

# Chemistry 1B, General Chemistry

## Chem 1B- Section 03

Lecture MW 4:30-5:45, MLC105

Lab MW 11:30-2:20, SC2204

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Lab TR 11:30-2:20, SC2204

**Instructor:** Dr. Chris Deming, email: [cdemo87@gmail.com](mailto:cdemo87@gmail.com)

**Office Hours (Tentative):** M 10:30 AM-11:30 AM, W 10:00 AM-11:30 AM, Science Center, Second Floor

**Course Description:** This class will cover the principals of chemical kinetics, intermolecular forces, chemical equilibrium, and thermodynamics.

This course is divided into two separate instructional periods, the lecture and laboratory sections. The lecture portion is primarily devoted to the material discussion while the laboratory portion gives a chance for students to practice chemical experimentation. One registration code will enroll for the lecture and lab sections. All students will have lecture during the same period but labs periods will be different depending on the section. Lecture and lab sections must be taken together to pass Chem 1B and will both go towards a single grade. Once lab sections are assigned there is no switching lab section.

## **Course Material:**

- 1. Lecture Text:** <https://openstax.org/details/chemistry>. This is a free online textbook that can be viewed or downloaded as pdf without charge. A hard copy of this book can also be rented or purchased through the De Anza bookstore or purchased through the openstax website.
- 2. Lab Manual:** <http://www.deanza.edu/chemistry/Chem1b.html>. This is also free. Lab manuals must be read BEFORE performing each lab. Further instructions to follow.
- 3. Lab Notebook:** Permanently bound, 8 ½ X 11 notebook with duplicate copies. All of these features are required for the notebook.
- 4. Scientific Calculator.** Logarithm and exponential functions required, NO GRAPHING CALCULATORS. You are encouraged to bring your calculator each day to work through examples as they are presented. Phones will not be allowed for calculations during tests so be sure to bring a calculator those days.
- 5. Safety Goggles.** Proper eye protection is required for every lab. Without goggles, the lab cannot be performed and the student receives a score of 0 for that day. Lab approved goggles are available at the bookstore; other goggles will not be permitted.

**Class Registration.** This class is a lecture and laboratory based course, so the registration limit is strictly set at 30 students per section based on the number of people able to safely conduct experiments in the space provided. The class is filled based on the official roster provided by the De Anza Admissions and Records, including an official waitlist. Students on this waitlist will not be permitted to come to lab sections or given a locker until officially enrolled.

**Dropping the Course.** Students that choose to drop this course are responsible for requesting a withdrawal through the admissions and records department **before** the deadline. Students who drop the class are also be required to officially check out of the lab locker. Failure to check out by the scheduled check out date will result in fees and a block placed on future registrations.

**Other important points.**

1. If you **miss** a lab lecture or experiment within the **first two weeks** of class **for any reason**, you will be **dropped** from the course.
2. More than one unexcused absence from lab will result in an automatic “F”.
3. If you are dropped within the first two weeks of class, your lab locker will be inspected for missing items, you will be charged for missing or broken items, and the locker will be reassigned
4. If you fail to check out of the locker for any reason, you will be charged an administrative fee and a hold will be placed on your account until resolved

**Grades/Evaluations:**

	Points
In-Class Exams, 3 total (150 points each, drop lowest)	300
Lab Note Book, 8 total (5 points each, drop lowest)	35
1-2 day labs, 6 total (10 points each, drop lowest)	50
3-4 day labs, 2 total (20 points each)	40
Lecture Final	300
Lab Final	75
<b>Total</b>	<b>800</b>

**Grade Assignment.** This rubric is subject to change throughout the quarter.

Grade	Percentage
A	>90
B	80-90
C	70-80
D	60-70
F	<60

**Tentative Dates.** All exam dates, lecture topics/dates, lab topic/dates are listed on page 5 and are subject to change throughout the quarter. The final exam date will not change and is provided on page 5 as well as the De Anza finals schedule page.

## Class Lecture

This class (Chem 1B) will cover chapters 9, 10, 12, 13, 14, and 16 from the assigned textbook. The lecture will serve to cover the most important aspects of the chapter but students are still responsible for all material in the book chapter. **Homework** will be assigned but will not be collected. Students are expected to complete all of these questions as well as the sample problems throughout the chapter. Below are four helpful tips that make learning much easier this quarter.

**1. Read the chapter before attending lecture.** This will make the presented material much easier to understand. Also, as mentioned before, not every topic will be covered in lecture so reading is essential to obtain the complete picture.

**2. Complete all practice problems assigned and all of the in chapter reviews.** Questions for the tests will be similar to these problems so it is worth it to give a thorough attempt completing these questions. This will benefit your understanding of the material as well as your grade. Additionally, extensive practice of these problems is the best way to ensure concept mastery. There are plenty of problems to try in the book and throughout the internet so be sure to take the time to practice problems.

**3. Don't fall behind.** In chemistry, each new topic will build on the previous so it is essential to understand the topics as they are presented. Following a lecture when you do not understand the previous material is not an effective method for learning and will lead to further problems. To avoid falling behind.....

**4. Get help.** If you are having a difficult time with a topic, it is your responsibility to get help. There are plenty of resources, including myself, for aiding in material comprehension, but it all starts with you making an effort to get this help. You are also encouraged to find a study group or coming to office hours.

**Lecture Exams.** There will be three lecture exams to test comprehension throughout the quarter. Exam will cover material from lectures, homework, and book chapters. If you are having difficulty completing the homework questions for that chapter, you are urged to get help *before* taking the test. Questions will range from easy to difficult and may require solving problems that have not been explicitly demonstrated before.

Each exam is worth **150 points** and the lowest test will be dropped so the top two test score will go towards the final grade. **No early or late tests will be administered.** The final exam is cumulative and is worth **300 points**. The final test score cannot be dropped and no late

or early finals will be administered. If you feel the grading of any exam is incorrect, you must turn the test back in within **one week** of the day the exam is passed back.

**Laboratory Notebooks.** You are expected to maintain a bound lab notebook with carbon copies for the lab portion of this course. The experimental procedure for the upcoming lab as well as recognition of the hazards must be written in this notebook *before* attending lab session (prelabs). Each prelab is worth 5 points but must be completed before the laboratory session or the student will not be allowed to complete the experiment and will receive a 0 for that lab for that day. Instructions for keeping a proper lab notebook are given in following sections.

**Lab Lecture/Experiment.** Students are required to attend all lab sessions. This includes the lecture at the beginning of the lab period and the entire experiment. Missing the lecture at the beginning of the class will prevent the student from participating in the lab that day. Labs are generally broken up into more than one section. All section must be attended for credit for that lab

There are no make-up labs. Missing lab will result in a 0 for that lab and more than one unexcused absence will result in an “F” for the class. It is also the student’s responsibility to understand all theory and practice of lab experiments as they are will be on the lab final and will help maintain safe lab procedures. If there is an excusable absence, you must notify *before* the missed lab or this will count as a missing lab. If there is an emergency and you cannot contact me before lab, please do so soon as possible.

If you miss a lab lecture or experiment within the **first two weeks** of class **for any reason**, you will be **dropped** from the course.

**Laboratory Reports.** A guideline for lab reports is given later in this syllabus. Lab reports are not due for every experiment so pay attention to in class instruction. Instead, some worksheet or data analysis may be due. The lowest of your 10 point labs will be dropped. Both 20 point lab assignments will count towards the grade. Lab reports are due one week after the completion of the experiment. No make-up labs or late reports will be allowed.

**Lab Final.** The lab final will test your understanding of the theories utilized in lab sections this quarter as well as the practices implemented to yield meaningful data. This exam is worth 75 points and is administered the last week of instruction. This date is indicated in the following lecture/lab schedule. No early or late exams will be allowed.

# Lecture/Lab Schedule

Lecture topic is in black, lab is in blue, and test dates are in red.

Week	Monday	Tuesday	Wednesday	Thursday
1 (1/9/17)	Chapter 9 (Gases) Check In	Check In	Chapter 9 (Gases) Molar Volume (1)	Molar Volume (1)
2 (1/16/17)	Chapter 10 (IMFs) Molar Volume (2)	Molar Volume (2)	Chapter 10 (IMFs) Vapor Pressure (1)	Vapor Pressure (1)
3 (1/23/17)	Chapter 12 (Kinetics) Vapor Pressure (2)	Vapor Pressure (2)	EXAM Ch. 9&10 Green Salt (1)	Green Salt (1)
4 (1/30/17)	Chapter 12 (Kinetics) Green Salt (2)	Green Salt (2)	Chapter 12 (Kinetics) Green Salt (3)	Green Salt (3)
5 (2/6/17)	Chapter 13 (Equilibrium) Green Salt (4)	Green Salt (4)	Chapter 13 (Equilibrium) Kinetics (1)	Kinetics (1)
6 (2/13/17)	Chapter 13 (Equilibrium) Kinetics (2)	Kinetics (2)	Chapter 13 (Equilibrium) Kinetics (3)	Kinetics (3)
7 (2/20/17)	Chapter 13 (Equilibrium) Kinetics (4)	Kinetics (4)	EXAM Ch. 12&13 Kc by Spec 20 (1)	Kc by Spec 20 (1)
8 (2/27/17)	Chapter 14 (Acids/Bases) Kc by Spec 20 (2)	Kc by Spec 20 (2)	Chapter 14 (Acids/Bases) Ka of Weak Acid	Ka of Weak Acid
9 (3/6/17)	Chapter 14 (Acids/Bases) pH Indicator (1)	pH Indicator (1)	Chapter 16 (Thermo) pH Indicator (2)	pH Indicator (2)
10 (3/13/17)	Chapter 16 (Thermo) Calcium Hydroxide (1)	Calcium Hydroxide (1)	Chapter 16 (Thermo) Calcium Hydroxide (2)	Calcium Hydroxide (2)
11 (3/20/17)	Chapter 16 (Thermo) LAB FINAL	LAB FINAL	EXAM Ch. 14&16 Check out	Check out

**LECTURE FINAL EXAM  
WEDNESDAY MARCH 29, 4-6 PM**

# Lab Safety/Preparedness

Maintaining safety in a laboratory is a primary concern. There are many hazards associated with chemistry labs and it is important to understand these hazards and that with proper techniques, the risk drops significantly. There are a few, very simple steps students should take to execute safe lab techniques and gain full points for this section.

First, always wear personal protective equipment (PPE) when performing lab experiments. Such items include, but are not limited to, safety goggles, long pants, sleeved shirt, and closed toe shoes. A more detailed list containing safe lab procedures and general practices will be handed out, reviewed, and signed before starting experiments.

Second, read the lab procedure BEFORE coming to lab and write in your notebook, indicating all materials needed so that all hazards are known ahead of time and may be properly addressed. Notes, facts, or any recognition of the hazards given on the procedure sheet is required to ensure the section on safety has been read. Reading the procedure ahead of time and knowing what tasks are at hand will also help the experiment go smoothly.

Finally, listen carefully to the directions provided at the beginning of the lab session. Many techniques can be performed safely and easily with the proper technique but become a safety hazard when performed improperly. If the lab lecture is missed, the student will not be allowed to perform that lab. Below is a partial list of safe and effective experimental practices.

1. Students must comply with all safety procedures and precautions when attending a laboratory session.
2. There will be no make-up labs so you are expected to attend all lab sessions
3. Properly prepare for each experiment by reading the procedure BEFORE class and writing in your lab notebook. Students will be awarded 1 to 5 points based on thoroughness and effectiveness
4. Lab data must be written in your lab notebook. Loose paper or napkins are not suitable for recording data.
5. Lab lecture must be attended. Failure to do so will result in missing that lab and losing all associated points.
6. Know the location of all emergency equipment such as fire extinguisher or first aid kit as well as the evacuation route and safe meeting place
7. Goggles are always required when in lab. This is for your protection. Prescription glasses do not count as safety goggles and must be worn under the goggles.
8. Long pants must be worn at all times. This is to protect you from chemical spills.
9. Closed toe shoes must be worn at all times. Again, this is to protect you against chemical spills or sharp, falling objects.
10. Sleeveless tops or tops exposing large portions of skin are not allowed
11. Long hair should be tied back and loose clothes should be fixed to prevent dipping in chemicals or catching fire if Bunsen burner is near
12. Report any injuries to the instructor immediately. It is important to get you the help you need if injured in lab, so please do not hesitate.

13. Report any large spills to the instructor immediately. Large accumulations of chemicals can cause hazards to you and those around you
14. No eating or drinking in lab.
15. Do not eat or taste any chemicals
16. Do not pipette liquids by mouth.
17. Do not smell a chemical directly. If the experiment requires you recording the smell, waft the vapor towards your nose.
18. Do not grab recently heated equipment because they stay hot for a while
19. Lab equipment is for designated experiments only. Unauthorized use of equipment will result in loss of points
20. Do not use an open flame near flammable materials
21. Use the fume hood when designated
22. Clean up all broken glassware immediately with a broom. Do not clean by hand. Dispose all broken glassware in the correct container
23. No chemical goes down the sink except pure water. Discard chemicals in the assigned container.
24. Do not pipette from the stock solution bottles. Instead, bring a beaker to the stock bottle, dispense the required amount, and pipette desired amount once back at your lab bench. Remember to replace the cap on the reagent bottle.
25. Do not pour excess reagent back into the stock bottle. Instead, properly dispose in designated container. To avoid discarding unused chemical, try hard to estimate the amount of chemicals needed before dispensing from stock solutions.
26. Read all labels on stock bottles carefully and label all beakers used to dispense each reagent
27. Keep equipment away from the edge of the lab bench
28. Avoid heating closed containers. This will result in pressure build up a possible eruption and injuries
29. Clean up after yourself. This includes lab equipment, the reagent bench, your bench, the weighing stations, the floor around you, and anywhere that you may make a mess. Failure to do so will result in point loss. Continual messiness may result in loss of all points for that lab.
30. Try not to touch your skin/face during lab session. Given the chance that there are chemicals on your hands, spreading the coverage will only make matter worse.
31. Wash your hands after every lab session.
32. Assume a chemical or procedure is hazardous unless you know otherwise
33. Follow all direction by the lab instructor

# Maintaining a Neat and Effective Lab Notebook

Laboratory notebooks are essential for any scientist. Our primary goal as chemists is to understand the complexities of the world around us by performing specifically designed highly controlled experimentation. Thus an easily accessible and highly organized means of recording observations or data is necessary for the obtaining the most accurate and detailed account of the experiment.

The following instructions should serve to indicate the minimum requirement for the upkeep of the lab notebook for this course.

## General Lab Notebook

**Name and starting date on the cover.** In the case of original research, you may be working with many others in the same space and need to distinguish your notebook from another's. Additionally, when you go back and look through old notes, dates on the cover allow easy recognition of the correct notebook. Your name and starting date must be on the cover before starting the first experiment.

**Table of Content.** Keeping a detailed table of content is another easy and effective way to organize your observations and data entries. This table must include the title of the experiment, the date of the entry, and the page number. Update each lab session.

**Table of Chemicals.** At the end of the notebook will be a table that lists every chemical you use and the corresponding hazards. This will be updated throughout the quarter and will serve to promote safe chemical practices as well as provide an easily accessible means of finding hazards of common chemicals. Information for this table can be found on the MSDS sheets.

## Each Experiment

**Title and Date.** The title of the experiment and the date of lab session must be at the top of the page.

**Abstract.** A brief summary of the experiment should follow the title. This should include the main purpose of the experiment, the laboratory procedures you will use, and the relevant mathematical relationships between measurable quantities.

**Experimental Procedure.** The experimental procedure is a detailed description of the method utilized to obtain experimental data. Divide this section into two columns. Use the left column for the procedure and use the right column for related observations and data collection. The written procedure should be in your own words, not copied directly from the lab manual and should be detailed enough that you do not need to look at the laboratory manual. This must



all be completed before the laboratory session or you will not be allowed to perform the experiment for safety reasons.

**Observations.** The phenomena you observe can yield as much information as the most detail measurements. Observations like temperature change, bubbling, color change, or solid formation should be recorded in the right column next to the related experimental procedure. Additionally, record any instrument problems or issues with the procedure. If your data is extremely far from expected, your experimental observations may give insight as to the source of such discrepancies.

**Data Tables and Calculations.** Recording data should be done in the right column next to the corresponding procedure and in a well-organized table. Good examples of effective data table organization can be found in the laboratory manual for each experiment. All data should have proper units as well as the proper level of significant figures for the instrument utilized.

Calculations should be written neatly and final answers should include units. For each type of calculation, you must demonstrate one example using your data. If graphing is required, a computer program must be used with appropriately labeled axes and scaling.

# Laboratory Report Guidelines

What follows indicates the minimum requirement for lab reports. Not all experiments require official report but all reports must be typed.

**Title.** The name of the experiment should be at the beginning. This does not need to be extremely large but should stand out.

**Objective.** The objective should state the main results you are looking for and the significance of the experiment.

**Procedure.** You should already have a detailed description of the experimental procedure in your lab book so simply reference the pages where this is located. Also, you will have already turned in a carbon copy of the procedure.

**Data and Calculations.** Data should be listed in a table or tables. The tables should be clearly labeled and entries should have proper units. Include graphs in this section. Each graph should have a title, properly labeled axes, and scaling that fits the data of the current experiment.

All chemical formulas must be written with appropriate subscripts or superscripts. If you do not know how to do this on your computer, please ask for help or check out the help feature of the processing program. Calculations should be written neatly and final answers should include units. For each type of calculation, you must demonstrate one example using your data. Always include units.

**Conclusion.** **The conclusion for each experiment, even those that don't require an official report, must be typed.** For the reports, this will be the final section. For **other experiments, this should be printed out and handed in** with the procedure and collected data.

There are three main aspects of the conclusion. First, present your experimental results and compare to expected values. Next, provide sources of error that may explain the discrepancy between the experimental results and the expected values. This should go beyond the simple explanation of "human error". Finally, include a discussion of the practices and theories that allow for the collection and analyzation of scientific information. This should also include comments on the validity of the mathematical relationship utilized. The conclusion is the most important part of the report as it involves the most critical thinking. Try your best on this section.