, solve only a & b
If you need extra practice with a particular skill, you may want to solve additional problems

Important Information to Memorize:

On the AP exam, you will NOT be given an ion chart, so it is essential to memorize ions and their names:

IONS LIST

acetate	$C_2H_3O_2^-$	ferric	Fe^{3+} (yellow)	oxalate	$C_2O_4^{2-}$
aluminum	Al^{3+}	ferrous	Fe^{2+} (green)	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^+ (green)	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+}

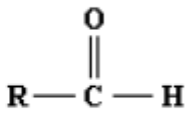
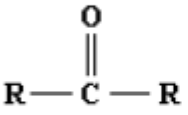
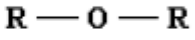
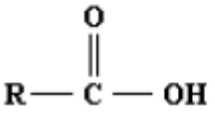
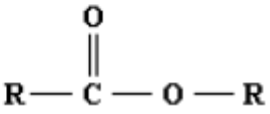
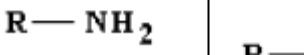
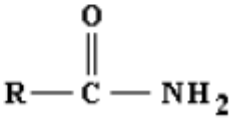
TABLE 4.1 ■ Solubility Guidelines for Common Ionic Compounds in Water

Soluble Ionic Compounds		Important Exceptions
Compounds containing	NO_3^-	None
	CH_3COO^-	None
	Cl^-	Compounds of Ag^+, Hg_2^{2+}, and Pb^{2+}
	Br^-	Compounds of Ag^+, Hg_2^{2+}, and Pb^{2+}
	I^-	Compounds of Ag^+, Hg_2^{2+}, and Pb^{2+}
	SO_4^{2-}	Compounds of Sr^{2+}, Ba^{2+}, Hg_2^{2+}, and Pb^{2+}
Insoluble Ionic Compounds		**Important Exceptions**
Compounds containing	S^{2-}	Compounds of NH_4^+, the alkali metal cations, and Ca^{2+}, Sr^{2+}, and Ba^{2+}
	CO_3^{2-}	Compounds of NH_4^+ and the alkali metal cations
	PO_4^{3-}	Compounds of NH_4^+ and the alkali metal cations
	OH^-	Compounds of the alkali metal cations, and NH_4^+, Ca^{2+}, Sr^{2+}, and Ba^{2+}

TABLE 4.2 ■ Common Strong Acids and Bases

Strong Acids	Strong Bases
Hydrochloric, HCl	Group 1A metal hydroxides (LiOH, NaOH, KOH, RbOH, CsOH)
Hydrobromic, HBr	Heavy group 2A metal hydroxides [$Ca(OH)_2$, $Sr(OH)_2$, $Ba(OH)_2$]
Hydroiodic, HI	
Chloric, $HClO_3$	
Perchloric, $HClO_4$	
Nitric, HNO_3	
Sulfuric, H_2SO_4	

Organic Chemistry: Functional Groups

alkanes C_nH_{2n+2}	alkenes C_nH_{2n}	alkynes C_nH_{2n-2}	aromatics (benzene) C_6H_6
alcohol R — OH	aldehyde 	ketone 	ether 
carboxylic acid 	ester 	amine 	amide 

Flame Test Colors

Barium – green
Sodium – yellow
Copper – blue (w/ green)
Potassium – lavender
Strontium – red
Lithium – red
Calcium – orange

AP Chemistry Personal Statement

I already know most of you from Honors Chemistry, but I would like to gain a little more insight into your interests and goals for AP Chemistry as we work together for another year. ☺

1. Describe your Chemistry experience last year. What were your strengths and weaknesses? What teaching and learning techniques work best for you? Anything else I should know about you?

2. Describe your hopes/ goals for AP Chemistry. What made you decide to take this class? What do you hope to gain from the class? What is your goal score for the AP exam? Describe the effort you will put forth to succeed in class. Have you, or are you currently, taking any other AP science or AP courses?

3. Tell me about yourself. How would you describe yourself? What do you like to do for fun? What activities are you involved in? What kind of goals do you have for your life?