# Chemistry 1A: Chemistry Laboratory

**Section 61: CRN 32199**
**Lab:** M/W 2:30-5:20 pm, Room SC2202

**Lab Instructor:** Dr. Lisa M. Wesoloski
**Email:** wesoloskilisa@fhda.edu
**Office Hours:** Monday and Wednesday, 2:00 – 2:30 pm, SC1200 office area

**Lab Course Materials**
**Required:**

1. **Lab Manual:** Microscale General Chemisry Laboratory, Pike Szafran, De Anza edition, John Wiley & Sons (2012). ISBN 9781119936015
2. **Venier Lab Experiments Manual** (2008), ISBN: 9782812344930
3. **Laboratory Notebook:** A bound (non-spiral) composition notebook or a carbon copy laboratory notebook.
4. Safety Goggles (OSHA-approved, Indirect Vent, Z87)
5. Latex or Nitrile Gloves
6. Scientific Calculator

**Optional:**

1. Lab coat
2. Binder for lab handouts

**Come to the first week of lab having:**

- ✓ Reviewed, printed and signed the safety document on De Anza's Chemistry website: http://nebula.deanza.edu/PSME_Division/Chemistry_files/Safety%20Document.pdf

## Lab Schedule: *(subject to change)*

| | MONDAY | | | WEDNESDAY |
|---|---|---|---|---|
| JAN 5 | CHECK-IN | | JAN 7 | Lab 1: Handout: Measurement |
| JAN 12 | Lab 2: Handout: Nomenclature | | JAN 14 | Lab 3: Gen Chem. Manual: Hydrate |
| JAN 19 | **Holiday: MARTIN LUTHER KING** | | JAN 21 | Lab 3: Gen Chem. Manual: Hydrate |
| JAN 26 | Lab 4: Handout: Precipitation | | JAN 28 | Lab 4: Handout: Precipitation |
| FEB 2 | Lab 5: Handout: Type of Reactions | | FEB 4 | Lab 5: Handout: Type of Reactions |
| FEB 9 | Lab 6: Venier Manual: Conductivity | | FEB 11 | Lab 6: Venier Manual: Conductivity |
| FEB 16 | **Holiday: PRESIDENT'S DAY** | | FEB 18 | Lab 7: Gen Chem. Manual: Vinegar |
| FEB 23 | Lab 7: Gen Chem. Manual: Vinegar | | FEB 25 | Lab 8: Venier Manual: Calorimetry |
| MAR 2 | Lab 8: Venier Manual: Calorimetry | | MAR 4 | Lab 9: Gen Chem. Manual: Redox Titration |
| MAR 9 | Lab 9: Gen Chem. Manual: Redox Titration | | MAR 11 | Lab 10: Gen Chem. Manual: Line Spectra |
| MAR 16 | Lab 11: Gen Chem. Manual: Molecular Model | | MAR 18 | Lab 11: Gen Chem. Manual: Molecular Model |
| MAR 23 | LAB FINAL CHECK-OUT | | | |

**Laboratory Procedures**

All students are expected to ***arrive to lab lecture on time*** and to be prepared to carry out the experiment scheduled for that lab session. 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, to emphasize safety hazards and proper chemical disposal.

**Attendance**

Attendance is required for all laboratory sessions. The course is impacted; there is neither make-up time in the course nor space for you to work in other sections. If you miss a lab, you **must** discuss the issue with the course instructor ***(valid reason and written documentations will be required).***

- A missed lab class results in a ***zero*** for the lab preparation score (the pre-lab or notebook preparation)
- Missing a 2nd lab will result in a ***zero*** on the lab preparation score (the pre-lab or notebook preparation) and its lab report.
- ***Missing a third lab will result in failing the course.***

**Laboratory Locker**

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 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 on the first day of lab. *Any unsafe behavior, intentional or not, will be noted and may be cause for dismissal from the class.*

Under ***NO*** circumstance are shorts and sandals allowed in the laboratory. *You will be dismissed from the laboratory if you are not wearing appropriate protective clothing.*

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 lab work may result.*

**Chemical Disposal and Clean-up**

As a concern for the environment and to follow county, state and federal law, proper chemical disposal is essential. 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 roo

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| **Laboratory Grade System** | **Accumulated Points** |
|---|---|
| ✓ Preparation for Lab | |
| o Pre-labs | 10 |
| o Notebook Preparation | 30 |
| ✓ Lab Reports | |
| o Informal Lab Reports | 60 |
| o Formal Lab Reports (lowest score is dropped) | 80 |
| ✓ Lab Exam | 70 |
| | **Total Points: 250** |

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## Grading Details

- ✓ **Preparation for Lab**
  It is imperative to come to lab prepared, having read the experiment for the day and having taken time to understand what will be taking place during the lab session. You will be following one of two methods to help you prepare for lab (depending on the lab that will be conducted that day). Students who do not submit the pre-lab assignment at the beginning of class or prepare the lab notebook as required will receive zero credit for lab preparation, no exceptions.

  - **Pre-labs (**For labs 1, 4 and 5, based on the handouts)
    You will prepare for the lab session by reading the lab handouts and submitting ***at the beginning of class*** your pre-lab sheet (found at the end of the lab handout). Please submit your answers to lab 4 on a separate piece of paper.

  - **Notebook: Pre-lab Preparation** (For Labs 3, 6, 7, 8, 9, and 10, based on Lab and Vernier Manuals)
    For all wet labs, you will read all lab sheets (introduction, experiment, etc). You will then prepare your notebook using the following guideline:

### Notebook Preparation Guideline

| | |
|---|---|
| *Title and Date* | Title of the experiment and the date that the experiment is performed |
| *Objective* | This is a sentence or two on why you are conducting the lab. |
| *Introduction/Background* | This is a brief explanation of the theory and concepts the lab is based on. It demonstrates your understanding of what we are doing and what we will learn from it. **DO NOT COPY the manual. Use you own words.** This should be in 4-5 sentences summarizing the experiment and highlighting important concepts of the lab. |
| *Chemical Equations* | Provide the necessary mathematical and chemical equations that will be used. *(if applicable)* |
| *Procedure* | This is an organized, and **numbered** outline of the procedure of the experiment. Do not include any obvious "How to" steps. Only include "What to do" steps. This means, it is not necessary to copy the manual, but you need sufficient detail that if your lab manual is not available, your entire procedure can be carried out completely. |
| *Data Tables* | Data, including masses, times, observations, spectra, temperature, color changes, absorbance readings, etc. Be sure to include units of measurement and significant figures and any required experimental conditions (time, temp.). Most of the labs in the manual provide tables ready for you to use. DO NOT USE THESE TABLES. Instead, **prepare your notebook with the same tables from the manual.** |

**ALL DATA COLLECTION IS TO BE DONE IN THE NOTEBOOK AND NOT IN THE LAB MANUAL.**

While the lab is in session, lab notebooks will be checked for pre-lab preparation. The instructor will initial correctly completed pre-lab pages.

**More on your Lab Notebook…**

**How to Keep a Lab Notebook**

1. Lab notebooks are bound (pages tied and glued together). If you want to skip a page or re-start a messy page, just start a new one. Do not remove the page.
2. All notebooks records must be in pen. Mistakes in a notebook should be lined out with a single line, ***never covered with Whiteout***, nor scribbled over to obscure the original notation(s). This generates a permanent non-changeable record of the work done.
3. Mark any sections of large blank spaces with a large X in the blank region. This means you cannot add any more writing in the area that was X'ed out.
4. The following sections must be included in your notebook: experiment title, purpose, a short background introduction, procedure, obsevation/data, data analysis and calculations.
5. Ideally, all parts of a lab are written directly into the notebook. All your experimental 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 and it must be initialed by you with the date. Although you may recopy your data in your notebook in a neat table, your ORIGINAL data must also be there!**
6. You must get the notebook lab pages ***signed by the instructor*** at the end of each lab period.

**Data Taking: Writing it Down in Your Notebook**

- During the lab session, you will complete data tables and record any and all observations about the experiment.
- Labs will regularly take the total amount of time allotted.
- ***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.***
- All data must be recorded to the precision of the instrument. If you are unsure of the precision, ask your instructor. 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!

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## ✓ Lab Reports

Each lab experiment requires a lab report. All work submitted must be your own work. ***Using another student's data or making up data is plagiarism and data falsification and will result in a zero for the assignment.*** All cases of cheating, plagiarism, or dishonesty will be reported to the Dean of Students.

The lab report **must** be turned in to the instructor at the start of the lab lecture period.

- All lab reports will be due on the subsequent Monday, except if that Monday is a holiday and then it is due on the following Weds, and the last two labs.
- Lab 10 is due Wed., March 18 and Lab 11 is due on the last day of class, March 23.
- **Late lab reports will lose 10% of their value per day.** A late assignment can be turned in electronically (scanned, or by a camera phone picture) and the hard copy turned in class when the lab session meets. **Lab reports in excess of two lab sessions late will be graded as zeros**.

- **Labs 1, 2, 4, 5, 10 and 11** will follow an **informal** lab report format
  Informal labs are worth 10 points each.
- **Labs 3, 6, 7, 8, and 9** will follow a **formal** lab report format
  Formal lab reports are worth 20 points each with the lowest score being dropped.

## Informal Lab Reports for Labs 1, 2, 4, 5, 10 and 11

Use the specific guidelines as addressed for each lab. Typing any part of an informal lab is optional.
**Staple all sheets of paper.**

Lab 1 – Measurement
Using your handout, complete and submit all tables and questions. Part D use Excel to complete amd print out your graph. Complete and submit all follow-up questions.

Lab 2 – Nomenclature
Submit your handout fron Sections 1-4 and Final Review Section.

Lab 4 – Precipitation
Submit all of Section II using Excel and provide the appropriate calculations.

Lab 5 – Types of Reactions
Submit on a separate piece of paper (not the handout sheet) ALL the net ionic equation and its reaction type as listed from Data Tables 1, 2 and 3(a and b). Submit the Follow-up questions as provided in the handout.

Lab 10 – Line Spectra
Submit all calculations as outlined under "Calculations and report" and "Report".

Lab 11 – Molecular Model
Follow the guidelines as described in the lab manual under "Report" and "Questions".

## Formal Lab Reports for Labs 3, 6, 7, 8, and 9

The formal post-lab report is ***typed (including calculations).*** Since your lab report is typed, you will need to use superscript and subscript notation. For example, the chemical formula for magnesium phosphate is $Mg_3(PO_4)_2$ **not** Mg3(PO4)2. The entire report will be in ***third person***.

The lab report will contain:

1. *Title, Name and names of partners and Report Date*
2. *Objective*
3. *Introduction/Background*
4. *Data Analysis (Data and Calculations)* This is where you provide data tables, perform calculations and attach graphs. Any graphs should have all axes labeled and proper units. **Show sample calculations and equations for your best trial. INCLUDE UNITS on all data, graphs, calculations, etc.** In your calculations use the rules of significant figures to determine how many significant figures your answer should contain. Points will be deducted for every significant figure error.
5. *Conclusion.* This is a summary of the experiment and its objective, and **your data analysis results**. **Remember to put numbers here**. You can also include any data interpretation and comparison to known values. *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).* **Do not use first-person**.
6. *References.* Last, but not least, **all reports contain a reference**. Remember: Your lab manual is always a reference!

**Note:** The procedure is not included. Post-lab questions provided in the manual are not included.

✓ **Lab Exam**
There will be one lab exam, worth 70 points. The exam is open-book and will cover material and calculations and principles learned in the experiments. ***There is no make-up for missing an exam regardless of reasons.***