

Chemistry 1A: General Chemistry:**Instructor Name:** R. Culp, M.S.**Location:** Reedley College**E-Mail:** robb.culp@reedleycollege.edu**(Best contact: In person or email)****Office Hours:** *There are no office hours. Plan to use down time in laboratory, or the time immediately following lab.***Course Syllabus:****Schedule Number:** 50180**Units:** 5**Lecture:** T/Th 3:30-4:45 PM in PHY 76**Laboratory:** T/Th 5:00 -7:50 PM in PHY 82*As a rule the lab will not dismiss before 7:50 PM*

Course Description:

This is the first course in a two course sequence in general chemistry and is intended for students majoring in science or satisfying prerequisites for professional schools. Topics included in the course are atoms, molecules, and ions, chemical formulas, and equations, stoichiometry, gas laws, electronic structure of atoms, chemical bonding, atomic orbital, and molecular orbital theories, solutions, precipitation reactions, oxidation reduction reactions, introduction to acids and bases, thermochemistry, properties associated laboratory experiments, and volumetric and gravimetric analysis methods.

Required Materials

- **Lecture Text.** Chemistry a Molecular Approach, by Nivaldo J. Tro [2nd or 3rd (recommended) edition].
- **Lab Text.** Reedley College Chem 1A lab book by Veronica Cornell (2013)
- **A simple scientific calculator: TI-30xa is recommended; it's simple and cheap.** Note: Only simple function calculators with small rectangular windows, capable of scientific notation (handles exponents of 10), and having log and 10^x functionality are allowed during examinations. **Graphing or programmable calculators are not allowed.** Nothing may be written on your calculator with the exception of your name; anything other than your name may be considered cheating. Calculators are checked during exams to enforce this rule.
- **Computer/Internet access.** Some materials for this class are posted on blackboard. Great updates are available only by e-mail or in class. Internet access is highly recommended.
- **Scantrons.** The final exam uses a scantron (882), answers to midterm exams are fill-in no scantron rqrtd.

A.) COURSE REQUIREMENTS FOR A PASSING GRADE:

- 1.) **ATTENDANCE:** Class lectures begin promptly at the scheduled time. Attendance is graded as a part of your class participation grade. No allowance can be made if you fail to initial the attendance sheet that is available at the beginning of each class. Coming in more than 5 min. late will count as an absence. Please plan to arrive at the normal start time for the class and laboratory.
- 2.) **COME PREPARED FOR CLASS:** Do the assigned reading before class. This is an important component of your homework assignment. The classroom lecture moves at a VERY fast pace. If you want to be productive, and understand what is said during lecture do the assigned reading.
- 3.) **MINIMUM TIME COMMITMENT:** Success in college chemistry stands on three factors. You are asked to divide your time (6-9 hours minimum per week, outside class) between all three (below) if you need an A, B or C grade. *You may find, depending on the quality of your previous course work, that more time is required so plan accordingly.*
 - **~1.5 hours per week** to read and highlight the text before lecture on the topic. The reading assignment and the lecture topics are listed for each lecture at the end of this syllabus. Work the examples in the text, identify areas of potential difficulty. Bring questions to class, to a tutor, or to your lab. Get clarity and understanding of important topics before beginning homework. Lectures don't cover all topics; your instructor has to prioritize what is addressed in class.
 - **~2-2.5 hours per week** to complete a careful post lecture review. PowerPoint slides are posted on line. Download these as handouts before each class and take additional notes. We will frequently do lecture examples that supplement slides examples. Review each lecture and do the following: (1) Define key terms; these were highlighted during lecture. (2) Rework ALL examples from the lecture and text. (Make sure you understand each example.) (3) Identify and transfer to a "3x5" card important equation setups, terms and methods for later review and study. The actual PowerPoint file from lecture is also posted and you may review this in detail at home.

- ~Minimum 4-6 hours per week for homework. Homework consists of a mix of problems that should help you check your understanding of lecture concepts. A 90% average homework score at the end of the semester will count as 100%. Any adjusted average score below 90% will be recorded as is. Many students who fail the course have great homework scores. Do additional problems as needed to assure yourself that you understand the concepts from the lecture outline. **The homework questions are not found on the exams, exams probe your understanding of definitions examples and concepts based on the lecture outline.** In some cases you may find hmwk questions on the exam but they are not the primary goal.
- 4.) **Plan your special events carefully:** Attending a wedding out of town, caring for an ill relative, going on a cruise, having a baby, getting married or any significant distraction WILL place you at a statistical risk of failing the class. Your instructor can excuse you from attendance, but not from the required course work. **Exams, homework and laboratory are never excused.**
- 5.) **Chemistry Survival:**
- Decide today what grade you are going to accept, and commit yourself to achieving it. Half measures yield one quarter of the desired result. Just good enough is NEVER good enough! **If you push yourself to achieve, you will!**
 - Don't go it alone, get a study partner! Working with a study partner has been shown to lift the average score by half a grade point or more. In the process you are accountable for a work ethic that yields success.
 - Tutoring is available. Get help when you need it.
 - **Who do you think you are?** *Regardless of what you do, expect to work at the level of a serious science or engineering major.* This class is targeted to that group. Doctors make up one percent of the US population, two percent are engineers. Conservatively the goals of students here represent only 5% of the US population. If you want to be one of the top 5%, you have to be better than the other 95%! If you don't have a 120 IQ you better have a top 5% work ethic. **"You are who you decide to be."**

B.) Course Policies and Descriptions:

- 1.) **Course Grading Policies:** The primary criterion for grading in this course is performance on exams, quizzes and in the laboratory. Borderline grades may be raised (1-2%) if the final exam grade reflects both your effort in the course and an increased understanding of the course material. Students with poor attendance and/or homework grades are not considered for rounding up 1-2% to a higher grade.

Grading: Your graded work is valued as follows for the purpose of calculating your overall grade:

	Number:	Percent of Grade:	Comment:
Home Work	17	7 %	<i>Daily assignments are at the end of the syllabus.</i>
Attendance in Lecture	33	3 %	
Midterm Exams	2 Quizzes, 3 Exams	40 %	<i>Descriptions are on pg. 3 & 12</i>
Comprehensive Final Exam	1	25 %	<i>See pg. 3</i>
Laboratory	4 Quizzes (3% ea.), Labs (13% total)	25 %	<i>Attendance in Laboratory is Required</i>

$$\% \text{ Overall} = 0.07 \times \% \text{ HmWk} + 0.03 \times \% \text{ Attn.} + 0.40 \times \% \text{ Exam} + 0.25 \times \% \text{ Final} + 0.25 \times \% \text{ Lab}$$

% Overall semester scores are converted to letter grades based on the following:

> 89.9 % A	80-89.9 % B	70-79.9 % C	55-69.9 % D	<55% F
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- 2.) **Description of Letter Grades:** Grades may be changed slightly ($\pm 2\%$) at the discretion of your instructor. An "A" grade reflects excellent work that yields clear evidence of a deep understanding of the theory taught throughout the course. These students have a clear, conversant, mastery of terms, theory and course calculations. A "B" grade reflects a good technical mastery of calculations and intermediate course concepts, but an individual who lacks the breadth of theory and application knowledge that an "A" student possesses. A "C" grade reflects a satisfactory functional understanding of many of the fundamental concepts and basic calculations. Students at the bottom end of this range may not possess all the requisite knowledge and skills to continue on in other chemistry courses successfully. Students who wish to argue for a higher grade need to have achieved that level of performance that provides clear evidence that a grade change may be warranted. **No final grade will be modified unless both the laboratory and final exam reflect mastery at the level of the new grade.**

- 3.) **Midterm Grades:** Exams and quizzes are typically graded within a week of their administration. The exam scores are distributed by email the day they are entered. Once graded, exams are available for pickup in class. It is the student's responsibility to pick up the exam and check scores. A key for worked out problems is posted on BB. **Students have a one week deadline after the exams are made available to check answers and to register a complaint about the test or calculated score. There are no exceptions to this rule.** Please pickup your exam and review it in a timely manner.
- 4.) **Midterm Exams (100 pts. ea. 75 minutes):** Each exam, as a rule, covers a specific set of chapters from the text (see exam descriptions in the schedule). The guide for exam content is the Course Lecture, Course Text and Assigned HmWk. Midterm exams consist of three sections (see below).
- **Section 1 (50 pts.):** 15-20 multiple choice questions that do not require calculations or written responses. These questions will probe your understanding of introductory terms, vocabulary, definitions and calculation set-ups. Read these carefully and circle the correct answer. This section is comprehensive regarding current and previous exam material. (No Partial Credit)
 - **Section 2 (35 pts.)** (5-10 problems): These questions will ask for calculation setups, brief one sentence explanations, and fill-in or matching responses. These questions will probe your understanding of common applications, procedures, vocabulary, chemical nomenclature, and equation setups. (Some Partial Credit)
 - **Section 3 (15 pts.)** (3-5 problems): These questions are intermediate to advanced multi-step problems. These are based on lecture, Lab Study Guides (tied to lecture) and on homework problems found toward the end of Mastering Chemistry Assignments. These problems typically involve a manipulation of a basic equation, or they may be problems that are of necessity multistep procedures. In other instances, you may be asked to do a short derivation similar to one presented in lecture. Most exams will have one brief essay question. The questions in this section will evaluate the depth of student understanding at the middle to upper end of course expectations. (Partial Credit is Assigned.)
- 5.) **Lecture Quizzes (Taken in Lab):** Two one hour quizzes are administered during laboratory and are associated with the first chapters of the text. The first covers chapters 1-3. It consists of 25 multiple choice questions (50 points total). The second covers chapter 4 exclusively. This chapter 4 quiz is entirely fill-in. (50 points total). This second quiz is a predictor of student success in the course. Failure here puts the student at risk of failing the course, though the quiz represents only 5% of the overall grade.
- 6.) **Midterm Exam Make-up Policies:** If a student misses an exam due to illness or personal emergency, he/she needs to inform the instructor by email on or before the day and time of the exam. to arrange a make-up the exam within the week. **Exams are made-up before the exam is returned to the class.** After the exam is returned, there are no exam makeups. Makeups are only offered by appointment before or after class. Students may receive a zero score for failing to notify the instructor on or before the day and time of the exam or for failing to arrange a time to make-up the exam. **Students are allowed to miss and makeup one exam per-semester.**
- 7.) **Final Exam:** The final exam is comprehensive and is required for all students regardless of their performance in the course. The final consists of 60 questions which span chapters 1-11 in our text. The questions are multiple choice. Students will need to bring a scantron 882, pencil, eraser, and a non-graphing calculator. Everything else will be provided. The final has the goal of evaluating your understanding of course goals and preparedness for courses that Chem. 1A is a prerequisite for. The purpose of the final is to probe a student's understanding of course concepts. A rule of thumb is that the exam is one third chemistry calculations, one third terms and explanations and one third theory. What the final exam lacks in depth, it makes up for in breadth. *Keep this in mind as you study and compile a set of lecture notes throughout the semester.* A photo ID is required for the final. No ID = No Score. **Failure to take the final yields an "F" final grade. No Exceptions.**
- 8.) **Incomplete Grades:** An "I", incomplete, grade may be assigned in a course only by approval of the course instructor if all of the following conditions are met: The student has completed all course work except the final examination. The student has a serious and verifiable reason for not completing the final. *The student has a passing grade in the course at the time the incomplete, "I" grade is assigned.* "I" grades are rarely assigned in Chemistry 1A.

- 9.) **Laboratory:** The laboratory course component is designed to teach the concepts and techniques of chemistry as an experimental science. Laboratory experiments may also provide significant support for lecture concepts. **LABORATORY ATTENDANCE IS MANDATORY.** A required component of laboratory attendance is bringing the required items for lab (Lab Manual, calculator, lab coat, shoes, and etc.) **Failure to come prepared for lab will count as an absence.** Students who fail to meet the laboratory attendance requirement or **fail to complete three laboratory reports** will receive a semester “F” grade. “I” grades are not assigned based on failure to attend laboratory or complete assignments, even in the circumstance where a student has been present to acquire the data in Lab. Use your allowed absences wisely.
- 10.) **Attendance:** Attendance is taken at the at the START of each lecture and at the start and finish of each laboratory meeting. Daily attendance means you were present at the start of lecture and at the start and conclusion of laboratory.
- C.) **College Policies:** The administration of this course adheres to ALL policies as posted in the 2012-2014 Reedley College Catalog. Below are excerpts that specifically important and apply to Chemistry 1A.
- 1.) **Students with Disabilities:** This course will adhere to the college policy regarding students with disabilities. Upon identifying themselves to the instructor and the college, students with disabilities will receive reasonable accommodation for learning and evaluation. For more information, contact Disabled Students Programs & Services (638-0333).
 - 2.) **Academic Dishonesty:** Students at Reedley College are entitled to the best education that the college can make available to them, and they, their instructors, and their fellow students share the responsibility to ensure that this education is honestly attained. Because cheating, plagiarism, and collusion in dishonest activities erode the integrity of the college, each student is expected to exert an entirely honest effort in all academic endeavors. Academic dishonesty in any form is a very serious offense and will incur serious consequences. This course adheres to the Reedley college policy regarding cheating and plagiarism.
 - **Cheating** may include, but is not limited to, copying from another’s work (**THIS APPLIES TO STUDENTS WHO COPY EACH OTHERS LAB WORK**), supplying one’s work to another, giving or receiving copies of examinations without an instructor’s permission, using or displaying notes or devices inappropriate to the conditions of the examination.
 - **Plagiarism may include**, but is not limited to, failing to provide complete citations and references for all work that draws on the ideas, words, or work of others, failing to identify the contributors to work done in collaboration, submitting duplicate work to be evaluated in different courses without the knowledge and consent of the instructors involved, or failing to observe computer security systems and software copyrights.
 - **Incidents of cheating and plagiarism** may result in any of a variety of sanctions and penalties, which may range from a failing grade on the particular examination, paper, project, or assignment in question to a failing grade in the course, at the discretion of the instructor and depending on the severity and frequency of the incidents.
 - 3.) **Disruptive Classroom Behavior:** The classroom is a special environment. Students are expected to behave in a manner consistent with and promoting the goal of learning. Students who talk during lecture, or behave in ways that are less than respectful of others, will be asked to leave the class. The instructor for this course reserves the right to ask students to continue the course without attending lecture or have a student removed from the course in extreme cases. Please be courteous and respectful to all students in the course.
 - 4.) **No-Show Drops:** A student will be dropped from this course (lecture and lab) if they fail to attend lecture during the first week of instruction and do not notify the instructor by email on or before 5 PM on the day of their absence. If a student is waiting for the seat, it will immediately be assigned to another student. Students dropped for failure to attend are not easily readmitted, since another student frequently is given the seat. **With the exception of a “no-shows” it is a student’s responsibility to properly drop the course.**

5.) Dropping the Course: Students may be dropped from class if they fail to attend the first class session of the semester. There are no institutionally approved excused absences for any reason to miss this first day of instruction. Additionally students who miss two consecutive weeks without communication with the instructor may be dropped. Students are expected to be in the classroom at the time the class begins. Instructors are required to take attendance at each class session and to report any student who is absent for two successive weeks of instruction. Unless there are significant extenuating circumstances, that student will be immediately dropped from class by the instructor if the absences are occurring before 50 percent of the class is expired. **STUDENTS, WHO FAIL TO TURN IN THREE LABORATORY REPORTS, MISS THREE CONSECUTIVE WEEKS OF LECTURE OR LAB WILL BE DROPPED.** If poor attendance occurs after the 50% drop deadline, a failing grade will result.

In all cases it is the student's responsibility to drop a class in which she/he no longer wishes to be enrolled.

D.) Descriptions of Course Assignments:

1.) Assignment Formatting for a Successful Grade: Work that looks like the work of a professional will receive a much better grade than that of a typical high School Student.

a.) Handwriting: All homework assignments, Laboratory Experiments, Study Guides, Exams, and Quizzes, with one exception will be handwritten. Any answer submitted by a student must be easily read, neat and properly formatted. Written responses that are graded will need to meet a few minimal criteria. Follow the bullets below or your work will not be graded.

- **Laboratory data will ALWAYS be written in black pen,** No Whiteout will EVER be used. A single line strikes through the error and the correct value is entered next to the original. Do not use any color pen other than black. Erasable pens are not acceptable.
- Homework, and calculations are done neatly in pencil, using whiteout or a good eraser is used to erase errors.
- **All responses are neatly printed** with capital letters at the start of each sentence, which will use good spelling, and reasonable punctuation.
- **Letters and numbers are universally well formed** and presented in a neat horizontal orientation.
- **There is no ambiguity in the presentation of numbers and equations.** If there is some doubt as to the numbers or relationships within a student response it will not be graded.
- **The font used in a written response will be large enough to be easily read.**

b.) Answers to Questions: Answer questions compactly and COMPLETELY address the question asked. Additionally, *No Equation Setup, No Units, No Rounding For Significant Figures always yields a poor grade. No Exceptions..EVER!*

- **Yes/No Answers:** Many questions on lab reports, homework and on exams will ask for a yes or no answer AND an explanation. Failure to address the explanation will yield NO points for the question.
- **Any calculation requiring unit conversions** will use the format for unit conversion. Proportion is not an acceptable method.
- **Equation Set-ups:** Frequently students turn in a list of answers for study guides, post labs, or homework sets. **NO NUMERICAL ANSWER is ever valid in this course without formally showing how it was obtained.** Easy or hard question ALWAYS require a formal equation.
- **Units:** Unless data is collected on a table where the column or row is labeled by name and unit, "units" will be reported for every number recorded as a result or within a mathematical equation.
- **Significant Figures:** Answers associated with single step calculations are first recorded in an unrounded form with units at the conclusion of a calculation and then in rounded form beside the original. Longer multistep calculations are not rounded until the final step has been completed. The final result is first recorded and then the correctly rounded final result is recorded beside it.
- **In the event there is not enough room on a laboratory report form,** or study guide to show all the work required to obtain a particular result, students will write in the space allowed for the calculation: SEE ATTACHED. The calculation will be very clearly labeled and attached to the report form or study guide. If the answer is not easily found it will not be graded.

c.) **Plagiarism:** Study partners are allowed to share ideas, experimental raw data and methods but not answers. If you copy your friends work, he/she will inevitably make a calculation error or misstatement that identifies that work as belonging to a single student. If your work is identical, neither paper will be graded.

2.) **Laboratory Reports:** ~50 % of the laboratory score is represented by laboratory experiment reports. We will complete more than 20 reports during the semester. The procedures and forms are found in the lab book. The normal schedule after the completion of the third week will be as follows. During the **last half hour of lab**, the instructor will address the critical information for preparing for the next lab. Students will complete a standard format prelab (see below) and the prelab form in the lab book. **Both components are due as a student arrives for lab at the next meeting.** These docs are date stamped and held by the instructor until the lab report is turned in. No Lab is graded unless the prelab was turned in on time. The prelab is graded with the lab report. FAILURE TO TURN IN THREE PRELABS, OR THREE COMPLETED LAB REPORTS OR SOME COMBINATION YIELDS AN AUTOMATIC “F” SEMESTER GRADE.

Typically the instructor will have a short safety lecture and then turn students loose to complete the laboratory experiment. The Lab report and post lab are due at the start of the next lab meeting. Attendance is taken after the prelab lecture for the next lab at the end of the laboratory period. ***No credit is granted for a laboratory unless the student was present of the entire laboratory period.***

a.) **Prelab Format For All Labs:** This prelab cover page is written by the student and attached to the front of the prelab form found in your lab book. The prelab cover page will neatly address the same seven questions for each laboratory experiment. It is due as the student arrives for lab. **Do not copy someone else’s. The original and the copy will not be graded and the lab will count as an absence.**

(1) At the top of the handwritten prelab cover sheet write the name of the experiment.

Example: *Empirical Formula Ratio of a Copper Sulfide Compound*

(2) Below the Experiment Write Your Name

Example: *Robert Smith*

(3) What is the overall goal of the experiment in no more than two sentences?

Example: *In this experiment we will determine the empirical formula ratio of a copper sulfide compound resulting from the reaction of copper metal with elemental sulfur.*

(4) What is the essential information needed to communicate the method? (100 words or less)

Example: *A one gram sample of copper wire is massed with good precision in a premassed porcelain crucible. The copper metal is covered with ~20 grams of sulfur and heated on a clay triangle at high temperature in a well vented hood. After heating the cooled crucible is reweighed and the net mass of sulfur that remains is calculated. The moles present as copper and sulfur are determined followed by the whole number empirical mole ratio for the compound.*

(5) What are the sources of potential error for this experiment?

Example: *The experiment assumes complete reaction of copper with sulfur. If the reaction is incomplete the result will yield a smaller number of moles of sulfur and introduce an error into the calculated formula.*

If the reaction is removed from the heat prematurely excess sulfur will not be driven off and a higher final mass for sulfur will result. This will yield a larger number of moles for sulfur than expected and a potential error.

(6) What are the safety considerations for this experiment?

Example: *The vaporized sulfur is very toxic so the experiment must be done in a hood.*

The crucible will be very hot and is delicate when heated. It is important to handle it with great care.

(7) What are the practical considerations for this experiment? **Example:** *A large excess of sulfur and very fine copper wire are required to assure complete reaction in the experiment.*

3.) Homework: In many classes homework is done for a grade. In most chemistry courses homework is designed to practice the skills and concepts that students learn in lecture and through self-study. It is intended to be the last step in the study process. By completing homework problems students will identify areas they need more work on and prove their understanding of other topics. Successful students will learn what they understand well and identify topics for further study. Homework problems should be addressed as though they were exam questions which in many cases they will be. As with exam questions, we are less interested in the answer than in probing a student's understanding of the process needed to obtain the answer. A secondary goal is to retain hard learned procedures, definitions and calculations with the homework so they can be reviewed for exams. **So in short homework is not a chore, it is practice.**

Weak areas require more work above time spent on homework and strong areas we can set aside until reviewing for the exam.

a.) **Mastering Chemistry is not used for homework.** However topical tutorials are posted for all chapters, students are free to access these for targeted self-study if they have purchased the program. Access information is found on a flyer on BB in course documents, Handouts folder.

b.) **Homework Format:** To better achieve the goals above this course requires traditional written homework. Students may include notes comments or any useful info regarding problems worked for homework. Below is the minimum format. The info below also applies to exam questions.

- **General Information:** Please turn in problems in the assignment order. For each question include a brief summary of the question and its number. The entire pack should be stapled in the upper right hand corner, no paperclips or folded corners please.
- **Definitions:** Answers will have enough information to convince the grader that the student both understands the concept and has set it on paper at a level where that information can be retained for future reference. Sentence or two sentence responses are the norm.
- **Processes:** Questions that ask the student to identify the steps or process to obtain a result will have enough information to convince the grader that the student both understands the process and has set it on paper at a level where that information can be retained for future reference. Clear well thought out flow charts, or numbered steps are the expectation.
- **Calculations:** Students will identify the variables explicitly provided in the problem and those implicit to the calculation. If a simple or multistep derivation is required, it will be included with the problem. Students will use the formatting required for all calculations in this course. These steps are modeled in how examples are done in lecture.
- **Homework is due at the start of laboratory each Tuesday.** It will normally be graded and returned during lab. Late homework is not accepted.
- **Homework Rubric: Each homework set is scored as 10 pts. possible.**
 - **Qualitative Overview (0-5 pts.):** Students will score zero points if the homework is a list of answers without showing equation set-ups, or does not include the question answered. The grader will flip through the homework and observe the general attention to detail and usefulness of the work product. Points are lost for sloppy presentation, significant figure errors, poor calculation set-ups, and formatting errors. **Handwriting and presentation is an important component of all assignments, if your work cannot be easily read, or your numbers cannot be determined with good precision it will not be graded.**
 - **Quantitative Overview (0-5 pts.):** A set of five problems chosen at random from throughout the set are evaluated for each week's homework. The following criterion is used: (1) Is the answer correct? (2) Does the answer have the correct units and significant figures? (3) Is the equation correctly formatted? (4) Did the answer completely address what was asked in the question? (5) *Within the problem, did the student show good evidence that he/she understood the concept, method, or process behind the question?*
 - **THE REAL GRADE FOR HOMEWORK EFFORT IS ON THE EXAMS.** A student who understands the homework they completed, will be better prepared for the exams, than the student who rushed to complete each question. *Completion* and *Understanding* are not always the same.

Week	Date	Ch. & Sec.	Lecture and Laboratory Outline and Due Dates:
1	8/13	1.6-1.8	(1) Quick Syllabus Overview , (2) Measurement; Sig Figs, Chemical Problem Solving Strategies, Unit Conversions, and Density. Lab: (1) Detailed Introduction to Chemistry 1A (2) Laboratory Safety: <i>No student will be admitted to class without having been present for the safety lecture. (Signed safety forms are due Immediately after the safety lecture.)</i> (3) Inventory and Check-in.
	8/15	1.1-1.6	(1) Introduction to the Scientific Method, (2) States of Matter: Elements, Compounds, Mixtures; (3) Physical & Chemical Changes, (4) Derived Units: Volume, Energy and Work. Please follow the format requested in the syllabus. Lab: (1) Laboratory Operations and Reports, (2) <i>Pickup Handout: "Significant Figures and Unit Conversion" for completion in lab on 8/20. Can't Read It/No Calc/No Units/Wrong Format....NO GRADE</i>
2	8/20	2.1-2.5 <i>Beginning Today: Lab Coats and Goggles are required in Lab.</i>	Foundations of Modern Atomic Theory: (1) Lavoisier (Law of Conservation of Mass), Proust (Law of Definite Proportions), Dalton (Atomic Theory, and Law of Multiple Proportions), Relative Atomic Weight, 1 st Periodic Table (2) Origins of the Nuclear Atom: Thomson & Milliken (Electron), (3) Rutherford's Gold Foil Experiment (Modern View of the Atom). Lab: (1) Prelab 2 Lecture and Assignment (Prelab assignment due, before students begin), (2) Lab. 2: <i>Properties and Changes in Matter</i> (Due Th 8/22), (3) <i>Pickup Handout: "Reporting and Interpreting the Accuracy and Precision of Experimental Results" Due at the end of lab on 8/22</i>
	8/22	2.6-2.8	Describing Atoms: Elements and Ions: (4) The Subatomic Particles, (5) Element Atoms and Periodic Table, (6) Isotopes, (7) Atomic Weights, (8) Ions and Periodic Table & Trends. Lab: (1) Prelab 3 Lecture and Assignment (Prelab assignment due, before students begin), (2) Lab. 3: <i>Measurements</i> (Due Th 8/22)
3	8/27	3.1-3.6	Describing Molecules and Compounds: (1) Binary Molecular Elements and Water. (2) Introduction to Chemical Bonds, (3) Introduction to Chemical Formulas, (4) <u>Identifying Elements and Compounds by Type</u> . Chemical Nomenclature: (5) Type I Ionic Compounds, (6) Type II Ionic Compounds, (7) Polyatomic Ions. (8) The Acids: Binary Acids and Oxyacids (Ternary). (9) Molecular Compounds. Lab: Chemical Nomenclature Handout (due 8/29) (self-correct before turning in)
	8/29 8/30 is the last day to register or drop without a "W"	2.9 & 3.7-3.11	Fundamentals of Mole Calculations, Conversion Maps and Conversions, Applied to Compounds: (10) Molar Mass of a Compound, (11) Avogadro's Number, (12) Formula Ratio, (13) Determining Empirical and Molecular Formulas. (14) Three step Strategy to Balance Chemical Reactions by Inspection. (Home Work for Ch. 3 is due on 9/3) Lec/Lab Quiz: Labs 2, 3, safety, and handouts (1 hr.) & Lec. Quiz Ch. 1-3.7 (1.75 hr.).
4	9/3	3.10 & 4.1-4.3	(1) Combustion Analysis, Reaction Stoichiometry: (2) Introduction to Reaction Stoichiometry and conversion Maps. <u>Theoretical Yield:</u> (3) Excess Reactant Problem, (4) Limiting Reactant Problem, (5) Percent Yield, (6) Mass Percent Composition Lab: (1) Lab 7 or Mole Calculation Study Guide <i>Can't Read It/No Calc/No Units/Wrong Format....NO GRADE Significant Figures are graded.</i> (2) Prelab Lec. for Lab 6: Empirical Formula of a Compound -- Oxide of Tin
	9/5	4.4 Beginning Today: Prelab is due before starting the Expt	Four Applications of the Molarity Unit: 5.) Molarity and Molar Concentration by Definition, (6) Moles from Volume and Molarity, (7) the Dilution Equation. (8) Finding The Molarity given percent composition and solution density. Lab: (1) Prelab for Lab. 6 due as students arrive. (2) Complete Lab. 6. (3) Prelab for Lab 8: The Formula of a Hydrate
5	9/10	4.5-4.8	Aqueous Reactions: (8) Acid-Base Titration: Liquid-Liquid and Solid Liquid. (9) Electrolytes, Nonelectrolytes, and Solubility Trends, (10) Aqueous Reactions That Form Precipitates, (11) Aqueous Reactions that Form Gases, (12) Aqueous Reactions That Form Molecular Substances. <u>Representing Aqueous Reactions:</u> Molecular Reaction (Review), (13) Complete Ionic Reaction, (14) Net Ionic Reaction. (15) Titration Calcs. (Titration SG) Lab: (1) Prelab for Lab. 8 due as students arrive. (2) Complete Lab. 8. (3) Prelab for Lab 5: Double Replacement Reactions and post-lab supplemental handout for 9/17.
	9/12	4.9 and 18.2	Finish Titration Calcs. Oxidation States, Electronegativity and Introduction to the "Half Reaction Method" of Balancing Oxidation Reduction Reactions. Most of the needed information is supplemented in the lab study guide. No Textbook Homework Lab: Lec. Quiz Ch. 2.9, 3.7-3.10 & 4.1-4.8 (1.5 hr.) and SG: Bal. Redox Rxns. Due 9/17

Week	Date	Ch. & Sec.	Lecture and Laboratory Outline and Due Dates:
6	9/17	5.1-5.4	Introduction to Kinetic Molecular Theory, The Definition of Pressure and the Empirical Gas Laws (overview) Gases: (1) What is Pressure? (2) The Units of Pressure, (3) Defining the Empirical Gas Laws and Applications. Lab: (1) Prelab for Lab. 5 due as students arrive. (2) Complete Lab. 5. (3) Lab 9: Stoichiometry
	9/19	5.5, 5.7-5.8	(4) Ideal Gas Law, (5) Molar Volume and STP, (6) Gas Density and Molar Mass Calculation. (6) Gas Phase Mixtures. Gas Law Applications: (7) Changing Condition Problems, IGL, (8) Stoichiometry. (9) Discussion of the Assumed Characteristics of an Ideal Gas. Lab: (1) Prelab for Lab. 9 due as students arrive. (2) Complete Lab.9. (3) Prelab for Lab 10: Alum Expt. (Pickup Alum Expt. Theory Handout)
7	9/24	5.6, 5.8-5.10	(9) Dalton's law of Partial Pressures, (10) Defining an Ideal Gas According to Kinetic Molecular Theory: Molecular Velocities, Diffusion, and Effusion. (11) Real Gases and an Explanation of Non-ideal Behavior (Van der Waals Eqn.). Lab: (1) Prelab for Lab. 10 due as students arrive. (2) Complete Lab.10. (3) Prelab for Lab 11: Gravimetric Analysis of Phosphorus in Plant Food
	9/26	5.1-10	Finish Ch. 5 and review kinetic molecular theory and applications. Lab: (1) Prelab for Lab. 11 due as students arrive. (2) Complete Lab.11. (3) Prelab for Lab 15: Redox Reactions: Burning Magnesium
8	10/1	6.1-3	Thermochemistry: (1) Defining Terms, (2) Defining Units, (3) The First Law of Thermodynamics: (4) Explanation of Internal Energy, (5) An Example Involving Heat and Work. Lab: (1) Prelab for Lab. 15 due as students arrive. (2) Complete Lab.15. (3) Prelab for Lab 16: Reactions of Copper
	10/3	6.4-5	Thermochemistry (Quantifying Heat and Work): (6) Heat Measurement (Constant Pressure Cond.). (7) Work: Pressure-Volume Work, (8) Heat Measurement (Constant Volume Cond.), Bomb Calorimeter Example. Lab Quiz 2 (Redox reactions, Labs 5, 6, 8-11) The quiz includes probing questions regarding the theory of each experiment, the calculations used in each, and is comprehensive regarding fundamental mole calculations and chemical nomenclature.
9 10/11 last day to drop with a "W" grade.	10/8	6.6-6.7	Thermochemistry Enthalpy of Reactions: (9) Introduction of Enthalpy, (10) Enthalpy Under Constant Pressure Conditions (Derivation), (11) Characterizing Enthalpy Is Exothermic or Endothermic, (12) Reaction Enthalpy a Stoichiometric Quantity. (13) Measuring Enthalpy Using a Coffee Cup Calorimeter, Lab: (1) Prelab for Lab. 16 due as students arrive. (2) Complete Lab.16. (3) Prelab for Lab 21: Charles' Law
	10/10	6.8-6.10	(14) Application of Hesse's Law and Calculating Standard Enthalpy Change For a Reaction Using Stnd. Heats a Formation. Lab: (1) Prelab for Lab. 21 due as students arrive. (2) Complete Lab.21. (3) Prelab for Lab 22: Molar Mass of a Volatile Liquid
10	10/15	Exam 2	Lecture: Exam 2: (Chapters 5 and 6). This exam includes a multiple choice section that covers fundamental terms, equation set-ups and theory from both chapters. The fill in portion specifically addresses some or all of the following: Work, Internal Energy, Calorimetry, Enthalpy, Reaction Energy, and Hess's Law. Lab: (1) Prelab for Lab. 22 due as students arrive. (2) Complete Lab.22. (3) Prelab for Lab 23: Atomic Weight of an Unknown Divalent Metal
	10/17	7.1-7.4	(1) The Nature of Light: (2) The Electromagnetic Spectrum. Characteristic Behaviors of Light: (3) Interference (Constructive Destructive) and Diffraction, (4) "Particle Nature" (Photons), (5) The Energy of a Photon, (6) The Photoelectric Effect, Shooting Photons at a Metal Target, (7) The Atomic Emission Of "H" and Neil Bohr's Model of The Atom, (8.) The Rydberg Equation. Lab: Lab: (1) Prelab for Lab. 23 due as students arrive. (2) Complete Lab.23. (3) Prelab for Lab 27: Heat Flow, Calorimetry

Week	Date	Ch. & Sec.	Lecture and Laboratory Outline and Due Dates:
11	10/22	7.5-7.6	<p>The Nature of the Electron: (9) Dual Nature of the Electron; Particle and Wave, (10) The DeBroglie Wavelength of an Electron, (11) The Electron's Complementary Properties and Heisenberg's Uncertainty Principle, (12) Solutions to Schrödinger's Equation and Quantum numbers, (13) The Rydberg Equation (Energy Associated With The Principle Quantum Number), (13) The Shapes of The Atomic Orbitals (Probability Densities)</p> <p>Lab: (1) Prelab for Lab. 27 due as students arrive. (2) Complete Lab.27. (3) Prelab for Lab 13: Acids and Bases</p>
	10/24		<p>Finish Ch. 7 begin Ch. 8 see above and below.</p> <p>Lab: (1) Prelab for Lab. 13 due as students arrive. (2) Complete Lab.13. (3) Prelab for Lab 19: Vitamin C in Fruit Juices</p>
12	10/29	8.2-8.3	<p>Periodic Properties of the Elements: (1) The Periodic Law, (2) Ground State Electron Configuration of Hydrogen (s, p, d, and f orbitals, electron spin and sub level splitting), (3) Pauli Exclusion Principle. (4) Sublevel Energy Splitting in Multi-Electron Atoms: (5) Shielding and Effective Nuclear Charge (Zeff.), (6) Sublevel Penetration, and General Energy Ordering of Orbitals For Multi-electron Atoms. (7) Writing Electron Orbital Diagrams and Valence Electrons.</p> <p>Lab: (1) Prelab for Lab. 19 due as students arrive. (2) Complete Lab.19.</p>
	10/31	8.4-8.8	<p>The Explanatory Power of Quantum Mechanics Applied to the Periodic Table: (8) Electron Configurations and the Modern Periodic Table. (9) Formation of Main Group Element Ions. (10) the Trend in Atomic Radius (Covalent Radius). (11) Periodic Trend in Ionic Radius. (12) Periodic Trend In First Ionization Energy for Main Group Elements. (13) Periodic Trend in Electron Affinity. (14) Metal Nonmetal Character.</p> <p>Lab: Quiz 3 (Labs 15-16, 21-23, 27) The quiz includes probing questions regarding the theory of each experiment, the calculations used in each, and is comprehensive regarding fundamental mole calculations and chemical nomenclature.</p>
13	11/5	9.1-9.5	<p>Survey of Chemical Bonds: (1) Lewis Theory Framework. (2) Formation of An Ionic Bond, (3) Energy Associated With the Formation of an Ionic Bond (Lattice Energy and the Born-Haber Cycle), (4) Predicting Relative Lattice Energies. (5) Survey of Covalent Bonding Using Lewis Theory.</p> <p>Lab: Titration Practical Exam (Group 1)</p>
	11/7	9.5-9.11	<p>Distribution of Charge in Chemical Covalent Bonds and Within Molecules: (6) Electronegativity and Bond Polarity, (7) Dipole Moments and Percent Ionic Character. Lewis Theory, (8) Lewis Diagrams, Resonance and Formal Charge. (9) Octet Rule Exceptions. (10) Bond Energies and Bond Lengths.</p> <p>Lab: Titration Practical Exam (Group 2)</p>
14	11/12	No Lecture	<p>Exam 3: (Chapters 7, 8 and 9) This exam includes a multiple choice section that covers fundamental terms, equation set-ups and theory from chapters 7, 8, and 9. The fill in portion specifically addresses some or all of the topics listed for each chapter. <i>Explanations are more important than computations for most of this exam.</i></p> <p>Lab: (1) Periodic Table and Trends Lab (Handout) (lecture text is required)</p>
	11/14	10.2-10.5	<p>Valence Bond Theory: (1) Electron Group Geometry. (2) Effect of Lone Pairs of Electrons on Bond Angles. (3) Determining Molecular Geometry and Polarity.</p> <p>Lab: Molecular Geometry Part 1</p>
15	11/19	10.6-10.8	<p>Valence Bond Theory: (4) Orbital Overlap as a Chemical Bond (energy Discussion), (5) Hybridization of Atomic Orbitals, (6) Formation of Bonds, and Molecular Geometry. (7) Essentials of Molecular Orbital Theory.</p> <p>Lab: (1) Molecular Geometry Part, (2) Prelab for Lab 29: Polarity</p>
	11/21	11.2-11.3	<p>Properties of Gases, Liquids and Solids: (1) Molecular Description of Liquids and Solids, (2) Discussion of Intermolecular Forces (Dipole-Dipole and Dispersion Forces). (3) H. Bonding.</p> <p>Lab: (1) Prelab for Lab. 29 due as students arrive. (2) Complete Lab.29. (3) Prelab: Introduction to Material Safety Data Sheets</p>
16	11/26	11.4-5	<p>(4) Explanation of Aqueous Solutions of Ionic Compounds. (5) Surface Tension, Viscosity and Capillary Action. (6) Phase Changes. (7) Clausius-Clapeyron Equation to Determine the Heat of Vaporization and Examples.</p> <p>Lab: Introduction to Material Safety Data Sheets (Written Assignment) (Due 12/5)</p>
	11/28	Thanksgiving	No Class

Week	Date	Ch. & Sec.	Lecture and Laboratory Outline and Due Dates:
17	12/3	11.6-11.8, 11.11-11.12 Ch. 12	Phase Changes of Pure Substances: (8) Fusion and Sublimation, (9) Heating Curve of Water and Calculating the Energy (Ice → Steam and Reverse), and (10) Introduction to Phase Diagrams. (11) Crystalline Solids (Unit Cells), (12) Crystalline Solids by Type.
			Lab: Lab: Lab Quiz 4 (Periodic Table, MSDS Paper, Labs 19, 28, and 29)
	12/5		Exam 4 (Ch. 10-11) Lab: Laboratory Checkout, Introduction to pH and pOH calculations (Handout)
18	12/10	Final	Tuesday, December 11, 3 PM-4:50 PM in PHY 76. The final begins and ends promptly. Read the Syllabus Section Titled: "Final Exam" for a description of the exam and what students are allowed on the exam. Leave cell phones, music players and hats in your car. Grades will be emailed to students after posting to Web Advisor by Friday Afternoon, 12/13

Week	Date	Ch. & Sec.	Homework Assignment: (Due the Tuesday of the week following its assignment)
1	8/13	1.7-1.8	2 nd Edition: 1: 20, 27, 28, 30, 32, 68, 70, 83, 85, 90, 95a, 100
			3 rd Edition: 1: 20, 27, 28, 30, 32, 68, 70, 83, 85, 90, 97a, 102
	8/15	1.1-1.6	2 nd Edition: 1: 5, 6, 9, 10, 11, 12, 13, 16, 21, 25, 34, 38, 42, 44, 46, 103, 107
			3 rd Edition: 1: 5, 6, 9, 10, 11, 12, 13, 16, 21, 25, 34, 38, 42, 44, 46, 105, 109
2	8/20	2.1-2.5	2 nd Edition: 2: 3, 4, 6, 14, 15, 30, 40, 41, 42, 44, [48 (and Why are they false?)], 126
			3 rd Edition: 2: 3, 4, 6, 14, 15, 30, 40, 41, 42, 44, [48 (and why are they false?)], 130
	8/22	2.6-2.8	2 nd Edition: 2: 17, 19, 21, 22, 23, 34, 51, 58, 63, 64, 68, 71, 72, 101, 115
			3 rd Edition: 2: 17, 19, 21, 22, 23, 34, 52, 58, 63, 64, 68, 71, 72, 104, 119
3	8/27	3.1-3.6	2 nd Edition: 3: 4, 5, 7, 8, 9, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 52, 54
			3 rd Edition: 3: 4, 5, 7, 8, 9, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 52, 54
	8/29	2.9 & 3.7-3.10	2 nd Edition: 2: 24, 27, 80, 81, 82, 84. 3: 56, 58, 76, 77, 80, 100, 101, 102, 117
			3 rd Edition: 2: 24, 27, 80, 81, 82, 84. 3: 60, 64, 82, 83, 86, 106, 109, 110, 125
4	9/3	3.10, 4.1-4.3	2 nd Edition: 3:90, 92. 4: 1, 2, 26, 28, 30, 34, 36, 46, 48, 52
			3 rd Edition: 3: 96, 98. 4: 1, 2, 26, 28, 30, 34, 36, 46, 48, 52
	9/5	4.4	2 nd Edition: 4: 5, 54, 56, 58, 60, 64, 66, 95, 108 & Titration Practice Problems Handout
			3 rd Edition: 4: 5, 54, 58, 60, 62, 66, 68, 99, 112 & Titration Practice Problems Handout
5	9/10	4.4-4.8	2 nd Edition: 4: 6, 7, 8, 10, 11, 68, 70, 72, 76, 82, 86, 94. Additional Problems on Handout
			3 rd Edition: 4: 6, 7, 8, 10, 11, 72, 74, 76, 80, 86, 90, 98. Additional Problems on Handout
6	9/17	5.1-5.4	2 nd Edition: 5: 1, 4, 6, 19, 30, 32, 36, 38, 40, 42, 44, 48, 49, 52, 53.
			3 rd Edition: 5: 1, 4, 6, 19, 26, 28, 32, 34, 36, 38, 40.
	9/19	5.5, 5.7-5.8	2 nd Edition: 5: 11, 12, 13, 14, 42, 44, 48, 49, 52, 58, 60, 66, 73, 76, 81, 84.
			3 rd Edition: 5: 11, 12, 13, 14, 38, 40, 44, 45, 48, 54, 56, 62, 69, 72, 77, 82.
7	9/24	5.6, 5.8-5.10	2 nd Edition: 5: 21, 23, 24, 66, 72, 73, 86, 88, 91, 94, 95, 96.
			3 rd Edition: 5: 21, 23, 24, 62, 68, 79, 84, 86, 89, 92, 93, 94.
8	10/1	6.1-3	2 nd Edition: 6: 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 34, [37 (explain false responses)], 39, 40, 41, 42, 43, 44.
			3 rd Edition: 6: 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 34, [37 (explain false responses)], 39, 40, 41, 42, 43, 44.
	10/3	6.4-5	2 nd Edition: 6: 15, 17, 18, 19, 20, 22, 46, 48, 52, 54, 64, 70, 69, 71.
			3 rd Edition: 6: 15, 17, 18, 19, 20, 22, 46, 48, 52, 54. 66, 68. 71, 73.
9	10/8	6.6-6.7	2 nd Edition: 6: 20, 22, 55, 56, 60, 61, 69, 70, 73.
			3 rd Edition: 6: 20, 22, 55, 56, 60, 63, 71, 72, 75.

Week	Date	Ch. & Sec.	Homework Assignment: (Due the Tuesday of the week following its assignment)
9	10/10	6.8-6.10	2 nd Edition: 6: 25, 26, 27, 28, 29, 76, 79, 82, 90.
			3 rd Edition: 6: 25, 26, 27, 28, 29, 78, 80, 84, 92.
10	10/17	7.1-7.4	2 nd Edition: 7: 9, 13, 14, 15, 16, 18, 22, 23, 24, 41a, 42a, [44 (100.2 MHz photon only)], 45, 52, 54, 58, 67, 73.
			3 rd Edition: 7: 7, 11, 12, 13, 14, 16, 20, 21, 22, 39a, 40a, [42 (100.2 MHz photon only)], 43, 50, 52, 56, 65, 71.
11	10/22	7.5-7.6	2 nd Edition: 7: 29, 30, 31, 32, 34, 60, 62, 64.
			3 rd Edition: 7: 27, 28, 29, 30, 32, 58, 60, 62.
12	10/29	8.2-8.3	2 nd Edition: 8: 1, 6, 11, 13, 9, 14, 16, 44, 46.
			3 rd Edition: 8: 1, 6, 9, 11, 7, 12, 14, 42, 44.
12	10/31	8.4-8.8	2 nd Edition: 8: 18, 21, 22, 24, 27, 28, 29, 32, 34, 35, 36, 39, 55, 62, 66, 86, 88, 100.
			3 rd Edition: 8: 16, 19, 20, 22, 25, 26, 27, 30, 32, 33, 34, 37, 53, 62, 66, 86, 88, 100.
13	11/5	9.1-9.5	2 nd Edition: 9: 3, 4, 9, 10, 12, 15, 16, 35, 38, 40, 43, 47, 49.
			3 rd Edition: 9: 3, 4, 9, 10, 12, 15, 16, 35, 38, 40, 43, 47, 49.
	11/7	9.5-9.11	2 nd Edition: 9: 19, 20, 21, 22, 26, 28, 29, 30, 31, 33, 51, 55, 56, 64, 66, 70, 76, 78.
			3 rd Edition: 9: 19, 20, 21, 22, 26, 28, 29, 30, 31, 33, 51, 55, 56, 64, 66, 74, 80, 82.
14	11/14	10.2-10.5	2 nd Edition: 10: 2, 4, 5, 7, 31, 34, 36, 37, 40, 44, 46, 48, 50, 52.
			3 rd Edition: 10: 2, 4, 5, 7, 31, 34, 36, 37, 40, 44, 46, 48, 50, 52.
15	11/19	10.6-10.8	2 nd Edition: 10: 8, 11, 13, 14, 16, 19, 20, 22, 27, 54, 56, 57, 58, 59, 64, 70, 74, 77, 78.
			3 rd Edition: 10: 8, 11, 13, 14, 16, 19, 20, 22, 27, 54, 56, 57, 58, 59, 64, 70, 74, 77, 78.
	11/21	11.2-11.3	2 nd Edition: 11: 4, 5, 9, 10, 11, 12, 13, 14, 49, 50, 52c, 54, 58, 60.
			3 rd Edition: 11: 4, 5, 9, 10, 11, 12, 13, 14, 49, 50, 52c, 54, 58, 60.
16	11/26	11.4-5	2 nd Edition: 11: 15, 16, 17, 19, 24, 25, 26, 61, 65, 67, 68, 70, 77.
			3 rd Edition: 11: 15, 16, 17, 19, 24, 25, 26, 61, 65, 67, 68, 70, 77.
17	12/3	11.6-11.9, 11.11-11.12 Due 12/5	2 nd Edition: 11: 28, 29, 31, 33, 34, 38, 40, 80, 83, 86, 88, 105, 106, 107
			3 rd Edition: 11: 28, 29, 31, 33, 34, 38, 40, 80, 83, 86, 88, 105, 106, 107
16	12/5		No Homework will be graded after 12/5, pickup your work if you want it. Papers than are not picked up are shredded on 12/11.

Quiz and Exam Descriptions:

Lab Quizzes (~ 50% of the Lab Grade): These are typically 10-20 free response, fill-in or calculation problems. At least half the quiz will probe the students understanding of laboratory objectives, theory and experimental error. Remaining questions are divided between: safety, fundamental chemical nomenclature, significant figures, and calculation of experimental results.

Lecture Quizzes (10% of the overall grade.): Two equally weighted quizzes administered in lab.

Quiz 1 covers chapters 1-3.6. This quiz has 30 question multiple choice questions. This quiz will specifically cover topics that were covered in lecture. Some topics were covered with more precise detail in lecture than in the homework. Although the homework provides good practice for all calculation related problems. This quiz stresses, but is not limited to, the scientific method, unit conversion, significant figures, introductory laws and terms, introductory atomic theory, understanding the periodic table, atomic particles, atomic symbols, atomic nuclides, and **chemical nomenclature (in good detail), writing chemical formula of ionic compounds.** Nomenclature and Formula writing is also addressed on lab quizzes throughout the semester.

Quiz 2 covers chapter 2.9, 3.7-3.10 and **chapter 4.** This quiz has 30 free response questions. Most questions on the quiz address chemical calculations, or calculation setups. Some questions will provide molarity or mass data for a compound by name and not by formula. **Topics include but are not limited to:** (1) Mole conversions using Avogadro's number, molar mass, formula ratio, and reaction ratio as conversion factors. For full credit problems will be set up as demonstrated during lecture. (2) Determining chemical formula from percent composition and molecular weight. (3) Combustion Analysis similar to problems in the homework. (4) Balancing a wide variety of reactions similar to those presented in lecture and in the homework. (5) Procedures associated with writing complete and not ionic reactions, and writing a net ionic reaction for a given unbalanced ionic reaction missing products. (6) Determine molarity from Gram and volume data. (7) Determine the molarity for a dilution. (8) Determine the grams of a solute present given molarity and volume data. (9) Determine the concentration of an ion given the dilution data or molarity and volume data for a parent compound. (10) Determine the concentration of a liquid unknown given a balanced chemical reaction and liquid/liquid titration data. (11) Determine the concentration of a liquid unknown given a balanced chemical reaction and liquid/solid titration data. (12) Balance a oxidation reduction reaction using the half reaction method. Calculation setups count for a minimum of 50% of the points for each problem. Significant figures count for 25% of the points. The answer is not evaluated without a reasonable equation set up. **The successful student will use identical methods to those demonstrated in lecture.**

Lecture Exams and Final: See Description on page 3.