AP Chemistry Summer Assignment

class website [**https://sites.google.com/a/rcs.rang.k12.va.us/baucom**](https://sites.google.com/a/rcs.rang.k12.va.us/baucom)

 The AP Chemistry course covers 2 semesters of college General Chemistry and laboratory (usually 8 college credits). Your summer assignment will be to complete a problem set that will give you an idea of concepts and skills that you need to make sure you are familiar with as a foundation for the course. The assignment counts as a test grade, is a requirement for taking the course, and is due the first day of class in August.

Summer Assignment:

1) Pick up a copy of the AP Chemistry Textbook and information packet. The Zumdahl textbook you have been

 assigned will not be the textbook we use next year. We have a limited number of texts for the course next year

 and are in the process of ordering more. However, this text is a good resource. I have listed chapter numbers

 from the Zumdahl text that align to the content of the problems you are working through. Access to the internet

 will also be helpful in order to access the class website, but is not required.

2) Complete the problem set attached. All work should be completed on notebook paper in blue/black ink or

 pencil, with adequate spacing between problems, and you should circle all calculated answers. Your work must

 support your answer and your written answers should be concise and cover all question points. The following

 resources are available if needed:

 \*A powerpoint is posted on the class website that provides a slide of notes for each problem. To

 access, go to the class website and click on “Forms & Docs” under the AP Chemistry menu. The

 powerpoint is titled “Summer Assignment Notes 2017-18”.

 \*An answer key/rubric is provided as a way to check your work and to confirm you are on the

 right track.

3) Write the number(s) of any problems you weren’t sure about (and might like to see worked) at the top of the

 first page of your completed problem set.

On the back of this sheet of info is a checklist of items that would be helpful for you to identify areas of content that you might need the most review as you prepare for the AP Chemistry course. This checklist is for you only. Feel free to email me this summer with any items that you would like me to make sure I cover specifically when we get to those areas of content in the course. It is completely understandable that you might feel rusty on some of the concepts you will need to recall when working on the problem set. If you have any other questions over the summer, please don’t hesitate to contact me. If you have difficulty accessing the class website, I can email you the powerpoint resource for the problem set available on that website. **sherry\_baucom@rockbridge.k12.va.us**

\_\_\_\_\_metric conversions (know prefixes femto to

 Giga)

\_\_\_\_\_metric conversions w/cubed & squared units

\_\_\_\_\_temperature conversion (◦C, K, & ◦F)

\_\_\_\_\_sig figs

\_\_\_\_\_dimensional analysis

\_\_\_\_\_isotopes (hyphen & standard nuclear notation)

\_\_\_\_\_nuclear stability (n:p ratio), mass defect,

 binding energy

\_\_\_\_\_nuclear decay (, elec.capture, p.emission)

\_\_\_\_\_decay series

\_\_\_\_\_half-life

\_\_\_\_\_radioactive dating

\_\_\_\_\_fission & fusion

\_\_\_\_\_electron configurations & orbital diagrams

\_\_\_\_\_recognize ions (single, multiple charges,

 polyatomics)

\_\_\_\_\_know diatomics

\_\_\_\_\_name & write chemical formulas for chemical

 compounds (ionic, covalent, acids, simple

 organic)

\_\_\_\_\_draw Lewis structures

\_\_\_\_\_identify molecular shape using VSEPR

\_\_\_\_\_recognize types of reactions

\_\_\_\_\_balancing equations

\_\_\_\_\_use of activity series

\_\_\_\_\_use of solubility rules

\_\_\_\_\_recognize strong/weak electrolytes

\_\_\_\_\_write complete & net ionic reactions

\_\_\_\_\_determine oxidation numbers

\_\_\_\_\_identify oxidation & reduction w/Redox rx

\_\_\_\_\_calculate percent by mass (aka % composition)

\_\_\_\_\_mole calc (grams, particles, molar

 volume, stoichiometry)

\_\_\_\_\_empirical formula calculations

\_\_\_\_\_stoichiometry calculations

\_\_\_\_\_determine limiting & excess reactant,

 theoretical & % yield calculations

\_\_\_\_\_solubility (saturated/unsat./supersat.)

\_\_\_\_\_solution concentration (molarity, molality,

 % by mass, % by volume, ppm, ppb)

\_\_\_\_\_dilutions

\_\_\_\_\_colligative properties (vapor pressure, FP

 depression, BP elevation, osmotic pressure)

\_\_\_\_\_titrations

\_\_\_\_\_enthalpy calculations (∆Hfus,∆Hvap,∆Hsub,bond

 enthalpy)

\_\_\_\_\_recognize endo-/exo- thermic processes

\_\_\_\_\_calorimetry calculations

\_\_\_\_\_Hess’s Law

\_\_\_\_\_entropy

\_\_\_\_\_atomic models

\_\_\_\_\_analyze electromagnetic spectrum

\_\_\_\_\_calculate wavelength, frequency, energy

\_\_\_\_\_recognize energy absorption & emission

\_\_\_\_\_photoelectric effect

\_\_\_\_\_emission spectra

\_\_\_\_\_quantum mechanics

\_\_\_\_\_trends (atomic size, electronegativity, IE)

\_\_\_\_\_effective nuclear charge

\_\_\_\_\_ionic bonding

\_\_\_\_\_covalent bonding (polar, nonpolar, resonance,

 octet rule exceptions, formal charge calc.)

\_\_\_\_\_metallic bonding

\_\_\_\_\_intermolecular forces (dispersion, dipole

 Hydrogen bonding)

\_\_\_\_\_kinetic molecular theory

\_\_\_\_\_pressure unit conversions (atm,Torr,mmHg,

 Pa,kPa,inches,bar)

\_\_\_\_\_gas calculations

 \_\_\_Boyles, Charles, Gay-Lussac,combined \_\_\_Ideal Gas

 \_\_\_Dalton’s

 \_\_\_collection over water

 \_\_\_Graham’s

 \_\_\_molar volume

 \_\_\_STP

 \_\_\_stoichiometry

\_\_\_\_\_diffusion & effusion

\_\_\_\_\_liquids (viscosity,volatility,surface tension,

 capillary action)

\_\_\_\_\_solids (crystalline,amorphous,molecular/

 covalent network/ionic/metallic, lattice)

\_\_\_\_\_phase changes

\_\_\_\_\_phase diagrams

\_\_\_\_\_heating curves

\_\_\_\_\_collision theory (orientation,energy)

\_\_\_\_\_energy diagrams (Ea, act.complex,catalyst)

\_\_\_\_\_equilibrium

 \_\_\_physical/chemical

 \_\_\_write equilibrium expressions

 \_\_\_calculate Keq (K=1, K>1, K<1)

 \_\_\_LeChatlier’s Principle & shifts w/changes

 in concentration,pressure,temp,volume)

\_\_\_\_\_acids & bases

 \_\_\_properties

 \_\_\_Arrhenius,Bronsted-Lowry,Lewis

 \_\_\_polyprotic acids

 \_\_\_Kw = [H3O+][OH-] = 1x10-14

 \_\_\_conjugate acid/base pairs

 \_\_\_recognize strong & weak electrolytes

 \_\_\_pH scale, indicators, pH meter

 \_\_\_Ka, Kb, Ksp

 \_\_\_calc pH & pOH

 \_\_\_pKa, pKb, Henderson-Hasselbalch

 \_\_\_analyze titration curves