

<p>REQUIRED ITEMS: TEXT: Introductory Chemistry, 5th ed., by <i>Nivaldo TRO</i> ISBN: #978-0321910295 Earlier editions (OK) “Lecture Handouts and Homework Sets for Chemistry 10,” by R. Culp, are available on blackboard. Print as needed. “Calculator” (TI-30xa): Programmable calculators are not allowed during exams. The TI-30xa is suggested for the course. <u>Directions for this calculator are written in the lecture notes.</u> SCANTRON FORM # 882-E (FIVE ARE NEEDED) LAB TEXT: (POSTED ON BLACKBOARD) ASSORTED STUDY GUIDES AND HANDOUTS (posted on Blackboard or in the lab manual; print as needed.)</p>	<p>INSTRUCTOR: R. C. CULP LECTURE AND LOCATION: SECTION: 51213 M/W 0400 -0515 PM PHY 76 (Lecture) F 09:00-11:50 AM PHY-82 (Laboratory) CONTACT INFORMATION: <ul style="list-style-type: none"> • E-MAIL: robb.culp@reedleycollege.edu • PHONE: No Message Phone At Reedley OFFICE HOURS: Our class is a mixture of lecture and laboratory. Please bring your questions to class. LAB. SUPPLIES: Shoes, approved safety goggles or <u>glasses</u>, additionally black ball point pen, pencil, straight edge (ruler), and <u>lab coat</u>.</p>
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RECOMMENDED: This course makes extensive use of downloadable PowerPoint files, video and electronic documents. If you do not have a computer, you will need access to one.

COURSE DESCRIPTION: This is a one-semester elementary class for students who have never taken high school chemistry. The course will give students a basic background in matter, energy, chemical reactions, measurements, formula writing, nomenclature, chemical calculations, gas laws, bonding, solutions, net-ionic equations, acid-base theory, pH, oxidation-reduction reactions and equilibrium. Recommended for applied science and non-science majors, or for students preparing to take Chemistry 1A.

- **ADVISORIES: English 1A and Mathematics 103**
- **INSTRUCTORS ADVISORY:** This class is considered to be easier than Chemistry 3A. HOWEVER, to a certain extent that is a misnomer. A understanding of the basic algebra and math operations is required for success. The course covers less material than the Chemistry 3A, but it is designed as a course for preparing students for Chemistry 1A (General Chemistry). Therefore topics we do cover are discussed at a depth comparable to Chemistry 3A and in some cases more intensively. Please do not add this class unless you have the needed study time (4 hrs/week, minimum) and the basic skills to be successful.

TEXT FOR THIS COURSE: The text specified for this course is **Introductory Chemistry (5th ed.), by Nivaldo Tro.** Older editions of the text are equally acceptable. This is the same text that is currently used for Chemistry 3A at Reedley College. While the texts are the same, the courses are considerably different. Chem. 10 will cover chapters 1-14, with particular attention to introducing students to fundamental terms, methods of calculation and theory. Students who continue on to Chemistry 3A should be able to use the same text.

DROP DATE: The last day to drop WITHOUT an (A-F) letter grade is Friday, October 14, 2016. After that date the instructor is required to assign a letter grade that will appear on your transcript. If you plan to drop the class, you should do so yourself. After the third week (9/2) not depend on your instructor to drop you for non-attendance. Students with a failing grade or a poor record of attendance after October 7th should discuss their status with the instructor before the October 14th withdrawal date.

I. ACHIEVING SUCCESS IN CHEMISTRY 10: Success in this course, and in college in general, requires effective effort that produces a desired learning outcome. Most successful college students develop an approach to learning that best utilizes their time and allows them to develop a level of understanding that permits them to be successful on exams. It is difficult to be successful without working at it. For most people it is impossible to be successful without developing regular study habits. **You will need to study at 4-6 hours each week outside of the classroom to complete assignments and prepare for exams.** This time includes reading, organizing, studying, and doing homework assignments. Preparing labs will require additional time. It is essential that you listen effectively and that you take good lecture notes in class. **Read the assigned text chapter or laboratory before coming to class and be prepared to ask questions** during the lecture and laboratory. Chemistry is a cumulative subject; later topics require a good understanding of this earlier material. **If you do not feel you can devote 4-6 hours per week to this course, plan to take the class when you can. Also, plan your special events carefully, students who fall behind, rarely finish successfully.**

- A.) **PARTICIPATION: Successful students generally have the following attributes:** (1) They ask questions during lecture and laboratory in order to clarify their understanding. (2) They are attentive to the many details associated with how they calculate and report numbers in laboratory. (3) They read the materials provided, and ask questions. (4) They take the time needed to UNDERSTAND what they are doing. (5) They are attentive to due dates and plan their time accordingly. (6) They come to class on time, and are prepared when they come.
- B.) **ATTENDANCE:** Lecture and laboratory attendance is taken at the start of each lecture and laboratory meeting and occasionally at the end of class. You may be dropped if you fail to attend for two consecutive weeks prior to the 9th week. If you do miss a lecture, download the lecture slides that were covered that day from blackboard. **Together attendance, participation and homework count as class participation for the purposes of your grade.**
- C.) **CLASSROOM LECTURE:** In-class lecture is the most important component of this course. The PowerPoint for each lecture is posted on blackboard. While the PDF is available for your classroom notes, the actual file is therefore your review. During lecture the instructor will establish learning goals for each chapter, and he will define most of the terms and methods you need to master in each chapter. Additionally, lectures define what you as a student are responsible for on exams. It is expected that you will download and review the lecture PowerPoint, before beginning the homework. The vocabulary and skills needed to complete the home work are found in the lecture. Your instructor will also provide a compact lecture outline each week for those attending the lecture to help you in your review of the lecture material.
- D.) **HOMEWORK:** The homework for this course is independent of the text. The homework sets are posted in the lecture folder on blackboard. At least one exam per semester draws most, if not all, of the exam questions from the homework sets. You should do the homework as soon as possible and come to the next lecture/laboratory period prepared to ask questions. It is almost impossible to learn chemistry without doing homework. Each homework set involves a structured review of the week's classroom lecture and PowerPoint and problems to help you confirm your understanding of lecture concepts. A completed homework set will receive a 100 of 100 pt score. Sets that are incomplete will receive a grade of 0-100 of 100 pts possible. **No late homework will be accepted.**
- **Homework does not count for a large percentage of your grade.** Yet, if you fail to do homework, the statistics indicate your risk of failing the course, doubles, or triples. Complete the homework with the idea that understanding the course work will significantly increase your grade and likelihood of success.
- E.) **EXAMS:** There are four scheduled (~40-50 question) midterm exams and a cumulative two-hour (50 questions) final exam. The midterm exams are given during the first 90 minutes of the laboratory class period and should take most students 60 minutes to complete. There are NO MAKEUPS for missed exams. I'M SORRY BUT THERE ARE NO EXCEPTIONS! The required two-hour final exam will cover new material and cumulative material. Your score on the cumulative portion of the final exam may be used to replace a low score on a previous exam (Instructors Option). Exam values increase as the semester progresses (below).

Exam 1	6 % of your course grade.	While Exam 1 is worth only 6% of your overall grade represents important concepts you will see again. Do not neglect to prepare for the exam.
Exam 2	10 % of your course grade.	
Exam 3	14 % of your course grade.	
Exam 4	14 % of your course grade	

- Exams for this course are strictly based on your understanding of lecture concepts. Specific exam questions are drawn from homework problems that are based on lecture concepts. The exams are weighted heavily at the end of the course. Failure on your first exam will not have a significant impact on your final score.
- F.) **LABORATORY:** Lab work will follow as closely as possible the material discussed in the lectures. There is no published lab manual for this course. All the lab assignments and experiments are available on Blackboard. It is your responsibility to print the assigned experiment and bring it with you to Laboratory each Friday. Pre-laboratory assignments are due at the beginning of the lab period or before you begin an experiment. Lab reports are generally due in class on the day of the laboratory experiment. You may not leave lab early unless you have completed and turned in the lab assignment. Late laboratory reports will be penalized 50% per week late. No laboratory reports will be accepted after it has been graded and returned to students in class. **No Laboratory Experiment will be graded unless the prelab was turned in on the day the lab was done.** The lowest nonzero laboratory report score of the semester will be dropped. Any missed labs will receive a grade of zero. It is not possible to make up missed labs and these are not dropped.

- **READ THIS: The laboratory experiments are a required component of this course.** Failure to turn in **three laboratory experiments**, regardless of attendance in lab results in a D or F final grade. If the missed laboratory occurs before the 9th week of the course the student may be dropped from the course.

II.) POLICIES AND GRADES:

A.) **ELECTRONIC DEVICES:** Please silence your cell phone during class and refrain from texting or surfing the internet. Please put your headphones and music players away during class. You **may NOT** use the calculator on your cell phone during an exam. If your phone is out during an exam, the exam will not be counted.

- **CALCULATORS:** Do not plan on using a borrowed calculator during exams. Come to the exam prepared with the required items.

B.) GRADES:

The grading scale is based on a straight percentage:

A = 100% - 90%
B = 89% - 80%
C = 79% - 65%
D = 64% - 50%
F = 49% - 0%

The final grade will be calculated as follows:

Average of Exams	44%
Final Exam	22%
Lab Grade	25%
Participation (includes HmWk):	8%
Total:	100%

The final percent score may be adjusted up by as much as 3 % for students that perform exceptionally well on the final and in laboratory. **No adjusted percentage will exceed the final exam or laboratory scores.**

Note: Grades are the result of effort. A course grade is earned based on constant EFFORT throughout the semester. Attendance and participation are minor components of your grade. These certainly contribute to your potential success. However, to achieve a passing grade, or an A or B grade in particular, you must exhibit an understanding of the course topic on exams and laboratory reports.

C.) **BLACKBOARD:** You are strongly encouraged to make use of Blackboard. It is like a virtual blackboard on the internet where I can post announcements. You will find the course syllabus, with lecture and lab schedules, lecture handouts, homework assignments, study guides and laboratory handouts and experiments. Lecture Slides will be posted in a full-size, color version and as a black & white, 3 slides/page handout version. Some students may find it helpful to print the handout version to bring to class. Please see me if you need help with Blackboard.

D.) **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. For more information, please read the college policy on cheating and plagiarism in the Reedley College catalog.

E.) **ACCOMMODATIONS:** If you have a verified need for an academic accommodation or materials in alternate media (i.e., Braille, large print, electronic text, etc.) per the Americans with Disabilities Act (ADA) or Section 504 of the Rehabilitation Act, please contact me as soon as possible.

F.) **NON-DISCRIMINATION STATEMENT:** The State Center Community College District does not discriminate nor harass on the basis of race, color, national origin, gender, sexual orientation, disability, or age in any of its policies, procedures, or practices, nor does it tolerate sexual harassment.

III. **COURSE OUTCOMES/OBJECTIVES:** The college specifies a list of specific skills that students should demonstrate at the end of this course. These have broad application to preparing students for Chemistry 3A and Chemistry 1A.

- Upon completion of this course, students will be able to: (10 questions based on these objectives are on the final exam)
 - A. Demonstrate a working knowledge of the periodic table in such ways as deriving inorganic chemical formulas and balanced chemical equations.
 - B. Write the name of inorganic and molecular compounds from the formulas.
 - C. Use dimensional analysis and stoichiometry to solve for an unknown parameter of density, volume, mass, pressure, temperature, molar mass and concentration.
 - D. Apply the definition of acids and bases and explain the concept of pH.
 - E. Apply basic safety procedures in the chemical laboratory and demonstrate laboratory skills in the use of analytical balances, following experimental procedures and the proper handling of glassware.

- **COURSE OBJECTIVES:** The college specifies a list of specific skills that students should demonstrate as they progress through their course of study. While this is not a complete list of what is on your exams, your exams will include all of these concepts at some point during the course.
- **In the process of completing this course, students will:**
 - A. Use the periodic table to predict properties of the elements and to obtain information for chemical calculations.
 - B. Identify molecular and ionic compounds and the specific bonding types that occur in these compounds.
 - C. Set up and balance chemical equations.
 - D. Complete mole and mass calculations using the stoichiometry in balanced equations.
 - E. Identify molecular and ionic compounds.
 - F. Demonstrate the use of the ideal gas law and combined gas law to calculate quantities for all the variables in an equation, such as pressure, volume, moles and temperature.
 - G. Identify the names and symbols of the elements on the periodic table and use these to derive inorganic chemical formulas and balanced chemical equations.
 - H. Write the names of ionic and molecular compounds given the chemical formula.
 - I. Use dimensional analysis to convert from the English to the metric system for measurements that are common to chemistry such as mass, volume, formula weights, density, linear measurements and temperature.
 - J. Balance chemical equations, and use both the molecular and net ionic forms of the equation and stoichiometry to predict quantities of products from given reactant amounts.
 - K. Describe covalently bonded compounds using Lewis structures.
 - L. Apply the definition of acids and bases to the understanding of pH and acid related problems.
 - M. Demonstrate safe use of the laboratory equipment, such as an analytical balance, glassware and thermometers, while conducting laboratory experiments.

Week:	Date:	Chapter:	Lecture Topics and Lab Assignments
1	8/15	Handout + 2.2	(1) Welcome, (2) Syllabus, Survey of Fundamental Algebra, Percent, Scientific Notation, Calculator Usage and Chemical Math HmWk 1 (Due: 8/22)
			Lab Safety (Due 8/19), First Week Survey (5 pts), Chemical Math Quiz (Open Book/Open Note) (0-40 pts) Quiz counts as a Study Guide.
2	8/22	2.3-2.5, 2.6-2.9	(1) Scientific Method, (2) Rules of Significant Figures, (3) Rounding for Multiplication and Division, (4) Density Calculations. (HmWk 2 Due, 8/29)
			Experiment #2: Laboratory Glassware, Balances, Unit Conversion, and Density Measurement (Due 8/26) Some lecture may be done in lab (1 hr). <u>This is also your opportunity to ask questions related to either the homework or the lab.</u>
3 Last Day to Add. 9/2	8/29	3.1-3.5 3.10-3.12	(1) Solids, Liquids and Gases, (2) Properties and Changes, (3) Elements (monatomic & polyatomic) and Compounds, (4) Introduction to the Periodic Table, (5) Pure Substances and Mixtures. (6) Defining Temperature , (7) Energy of Warming (HmWk 3 Due: 9/9)
			Experiment 3: Separation of a Mixture (Due 9/2)
4 Labor Day 9/5	9/7	4.1-4.5	Lecture (Atoms, Isotopes and Ions): (1) What is an Atom? (2) The subatomic particles that compose an atom. (3) What is an Element? (4) What is an Isotope? (5) What is an Ion? (6) Calculate Atomic Weight (HmWk 4, Due 9/16) Mon. Holiday
			Exam 1 (2 hrs) (Covers Chapters 1-4.5) A strong emphasis is placed on significant figures, unit conversions, the metric system and fundamental concepts from lecture. A sample exam is posted; your exam is not identical. Study Guide Handout: Classification of Elements Worksheet (complete after the exam, Due: 9/9)
5	9/12	4.6-4.9 5.3-5.6	(How to Name Chemical Compounds): (1) Differences in Ionic and Molecular Formulas, (2) Identification of Cmpnds. by Type, (3) Formulas of Ionic Cmpnds., (4) Ionic Formulas with Polyatomic Ions, (5) Naming Type I Cmpnds., (6) Naming Type II Cmpnds., (7) Naming Type III Cmpnds., (8) Identifying and Naming Common Acids. (HmWk 5 Due, 9/23) Strategic Memorization is required (Blue Card).
			Experiment 4: Atomic Weight of Cu (Due: 9/19)
6	9/19	5.7-5.9 6.1-5	(Chemical Composition): (1) Introduction to the Mole Unit, (2) The Mole Unit as a Measure of Mass, (3) Mole Unit as a Number, (4) The Formula of a Compound Used as a Conversion Factor. (HmWk 6 Due: 9/30)
			Experiment #7: Estimating the Size of a Mole (<i>Using Split Peas</i>) (Due: 9/23)
7	9/26	6.6-6.9 7.2-7.5	(Chemical Composition): (5) Percent by Mass Composition, (6) Calculation of Empirical Formulas, (7) Calculation of Molecular Formulas (Balancing Chemical Reactions): (1) Exam 1 Recap, (2) Defining a Chemical Change, (2) The Components of a Chemical Reaction Equations, (3) Balancing Chemical Reaction Methods. (HmWk 7 Due: 10/7)
			Experiment #5: Formula Ratio of Magnesium Oxide (2 hours) Due: 9/30 Laboratory Quiz (100 pts) Open Book Note (All Lab. Experiments., Chemical Nomenclature and Calculations)
8	10/3	7.6-7.10	(Balancing Chemical Reactions): (1) Reactions by Type, (2) Aqueous Rxns., (3) Complete Ionic Rxns., (4) Net Ionic Rxns
			Exam 2 (Ch. 4-7.5): Nomenclature (required memorization), mole conversions, and introductory reaction balancing. Complete and Net Ionic Rxns
9 Last Day to Drop (F) 10/14	10/10	8.1-8.6 3.10- 3.12, 8.7	(Chemical Quantities): (1) Using a Chemical Reaction for Mole Conversions, (2) Calculating the Yield for a Mixture of Two Reactants, (3) Calculating Percent Yield. (Energy): (1) Energy, (2) Warming Cooling, (3) Exothermic and Endothermic Processes, (4) Heat (q) Calculations. (5) Specific Heat Capacity, (6) Heat of Reaction. (HmWk 8 Due: 10/21)
			Experiment #6: Five Chemical Reactions (Due 10/14)
10	10/17	9.1-9.5 9.5-9.6	(Simple Theory of Light) (1) Electromagnetic Radiation, (2) Energy, Frequency and Wavelength of Light, (3) Electromagnetic Spectrum, (4) Origin of Light in the Atom, (5) Bohr's Theory of the Atom, (6) Simplified Introduction to the Quantum Atom, (7) Valence Electrons, (8) Subshells and orbitals, (9) Aufbau Fill Order, (10) Electron Orbital Diagrams and Electron Configurations. (HmWk 9 Due: 10/28)
			Experiment 8: Percent Water in a Hydrate (10/21)

11	10/24	9.7-9.9 10.2-10.4 10.5, 10.7	(Electrons in Atoms) and Valance Electrons , (11) Origins of the Periodic Table (12) Valance Electrons and Formation of Ions (Octet Rule), (13) Periodic Trends. (Chemical Bonding): (1) Ionic and Covalent Chemical Bonding, (2) Electronegativity, (3) Types of Chemical Bonds, (4) Lewis Structures of Molecules Based on the Octet Rule, (5) Predicting the Shapes of Molecules. HmWk 10 Due: 11/4
			Atomic Spectroscopy Activity and Electron Configuration and Electron Orbital Diagram Work Sheet. (Due 11/4)
12	10/31	11.2-11.5 11.6-11.8	(Properties of Gases): (1) Kinetic Molecular Theory of Gases, (2) Pressure and Pressure Measurement, (3) Empirical Gas Law Relationships, (4) Ideal Gas Law
			Exam 3 (Ch.7(complete) – Ch. 10) Rxn Balancing, ionic rxns, stoichiometry, energy, theory of electromagnetic radiation, modern atomic theory, octet rule, periodic trends, chemical bonding definitions, Lewis diagrams and the shapes of molecules.
13 Veterans Day 11/11	11/7	11.8-11.10 12.1-12.3, 12.6	(Properties of Gases): (5) Calculations Under Static Conditions and Changing Conditions, (7) Gas Phase Reactions, (8) Daltons Law of Partial Pressures. (Liquids, Solids, and Intermolecular Forces): (1) Properties of Liquids and Solids, (2) Types of Intermolecular Forces, (3) Types of Crystalline Solids. (HmWk 11 (Ch.11) Due: 11/14) Holiday No Lab
14	11/14	12.7, 12.4-12.5	(Liquids, Solids, and Intermolecular Forces): (4) Phase Changes and Boiling Liquids, (5) Heat (q) Changes in State, (6) Intermolecular Forces, (7) Chapter Recap.
			Experiment 10: Determination of the Ideal Gas Constant (R) (Due, 11/18)
15 Thanks- giving 11/24, 25	11/21	13.2-13.4 13.5-13.8	(Properties of Solutions and Units of Concentration): (1) Formation of a Solution, (2) Mass Percent, (3) Definition of Molarity, (4) Moles From Molarity and Volume, (5) Molarity by Dilution, (6) Solution Stoichiometry. (HmWk 12 (Ch.12) Due, 11/28) Holiday No Lab
16	11/28	14.6 14.2-5	(Acid Base Titration Calculations): (1) liquid-liquid (one to one titrations), (2) liquid-liquid titrations, (3) liquid solid titrations, (4) Determination of a Liquid Unknown for Use as a Standard. (Acids and Bases): (1) Acid Base Definitions, (2) Relative Strength of Acids and Bases. (HmWk 13 (Ch.13) Due, 12/9)
			Experiment 13: Determination of Calcium and Magnesium Water Hardness
17	12/5	14.7-14.9	(Acids and Bases): (2) Relative Strength of Acids and Bases, (3) Water and pH Scale, (4) pH and pOH Calculations, (5) Acidic and Basic Solutions. (Final Lecture) Discussion of the Final.
			Laboratory: Exam 4 (Ch.11.4-14.9) (HmWk 14 (Ch.14) Due: 12/12)
18	12/12		Final is on Monday (12/12/2016) from 4-5:50 in PHY 76 The Final Exam covers Lecture on Chapters 1-14 from TRO, and breaks down as follows: <ul style="list-style-type: none"> • 10 Questions Based on Syllabus Course Outcomes /Objectives • 40 Questions Based on Exams 1-4 (10 questions from Ch. 14) Questions are the same, but numbers, chemical reactions, and the compounds may be changed. Specific questions from chapter 14 will be added, if the chapter was not covered on Exam 4. <i>Please Bring a Scantron 882 E, pencil, eraser and calculator for your use during the exam. No Calculators are Provided.</i>

Due dates may be changed by the instructor. Late work is penalized 30% per week late.

Midterm Exams: Each exam draws questions equally from each chapter covered. Exam questions are similar to, homework questions, laboratory assignments; **lecture PowerPoints**, and Study Guides. All questions will have only one correct answer. In the event that a question contains an error or has no single correct answer, it will be dropped from the exam. Sample exams are posted, these should give you a sense of how questions are asked, but they are not the source of questions for your exam or in even an effective exam outline. These are not suitable as exam

Midterm and Final Grades: Please keep your returned exams for final exam review. A grade report is provided to each student with the return of each exam. The grade report will detail your scores for each item graded. Please check the report against your records. At the end of the semester final grades are posted to Web-Advisor by 5PM on 12/16/2016.