

Chemistry 1A: General Chemistry

Lab:	MTWTh	3:00 PM – 5:50 PM	SC2202
Lecture:	MTWTh	6:00 PM – 7:15 PM	SC2202

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Office Hours: *by appointment* **Office:** SC 1200 office area
Class website: <http://foothillchem.yolasite.com>

Lab Materials (Required):

1. **Microscale General Chemistry Laboratory, 2008 De Anza ed:** Szafran, Singh, Pike.
2. **Chemistry 1A Vernier Laboratory Experiments** (supplement), Muzzi, Gray, Doan
3. **Lab Handouts** from the website(s)
4. **Carbonless copy Lab notebook:** 100 page carbonless copy spiral bound notebook. ISBN: 1429224541
5. **A Scientific Calculator**
6. OSHA-approved Safety Goggles (Indirect Vent, Z87)
7. Disposable purple nitrile gloves (*optional*) – save your skin and your nails!
8. Knee length lab coat or lab apron (*optional*) – functional and stylish!
9. A stapler. (*optional*) apparently the stapler in this room doesn't work well.

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 CHECK-IN

Locker check-in will take place the first day of lab. It is your responsibility to make sure that all glassware is present and unbroken at the time you check in. If at any point after the first day of lab you need to replace an item in your locker, your student account will get charged for it. *If you drop this course, then you must arrange to **check-out your locker with your instructor during your regularly scheduled lab period.*** The stockroom technician or other instructors WILL NOT check-out lockers for any students. **Any person who has not checked out by the end of the last scheduled lab period for the quarter will have an administrative fee added to their student account and a hold put on their registration.**

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 SAFETY

Laboratory safety is an everyday assignment. ***Being safe in the lab is a top priority.*** The importance of safety in the laboratory will be reviewed the first day of lab. *Any unsafe behavior, intentional or not, will be noted and may be cause for dismissal from the class.*

For your protection, **safety goggles** with indirect ventilation and an ANSI minimum rating of Z87 **must be worn AT ALL TIMES** in the laboratory. **ONE warning** will be issued to any student that is observed wearing their goggles on their forehead, hanging them around their neck, etc... instead of wearing over their eyes. If the **warning is disregarded, expulsion** from the lab and a zero on the assignment may result. A student can also lose safe points for unsafe behavior. These points can come from the lab grade.

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 to emphasize safety hazards and proper chemical disposal. *If you are more than **10 minutes** late for lab lecture, you will not be allowed to do the experiment for that day.*

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 POLICIES (CONTINUED):

CHEMICAL DISPOSAL

As a concern for the environment and to follow county, state and federal law, proper chemical disposal is essential. *Students who do not comply with directed procedures may be expelled from the lab or failed in the course for repeated offenses.* Check with the instructor if you have any questions. Not all chemical waste is compatible and some waste will have special containers.

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 always due 2 lab periods (usually 1 week) 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 20% of final class grade with 5 of the 20 from pre lab and the lab and data equaling the rest.

Pre-Lab Assignments (5/20): 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, safety/chemicals/equipment section and a numbered procedure written in your own words. You should also answer any pre-lab questions. 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. Prelab and data pages are collected at the end of lab **before you leave.**

Data Pages (3/20): At the end of each lab you must have your data pages initialed by your instructor. You should then turn in the copy of your data page (along with your pre-lab) before leaving lab. **Students that fail to turn in their data pages will not get credit for the experiment.** Data pages will be graded based on proper set up and format, complete recording of data to the correct number of significant figures, and neatness and legibility. You may, at your option, turn in your original copy of the data and keep the copy if legibility of the copy is an issue. See the Notebook Guide for formatting and style tips.

Laboratory Assignments/Reports (12/20): Laboratory reports are usually due two class session after the completion of the lab, with the exception of the final few 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 will be collected **BEFORE** the start of the laboratory lecture on its due date.

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

<i>Title</i>	Title goes on each page of the report
<i>Purpose</i>	This is a sentence or two on why you are conducting the lab: what are the objectives. (<i>What you want to do/prove</i>) This is part of the pre-lab write up.
<i>Introduction/Background</i>	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. (<i>What are you basing this experiment on</i>) This is part of the pre-lab write up
<i>Chemicals/Safety/Equipment</i>	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. (<i>What you need to think about as you're doing the experiment</i>) This is part of the pre-lab write up.
<i>Pre-lab Calculations</i>	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.
<i>Procedure</i>	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. (<i>What you did.</i>) This is part of the pre-lab write up.
<i>Data Tables</i>	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.). (<i>What you observed.</i>) You should have an empty data table at the start of the lab and turn in a filled out copy at the end of the lab period. The completed data tables, data analysis, discussion, conclusion and post-lab questions are all part of the lab write up which is generally due one week after the last session of that lab (with the exception of the labs that are performed on the last week).
<i>Data Analysis (Calculations)</i>	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. (<i>What you can get out of your data</i>)
<i>Discussion/Errors</i>	This is where you interpret your data and data analysis, compare experimental data to known results, and explain errors and possible errors. (<i>What your data means</i>)
<i>Conclusion</i>	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. <i>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).</i> (<i>What you accomplished</i>)
<i>Post Lab Questions</i>	If there are any post lab questions, they get put here.

CARBON COPIES OF THE PRELAB WORK WILL BE CHECED AT THE START OF LAB LECTURE. IF YOU HAVE NOT COMPLETED THIS WORK, YOU WILL BE EXCUSED FROM LAB UNTIL YOU DO COMPLETE IT. A COPY OF THE DATA MUST BE TURNED IN AT THE END OF THE LAB PERIOD.

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 simply 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 LABPRO PROCEDURES. The LabPro Quick Start 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 student's 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.*