Chemistry 1A: General Chemistry

Lab 01: MW 8:30 AM – 10:20 AM Online

Lab 1 Instructor: Dr. Daria Eiteneer
Office Hours: M 2:30-3pm (Zoom), F 1-1:55pm (Zoom), T and Th 9-9:30am (Canvas)

This course syllabus is a contract:
One purpose of this syllabus is to provide you with the guiding principles upon which the class runs. Another purpose is to make sure that you have, at your fingertips, answers to common questions that might arise. This document is available at all times on the Canvas site and any revisions will be posted. Make sure you read it in its entirety before you ask me any questions about the course schedule, requirements, grading, etc… It is also a contract between you the student, and I, the instructor of record. Make sure that you understand its contents fully, especially the parts that pertain to testing and the computation of your grade, because so long as you remain enrolled in the course, you are implicitly agreeing to abide by these terms.

Course Description: Chemistry 1A is the first quarter of a year-long general chemistry class. We begin with the study of what matter is: how do we classify it and what makes it up. We then proceed to some baseline knowledge necessary to the study of chemistry: Stoichiometry, classification of compounds and chemical reactions, and the role of energy in reactions. We will then build on earlier topics, using quantum mechanics to more fully explore atomic structure, molecular shape and different theories of bonding

Prerequisites: A "C" or better in Chem 25 or 30A, or satisfactory score on Chemistry Placement Test.
Math 114, 130, or equivalent (Intermediate Algebra)

Lab Materials (Required):

1. **Hands on Labs:** This material is linked to Canvas and items to complete it will be shipped to your home after census day once you order them from the bookstore. (no cost)
2. **A scientific calculator:** Must have log and exponential functions. You **may not** use a graphing calculator or your phone as a calculator for any quizzes, exercises, or exams.
3. **Computer and printer access.** As this is an online class, you will require a computer with internet access and a printer throughout this course.
4. **Camera access:** You should be able to broadcast video from your computer or phone. If this is not possible for you, please talk to me during the first week of class so we can discuss accommodations.
5. **A PDF App:** Throughout the quarter you will turn in handwritten assignments by creating a PDF and uploading it to Canvas. Recommended apps include GeniusScan and CamScanner
6.

A note on inappropriate resources: There are many "study assistance" services available to you, some paid, some for free. In any case, any service that provides you an answer on demand is destructive to the learning process and unacceptable in this class. You always want to reach for "knowing how to solve" a question as opposed to "getting the answer" to it. Using websites like Chegg, CourseHero, and Reddit in this manner is specifically prohibited in this class. Using these sites may get you through this course, but will inevitably handicap you in later quarters of General Chemistry or in more advanced courses that rely on this foundation. Likewise, and this should go without saying, having anyone else complete your assigned work for you is unacceptable and ultimately self-defeating. Utilizing any of these resources or

having another student complete your work may result in being assigned a failing grade for the course.

If you are ever in doubt about whether a resource is appropriate or not, please ask me and I will be happy to help you evaluate it. A failure to inquire in this manner will not reflect well in any disciplinary actions that arise.

Laboratory work will count for 33% of the total Chem 1A grade. For more details, please refer to the lecture syllabus.

Laboratory Work (33%): You will be expected to participate in virtual lab activities, complete lab worksheets and reports, and pass lab quizzes. More details on these items can be found on the laboratory handout.

Class Policies – for more information refer to the lecture syllabus.

A. **Lab Attendance:** Attendance is a critical component of the learning process, and will cover material that may not appear in your text while clarifying the material that is. Learning Chemistry effectively depends on building up from a base of knowledge. If you do not set a firm foundation, you will not be able to build your understanding of the field effectively. In other words, **miss too many classes and you will likely fail the class**.
B. **Class Behavior:** Be ready to start class at the scheduled time. Please log in a few minutes early if you can and pull up your canvas site for the start of class. Participants in Zoom will start muted, but I encourage everyone to be on camera whenever possible. Please do not disrupt class with irrelevant conversations, either in the form of inappropriate comments or private conversations. *I would always prefer you show up late as opposed to skipping the class entirely.*
C. **Please minimize distractions as much as possible during class.** I recommend you turn off your cell phone and close other browsing windows when you enter the class or lab.
D. **Academic Dishonesty:** Cheating or plagiarizing another student's work, in whole or part, will result in a zero for the assignment and related assignments, a referral to the dean and college disciplinary board and my immense disappointment. Any case where you attempt to gain unfair advantage over other students or attempt to pass off another's work as your own **is cheating**. Please see me if you have any questions about whether a resource you wish to use is appropriate or not. You implicitly agree to abide by the Honor Code as a condition of enrollment in this class: http://www.deanza.edu/studenthandbook/academic-integrity.html
E. **Questions/Help:** I am available to answer questions during office hours, by email, or by appointment. Please feel free to contact me with any problems or concerns that you have. Also remember that your fellow students are great resources.

Attendance Note

You are responsible for all the material covered in this course, and it is expected that you attend and participate in all of the lecture and laboratory sessions. *If you must be absent, then it is in your best interest to contact your instructor as soon as possible in order to find out what work you have missed.*
Due to the high number of students wishing to enroll in this class, any unjustified absences during the **first week of class **will result in you being dropped.

Chemistry 1A: Chemistry Laboratory Notes

Lab Materials (Required):

a. **De Anza Lab Experiments:** Available online at: https://www.deanza.edu/chemistry/Chem1A.html
b. **Lab notebook:** Any College-ruled notebook will work. I suggest setting aside a notebook explicitly for this purpose
c. **A Scientific Calculator**
d. **Access to HOL – Hands on Labs**
e. OSHA-approved Safety Goggles (Indirect Vent, Z87) (not needed for fully online courses)
f. Disposable purple nitrile gloves *(optional)* – save your skin and your nails! (not needed for fully online courses)
g. Knee length lab coat or lab apron (*optional*) – functional and stylish! (not needed for fully online courses)

CAREFULLY read the attached DeAnza Chemistry Department laboratory policies and safety and housekeeping rules.

You must complete and turn in the Student Contract (provided by instructor) by the second lab meeting. You will not be allowed to attend lab until the Contract is signed and turned in.

LAB POLICIES:

LABORATORY PROCEDURES AND POLICIES

All students are expected to arrive to lab on time and to come to lab prepared to carry out the experiment scheduled for that session. This means that you have studied the experiment for the day, have a basic understanding of its purpose and procedure, the chemistry involved and *have prepared your laboratory notebook for the experiment prior to the start of lab*. I ask that all students do a conscientious and thorough job of cleaning up after themselves, whether it is in their own work area in the lab, or shared areas such as the chemical supply table and balance room.

LABORATORY LECTURE

The beginning of each laboratory session is designated as a laboratory lecture period for which you **must be on time** in order to perform the scheduled experiment. The instructor will use this lecture period to outline important details of the procedure, overview theory and calculations, and discuss common safety hazards and proper chemical disposal techniques. *Being late for the beginning of lab will result in a penalty to the grade for that lab assignment.*

ATTENDANCE

Attendance is required at all scheduled laboratory sessions. NEVER plan on missing a lab. *You will receive a zero on the second lab you miss and will fail the course on the third.* These absences include those in which you arrive too late for lab lecture and are thus not allowed to complete the experiment. I may allow for emergencies and other complications in life. Additionally, do not plan on leaving lab early. Labs will regularly take the total amount of time allotted.

LAB SAFETY & CHEMICAL DISPOSAL

These two topics will be discussed during lab lecture and reinforced with questions in lab assignments. While this topic is more theoretical than practical in an online course, you will be expected to know these common procedures in future courses. Please pay close attention to these items and ask questions about anything that does not make sense.

LAB REPORTS

All lab reports must be completed and turned in to receive a passing grade in this class. **Using another student's data or making up data is plagiarism and data falsification and will result in a zero for the assignment and referral to the dean**. In cases where a student was unable to complete a lab, the instructor may direct you to use another's data in order to complete follow up quests at his discretion. The source of your data must always be cited in lab reports.

LATE ASSIGNMENTS

Due dates for assignments are listed on the class schedule. Late assignments will lose 20% of their value per period missed. Assignments in excess of 2 periods late will be graded as zeros (**All Labs must still be turned in to receive course credit**). It is the student's responsibility to know when labs are due based on the provided class schedule. Labs are usually due 2 lab periods after the lab session in which they are completed.

EXCUSED ABSENCE

Every student gets one excused absence. To reflect this, your lowest pre-lab, data page, and lab report are dropped at the end of the quarter. Missing a 2nd lab will result on a score of zero on that lab. **Missing a third will result in failing the course.**

Lab Score Breakdown (comprises 33% of final class grade)

Pre-Lab Assignments	15%	Lab Quizzes/Exam	20%
Lab Reflections	20%	Lab Reports	45%

Pre-Lab Assignments (15%): Lab notebooks will be collected at the beginning of lab lecture and pre-lab assignments will be checked off before the start of lab. Pre-lab assignments should include a title, purpose/objectives, short introduction (~1-2 paragraphs) to the experiment and a numbered procedure written in your own words. Late pre-lab assignments are not accepted for credit, but must be turned in before you are allowed to start the lab. See the Notebook Guide for formatting and style tips. Pre-lab and data pages are collected at the end of lab **before you leave.**

Lab Reflections (20%): At the end of each lab, your instructor will distribute several lab reflection questions. These will be turned in with your lab report. There will also be some post-lab questions associated with our Hand on Labs experiments. These may be incorporated into your lab reflections score. Note that the lab reflection questions may give you ideas about topics to address in the discussion section of your lab reports.

*Lab Reflections for HoL labs will also require you to take pictures of your experimental set up and data collection. Be sure to read these **before** carrying out the experiment.*

Laboratory Assignments/Reports (45%): Some labs in this course are formal lab reports. Laboratory reports are usually due one week after the completion of the lab, with the exception of the final labs, as specified in the class schedule. Please see the Lab Report guide for tips on this as well. *For some experiments you may be collecting and sharing data with a partner, however you must do your own calculations and formulate your own conclusions for each experiment.* **If students are found to have copied from one another, points will be deducted from the grade or a grade of zero will be given for ALL students involved!** The laboratory assignments are due **BEFORE** the start of the laboratory lecture on its due date. Not all lab reports are equally weighted.

Lab Quizzes/Exam (20%):

There will be several short lab quizzes throughout the Quarter. These will be a mixture of short answer and multiple choice questions related to lab topics and problems. A final lab quiz will ask you several comprehensive problems.

Chem 1ABC Laboratory
De Anza College

How to Keep a Lab Notebook

Notebook Rules

1. Lab notebooks are bound (pages tied and glued together so that they are not easily removed. They are also numbered on every page, so again it is difficult to add or remove pages without this being obvious.

2. All notebooks records are kept in ink. **Mistakes in a notebook should be lined out with a single line, never covered with Whiteout or similar products, nor scribbled over to obscure the original notation(s)**. This generates a permanent non-changeable record of the work done. This is crucial! If you ever work in a laboratory, you must NEVER erase, whiteout, cover over, or remove any mistakes or data. If you did so, this would be classified as data falsification and you could be fired, as well as face fines and criminal prosecution.

3. All notebook pages must be dated and should also have the title of the experiment being carried out on it.

4. All notebooks should have a table of contents for the work done. The traditional place for a table of contents is in the front of the book. Many notebooks will include a space for a table of contents. If yours doesn't, **leave the first 3 pages blank** and construct you own.

5. Ideally, all parts of a lab are written directly into the notebook. In this class however, I will not be requiring you to attach all your graphs and conclusions to your notebook. Some of your work may be done on separate paper and turned in as your final report. Be sure to refer to the next page in order to ensure that you have the right sections in your notebook. All your data must be recorded in your notebook.

   If you record your data into the manual or on a piece of paper, THIS is your original data and it MUST be taped or glued into your lab notebook. Although you may recopy your data in your notebook in a neat table, your ORIGINAL data must also be there!

6. For every experiment, in addition to a title, there should also be a "Purpose", a short background introduction, a Chemicals and Equipment section, a Safety and Waste section, a Procedures section, an Observation/Data Collection section, and a Data Analysis section. Formal reports will also include a Discussion/Error Section and a Conclusions section. The following page shows the required order for these sections in the notebook.

7. The following sections must be included in your notebook: Title, Purpose, Chemical/Safety Equipment, All Pre-Lab work, Procedure, Data, and Calculations. All other sections, including Graphs and Tables, Discussion/Errors, Conclusion and Post-lab Questions may be done on separate pages.

Order of Sections for a Lab Notebook

Title	Title goes on each page of the report
Purpose	This is a sentence or two on why you are conducting the lab: what are the objectives. (*What you want to do/prove*) **This is part of the pre-lab write up**.
Introduction/Background	This is a brief explanation of the theory and practice the lab is based on. It demonstrates your understanding of what we are doing and what we will learn from it. It should be 1-2 paragraphs long. *(What are you basing this experiment on)* **This is part of the pre-lab write up**
Chemicals/Safety/Equipment	All equipment & chemicals are listed here with basic chemical safety info (including ***basic hazard info*** like is it flammable, corrosive, etc; ***handling and safety precautions*** like use only in the hood or keep away from open flames; and ***emergency/first aid info***) on **all** the chemicals being used. Read the procedure to get all the chemicals & equipment used. This can be a table or a paragraph. (*What you need to think about as you're doing the experiment*) **This is part of the pre-lab write up**.
Pre-lab Calculations	Any assigned pre-lab calculations are to be completed in your notebook prior to beginning any lab. This section is not common but do check! **This is part of the pre-lab write up**.
Procedure	Reference the procedure in your lab notebook and then write down any changes to the procedure in enough detail so others reading the notebook could repeat the lab with the changes. (What *you did*.) **This is part of the pre-lab write up**.
Data Tables	Data, including masses, times, observations, spectra, temperature, color changes, absorbance readings, etc. go here. Be sure to include units of measurement and significant figures and any required experimental conditions (time, temp.). (*What you observed*.) **Your pre-set data tables are part of the pre-lab write up.**
Data Analysis (Calculations)	This is where you perform calculations and attach graphs. Show all calculations and equations. Some labs require you to do some data analysis as you collect the data, but you still need to have a separate Data Analysis Section. Data Analysis may be recopied as it is not raw data. (*What you can get out of your data*)
Discussion/Errors	This is where you interpret your data and data analysis, compare experimental data to known results, and explain errors and possible errors. (*What your data means*)
Conclusion	This is a summary of the experiment and its objective, your important data, important data analysis results, your data analysis interpretation, comparison to known values, and errors. Remember to put numbers here as well as explanations on errors. *Important: The Conclusion is a rewording or restatement of everything which is already found in your report (except perhaps a personal opinion on how you could improve the lab to obtain better results).* (*What you accomplished*)
Post Lab Questions	If there are any post lab questions, they get put here.

A Prelab worksheet will be turned in at the start of lab. If you have not completed this work, you will be excused from lab until you complete it. Always prepare before lab! Being on time is worth points!

Some tips on preparing your notebook:

1. Make sure your name and the experiment title are on each page.
2. Make sure your data collection pages are neat and your records legible.
3. **Make sure all chemicals needed are listed with the necessary concentrations.**
4. What glassware to be used can usually be streamlined in the procedure. Specifying the size of a test tube or beaker is often not necessary.
5. For the procedure DO NOT INCLUDE ANY OBVIOUS "HOW TO" STEPS. ONLY INCLUDE "WHAT TO DO" STEPS. For example, if the procedure calls for preparation of 25 mL of 0.050 M NaOH solution by dilution of 0.10 M NaOH do not include the steps involved to prepare the pipet (i.e. washing, rinsing with solution to be pipetted). Your notebook simple needs to read:

   "Prepare 25 mL of a 0.050 M NaOH solution by dilution from a 0.10 M stock solution."

   For this example, you should also record the volume of the 0.10 M solution used and the type of glassware used (i.e. pipette, volumetric flask, etc.).
6. OMIT ALL REFERENCES TO SPECIFIC LABQUEST PROCEDURES. The LabQUEST Guide is always available as a reference. Simply state what to do. For example, "Calibrate the pH sensor using pH 4 and 10 buffers." Would be an adequate step for using pH sensors.

CHECK LIST FOR COMPLETED LABORATORY ASSIGNMENTS/REPORTS

1. Write your name on the first page. **All loose papers must be stapled together!** (No paper clips, no bent corners, etc.) Loose papers will not be accepted and if you do turn them in, points will be deducted! Turn-in only what is asked for, no extra pages.

2. The lab report or assignment should be neat. Lab reports should be typed, other worksheets may be completed neatly in pencil or pen. Mistakes during data collection should be crossed out with a single line (not erased!). All writing must be legible. On graphs, circle the points so they can be seen. **INCLUDE UNITS on all data, graphs, calculations, etc…!**

3. Unless otherwise notified by your instructor, all exercises and problems in a lab report or assignment must be completed for full credit. If you are having trouble solving a problem, **see your instructor for help**. Do not copy another students work, both you and the other student will be penalized!

4. **In all calculations** show the **set-up with units**! If multiple trials are performed, you only need to show the set-up for the first trial.

5. All data must be recorded to the precision of the instrument. If you are unsure of the precision ask your instructor or refer the Measurements Lab (completed in class). For example, a buret reading where the meniscus falls exactly on 15 mL is recorded as 15.00 mL not 15 mL. The trailing zeros in the 15.00 mL reading are significant!

6. In your calculations use the rules of significant figures to determine how many significant figures your answer should contain. Review the rules for significant figures! Points will be deducted for every significant figure error.

Rules for Safe and Efficient Chemistry Laboratory Operations

Safety Rules:

1. *Prepare for each experiment by reading all of the directions before lab starts.*
2. *Locate the Safety Equipment.* Know the locations of the eye wash, safety shower, fire extinguishers, fire blankets, first aid kit, fume hoods, telephone and all exits that are to be used in an emergency. Your laboratory instructor will describe the use of the safety equipment.
3. *Protect your eyes.* Wear approved eye protection at all times. Your laboratory instructor will inform you which of these you must have. Goggles provide maximum safety. Prescription glasses, if you need them, must be worn under approved eye protection. Contact lenses should not be worn in the laboratory because fumes may accumulate under the lenses and injure your eyes and the lenses make it difficult to flush chemicals from your eyes.
4. *Tie long hair back.* This precaution will keep your hair out of burner flames and harmful chemicals.
5. *Do not wear clothing with loose, flowing sleeves.* This precaution will keep your sleeves out of burner flames and harmful chemicals.
6. *Wear shoes that cover all of your feet.* Broken glass on the laboratory floor and spilled chemical reagents are all too common. Shoes that cover your feet completely will protect them from broken glass and chemical splashes. The best types of shoes are closed-toe made out of leather.
7. *Wear clothes that cover your torso and your legs to the knees.* Clothing will give your body needed protection. Good clothing can be protected with a lab apron or coat.
8. *Do not eat or drink in the laboratory.*
9. *Do not taste any chemical reagent.*
10. *Do not smell chemical reagents directly.* When you are instructed to smell a chemical, do so by gently wafting the vapors toward your face. Do not inhale deeply.
11. *Do not pipette solutions by mouth.* Use a rubber suction bulb to fill the pipette.
12. *Do not work with flammable liquids near a flame.*
13. *Do not engage in games or horseplay in the laboratory.* Never run in the laboratory.
14. *Do not attempt unauthorized experiments in the laboratory.*
15. *Do not work in the laboratory in the absence of your instructor or his or her authorized representative.*
16. *Use a fume hood when required.*
17. *Handle glass tubing and thermometers carefully.* When inserting glass tubing or thermometers through a rubber stopper, always hold the glass close to the stopper and use a lubricant such as glycerin to help the glass slide through the stopper. Do not continue to try to force glass through a stubborn stopper, get a new stopper and/or get help. When inserting a pipette into a pipette bulb, hold the pipette near the bulb and GENTLY insert the pipette.
18. *When diluting, never pour water into concentrated reagents.* Always pour the reagent into the water.
19. *If you spill a chemical reagent on yourself, immediately flood the exposed area with water and then summon the laboratory instructor. Inform the instructor immediately about any other accidents or spills.*
20. *Be aware of your neighbors. Are they obeying the safety rules?* A neighbor's accident may injure you.
21. *Avoid touching your face and rubbing your eyes while in the laboratory.* If you must do so, first wash your hands.
22. *Wash your hands before leaving the laboratory.*
23. *Never heat a closed container.* Pressure build up can cause the container to explode.
24. *Assume any chemical is hazardous if you are unsure.*
25. *Do not violate any other safety rule issued by your laboratory instructor.*

Housekeeping Rules:

1. *Clean up broken glass immediately with a broom and dustpan. Do not use your hands.* Dispose of broken glass in the special container that is provided, never in a regular trash can.
2. *Chemical spills must be cleaned up immediately.* Immediately notify your instructor who will advise you how to clean it up and/or assist you. Dispose of the collected contaminated chemical properly as instructed.
3. *Do not pour any chemical down into the sink or in the trash without authorization.* Clearly labeled disposal bottles will be provided when needed.
4. *Take containers to the stock of chemical reagents.* Do not bring stock chemicals to your laboratory bench.
5. *Read the label on a reagent bottle carefully.* Is it the correct chemical? Is it the correct concentration?
6. *Do not insert your own pipette, medicine dropper or spatula into a stock bottle.*
7. *Use special care with stoppers or tops of stock bottles.* Do not allow them to pick up contamination. Your instructor will provide additional instructions for handling the stoppers or tops found in your laboratory.
8. *Always replace the stopper or top of a stock bottle when you are finished taking some of the reagent.* Make sure that you put the stopper or top back onto the correct bottle.
9. *When pouring liquid from bottles, hold the bottle with the label against the palm of your hand so that the liquid is poured from the side opposite the label.* If any liquid runs down the outside of the label, immediately wipe off the liquid.
10. *Do not take any more of a reagent than is required.* Many of the chemicals used in the laboratory, including deionized water, are costly.
11. *Never return any unused reagent to a stock bottle.* If you take too much of a chemical, dispose of it as directed by your instructor or offer it to a classmate who needs it.
12. *Set up your glassware and apparatus away from the edge of your laboratory bench.*
13. *Thoroughly clean the area around your laboratory bench and the top of your laboratory bench before leaving lab.*
14. *Keep shared areas of the laboratory clean.* This includes areas such as the balance room and where the stock bottles are stored. It is especially important to keep the balances clean and free of chemical spills.
15. *Keep your laboratory equipment clean.* Good results depend on clean equipment.
16. *If a piece of equipment containing mercury is broken, inform your laboratory instructor immediately.* Keep the area blocked off to avoid scattering the mercury.
17. *Follow any other housekeeping rules given by your laboratory instructor.*

Tentative* Lab Schedule for Chem 1A: *Subject to Change
Winter 2021 De Anza College **Dr. Woodbury**

Week	Date	Lab Topic	Due	Notes
1	M 1/4 W 1/6	Chapter 1&2 Review, Chemical Calculations (videos) Intro to HoL: Getting Started and Lab Safety Review Calculations		
2	M 1/11 W 1/13	Lab 1: Nomenclature Workshop Lab 2: Measurements		**L1: Worksheet only** **L2: Data/Discussion Only**
3	M 1/18 W 1/20	**No Lab – MLK Holiday** Lab 3: Hydrates, Experimental & Analysis	**Lab 1** **Lab 2**	 **L3: Formal Report** Peer Review
4	M 1/25 W 1/27	Lab 5: Types of Reactions Conductivity Demonstration Ionic Equation Practice.	 *Hydrate, Rough*	L5: Worksheet Conductivity: Lab Reflection only
5	M 2/1 W 2/3	HoL: Lab Techniques and Measurements **Lab Quiz 1: Safety,** Measurements, Hydrates, Types of Rxns	**L5 – WS**	**HoL 1: D&D**
6	M 2/8 W 2/10	HoL: Hess's Law Line Spectra Worksheet	**Hydrate Final** HoL Measurements	**HoL 2: D&D** **Line Spec**: Worksheet
7	M 2/15 W 2/17	**No Lab – Presidents' Holiday** HoL: Precipitation	 HoL 2	 **HoL 3: D&D**
8	M 2/22 W 2/24	Virtual & HoL: Acid/base **Lab Quiz 2:** Hess's Law, Line Spectra, Conductivity	Line Spectra WS HoL 3	**Titration: Formal Report -** Peer Review
9	M 3/1 W 3/3	Lab 9 - Redox Titration – Dry Lab	 *Titration Rough*	**L9: D/D Only**
10	M 3/8 W 3/10	Lab 11: Molecular Modeling HoL: Hydrate (extra credit)	**Titration Final**	**L11: WS Only** **HoL 5: pdf & reflection**
11	M 3/15 W 3/17	Lab Wrap-up. Review **Lab Quiz 3:** Precipitation, Titration, Molecular Models	Lab 9 Lab 11 Worksheet HoL Hydrate (by 3/19)	
12	 W 12/9	**No Lab this week** **FINAL EXAM** **9:15AM-11:15 AM**		**No Lab –** **Finals Week**

Student Learning Outcome(s):

*Identify and explain trends in the periodic table.
*Construct balanced reaction equations and illustrate principles of stoichiometry.
*Apply the first law of thermodynamics to chemical reactions.