AP CHEMISTRY

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Course description: You are one of the select few students who registered for AP Chemistry this year. This science AP course is one of the capstones of the most rigorous secondary school science curricula taught in America. Only 0.3% of high school students embark on this academic journey[1] each year. With this in mind, the academic "heavy lifting" that is associated with this course must be noted. Besides content mastery of the material, critical thinking and problem solving abilities are mandatory talents for academic success and solid scores on the AP Exams. Content can be taught; however, problem solving and critical thinking are acquired by lifelong effort and natural abilities.

As a Salisbury School Student, you can sometimes over extend yourself. Because all AP courses have distinct goals that must be reached, some students can fall behind when extracurricular activities are the mainstay of their daily or weekly schedules. Also, the spirit of our high school curriculum is experiential, with many classes requiring field trips and extra curricular adventures (only 119 days of instruction according to my calculations). This means that the overall tone of our school operates contrary to the nature of some AP driven courses. With limited instructional time available for preparation for the AP science exams, students must work independently and vigorously to meet the learning objectives.

This letter is not intended to discourage you, but you need to know the level of commitment required to excel in the AP Chemistry course. With this in mind, we all must be committed to the final goals: understanding and mastering the content and achieving a high score on the AP examinations. I want you to be prepared to assess your abilities and your level of commitment during the first weeks of schools.

In the following pages I have listed all of the AP Chemistry goals for the year. I have also darkened the bullet point items of all the subjects that were covered in honor's chemistry. If you feel you have an inadequacy in those areas do not hesitate to see me and we can work out a study plan.

Daily work will be posted online at *www.drjdegan.com*.

Please purchase the following text:

Brown, LeMay, Bursten, Murphy, Woodward Chemistry the Central Science 12ed
ISBN-10: 0321696727 ISBN-13: 978-0321696724

Materials needed every day:

- Text book (you must purchase, see above)
- A 2 inch (or larger) 3-ring binder (binder will stay in classroom)
- 1 Clasp folder for paper transport
- Mechanical Pencil & erasers
- Calculator

[1]Statistic is just based on AP Chemistry:
According to http://www.census.gov/prod/2003pubs/c2kbr-26.pdf there were 16,380,951 students enrolled in secondary education in the year 2000. According to a National Science Foundation study, there were 51,293 students enrolled in Chemistry AP classes. http://www.nsf.gov/statistics/nsf03312/c1/c1s1.htm $5.13 \times 10^4 \div 1.64 \times 10^7 = 0.3\%$

Chapters	IV. Descriptive (1-15%) and V. Laboratory (5-10%)
23 **24**	○ Products chemical reactions ○ Relationships in the periodic table: horizontal, vertical and diagonal with examples from alkali metals, alkaline earth metals, halogens and the first series of transition elements ○ Introduction to organic chemistry: hydrocarbons and functional groups (structure, nomenclature, chemical properties)
LAB	○ Making observations ○ Recording data, calculations, interpretations ○ Scientific writing

Chapters	I. Structure of Matter (20%)
2 **3** **3** **6** **7** **22**	**Atomic theory and atomic structure** ○ Evidence for the atomic theory ○ Atomic masses; determination by chemical and physical means ○ Atomic number and mass number; isotopes ○ Electron energy levels: atomic spectra, quantum numbers, atomic orbitals ○ Periodic relationships including, for example, atomic radii, ionization energies, electron affinities, oxidation states
8 **11** **9**	**Chemical bonding** **Binding forces** ○ Types: ionic, covalent, metallic, hydrogen bonding, van der Waals (including London dispersion forces) ○ Relationships to states, structure, and properties of matter ○ Polarity of bonds, electronegativities **Molecular models** ○ Lewis structures ○ Valence bond: hybridization of orbitals, resonance, sigma and pi bonds ○ VSEPR ○ Geometry of molecules and ions, structural isomerism of simple organic ○ molecules and coordination complexes; dipole moments of molecules; relation of properties to structure
21	○ Nuclear chemistry: nuclear equations, half-lives, and radioactivity; chemical applications

Chapters	II. States of Matter (20%)
10	**Gases** Laws of ideal gases ○ Equation of state for an ideal gas ○ Partial pressures Kinetic molecular theory ○ Interpretation of ideal gas laws on the basis of this theory ○ Avogadro's hypothesis and the mole concept ○ Dependence of kinetic energy of molecules on temperature ○ Deviations from ideal gas laws
11 **12**	**Liquids and solids** ○ Liquids and solids from the kinetic-molecular viewpoint ○ Phase diagrams of one-component systems ○ Changes of state, including critical points and triple points ○ Structure of solids; lattice energies
13	**Solutions** ○ Types of solutions and factors affecting solubility ○ Methods of expressing concentration (use of normalities is not tested) ○ Raoult's law and colligative properties (nonvolatile solutes); osmosis ○ Nonideal behavior (qualitative aspects)

Chapters	III. Reactions (35–40%)
4 **16** **20**	**Reaction types** ○ Acid-base reactions; concepts of Arrhenius, Brønsted-Lowry and Lewis; ○ coordination complexes; amphoterism ○ Precipitation reactions ○ Oxidation-reduction reactions ○ Oxidation number ○ The role of the electron in oxidation-reduction ○ Electrochemistry: electrolytic and galvanic cells; Faraday's laws; standard ○ half-cell potentials; Nernst equation; prediction of the direction of redox reactions

Chapters	III. Reactions (35–40%) continued
3	**Stoichiometry** ○ Ionic and molecular species present in chemical systems: net ionic equations ○ Balancing of equations, including those for redox reactions ○ Mass and volume relations with emphasis on the mole concept, including ○ empirical formulas and limiting reactants
15 **16** **17**	**Equilibrium** ○ Concept of dynamic equilibrium, physical and chemical; Le Chatelier's principle; ○ equilibrium constants ○ Quantitative treatment ○ Equilibrium constants for gaseous reactions: *Kp, Kc* ○ Equilibrium constants for reactions in solution ○ Constants for acids and bases; pK; pH ○ Solubility product constants and their application to precipitation and the ○ dissolution of slightly soluble compounds ○ Common ion effect; buffers; hydrolysis
14	**Kinetics** ○ Concept of rate of reaction ○ Use of experimental data and graphical analysis to determine reactant ○ order, ○ rate constants and reaction rate laws ○ Effect of temperature change on rates ○ Energy of activation; the role of catalysts ○ The relationship between the rate-determining step and a mechanism
5 **19**	**Thermodynamics** ○ State functions ○ First law: change in enthalpy; heat of formation; heat of reaction; Hess's law; ○ heats of vaporization and fusion; calorimetry ○ Second law: entropy; free energy of formation; free energy of reaction; ○ dependence of change in free energy on enthalpy and entropy changes Relationship of change in free energy to equilibrium constants and electrode ○ potentials

Scientific Writing:

Use the following rough draft indicators to reread and fix your lab report section.

FFFF- Format/mechanics problem check online guide for correct format.

SSSS- Look closer at this statement and make it easier to read and run a spell check.

WWWW- - Incorrect word choice, rephrase and remove inappropriate word

EEEE - See me

JJJJ- Made too far of a jump from one statement to the next. You need to add a sentence or two to clarify this assumption or transition.

MMMM- Add more information here

LAB1 FINAL DRAFT EVALUATION (example)

Grading rubric:	Possible	Score	Reason
Introduction	20	-4	Forgot in this study paragraph…
Materials Methods	20	-5	No second experiment protocol?
Results	20	-2	Show the actual equation in this section and the results
Conclusion	20		
Figures & Tables	20	-2	equation used to solve- see fig
format	(- 20pts)	-5	late
TOTAL	100	81	

Grading:

Class Work/Homework 40%:
This consists of homework problems from the book, any supplemental sheet, science labs and lab reports.

Test/Quizzes 40%:
Test and quizzes can range from multiple choice questions to free response problems.

Trimester Project 20%:
For the first and second trimester the project will be an exam on the material covered in preparation for the AP exam. For the third trimester the project will be an independent laboratory assignment with a lab report.

I have read the syllabus and understand the conditions by which I will be evaluated.

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Print your name

_____
Your signature

_____
Print your parent or guardian's name

_____
Your parent or guardian's signature

	@	

Your parent or guardian's email address

Your parent or guardian's preferred contact phone number