

# Chemistry 1B: General Chemistry, Spring 2023

## Class Schedule

<b>CHEM 1B01 CRN 47970</b>	Lecture	MW 11:30 am – 12:45 pm in MLC103	<b>Holidays</b>	
	Lab	MW 8:30 am – 11:20 am in SC2204		May 29
<b>CHEM 1B02 CRN 47971</b>	Lecture	MW 11:30 am – 12:45 pm in MLC103	June 19	Juneteenth
	Lab	MW 2:30 pm – 5:20 pm in SC2204		

You must attend the lab section that you are registered for. The lab and lecture components of the class cannot be taken separately under any circumstances.

## Course Webpage

De Anza Canvas. You will be automatically added to the Canvas shell as a student when you enroll in the course. Students on the waitlist do not have access to Canvas. **Turn on Canvas notifications to receive class announcements, Inbox message, and comments on assignment submissions.**

## Community Statement

Every person in this class, regardless of personal history or identity categories, is a welcome and important member of this group. Your experiences are important, and you are encouraged to share them as they become relevant. No person in this group is ever expected or believed to speak for all members of any group(s).

You have the right to determine your own identity, to be called by whatever name you wish, and to be referred to by your pronouns. You have the right to adjust these things at any point. If you find any aspects of facilitation, instruction, subject matter, or program environment that result in barriers to your inclusion, please let me know right away, privately without fear of reprisal. We are all learning. It is my goal to continue learning and improving to support everyone in this class and, by extension, all my current and future students.

## Instructor Contact Information

**Instructor:** Dr. Megan Brunjes Brophy

**Office:** SC1220

**E-mail:** [brophymegan@fhda.edu](mailto:brophymegan@fhda.edu)

**Phone Number:** 408-864-8338

Please note that **e-mail and Canvas** are the most reliable ways to get in touch with me outside of class and office hours. I do not reply to non-urgent emails on evenings and weekends. In general, you can expect a reply from me in 2–3 business days. If you have not heard back from me in that time frame, you are welcome to send another message.

### Let's talk about chemistry!

Student hours (or office hours) are an opportunity for you to come talk to your instructor outside of regular class time. You are welcome to come talk to me about the course, questions that you have about the material or practice problems, and your educational path. Each of my office hours are open to all my students; please drop in.

Day	Time	Location
Monday	12:45 pm – 1:35 pm	SC1220
Tuesday	2:20 pm – 3:10 pm	
Wednesday	12:45 pm – 1:35 pm	
Thursday	2:20 pm – 3:10 pm	



## Course Description

Chemistry 1B is the second quarter of a year-long introduction to the principles of general chemistry, and a direct continuation from Chemistry 1A. Chemistry 1B will constitute an investigation of intermolecular forces and their effects on chemical and physical properties, investigation of reversible reactions from the standpoints of kinetics, thermodynamics, and equilibrium, as well as investigation and application of gas laws and kinetic molecular theory.

## Enrollment

### Prerequisites

Chemistry 1A with a grade of C or better. EWRT 211 and READ 211 (or LART 211), or ESL 272 and 273.

### Recommended Preparation

I generally assume that students enrolled in Chemistry 1B have taken Chemistry 1A in-person at De Anza College within the last 6 months. If that does not describe your recent chemistry background, I encourage you to reach out *early* and *often* to myself as well as the campus tutoring and academic support services as issues arise.

### Late Adds and Add Codes / Drops

I will only give out add codes if space is available before the second lab meeting. If you are interested in joining the class, *you must attend the first lab meeting*. Students who miss the first class will not be permitted to enroll in the course under any circumstances. Similarly, if you are enrolled in the course and miss the first day, you will be dropped from the course during the lab period. I strongly encourage you to enroll in an open section if you are on the waitlist.

## Course Objectives

- I. Analyze the behavior of gases.
- II. Evaluate how intermolecular forces influence solids, liquids, and phase changes.
- III. Calculate the rate of a reaction and assess the mechanism of action.
- IV. Utilize the fundamental principles of equilibrium to probe reaction dynamics.
- V. Differentiate between acids and bases and evaluate their reactivity.
- VI. Employ the principles of equilibrium in an expanded discussion of thermodynamics.

## Important Dates

### College Dates

<b>First Day</b>	April 10, 2023	First day of class! In-person attendance is mandatory.
<b>Drop Day</b>	April 23, 2023	Last day to <i>drop</i> the course without a withdraw being recorded.
<b>Withdraw</b>	June 2, 2023	Last day to <i>withdraw</i> from the course.

For a full list of important dates, please see <https://www.deanza.edu/calendar/>

If circumstances beyond your control prevent you from completing the course, you may qualify for an excused withdrawal.

### Exam Dates

*There will be four midterm exams. In general, midterm dates will move only in cases of force majeure. The date of the Exam 4 is determined by the college and cannot be moved under any circumstances.*

<b>Exam 1</b>	April 24 <i>in lecture</i>
<b>Exam 2</b>	May 15 <i>in lecture</i>
<b>Exam 3</b>	June 5 <i>in lecture</i>
<b>Exam 4</b>	June 23 11:30 am – 1:30 pm in MLC103

### Mandatory Lab Days

<b>Check-In</b>	April 10	<b>Quiz 1</b>	May 1
<b>Lab Check-Out</b>	June 21	<b>Quiz 2</b>	May 17
		<b>Quiz 3</b>	June 21

## Required Materials: Lecture

- **Computer and printer access** You will require internet access and a printer throughout this course. The Library West Computer Lab is located on the lower level of Learning Center West in LCW 102. Printing can be found around campus: <https://www.deanza.edu/students/printing.html>
- **Textbook** *OpenStax Chemistry*, 2<sup>nd</sup> edition. Available **free** online at <https://cnx.org/contents/f8zJz5tx@9.18:DY-noYmh@9/Introduction> or on the OpenStax app (iPhone/iPad).
- **Online Homework** We will use Aktiv chemistry this quarter for our online homework system and for some in-class practice. You must sign up for access to the course through Canvas (waitlisted students will not have access).
- **Calculator** A scientific calculator with base-10- and natural-log functionality is necessary and sufficient for this class. If you have already purchased a graphing calculator for another class, you may use it on exams and quizzes; however, *we will not use the graphing functionality*. Recommended models:  
<https://www.amazon.com/Texas-Instruments-MultiView-Scientific-Calculator/dp/B000PDFQ6K>  
[https://www.amazon.com/dp/B005QXO8J0/ref=dp\\_cerb\\_3](https://www.amazon.com/dp/B005QXO8J0/ref=dp_cerb_3)
- **Index Cards** A pack of 100 3x5 index cards. *Bring these with you to every class.*

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- Stapler and staples (*recommended*).

## Required Materials: Lab

- **Lab Manual** Lab procedures and assignments for Chemistry 1B will be posted on Canvas. You should print the lab manual and bring it with you to lab.
- **Lab Notebook** A dedicated bound composition notebook to use as a laboratory notebook. Notebooks with metal spiral binding are *not* permitted. *You do not require a lab notebook with carbon copies for this quarter.*
- **Personal Protective Equipment**
  - Approved laboratory safety goggles (not safety glasses), available from the De Anza College Bookstore. Safety goggles must carry a ANSI Z87.1 shatter rating. If you purchase safety goggles from another retailer you must present the packaging with verification of ANSI rating to your instructor.
  - Disposable latex or nitrile gloves.
  - A lab coat or lab apron is optional and recommended.

## Supplemental Materials

- *Calculations in Chemistry an Introduction*, 2<sup>nd</sup> edition by Dahm and Nelson. Available at many online retailers [https://www.amazon.com/Calculations-Chemistry-Introduction-Donald-Dahm/dp/0393614360/ref=dp\\_ob\\_title\\_bk](https://www.amazon.com/Calculations-Chemistry-Introduction-Donald-Dahm/dp/0393614360/ref=dp_ob_title_bk)
- *Chemistry: The Molecular Nature of Matter and Change*, any edition by Silberberg and Amateis, available at the De Anza College Bookstore or from multiple online retailers. Chemistry 1A, 1B, and 1C all use the same textbook.

## Campus Resources

- **Math, Sciences, and Technology Resource Center (MSTRC) Tutoring.** The MSTRC offers tutoring for the Chemistry 1 sequence and is located in room S43 in the S-quad. <https://www.deanza.edu/studentsuccess/mstrc/>
- **Disability Support Programs Services** The mission of DSPS is to ensure access to the college's curriculum, facilities, and programs. In particular, DSPS can help you get extended time on examinations. <https://www.deanza.edu/dsps/>
- **De Anza College Library** The library houses the Library West Computer Lab and group study rooms that may be reserved online. <https://www.deanza.edu/library/index.html>
- **Resources for Students** Additional resources may be found at <https://www.deanza.edu/services/>
- **Office Hours** Instructor office hours are the best time to ask questions related to course content in-person. This time is *for you, the student*.

*I expect you to use the resources available to you, share high-quality resources with your classmates, and ask for help when needed.*

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## Syllabus Statement

This course syllabus is a living document. Please read it carefully and completely in its entirety before asking me any questions regarding the course schedule, content, requirements, grading, etc. You are expected to adhere to the De Anza College Student Code of Conduct Administrative Policy 5510 at all times. All corrections and changes to this syllabus will be announced through Canvas.

This class is divided into two separate instructional periods: a lecture period devoted to the primary course material and a lab period for conducting lab experiments. Everyone will have the same lecture period, but a different lab period depending on which section you are enrolled in. At De Anza College, the lab and lecture may not be taken as separate courses under any circumstances.

## Hours

This is a five-unit course. Three hours lecture and six hours laboratory will be spent in class. You should expect to spend an additional 10-20 hours a week studying and working on class assignments in order to be successful in this class.

## Attendance Policy

Your punctual attendance is expected at all lecture and laboratory sections of the course. *Plan to arrive 5-10 minutes early.* If you will have to miss lecture or lab for any reason, let me know through Canvas or by email as soon as possible. Notifying your instructor of absences or tardiness shows that you take your responsibility towards your fellow students seriously. If

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you miss either lab or lecture, please arrange a time to meet with a fellow student so that you can get notes and find out what you missed.

The De Anza College Chemistry Department does not offer make-up labs under any circumstances. **If you miss 3 lab periods you will fail the course.** This is non-negotiable. You should consider if this is the best quarter for you to commit to this class.

## Honors Sections

We have the option of offering honors sections of Chemistry 1A, 1B, and 1C. If you are involved in the honors program, and interested in enrolling in honors chemistry, please come talk to me during the first week of class. Honors students will be required to complete an additional lecture-based project.

## How to Learn Chemistry

Chemistry is broad subject that has a reputation for being hard. This class will utilize many resources in concert to help you gain skills, knowledge, and understanding for you to apply chemical principles to multiple areas of study. The lectures will provide organization and context for the topics that we cover, and you should use the assigned reading to fill in the details.

1. Complete the assigned reading before coming to class. Review 1A topics that are unfamiliar. Write down any vocabulary words that you do not understand as well as their definitions *from the textbook*.
2. Take *handwritten* notes during class and review your notes regularly. Cognitive science tells us that we learn new information better when we write rather than type.
3. Review your notes early and often. Use the assigned reading to fill in details and redraw important figures.
4. Write down any questions you have. Bring these questions with you to office hours or the drop-in tutoring center.
5. Most of the “rules” that you learn in chemistry are guidelines. There are exceptions. You will recognize these exceptions more as your chemical intuition builds.
6. Do a little bit every day. After every lecture, review the reading assignment and complete in-chapter and end-of-chapter exercises. Spend at least an hour on chemistry every day.
7. Seek conceptual understanding. Memorization will follow.
8. Join a study group. Work on problem sets together. The best way to learn the material is to teach it to somebody else.
9. Utilize the free tutoring services on campus and online through the MSTRC.
10. Take care of yourself! Stay well-rested and drink water. Your physical health and safety are your priority. If you need assistance with any basic needs, please reach out to me to referrals to campus resources.



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## Academic Integrity

The process of learning requires physical changes to occur in your brain. Cognitive research demonstrates that consistent practice and learning to recognize mistakes are key aspects of the learning process. As such, all students should be aware of the De Anza College policy on academic integrity outlined at [https://www.deanza.edu/policies/academic\\_integrity.html](https://www.deanza.edu/policies/academic_integrity.html). The following text is reproduced from the De Anza College manual:

*...the college is committed to providing academic standards that are fair and equitable to all students in an atmosphere that fosters integrity on the part of student, staff and faculty alike. The student's responsibility is to perform to the best of his or her potential in all academic endeavors. This responsibility also includes abiding by the rules and regulations set forth by individual faculty members related to preparation and completion of assignments and examinations.*

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I expect that all work submitted for this class will represent your own understanding of the material and must be written in your own words. Cheating, copying, plagiarizing, etc. will not be tolerated. Due to the “online” nature of the class, students must take extra care to abide by the policies and expectations set forth for each assignment. While it is tempting to use the full weight of the internet, some sources may provide misleading or corrupt information. Students should focus on the required reading and recommended resources for the class, and any other sources must be vetted by the instructor. Tutoring resources are allowed for homework assignments; however, using a paid, static resource is forbidden. This can be particularly challenging as some websites that profess to provide tutoring services are destructive to the learning process. A good rule-of-thumb is that any tutoring service will help you solve a problem and arise at an answer *on your own*—this means that your brain is making new physical connections between neurons, and you are learning! If an online source professes to offer tutoring, but instead provides you with answers, this is cheating. The websites Chegg, CourseHero, Reddit, as well as any similar site are explicitly forbidden for all class assignments. Posting class assignments on these websites is considered intent to cheat and a violation of the academic integrity policy. I am happy to discuss appropriate resources with you, and I encourage you to ask for permission rather than forgiveness.

You may collaborate with your classmates on lecture homework assignments; however, the final work that you submit must reflect your own understanding of the material. Do not allow any other student to copy your work under any circumstance. If a student asks if they can copy your work or “just see it as an example”, ask them to reach out to the instructor for help. If two students turn in the same work, both students will have participated in academic dishonesty.

Class assessments are used to measure an individual student’s mastery of the material. They are all closed resource, and you will be provided with any physical constants or additional information as necessary. A common mistake that past students have made is to Google a question and copy an answer from the internet—this behavior is forbidden, and the consequences are described below. If I suspect cheating on a quiz, you will be required to meet with me face-to-face.

Any incident of cheating or plagiarism, no matter how minor, will be reported to the Dean of Student Development and the Dean of the Physical Sciences, Mathematics, and Engineering division. Administrative consequences are summarized in the college manual. Additional consequences will be applied to your course grade. **The first incident of academic dishonesty will result in zero points on the assignment, a grade penalty of up to 8% to be deducted from your final grade, and loss of any extra credit points for the quarter.** Any subsequent instances of academic dishonesty *no matter how minor* will result in failing the class. In short, academic dishonesty will have a negative impact on your grade and may result in disciplinary probation or expulsion. If academic dishonesty is discovered within two-years of your completion of the course, your official grade will be changed.

I recognize that these consequences may sound scary. Unfortunately, I have had students who did not pass this class as a direct result of academic dishonesty. I *am* committed to supporting you and your learning process, and I expect you to display high ethical standards. If you require an extension on any assignment, please reach out to me to arrange appropriate accommodations. Our class meetings are dedicated to working through practice problems, and I encourage you to bring questions and utilize the discussion boards for additional feedback. If you are not sure if a resource is allowed, or if something feels “off” to you, alert your instructor right away. I do reserve the right to make major changes to the class structure—including requiring an oral exam / exit interview—if there are class-wide violations of the academic integrity policy.

## Lecture

Your attendance and active participation are expected at every lecture period. If you know that you will not be able to attend lecture for any reason, let me know by email right away (even if only 5 minutes before class or 5 minutes after the start of class). You are responsible for communicating with a classmate to get any notes or missed information. Late arrivals and early departures are distracting for the whole class (and me!), so arrive on time and stay for the whole class period. I strongly encourage taking your own notes in lecture. We will sometimes use computers or other electronic devices; however, do not use your computers for non-course related activities during lecture. Put your phone on silent or Do Not Disturb while you are in class. If you must take a phone call in case of emergency, quietly leave the room before answering the phone.

### Recommended practice problems

Consistent practice is an essential component of learning, and homework questions will often be like exam questions. Recommended practice problems from the textbook will be posted for each chapter; however, homework will *not* be graded. In general, the answers to these questions may be found in the back of the textbook and solutions are readily available online. It is your responsibility to keep up with suggested practice problems *every day*. *Productive collaboration with classmates is expected and encouraged; however, any work that you submit must represent your own understanding and contributions.*



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### Collected lecture assignments

Some lecture assignments will be collected and graded for completion. Bring loose leaf paper and a writing utensil to class with you. In-class assignments cannot be made up for credit under any circumstances.

### Exams

There will be a total of four exams this quarter, and your top three scores will be used to calculate your final grade. Early and late exams will not be administered, and **missing an exam will result in a zero**. You should arrive to class on time for the exams. I do not guarantee that you will be able to take the exam if you arrive late. I am unable to accommodate make-up exams under any circumstances. If you require any accommodations for exams, you must be approved by DSPS. For extended-time or reduced-distraction exams, please schedule your exam in the DSPS office during the normal class time.

Exams will consist of short answer questions with the opportunity for partial credit. You must show your work in order to receive credit for any answer. Detailing any mathematical steps in a clear fashion will communicate your understanding of the material. *I am more interested in how you think about a problem than your final answer*. You will be asked to demonstrate your conceptual understanding of the material and apply those concepts in an algebraic context and solve quantitative problems.

You should bring a scientific or graphing calculator with you to each exam. ***Phones, smart watches, and other computers are not permitted in any circumstances***. If I see you on your phone or other electronic device (besides a regular calculator), you will receive a zero on the exam.

The first three exams will be administered during the scheduled lecture time. Exam 4 will be administered during the designated final exam time on **Monday, June 26<sup>th</sup> from 11:30 am – 1:30 pm in MLC103**. This date and time are determined by De Anza College and cannot be moved under any circumstances. If you cannot take the exam at this time, you will receive a zero.

## Lecture Schedule and Assigned Readings

Chemistry 1B will cover material presented in chapters 9, 10, 12, 13, 14 and 16 of OpenStax Chemistry. We will also review Chemistry 1A topics throughout the quarter.

Detailed reading related to each lecture will be announced in class. In the schedule below, chapter reading is given for the required OpenStax OER textbook as well as Silberberg (9e).

Every effort will be made to keep to the lecture schedule below. If we fall significantly behind this schedule, the content of the exams will be adjusted to reflect the material that we covered in class. Exam dates will not be modified except in cases of *force majeure*.



Unit	Week	Date	Day	Lecture Topic Readings	Activities
1	1	4/10	M	Kinetic Molecular Theory and Properties of Gases Maxwell-Boltzmann Distribution Gas Laws and Applications: How do airbags work? <input type="checkbox"/> Silberberg Chapter 5 <input type="checkbox"/> OpenStax Chapter 9	Atoms in Motion (iPad app) PhET gases simulation
		4/12	W	Kinetic Properties of Gases Deviations from Ideal Behavior <input type="checkbox"/> Silberberg Chapter 5 and 12 <input type="checkbox"/> OpenStax Chapter 9 and 10	Refinement of uranium
	2	4/17	M	Intermolecular Forces Properties of Water <input type="checkbox"/> Silberberg Chapter 12 <input type="checkbox"/> OpenStax Chapter 10	PhET attractive forces
		4/19	W	Phase Changes and Review of Enthalpy <input type="checkbox"/> Silberberg Chapter 12 <input type="checkbox"/> OpenStax Chapter 10	Phase diagrams
		4/24	M	<b>Exam 1: Gases, Intermolecular Forces, and Phases of Matter</b> (75 minutes)	
2	3	4/26	W	Chemical Kinetics, Reaction Rates, Reaction Mechanisms and Transition States <input type="checkbox"/> Silberberg 16.1-16.2, 16.6, 16.7 <input type="checkbox"/> OpenStax Chapter 12	Collision theory simulation
		5/1	M	Chemical Kinetics, Reaction Rates, Reaction Mechanisms and Transition States <input type="checkbox"/> Silberberg Chapter 16 <input type="checkbox"/> OpenStax Chapter 12	Photochemical smog
	4	5/3	W	The Rate Laws and Integrated Rate Laws <input type="checkbox"/> Silberberg Chapter 16 <input type="checkbox"/> OpenStax Chapter 12	Integrated rate law calculations
		5	5/8	M	Kinetics, continued <input type="checkbox"/> Silberberg Chapter 16 <input type="checkbox"/> OpenStax Chapter 12
	5/10		W	Equilibrium <input type="checkbox"/> Silberberg Chapter 17 <input type="checkbox"/> OpenStax Chapter 13	
		5/15	M	<b>Exam 2: Kinetics and Qualitative Chemical Equilibrium</b> (75 minutes)	
3	6	5/17	W	Equilibrium: ICE Box Method <input type="checkbox"/> Silberberg Chapter 17 <input type="checkbox"/> OpenStax Chapter 13	
		7	5/22	M	Equilibrium: Le Chatelier's Principle <input type="checkbox"/> Silberberg Chapter 17 <input type="checkbox"/> OpenStax Chapter 13 Proton Transfer and Polyprotic Acids <input type="checkbox"/> Silberberg Chapter 18 <input type="checkbox"/> OpenStax Chapter 14
	5/24		W	Weak Acids and Bases <input type="checkbox"/> Silberberg Chapter 18 <input type="checkbox"/> OpenStax Chapter 14	

	8	5/29	M	<b>Memorial Day: No classes</b>	
		5/31	W	Acid-base Properties of Salts <input type="checkbox"/> Silberberg Chapter 18 <input type="checkbox"/> OpenStax Chapter 14	
	9	6/5	M	<b>Exam 3: Equilibrium Calculations and Acid-Base Chemistry</b> (75 minutes)	
4		6/7	W	Thermodynamics: Reaction Entropy <input type="checkbox"/> Silberberg Chapter 20 <input type="checkbox"/> OpenStax Chapter 16 <input type="checkbox"/> OpenStax Physics 15.7	Microstates
	10	6/12	M	Thermodynamics: Reaction Entropy <input type="checkbox"/> Silberberg Chapter 20 <input type="checkbox"/> OpenStax Chapter 16	
		6/14	W	Thermodynamics: Spontaneous Reactions <input type="checkbox"/> Silberberg Chapter 20 <input type="checkbox"/> OpenStax Chapter 16	Thermodynamics and kinetics of diamond stability
	11	6/19	M	<b>Juneteenth: No classes</b>	
		6/21	W	Quarter Wrap-up	
12	6/26	M	<b>Monday 11:30 am – 1:30 pm</b> <b>Exam 4: Thermodynamics</b>		



## Lab

Chemistry is an experimental science, and the laboratory is a major component of the course. De Anza College does not offer make-up labs, and ***you must attend the laboratory section that you are registered for*** to complete the required labs. Everyone gets one excused absence with no grade penalty. A second absence, regardless of the circumstances of your first absence, will result in a zero for the lab and all associated assignments. After a third lab absence, you will automatically receive an "F" in the course.

Your timely attendance is expected at every lab. The beginning of each lab period is reserved for lab lecture. The lab lecture is a required component of the laboratory section and will include essential safety information. ***If you miss lab lecture, you will not be permitted to complete that lab and you will receive a zero for all related assignments.***

You must clean up your work area before leaving each lab. Failure to do so will result in a loss of points for that lab. Before you leave lab, ***check-out with me.*** You will not receive credit for the lab unless I have signed your data in your lab notebook.

Lab assignments will consist of pre-labs, completion of laboratory experiments and mindful data collection, and analysis of data.

### ACS Laboratory Safety Course

The ACS Laboratory Safety Course must be completed by the second lab meeting.

### Pre-lab Assignments

Pre-lab assignments will vary by lab; however, they will generally include assigned reading, safety preparation, and an introduction to the lab experiment. I expect you to come to lab prepared to complete each experiment with minimal delays. Pre-lab assignments will be submitted on Canvas as file uploads (PDF or JPG) and will generally be due the *business day* before the lab. For example, the pre-labs for Monday labs will be due on Fridays at 8:30 am. Pre-labs will generally be graded out of 3 points.

As a rough rubric, scoring 3/3 points on a pre-lab means that you have completed the lab to a high standard (e.g. detailed and unambiguous schematic of the procedure, answer all questions in full sentences); 2/3 indicates the pre-lab is good but there is room for improvement; 1/3 indicates that the pre-lab is incomplete or lacks detail.

### Lab Procedure and Lab Notebooks

***Data collected during the lab period must be recorded directly in your laboratory notebook.*** You will not receive credit for any data written on a worksheet or separate piece of paper. Before you leave lab for the day, have me check off on your data in your lab notebook for the available points.

Arrive on time	1 point
Complete the lab safely	1 point
Record data in your lab notebook	1 point
Clean up your station and equipment before the end of class	2 points
<b>total</b>	<b>5 points</b>

### Analysis Worksheets

Data analysis worksheets will be posted on the course webpage. The precise nature of the assignment and the number of points available will vary. Analysis worksheets must be printed and submitted on the due date *at the beginning of class*. Due dates will be announced in class and on Canvas.

### Lab Quizzes

There will be three lab quizzes in this course. The quizzes will cover safety material, background theory, experimental techniques, calculations, and analysis related to your laboratory experiments. The average of your top two quizzes will be used towards your final grade. The expected content of each quiz is given below.

Quiz 1	Molar volume of a gas Enthalpy of vaporization
Quiz 2	Green salt lab (all days) -Micropipette use -Redox titration

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	-UV-Visible spectroscopy -Standard curve method -Gravimetric analysis
Quiz 3	Iodine clock reaction Kc by spectroscopy Ka of a weak acid Thermodynamics of calcium hydroxide solution

### Clean-up

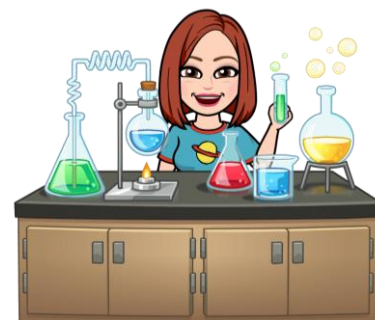
Each student is required to sign up for one lab period in which they will be responsible for after-lab clean-up. This involves staying to end of lab, making sure the common lab areas and balance area is clean, the waste bottles are closed, etc. In addition, each student is responsible for cleaning their own materials and work area.

Students should start cleaning up their own areas *30 minutes prior to the end of lab* and should have Dr. Brophy check their lab notebooks no later than 20 minutes prior to the end of lab. The last 10 minutes of lab are reserved for the instructor to do a final inspection of the lab and waste areas.

## Laboratory Safety

All chemistry laboratories inherently come with associated risks and hazards. It is inevitable that some accidents will occur during your chemistry course work. When an accident occurs, **inform your instructor immediately** and **do not attempt to clean-up any broken glassware or spilled chemicals by yourself**. In order to ensure that the lab is as safe as possible, we must (1) **Recognize hazards**, (2) **Assess the risks of hazards**, (3) **Minimize the risks of hazards**, and (4) **Prepare for emergencies**.

You have the right to advocate for yourself. If you feel a particular procedure or chemical is unsafe, or a specific accommodation will enhance your lab experience, I welcome your feedback. I may not have an answer or solution for you right away, but I will work on your behalf to make sure that you can complete the labs safely.



From the American Chemical Society Safety In Academic Laboratories Guidelines, 7th Ed., the following mandatory minimum safety requirements must be followed by all students and be rigorously enforced by all chemistry faculty:

- 1) **Chemistry Department-approved safety goggles purchased from the De Anza College bookstore (NOT safety glasses) must be worn at all times once laboratory work begins, including when obtaining equipment from the stockroom or removing equipment from student drawers**, and may not be removed until all laboratory work has ended and all glassware has been returned to student drawers.
- 2) **Shoes that completely enclose the foot** are to be worn at all times; NO sandals, open-toed, or open-topped shoes, or slippers, even with socks on, are to be worn in the lab.
- 3) Shorts, cut-offs, skirts or pants exposing skin above the ankle, and sleeveless tops may not be worn in the lab: **ankle-length clothing must be worn at all times**.
- 4) Hair reaching the top of the shoulders must be tied back securely.
- 5) Loose clothing must be constrained.
- 6) Wearing "...jewelry such as rings, bracelets, and wristwatches in the laboratory..." should be discouraged to prevent "...chemical seepage in between the jewelry and skin...".
- 7) **Eating, drinking, or applying cosmetics in the laboratory is forbidden at ALL times, including during lab lecture. Food and drink containers are not allowed in lab at any time. If I see them, I will put them outside.**
- 8) Use of electronic devices requiring headphones in the laboratory is prohibited at ALL times, including during lab lecture.
- 9) Students are advised to inform their instructor about any pre-existing medical conditions, such as pregnancy, epilepsy, or diabetes, that they have that might affect their performance.
- 10) Students are required to know the locations of the eyewash stations, emergency shower, and all exits.
- 11) Students may not be in the lab without an instructor being present.
- 12) Students not enrolled in the laboratory class may not be in the lab at any time after the first lab period of each quarter.
- 13) Except for soapy or clear rinse water from washing glassware, **NO CHEMICALS MAY BE Poured INTO THE SINKS**; all remaining chemicals from an experiment must be poured into the waste bottle provided.
- 14) Students are required to follow the De Anza College Code of Conduct at all times while in lab: "horseplay", yelling, offensive language, or any behavior that could startle or frighten another student is not allowed during lab.
- 15) Strongly recommended: Wear Nitrile gloves while performing lab work; wear a chemically resistant lab coat or lab apron; wear shoes made of leather or polymeric leather substitute.

**Reckless behavior will not be tolerated. If your actions endanger the health and safety of yourself or another person, you will be asked to leave and you will receive a zero for the lab and related assignments. In extreme cases, you may lose your lab privileges for the remainder of the quarter and/or fail the course.**

## Lab Schedule

The expected laboratory schedule for spring 2023 is given below. Pre-lab and post-lab assignments will be posted on Canvas and submitted at the beginning of the lab period.

Week	Monday	Wednesday
1	<b>Check-In</b> Complete lab safety assignment at home	<b>Molar Volume of a Gas</b> Collect data Worksheet to be completed at home
2	<b>Structure and Polarity Review</b> In-class worksheet due at the end of class	<b>Heat of Vaporization of Water Day 1</b> Perform experiment and collect data
3	<b>Heat of Vaporization of Water Day 2</b> Excel data analysis due at the end of class	<b>Green Salt Day 1</b> Synthesis of iron oxalate Start recrystallization
4	<b>Lab Quiz 1</b> <b>Green Salt Day 2</b> Filter recrystallized product Micropipette practice	<b>Green Salt Day 3</b> Introduction to UV-Vis spectroscopy Oxalate quantification by redox titration Worksheet to be completed at home
5	<b>Green Salt Day 4</b> Iron quantification by UV-Vis Prepare class standard curve Worksheet to be completed at home	<b>Green Salt Day 5</b> Hydrate quantification by gravimetric analysis Worksheets due at the end of class.
6	<b>Iodine Clock Day 1</b> Experimental design Collect data for parts I and II	<b>Lab Quiz 2</b> <b>Iodine Clock Day 2</b> Finish collecting data for parts I and II
7	<b>Iodine Clock Day 3</b> Collect data for parts III and IV	<b>Iodine Clock Day 4</b> Analysis due at the end of class
8	<b>Memorial Day</b> No class	<b><math>K_c</math> by Spectroscopy Day 1</b> Collect data
9	<b><math>K_c</math> by Spectroscopy Day 2</b> Analysis due at the end of class	<b><math>K_A</math> of a Weak Acid</b> Collect data Worksheet to be completed at home
10	<b>Calcium Hydroxide Day 1</b> Collect data	<b>Calcium Hydroxide Day 2</b> Analysis due at the end of class
11	<b>Juneteenth Holiday</b> No class	<b>Lab Quiz 3</b> <b>Check-Out</b>

## Grading Policies and Schemes

To succeed in this course, you will need to exhibit **consistent and sustained effort** throughout the quarter. This will be demonstrated through in-class participation, laboratory preparation and data analysis, and examinations. Assignment types are assigned a weight; not all points are created equally!

Lecture 70% of total grade

Final % Grade<sup>1,2</sup>

Lecture assignments (collected in class)	10%	>100.0	A+
Exams	60%	>90.0	A
		88.0 – 89.9	A–
		85.0 – 88.9	B+
		80.0 – 84.9	B
		78.0 – 79.9	B–
		75.0 – 77.9	C+
		68.0 – 74.9	C
		63.0 – 67.9	D+
		55.0 – 62.9	D
		<55%	F
<b>Lab</b>	<b>30% of total grade</b>		
Lab assignments (pre-labs, lab, analysis)	15%		
Lab quizzes	13%		
Clean-up	2%		

<sup>1</sup>If your average in either the lab *or* lecture portion of the course is less than 55%, you will receive an F as a final grade.

<sup>2</sup>A+ grades will be given to students who demonstrate excellence in the following three areas: lecture, lab *and* class participation.

Note that grades will be entered in Canvas; however, the gradebook and assignment types may not be finalized until the end of the quarter. I encourage you to make your own spreadsheet to keep track of your letter grade throughout the quarter.

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**Student Learning Outcome(s):**

\*Evaluate the principles of molecular kinetics.

\*Apply principles of chemical equilibrium to chemical reactions.

\*Apply the second and third laws of thermodynamics to chemical reactions.

**Office Hours:**

M,W	12:45 PM	01:35 PM	In-Person	SC1220
T,TH	02:20 PM	03:10 PM	In-Person	SC1220