Chemistry 1406
Chemistry for the Health Professions
Spring 2019

Dr. Janet L. Maxwell
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CAV 229B, 325-486-6624
Office Hours: MWF 11:00 am – noon
Tuesday 2:00 – 3:00 pm, Thursday 11 am -noon
or by appointment

Required Texts: “General, Organic and Biological Chemistry”, 3rd edition by Frost and Deal
ISBN 978-0134042428

Also Required: 1) Registration/Participation in the Sapling Learning For-Credit Homework Software System (ISBN 9781319080242)
3) Academic/Daily Planner
4) A scientific calculator (Texas Instruments is the recommended brand, but other brands are acceptable)
5) Safety Goggles

Course Description: An Introduction to General, Organic and Biological Chemistry with emphasis on the role of chemistry in health and illness. Intended for nurses and allied health professionals.

Student Learning Outcomes:

A. Introduction to Chemistry - Students will be able to:
   1. Classify a sample of matter as a mixture, a compound, or an element; and describe a mixture as homogenous or heterogenous.
   2. Know the names and symbols of common elements, the differences between metals, metalloids and nonmetals, and the organization of the periodic table.
   3. Convert a measurement from one unit to another using a conversion factor, report a measured value to the correct number of digits, be able to use a calculator to carry out calculations, be able to round answers to the appropriate number of significant figures, be able to express numbers in scientific notation, to enter numbers in scientific notation correctly into the calculator, to understand the values of numbers expressed using scientific notation and to understand how to find the percent of a whole or the percent that one number is of another number.
   4. Define mass and volume, and know how to express these properties using the metric system and define and solve for density and specific gravity and use density or specific gravity to solve for the mass or volume.
   5. Understand and interconvert between temperature scales, understand units of energy and be able to calculate the specific heat of a substance.
   6. Distinguish the bulk properties of the three states of matter, and relate these properties to the behavior of the particles that make up the substance.
   7. Understand the difference between precision and accuracy.
   8. Carry out dosage calculations and use percents in health care applications.
   9. Determine whether a process is a physical change or a chemical reaction and write and balance a chemical equation to represent a chemical reaction.
B. Atoms and Radioactivity – Students will be able to:

1. Know the properties of the subatomic particles, and determine the mass and charge of an atom from the number of each type of subatomic particle.
2. Understand the concepts of atomic number and mass number and how these relate to the numbers of protons and neutrons in the nucleus of the atom.
3. Know how isotopes are related to one another, and understand the relationship of atomic weight to the masses of individual atoms.
4. Understand the concepts of radioactivity and radioisotopes and be able to describe and write the equations for the common types of nuclear decay.
5. Understand the units of radioactive disintegration and the concept of half-life.
6. Understand the most common medical applications for radioisotopes.

C. Compounds – Students will be able to:

1. Understand how electrons are arranged in an atom, write electron arrangements for the first 20 elements and understand the octet rule.
2. Predict ion charges for representative elements, and understand how atoms gain and lose electrons to form ions.
3. Predict the formulas of ionic compounds using the ion charges, and learn the names and charges of common transition metal ions.
4. Write the names and formulas of ionic compounds that contain two elements, learn the names and formulas of common polyatomic ions, and write the names and formulas of compounds that contain polyatomic ions.
5. Understand how covalent bonds are formed, use the octet rule to predict the number of covalent bonds an atom can form, draw Lewis structures for molecules that contain single bonds, draw Lewis structures for molecules that contain double or triple bonds, use lines to represent bonding electrons and write names for binary covalent compounds.
6. Use the mole concept to express numbers of formula units, interconvert between moles and masses, understand the significance of Avogadro’s number and use it to interconvert between numbers of atoms and masses in grams.
7. Determine the shapes of molecular compounds. use electronegativities to predict whether a covalent bond is polar or nonpolar, determine the type of charge on each bonding atom and determine the polarity of molecules containing more than one covalent bond.

D. Introduction to Organic Compounds – Students will be able to:

1. Explain why carbon is uniquely suited to be the main structural element of organic chemistry, and describe the ways in which carbon atoms form covalent bonds.
2. Learn the names of the first 10 linear alkanes, and use common conventions to draw their structural formulas.
3. Classify fatty acids based on their structures.
4. Understand how and why chemists use functional groups to classify organic molecules and how alcohols and amines are categorized as primary, secondary or tertiary.
5. Distinguish linear and branched alkanes and cycloalkanes, and recognize and draw isomers of simple alkanes.
6. Name branched alkanes, cycloalkanes and haloalkanes.
7. Name and draw the cis and trans forms of cycloalkanes and alkenes, and distinguish between constitutional isomers and cis-trans isomers.
8. Understand the concept of chirality in organic chemistry and be able to distinguish stereoisomers from other types of isomers.
E. Carbohydrates – Students will be able to:
1. Understand the structural features and typical physical properties of monosaccharides, including the chirality of these molecules.
2. Understand the concept of organic oxidation and reduction reactions as applied to the concept of reducing sugars.
3. Understand the formation of ring structures in monosaccharides and the relationship between the anomers of a monosaccharide.
4. Understand, name and draw the structures of the most common glycosidic linkages in disaccharides and understand the breaking and forming of glycosidic bonds.
5. Describe the building blocks, linkages and biological functions of the common disaccharides and polysaccharides.
6. Understand the structure and function of the carbohydrate antigens in blood.

F. Intermolecular Forces – Students will be able to:
1. Describe the different types of intermolecular forces between molecules or ions, and relate the strength of these forces to physical properties.
2. Be able to name and define the phase changes.
3. Understand the rule of “like dissolves like” and how it applies to nonpolar compounds, polar compounds and ionic compounds, recognize hydrophilic and hydrophobic regions in a molecular compound, and rank the solubilities of structurally related compounds.
4. Understand the role of soap in removing oil and grease.
5. Understand the role of the strength of intermolecular forces in determining the melting and boiling points of substances.
6. Understand and apply the relationships between pressure, volume and temperature for a gas.
7. Understand the qualitative and quantitative aspects of Boyle’s Law and Charles’ Law and be able to predict the behavior of gases under changing conditions.
8. Understand the effect of saturation and unsaturation of fats on their melting points and distinguish between cis-unsaturated and trans-unsaturation fats.
9. Understand the structure and function of lipids in cell membranes.

G. Solution Chemistry – Students will be able to:
1. Identify the solute and solvent in a solution and distinguish between solutions, colloids and suspensions.
2. Describe and interpret the solubility of a compounds, and predict the effects of temperature and pressure on solubility.
3. Describe what happens when ionic and molecular compounds dissolve in water and distinguish between strong electrolytes, weak electrolytes and nonelectrolytes.
4. Determine the number of equivalents per mole for dissolved ions.
5. Calculate and use milliequivalents per liter, millimoles per liter, molarity, percent concentrations, other common concentration units involving masses of solutes.
6. Calculate the final volume or concentration of a solution in a dilution, and calculate the volumes of a concentrated solution and water needed to carry out a dilution.
7. Determine the direction of osmosis and dialysis, and predict the effect of a solution on red blood cells using the overall molarity of the solution.
8. Understand and explain the different modes of transports of substances across cell membranes.

H. Acids and Bases – Students will be able to:
1. Distinguish between Acids and Bases in aqueous solution.
2. Understand the definition of strong acids and strong bases.
3. Understand the concept of chemical equilibrium and the equilibrium constant and use Le Chatlier’s principle to predict the effect of a disturbance on a system at equilibrium.
4. Understand the definition of strong acids and use the value of $K_a$ or $K_b$ to determine which acid or base is strongest or weakest.

5. Write the equation for the ionization of an acid base in water and identify acid-base conjugate pairs.

6. Write the self-ionization reaction for water, and use the concentration of either hydronium or hydroxide ion to calculate the concentration of the other ion.

7. Relate the pH of a solution to the hydronium ion concentration, and use pH to determine the acidity or basicity of a solution.

8. Understand the concept of $pK_a$ and the relationship between pH and $pK_a$.

9. Recognize buffer solutions, describe how buffers resist pH changes, and estimate the pH of a buffer from the $pK_a$ of the acid and the concentrations of the buffer components.

Student Learning Outcomes will be evaluated using exam questions.

Grading:

- Exam 1 (18 questions x 5 pts) - 6.67 % of the grade 90 pts
- Exam 2 (20 questions x 5 pts) - 7.41% of the grade 100 pts
- Exam 3 (30 questions x 5 pts) - 11.1 % of the grade 150 pts
- Exam 4 (22 questions x 5 pts) - 8.15% of the grade 110 pts
- Final Exam (comprehensive - 50 questions x 5 pts) 250 pts (Final worth 18.5% of the grade)
- Sapling Learning Online Homework Grade 100 pts (Homework worth 7.41% of the grade)
- Top Hat Participation Grade 100 pts (Participation worth 7.41% of the grade)
- Quizzes 8 x 15 = 120 pts (9 quizzes will be given and the lowest quiz grade will be dropped- 8.89% of the grade)
- Lab Grade 14 x 20 = 280 pts (One lab grade can only be dropped if there is a documented excuse in writing –20.7% of the grade)
- Study Skills/Planner Work 50 pts (SSWS worth 3.70% of the grade) Total = 1350 pts

Total scores within the following ranges at the end of the semester guarantee the student at least the indicated letter grade:

- A 90% or better
- B 80-89%
- C 70-79%
- D 60-69%
- F 0 – 59 %

Students are responsible for monitoring their own grades on blackboard. See the column “weighted average”.

Exams:

See above for the number of questions on each exam. Each question will be worth 5 points. Questions will be in a random, scrambled order. Students who arrive at an exam early/on-time will have the full class period to take the exam. **Students who arrive more than 5 minutes late to an exam will have their exam paper taken away at the same time that the last early/on-time student finishes their exam.**

Exam Grades: Exam grades will be posted on blackboard, usually within a few hours after the exam has been taken. The answers to the exam will
be posted on Blackboard sometime during the week after the exam. The student can claim their paper exam copy in the class period following the exam. The student can then compare the grade on Blackboard to the number of questions missed so that he or she can make certain the exam was graded correctly. Please see Dr. Maxwell if there is a discrepancy between the grade posted on Blackboard and the number of questions missed according to the key.

Old Exam Copies: During the exams, students are required to write their name on both their answer sheet and their paper copy of the exam. The paper copy will be returned to the student during the next class period. Student answer sheets from exams will be held by the instructor for one calendar year from the date of the exam. Student answer sheets cannot be claimed by the student. Paper copies of the final exam will be available for perusal by the student for one year from the date of the exam, but cannot be taken from Dr. Maxwell’s custody.

Deadline: Last Day to drop the course: Thursday, March 28

Persons with disabilities which may warrant academic accommodations must contact the Student Life Office, Room 112, University Center, in order to request and to implement academic accommodations.

Attendance Policy: Roll will be taken each class period. If you come to class late, there will be a sign-in/sign-out sheet by the door that you can sign. Top Hat will be part of the participation/CPS grade that is worth 100 points total out of 1280 points. Missing class will lower your attendance grade significantly, so you must attend class if you expect to pass this course.

Blackboard: Blackboard is a computer learning environment to help you with your studies.

Classroom Performance System: All students are required to enroll in the Top Hat classroom performance system at the beginning of the semester. You can use the app on your cell phone or other mobile device, or you can text your answers to the Top Hat phone number. Students must bring the device (cell phone, tablet, etc.) to every class period. We will use the mobile device to respond to groups of multiple choice questions designed to enhance the learning experience in the course. Students will receive a participation grade based on performance on the CPS questions based on participation, not on whether the responses are correct. Missing class will lower your Top Hat grade significantly, so you must attend class if you expect to pass this course. Missing CPS questions can only be made up at the instructor’s discretion if the student has a documented reason for missing class. The instructor reserves the right to deny the student the opportunity to make up missed CPS questions. Your mobile device will also be used to take quizzes. The best way to make sure to get credit for the CPS questions is to attend class and to participate when the questions are asked. You will receive one or more emails at the beginning of the semester from Top Hat, prompting you to sign on and register in the system. If you follow the link in the email sent to you, you will automatically be enrolled in the right section of the course. Important: You must pay for your Top Hat Account before January 22 using the same
last name as the one in the ASU computer system. That’s the only way your real name gets entered into the system. If you have not paid for your subscription by Jan. 22, you will not get credit for any activities that involve Top Hat until your subscription is paid.

Top Hat Course Codes:  Be sure to use the correct course code for your section!!!!!
Class that Meets Monday, Wednesday & Friday at 10:00 am:  888986
Class that Meets Tuesday & Thursday at 9:30 am:  662850

Quizzes: Quizzes will be given in lecture as shown in the course schedule on the last page of this syllabus and in the table below. Quiz topics will include the material from the previous week’s lab and the sections associated with those topics from the textbook as well as additional sections as assigned in class. In order to study for the quizzes, you need to read the textbook sections listed for the quiz topic and work all the practice problems and additional problems listed in “Practice Problems and Additional Problems” handout on Blackboard. Quizzes will be worth 15 points. Nine quizzes will be given and the lowest quiz grade will be dropped. Make-up quizzes will not be given for any reason whatsoever. Students who have not enrolled in Top Hat by Jan. 22 will be given a zero on all quizzes until the clicker is registered. These zeros are irreversible.

Practice Problems: At the end of each section in the textbook, there is a list of practice problems and a list of additional problems. The answers to the odd-numbered practice problems and additional problems are given at the end of each chapter. You will be responsible for knowing what problems are assigned for each section to study for quizzes and exams. This information is given in the document labeled “Practice Problems and Additional Problems by Section” found under course materials on Blackboard.

Calculators: Students are expected to bring a scientific calculator to class every day, including days with quizzes or exams. The calculator may be a graphing calculator, or just a regular scientific calculator. Students may NOT use cell phones in place of calculators during quizzes or exams. Note: the calculators found on the cell phones are useless for calculations in lab. Bring a real calculator to lab.

Make-up Exam Policy: Students will only be allowed to take one make-up exam if there is an illness or emergency which is documented in writing. In order for a student to be eligible to take a make-up exam, the student must notify Dr. Maxwell before the exam is missed by telephone, voice mail or email. When a student returns to class after missing an exam, he or she must present a document such as a doctor’s note or funeral notice in order for Dr. Maxwell to give permission for a make-up exam. All make-up exams will be given on Friday, May 3 at 1:00 pm in Cav 219. Students will not be given a second chance for a make-up exam. Each student may take no more than one make-up exam for any reason whatsoever.
Sapling Learning Homework System: Students will be provided with a list of assigned homework problems from Chapters 1-4 and 6-9 in the textbook. There are usually two assignments for each chapter. These problems will be found in the Sapling Learning Online Homework System. Students will be graded on the completeness of the assignments. There will be no deduction for multiple attempts at problems. Students are expected to keep working all the homework problems until they have arrived at the correct answer. **Do NOT hit “give up and view solution”**. Students are expected to begin working on the homework for a particular problem set as soon as we begin talking about that material in the lecture or the lab. Due dates for homework assignments are listed in the chart below. The Sapling Learning Homework system can accept late homework assignments, except for the last assignment, HW 9. **However, for each day that the homework is late, 25% of the score will be deducted.** After 4 days, no credit will be given for late assignments. The system computes the score if any deductions need to be made for late homework. There will be no credit for late submissions for the Chapter 9 homework.

**Important:** in order to get credit for your Sapling homework assignments, you **must** register for Sapling using the same last name as the one for you in the ASU Computer system.

### Sapling Learning Homework Deadlines

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Topics</th>
<th>Due by:</th>
<th>Time due</th>
<th>Worth</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1</td>
<td>Pure substances, mixtures, periodic table, metals, nonmetals, metalloids, Metric units and prefixes, metric to metric conversions, significant figures, scientific notation, percents, matter, density</td>
<td>Monday, Jan. 21</td>
<td>11:55 pm</td>
<td>8 pts</td>
<td>Complete after reading through Lab 1 and finishing Lab 2</td>
</tr>
<tr>
<td>1-2</td>
<td>Temperature, energy, specific heat, physical states, precision vs. accuracy, dosage calculations, percent calculations in health science, physical and chemical changes, chemical reactions</td>
<td>Sunday, Jan. 27</td>
<td>11:55 pm</td>
<td>7 pts</td>
<td>Complete after Lab 3</td>
</tr>
<tr>
<td>2</td>
<td>Subatomic particles and their properties, atomic number, mass number, isotopes, atomic mass, Radioisotopes, types of radiation, biological effects of radiation, nuclear equations, radioactive decay, half-lives, medical applications for radioisotopes</td>
<td>Tuesday, Feb. 5</td>
<td>11:55 pm</td>
<td>8 pts</td>
<td>Complete after Lab 4</td>
</tr>
<tr>
<td>Assignment</td>
<td>Topics</td>
<td>Due by:</td>
<td>Time due</td>
<td>Worth</td>
<td>Comments</td>
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<tr>
<td>3-1</td>
<td>Electron arrangements, the octet rule, ion formation, ionic compounds, naming ionic compounds and writing the formula of ionic compounds with representative element ions, transition element ions and polyatomic ions, the mole, Avogadro’s number, atoms to moles conversions, molar masses of compounds</td>
<td>Sunday, Feb. 10</td>
<td>11:55 pm</td>
<td>10 pts</td>
<td>Complete after Lab 5</td>
</tr>
<tr>
<td>3-2</td>
<td>Covalent bonds, electron dot structures, Lewis structures, grams to moles conversions, grams to atoms or molecules conversions, molar masses of compounds, grams to molecules conversions</td>
<td>Sunday, Feb. 17</td>
<td>11:55 pm</td>
<td>9 pts</td>
<td>Complete after Lab 6</td>
</tr>
<tr>
<td>4-1</td>
<td>Molecular geometry, electronegativity, polarity of bonds and molecules, alkanes, skeletal structures, functional groups, families of organic compounds, fatty acids</td>
<td>Tuesday, Feb. 26</td>
<td>11:55 pm</td>
<td>6 pts</td>
<td>Complete after Lab 7</td>
</tr>
<tr>
<td>4-2</td>
<td>Nomenclature of alkanes, constitutional isomers, cis-trans isomers, unsaturated fatty acids, enantiomers, chiral molecules in biochemistry</td>
<td>Sunday, March 3</td>
<td>11:55 pm</td>
<td>8 pts</td>
<td>Complete after Lab 8</td>
</tr>
<tr>
<td>6-1</td>
<td>Classes of carbohydrates, aldoses vs. ketoses, structures of common monosaccharides, stereochemistry of monosaccharides, cyclic forms of monosaccharides, oxidation and reduction of monosaccharides</td>
<td>Tuesday, March 19</td>
<td>11:55 pm</td>
<td>8 pts</td>
<td>Complete after Lab 9</td>
</tr>
<tr>
<td>6-2</td>
<td>Hydrolysis of disaccharides, naming glycosidic linkages, labeling anomeric, acetal and hemiacetal carbon atoms, structures of common disaccharides, reducing disaccharides, structures of storage and structural polysaccharides, ABO blood types</td>
<td>Sunday, March 24</td>
<td>11:55 pm</td>
<td>6 pts</td>
<td>Complete after Lab 10</td>
</tr>
<tr>
<td>7-1</td>
<td>Polarity of organic molecules, types of attractive forces, pressure, Boyle’s Law, Charles’ Law</td>
<td>Tuesday, April 2</td>
<td>11:55 pm</td>
<td>7 pts</td>
<td>Complete after Lab 11</td>
</tr>
<tr>
<td>7-2</td>
<td>Gay-Lussac’s law, combined gas law, phase changes, liquids, solids, solubility, amphipathic compounds, soap, dietary lipids, trans fats, phospholipids, cellular membranes</td>
<td>Sunday, April 7</td>
<td>11:55 pm</td>
<td>8 pts</td>
<td>Complete after Lab 12</td>
</tr>
<tr>
<td>Assignment</td>
<td>Topics</td>
<td>Due by:</td>
<td>Time due</td>
<td>Worth</td>
<td>Comments</td>
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<tr>
<td>8-1</td>
<td>Solutions, colloids, suspensions, solubility vs. temperature for solids and gases, solubility vs. pressure for gases, strong electrolytes, weak electrolytes, nonelectrolytes, concentration, molarity, equivalents, milliequivalents per liter, percent concentration, ppm</td>
<td>Sunday, April 14</td>
<td>11:55 pm</td>
<td>6 pts</td>
<td>Complete after Lab 13, Sections 1-5</td>
</tr>
<tr>
<td>8-2</td>
<td>Dilution, diffusion, osmosis, dialysis, passive diffusion, facilitated transport, active transport</td>
<td>Tuesday, April 23</td>
<td>11:55 pm</td>
<td>4 pts</td>
<td>Complete after Lab 13, Sections 6-7</td>
</tr>
<tr>
<td>9</td>
<td>Acids, Bases, neutralization reactions, chemical equilibrium, Le Chatlier’s principle, weak acids and bases, $K_a$, conjugate acids and bases, the autoionization of water, pH, calculating pH and $[\text{H}_3\text{O}^+]$</td>
<td>Sunday, April 28</td>
<td>11:55 pm</td>
<td>5 pts</td>
<td>Complete before the Final Exam</td>
</tr>
</tbody>
</table>

Late Homework Policy: The Sapling Learning Homework system can accept late homework assignments. **However, for each day that the homework is late, 25% of the score will be deducted.** After 4 days, no credit will be given for late assignments. The system computes the score if any deductions need to be made for late homework. There will be no credit for late submissions for the Chapter 9 homework.

Policy on Academic Dishonesty: Students are expected to work independently on quizzes, exams and lab reports. See the ASU Student Handbook for definitions of cheating and plagiarism. Any student who is caught cheating or plagiarizing in this class will be subject to failure in the course and possible suspension from the University. Cheating and/or plagiarism will not be tolerated! Angelo State University expects its students to maintain complete honesty and integrity in their academic pursuits. Students are responsible for understanding the Academic Honor Code, which is contained in both print and web versions of the Student Handbook.

Cell phone policy: In regular class sessions and during exams, all cell phones must be set to silent alert. Students are not allowed to use cell phones during exams and quizzes for any reason whatsoever. Thank you for respecting the rights of your fellow classmates by turning off the ringer on your phone during class.

Lab Course: Attendance in lab is a mandatory part of this course. We will do group activities, short lab procedures and study skills in lab. The point values for these activities can be found on the lab schedule on the last page of this syllabus. **Note that almost all of the new material will be presented during the lab period and not in the lecture. Poor attendance in lab will be fatal to your grade!**
Lab Reports: Labs and Experiments will be carried out as group activities in lab. Each lab will be worth 15 points. Students are required to check their lab answers with the Instructor or Lab Assistant before leaving the lab that day.

Group Activities in Lab: A critical part of the learning in lab will take place in group learning activities. You are encouraged to stay in the same group for the semester. Students will help each other learn the material as well as getting help from the lab assistant or instructor.

Mandatory Laboratory Safety Training and Quiz: All students who have not done previously done so must take the Blackboard Laboratory safety training and quiz. To determine if you are required to take it or not, log onto Blackboard. If you see the Course “Lab Safety Training”, then you are required to take the training and quiz. If you don’t see that course, or if you already have a passing score on the exam, then you are exempt from the requirement. If you do see the course, click on “Lab Safety Training”. Under the left hand menu, choose “Get Started Here”. There are three sections: 1) Welcome to Lab Safety Training --There are your instructions. 2) Lab safety training -- Click on “Lab Safety - Click here to begin” --This will download a Powerpoint slide show which will cover the safety training. 3) The lab safety quiz. You must score 90% or higher. Students who are required to pass the Safety Quiz will not be allowed to attend lab without passing the quiz starting Tuesday, Jan. 22. There will be no exceptions to this rule.

Missing Lab Policy: Students will only be allowed to miss a lab if there is an illness, emergency or other schedule problem which is documented in writing. In order for a student to be eligible for a make-up lab, the student must notify Dr. Maxwell or the lab instructor before the lab is missed by telephone, voice mail or email. When a student returns to class after missing a lab, he or she must present a document such as a doctor’s note or funeral notice or coach’s note in order for the instructor to give permission to miss the lab. If you have a documented excuse, your missing lab grade will be dropped. Note: Students can only be excused from and drop one lab grade per semester.

Study Skills/Planner: The last activity of the day in lab for weeks 2-11 in lab will be an introduction to study skills. The study skills worksheets are found on blackboard and you are responsible for printing them out and bringing them to lab the appropriate week. Each study skills worksheet will be worth 5 points, and students will be encouraged to discuss the study skills worksheet with their group members before each student turns in their individual papers. In order to get credit for your study skills worksheet each week, you must show the instructor your weekly planner for the next week with a list of scheduled times to study for this course, and hopefully for your other courses as well. Students who turn in their study skills sheet without showing the instructor their weekly planner will receive a zero on the study skills worksheet. Research has shown that students who plan and organize their study time are much more likely to succeed in a course than students who do not organize their time well. Planners can be paper or electronic. It is a good idea for you to read through all the
worksheets at the beginning of the semester so that you can begin to implement these ideas as early as possible.

Lab Clean up: Before a student can leave the lab at the end of the experiment, he or she must make sure that the bench area is clean, that all electrical equipment has been unplugged and all faucets turned off, and that no solids have been left in the sinks. In the common areas, all of the hoods and balances must be clean and all reagent bottles must be capped. If reagent bottles are found uncapped during or after the lab or if the common areas are found dirty or with things that are not supposed to be there at the end of the lab, then clean-up points will be deducted from the grades of all lab students in that section for that experiment. If a particular bench is found dirty or with things that are not supposed to be there, then clean-up points will be deducted from all the students using that bench. If the instructor can determine who is responsible for a particular mess, then the clean-up points will be deducted only from the grades of the student or students responsible. If not, then clean-up points will be deducted from all students in the section for messes in common areas and from all students on a particular bench for messes on that bench. No points will be deducted for broken glassware as long as it is cleaned up and reported to the instructor.
<table>
<thead>
<tr>
<th>Week</th>
<th>Dates: Class Meetings</th>
<th>Sections Covered</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jan. 14, 16 &amp; 18</td>
<td>Sections 1.1 - 1.2</td>
<td>No quiz</td>
</tr>
<tr>
<td>2</td>
<td>Jan. 23 &amp; 25</td>
<td>Sections 1.3 - 1.4</td>
<td>Jan. 23 – Quiz 1 (Wednesday)</td>
</tr>
<tr>
<td>3</td>
<td>Jan 28, 30 &amp; Feb 1</td>
<td>Sections 1.5 – 1.7</td>
<td>Jan. 28 – Quiz 2</td>
</tr>
<tr>
<td>4</td>
<td>Feb. 4, 6 &amp; 8</td>
<td>Chapter 2</td>
<td>Feb. 4 – Exam I (Ch 1, Labs 1-3)</td>
</tr>
<tr>
<td>5</td>
<td>Feb. 11, 13 &amp; 15</td>
<td>Sections 3.1 – 3.3 &amp; parts of 3.5</td>
<td>Feb. 11 – Quiz 3</td>
</tr>
<tr>
<td>6</td>
<td>Feb. 18, 20 &amp; 22</td>
<td>Sections 3.4 – 3.7</td>
<td>Feb. 18 – Quiz 4</td>
</tr>
<tr>
<td>7</td>
<td>Feb. 25, 27 &amp; March 1</td>
<td>Sections 4.1 - 4.3</td>
<td>Feb 25 – Exam 2 (Chs 2-3, Labs 4-6)</td>
</tr>
<tr>
<td>8</td>
<td>March 4, 6 &amp; 8</td>
<td>Sections 4.4 - 4.5</td>
<td>March 4 – Quiz 5</td>
</tr>
<tr>
<td></td>
<td>March 11, 13 &amp; 15</td>
<td>No class</td>
<td>SPRING BREAK</td>
</tr>
</tbody>
</table>
## Week 9
### Dates:
- March 18, 20 & 22

### Class Meetings
- Sections 6.1 - 6.4

### Sections Covered
- Wednesday, March 20 – Quiz 6

### Topics
- Classes of carbohydrates, aldoses vs. ketoses, structures of common monosaccharides, stereochemistry of monosaccharides, cyclic forms of monosaccharides, oxidation and reduction of monosaccharides

## Week 10
### Dates:
- March 25, 27 & 29

### Class Meetings
- Sections 6.5 - 6.7

### Sections Covered
- March 25 – Quiz 7

### Topics
- Hydrolysis of disaccharides, naming glycosidic linkages, labeling anomeric, acetal and hemiacetal carbon atoms, structures of common disaccharides, reducing disaccharides, structures of storage and structural polysaccharides, ABO blood types

## Week 11
### Dates:
- April 1, 3 & 5

### Class Meetings
- Sections 7.1 - 7.2

### Sections Covered
- April 1 – Exam 3 (Ch 4 & 6, Labs 7-10)

### Topics
- Polarity of organic molecules, types of attractive forces, pressure, Boyle’s Law, Charles’ Law

## Week 12
### Dates:
- April 8, 10 & 12

### Class Meetings
- Sections 7.2 (cont) – 7.6

### Sections Covered
- April 8 – Quiz 8

### Topics
- Gay-Lussac’s law, combined gas law, phase changes, liquids, solids, solubility, amphipathic compounds, soap, dietary lipids, trans fats, phospholipids, cellular membranes

## Week 13
### Dates:
- April 15, 17 & 19

### Class Meetings
- Sections 8.1-8.4

### Sections Covered
- April 15 - Quiz 9

### Topics
- Solutions, colloids, suspensions, solubility vs. temperature for solids and gases, solubility vs. pressure for gases, strong electrolytes, weak electrolytes, nonelectrolytes, concentration, molarity, equivalents, milliequivalents per liter, percent concentration, ppm

## Week 14
### Dates:
- April 22, 24 & 26

### Class Meetings
- Sections 8.5 – 8.7

### Sections Covered
- April 22 - Exam 4 (Chapter 7 & Sections 8.1-8.4)

### Topics
- Dilution, diffusion, osmosis, dialysis, passive diffusion, facilitated transport, active transport

## Week 15
### Dates:
- April 29, May 1 & 3

### Class Meetings
- Chapter 9 – Acids, Bases, pH (Sections 9.1-9.5 only)

### Topics
- No quiz this week

- Acids, Bases, neutralization reactions, chemical equilibrium, Le Chatelier’s principle, weak acids and bases, $K_a$, conjugate acids and bases, the autoionization of water, pH

## Week 16
### Dates:
- May 8

### Sections Covered
- May 8 8:00 am – Final Exam (Comprehensive)

The final exam for Section 010 will be held on Monday, May 8 at 10:30 am – 12:30 pm
Meets TR at 9:30-10:45 am in Cav 219. We will cover Chapters 1-4 & 6-9. We will skip Chapter 5.

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates: Class Meetings</th>
<th>Sections Covered</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jan. 15 &amp; 17</td>
<td>Sections 1.1 -1.2 No quiz</td>
<td>Pure substances, mixtures, periodic table, metals, nonmetals, metalloids, Metric units and prefixes, metric to metric conversions,</td>
</tr>
<tr>
<td>2</td>
<td>Jan. 22 &amp; 24</td>
<td>Sections 1.3 - 1.4 Jan. 22 – Quiz 1 (must have paid for top hat to get credit for all quizzes)</td>
<td>Significant figures, scientific notation, percents, matter, density, temperature, energy, specific heat, physical states, precision vs. accuracy</td>
</tr>
<tr>
<td>3</td>
<td>Jan. 29 &amp; 31</td>
<td>Sections 1.5 – 2.7 Jan. 29 – Quiz 2</td>
<td>Dosage calculations, percent calculations in health science, physical and chemical changes, chemical reactions</td>
</tr>
<tr>
<td>4</td>
<td>Feb. 5 &amp; 7</td>
<td>Chapter 2 Feb. 5 – Exam 1 (Ch 1, Labs 1-3)</td>
<td>Atoms, subatomic particles, atomic number, mass number, isotopes, atomic mass Radioactivity, radioisotopes, nuclear equations, radioactive decay, radiations units and half-lives, medical applications for radioactivity</td>
</tr>
<tr>
<td>5</td>
<td>Feb 12 &amp;14</td>
<td>Sections 3.1 – 3.3 &amp; parts of 3.5 Feb. 12 – Quiz 3</td>
<td>Electron arrangements, the octet rule, ion formation, ionic compounds, naming ionic compounds and writing the formula of ionic compounds with representative element ions, transition element ions and polyatomic ions, the mole, Avogadro’s number, atoms to moles conversions, molar masses of compounds</td>
</tr>
<tr>
<td>6</td>
<td>Feb. 19 &amp; 21</td>
<td>Sections 3.4 – 3.7 Feb. 19 – Quiz 4</td>
<td>Covalent bonds, electron dot structures, Lewis structures, grams to moles conversions, grams to atoms or molecules conversions, molar masses of compounds, grams to molecules conversions</td>
</tr>
<tr>
<td>7</td>
<td>Feb. 26 &amp; 28</td>
<td>Sections 4.1 - 4.3 Feb 26 – Exam 2 (Chs 2-3, Labs 4-6)</td>
<td>Molecular geometry, electronegativity, polarity of bonds and molecules, alkanes, skeletal structures, functional groups, families of organic compounds, fatty acids</td>
</tr>
<tr>
<td>8</td>
<td>March 5 &amp; 7</td>
<td>Sections 4.4 - 4.5 March 5 – Quiz 5</td>
<td>Nomenclature of alkanes, types of isomers in organic chemistry, unsaturated fatty acids, chiral molecules in biochemistry</td>
</tr>
<tr>
<td></td>
<td>March 12 &amp; 14</td>
<td>No class</td>
<td>SPRING BREAK</td>
</tr>
<tr>
<td>Week</td>
<td>Dates: Class Meetings</td>
<td>Sections Covered</td>
<td>Topics</td>
</tr>
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<tr>
<td>9</td>
<td>March 19 &amp; 21</td>
<td>Sections 6.1 - 6.4</td>
<td>Classes of carbohydrates, aldoses vs. ketoses, structures of common monosaccharides, stereochemistry of monosaccharides, cyclic forms of monosaccharides, oxidation and reduction of monosaccharides</td>
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<tr>
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<td>Thursday, March 21 – Quiz 6</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>March 26 &amp; 28</td>
<td>Sections 6.5 – 6.7</td>
<td>Hydrolysis of disaccharides, naming glycosidic linkages, labeling anomic, acetal and hemiacetal carbon atoms, structures of common disaccharides, reducing disaccharides, structures of storage and structural polysaccharides, ABO blood types</td>
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<tr>
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<td></td>
<td>March 26 – Quiz 7</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>April 2 &amp; 4</td>
<td>Sections 7.1 - 7.2</td>
<td>Polarity of organic molecules, types of attractive forces, pressure, Boyle’s Law, Charles’ Law</td>
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<tr>
<td></td>
<td></td>
<td>April 2 – Exam 3 (Ch 4 &amp; 6, Labs 7-10)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>April 9 &amp; 11</td>
<td>Sections 7.2 (cont) – 7.6</td>
<td>Gay-Lussac’s law, combined gas law, phase changes, liquids, solids, solubility, amphipathic compounds, soap, dietary lipids, trans fats, phospholipids, cellular membranes</td>
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<tr>
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<td></td>
<td>April 9 – Quiz 8</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>April 16 &amp; 18</td>
<td>Sections 8.1-8.4</td>
<td>Solutions, colloids, suspensions, solubility vs. temperature for solids and gases, solubility vs. pressure for gases, strong electrolytes, weak electrolytes, nonelectrolytes, concentration, molarity, equivalents, milliequivalents per liter, percent concentration, ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>April 16 – Quiz 9</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>April 23 &amp; 25</td>
<td>Sections 8.5 – 8.7</td>
<td>Dilution, diffusion, osmosis, dialysis, passive diffusion, facilitated transport, active transport</td>
</tr>
<tr>
<td></td>
<td></td>
<td>April 23 - Exam 4 (Chapter 7 &amp; Sections 8.3- 8.4)</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>April 30 &amp; May 2</td>
<td>Chapter 9 – Acids, Bases, pH (Sections 9.1-9.5 only)</td>
<td>Acids, Bases, neutralization reactions, chemical equilibrium, Le Chatlier’s principle, weak acids and bases, (K_a), conjugate acids and bases, the autoionization of water, pH, calculating pH and ([H_3O^+]), (pK_a), the relationship between pH and (pK_a), amino acids, buffers, the role of the bicarbonate buffer system in human physiology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No quiz this week</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>May 9</td>
<td>May 9  8:00 am – Final Exam (Comprehensive)</td>
<td>The final exam for Section 020 will be held on Thursday, May 11 at 8:00 – 10:00 am</td>
</tr>
<tr>
<td>Week</td>
<td>Dates</td>
<td>Lab</td>
<td>Study Skills Worksheet</td>
</tr>
<tr>
<td>------</td>
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<td>--------------------------------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>Jan 15</td>
<td><strong>Lab Safety Presentation</strong></td>
<td>Study Skills Worksheet #1: Time Management/Show Instructor your Planner (5 pts)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lab 2: Properties, Units &amp; Conversions (20 pts)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Jan 22</td>
<td><strong>Students will not be allowed in lab until the Lab Safety Course Quiz has been passed with a 90% or Better.</strong> Lab 3: Multistep Conversions, Dosage Calculations and Specific Heat (20 pts)</td>
<td>Study Skills Worksheet #2: Test Preparation (5 pts)</td>
</tr>
<tr>
<td></td>
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<td><strong>Students who are pregnant or who may be pregnant will carry out this experiment in the library.</strong></td>
<td></td>
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<tr>
<td>3</td>
<td>Jan. 29</td>
<td>Lab 4: Atoms, Isotopes &amp; Radiation (20 pts)</td>
<td>Study Skills Worksheet #3: Motivation (5 pts)</td>
</tr>
<tr>
<td></td>
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<td><strong>Students who are pregnant or who may be pregnant will carry out this experiment in the library.</strong></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Feb 5</td>
<td>Lab 5: Arrangement of e-, Ionic Compounds &amp; Introduction to Moles &amp; Covalent Compounds (20 pts)</td>
<td>Study Skills Worksheet #4: Distributed Practice (5 pts)</td>
</tr>
<tr>
<td>5</td>
<td>Feb 12</td>
<td>Lab 6: Covalent Compounds and Moles (20 pts)</td>
<td>Study Skills Worksheet #5: Learning and Memory (5 pts)</td>
</tr>
<tr>
<td>6</td>
<td>Feb 19</td>
<td>Lab 7: Introduction to Organic Compounds and Families of Organic Compounds (20 pts)</td>
<td>Study Skills Worksheet #6: Critical Thinking (5 pts)</td>
</tr>
<tr>
<td>7</td>
<td>Feb 26</td>
<td>Lab 8: Naming Branched Alkanes and Isomers (20 pts)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>March 5</td>
<td>Lab 9: Intro to Carbohydrates: Monosaccharides (20 pts)</td>
<td>Study Skills Worksheet #7: Note-Taking Techniques (5 pts)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Students who are pregnant or who may be pregnant will carry out this experiment in the library.</strong></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>March 19</td>
<td>Lab 10: Glycosidic Linkages, Disaccharides, and Polysaccharides (20 pts)</td>
<td>Study Skills Worksheet #8: Learning Styles (5 pts)</td>
</tr>
<tr>
<td>10</td>
<td>March 26</td>
<td>Lab 11: Attractive Forces &amp; Gas Laws (20 pts)</td>
<td>Study Skills Worksheet #9: Learning Styles Active Reading (5 pts)</td>
</tr>
<tr>
<td>12</td>
<td>April 9</td>
<td>Lab 13, Sections 1-5: Solutions, Solubility, Concentration, Dilution, Osmosis &amp; Membrane Transport (20 pts this week) <strong>continued next week</strong></td>
<td>n/a</td>
</tr>
<tr>
<td>13</td>
<td>April 16</td>
<td>Finish Lab 13 : Osmosis &amp; Membrane Transport Lab 14, Sections 1--5 Acids, Bases pH, (20 pts this week)</td>
<td>n/a</td>
</tr>
<tr>
<td>14</td>
<td>April 23</td>
<td><strong>Mandatory Attendance for All Students! – Only students who have a documented excuse can miss a Lab! (20 pts)</strong></td>
<td>n/a</td>
</tr>
<tr>
<td>15</td>
<td>April 30</td>
<td></td>
<td>n/a</td>
</tr>
</tbody>
</table>