

THE UNIVERSITY OF
CHICAGO

DEPARTMENT OF

CHEMISTRY

Guide for Teaching Assistants

Department of Chemistry
The University of Chicago



5th Edition

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Preface

Welcome to the Department of Chemistry at the University of Chicago. One of the goals of our graduate program is to produce exceptional teachers as well as excellent researchers, and this guide is designed to help in that. It will provide you with policy information and help you improve as a teacher. It should also serve as a touchstone later in your studies as you strive to reach your full potential as a teacher.

This guide is intended to familiarize you with your teaching responsibilities for General Chemistry and Organic Chemistry as well as provide you with specific information for the teaching role that you will perform. The information provided in this guide will also be valuable to experienced Teaching Assistants, as it provides a summary of the important policies in the teaching laboratory.

Teaching Assistants have a serious responsibility within the Chemistry Department. A large portion of the individual attention and instruction for students in chemistry classes depends on the knowledge, concern, dedication, and initiative from the Teaching Assistants. You have the chance to directly influence students' attitude toward the Department and their performance in chemistry courses, as well as their career choice in the future.

As a Teaching Assistant, you will have a great opportunity to practice your teaching skills and benefit from your teaching experience. If you choose a career in teaching or research, the ability to effectively communicate your scientific work with other professionals and the general public may be vital to your success. Therefore, the role of Teaching Assistant has the potential to significantly affect your personal and professional development.

The quality of your teaching is largely dependent on your attitude and ethics. Your view of the role as a Teaching Assistant will fundamentally determine the effectiveness of your teaching. To be a good Teaching Assistant, you need to take pride in your teaching, be a good role model for students, and take initiative when it is needed.

We hope that you will enjoy teaching at the Department of Chemistry and find this Guide for Teaching Assistants useful now and in the future. It is our goal to engender a sense of community in order to help you have a gratifying experience as a Teaching Assistant and a graduate student.

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I. Introduction

A. Mission

Our mission is to train and support graduate students as teachers transitioning to researchers by developing their teaching, speaking, writing, problem-solving, and other career-enhancement skills. We strive to establish a supportive and professional community with positive mentor relationships.

B. Goal

Our goal for teaching in the Department of Chemistry is to ensure that all students gain a strong foundation of chemical knowledge through the independent application and engagement of concepts, both in the laboratory and in written work.

This guide is intended to familiarize first-year Chemistry Teaching Assistants (TAs) with their teaching responsibilities and provide specific guidelines on the performance of these duties. Experienced Teaching Assistants should also review these materials, as they provide a summary of the most critical aspects of the General and Organic Chemistry laboratory TA teaching assignments.

C. Responsibilities

Each Teaching Assistant plays an integral role in undergraduate education. A large portion of the individual attention and instruction of undergraduates in chemistry classes depends on the knowledge, concern, and dedication of the TAs. The TA's close contact with students will directly influence their attitude toward the department and their performance in courses. It is vital that take this responsibility seriously because students will see TAs as the face of the Department.

Teaching Assistants for the Department of Chemistry at The University of Chicago have the following responsibilities:

1. Attend Weekly TA Meetings

These meetings are mandatory. The Laboratory Director will discuss important information regarding TAs' weekly responsibilities and upcoming labs. The lecturing faculty member may also provide information about the course.

2. Lead One Lab Section Each Week

Responsibilities for leading the lab include:

- a) arriving at the lab 10 minutes before the scheduled class start time to ensure that everything is ready for the students when they arrive;
- b) demonstrating new equipment and techniques to students;
- c) communicating any updates or changes to the experiment;
- d) interacting with students as they complete their experiments and troubleshooting when necessary;
- e) proctoring the lab until the last student is finished;
- f) making sure that the lab is left clean and orderly, common equipment is returned to where it belongs, and instrumentation is turned off;
- g) locking the laboratory after everyone has left.

3. Lead One Discussion Section Each Week

Responsibilities for leading the discussion include:

- a) arriving at the classroom 10 minutes before the scheduled class to ensure that everything is ready for the students when they arrive;
- b) being prepared with a lesson plan that incorporates information from the week's lecture and TA meeting;
- c) giving the students important information about the upcoming lab;
- d) being prepared to review pertinent topics from lecture and providing sample problems on lecture topics for in-class problem solving;
- e) engaging with students for the full 50-minute class period.

4. Grade Assignments

TAs are responsible for recording and reporting all grades to Canvas on a weekly basis including notebook copy pages, lab reports, homework, and any other assignments the teaching faculty gives. The turn-around for grades will be one week from the date the assignment is due.

5. Proctor and Grade the Midterms and Final Exam

The Lab Director and instructional faculty will provide TAs with the proctoring and grading schedule.

6. Hold Office Hours for 2 Hours a Week

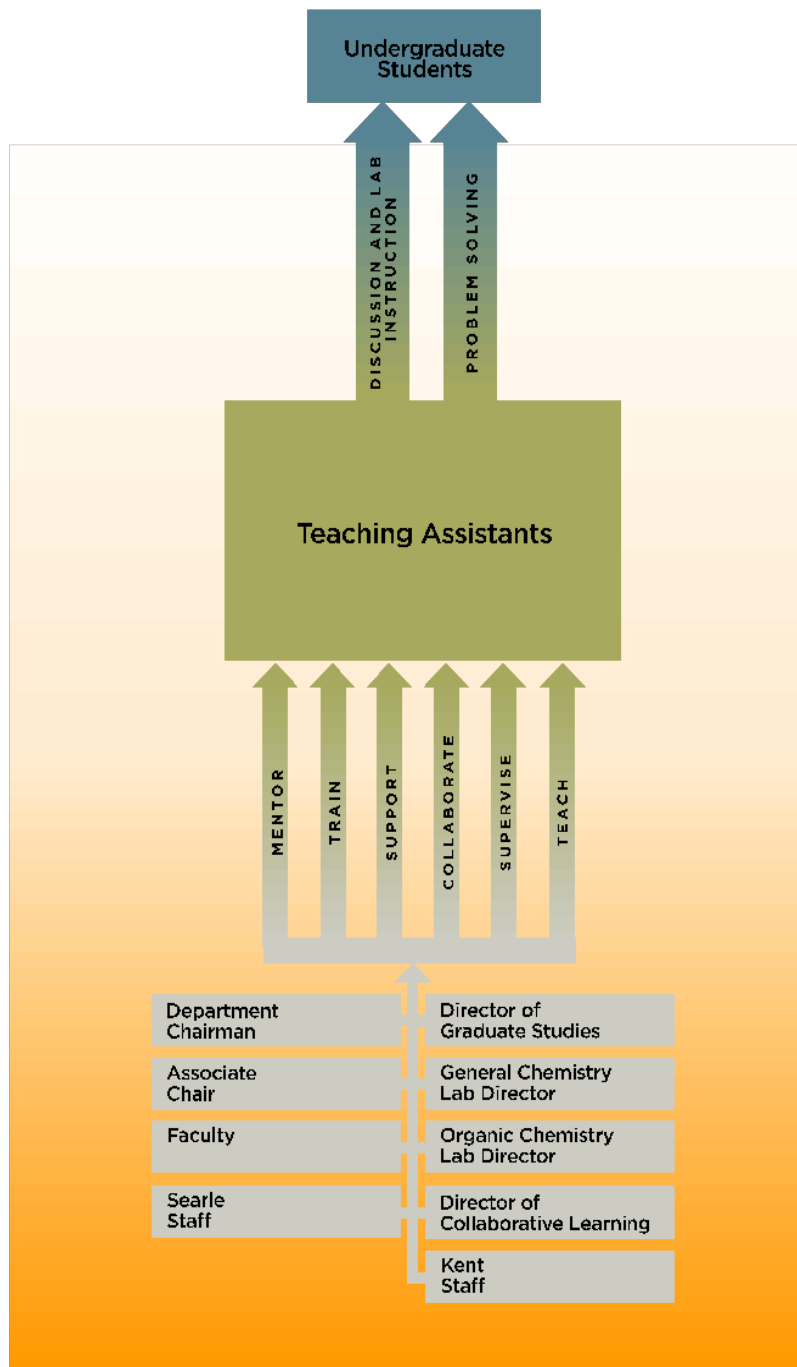
General Chemistry TAs hold one hour of open and one hour of closed office hours per week. Organic TAs hold two hours of open office hours per week. Closed office hours are only for students in one section, while open office hours are for any student in the class.

7. Attend Class Lectures

8. Be On Call

Each TAs will be required to be on call one week per quarter. While on call, a TA may be asked to fill in for a sick TA or any other case of emergency in the class.

D. Support Chart



II. General Information

A. Schedule

The Lab Directors will make the teaching assignments before classes start each quarter. It is each TA's responsibility to communicate any schedule conflicts to their Laboratory Director. Teaching duties and graduate classes are TAs' top priorities in the first year, and personal preferences or seminar attendance cannot always be accommodated.

B. Supplies

Each Teaching Assistant will receive keys, textbooks, goggles, and a lab coat for their teaching assignments. These items must be returned when their teaching duties are over.

TAs will also be provided a photocopy code on the departmental copiers. Photocopies should be made for instructional materials only. The copier on the third floor between Kent and Jones is designated for teaching use.

C. Grading

A grading scheme for each lab report and homework assignment will be provided to the Teaching Assistants. It is important that the point distribution is carefully followed. Deviations from the grading schemes may lead to significant variations in scores and unfair grading across the entire class. By the end of the quarter, all scores will be normalized across all sections, which affects the equity of a student's grade if the grading scheme is not followed.

No matter how detailed a grading scheme is, it cannot predict every type of answer a TA will encounter. One of the best ways to grade assignments is to look at a few answers before assigning points. This way, the TA can identify how to distribute partial credit before marking students' work. Keep a record of how partial credit is distributed so that the grading can be fair and consistent.

Each TA will use the grade sheet on Canvas for recording grades. Always keep the grades and graded work secure. Do not leave any graded assignments or rubrics where students can gain access, such as on a public computer. Under federal law, the Federal Educational Rights and Privacy Act (FERPA), TAs cannot disclose a student's grade to a person other than that student or the Instructor(s).

At the end of the third and sixth week of the nine-week quarter, TAs must be up-to-date with their grades. Failing to keep up will be reflected in the teaching evaluation. Students learn from their mistakes and the sooner they see their graded work, the sooner they can stop making the same mistakes.

At the end of each quarter, the Teaching Assistants must also give each of their students a written evaluation based on the performance of the student. A copy of the Student Evaluation Form, that must be filled out for every student, can be found in the Appendix.

Teaching Assistants must not attempt to predict a student's final letter grade in the course, but rather refer the student to the Instructor. Students wishing to withdraw from the course must contact their college advisor. Changes to midterm or final examination grades can only be made through the Laboratory Director or the Instructor.

D. Guidelines for Proctoring

1. Passing Out the Exams

Before passing out the exams, TA proctors must make sure students put away all books, notes, and personal belongings unrelated to the exam, including cell phones and other electronics. Once this is complete, TAs must count the number of students in a row and pass out only that number of exams. Extra exams that are passed out often go missing and threaten the integrity of any make-up exams that may occur. Once all the exams have been passed out, students should be instructed to start at the same time. When the exam has started, TAs must count the number of students and the number of extra exams, and this total should equal the starting number of exams. In the case of a missing exam, proctors must check through the exam room and outside area to see if it can be found. If needed, consult the Lab Director or Instructor.

2. During the Exam

It is the TA's responsibility to watch the students, walk around, and pay attention to students sitting in the back. Proctors are not allowed to bring a computer or reading materials to the exam room. If a student is suspected of cheating, the TA has every right to ask the student to keep their eyes on their exam. Any pieces of evidence (cheat sheets, writing on their hands, cell phone pictures, etc.), must be confiscated, the student's name must be recorded, and the Laboratory Director and the Instructor alerted. If a question is asked, the proctors must seek guidance from the lecturing faculty member to assure it is answered in alignment with what is being tested. Any suspected error on the exam must be communicated to the Instructor prior to a class wide announcement being made.

3. Collecting the Exams

When the exam time has ended, the proctors must announce that the exam time is over and be proactive about collecting the exams. Some students will only stop taking the test when their exam is collected by a TA. The proctors must promptly collect exams to prevent students from discussing questions and changing answers on the way to turning them in. Before leaving the room, the exams must be counted again to ensure no one has taken an exam home. If any irregularities come up, the Lab Director and Instructor must be alerted.

E. Face-to-Face Teaching

Each week TAs have at least six contact hours working with students as outlined in the responsibilities section of this guide, including a lab experiment up to 4 hours, one hour of discussion, and two office hours.

The operational details for teaching in the lab are provided in Section IV. Due to safety considerations, this is one of the most important parts of the Teaching Assistant position. Laboratory experiments are hands-on exercises, and it is imperative that students receive excellent instruction. The laboratory experience expands upon information that is introduced in lecture and puts these concepts into practice.

The operational details for teaching a discussion session are detailed in Section V. This is when important information about the upcoming lab are relayed, lecture topics are reviewed, and problem-solving concepts are taught.

TAs will have two hours of office hours every week. Office hours are designed for one-on-one instruction with students in the class. This is an opportunity to review concepts for individual students that may not be appropriate for group discussion.

While graduate students are serving as Teaching Assistants, performing other teaching roles within the University, such as tutoring, presents a conflict of interest and thus are not allowed. These opportunities are available upon the completion of the TA position.

F. Evaluation of Teaching

Teaching Assistants are evaluated at the end of the two-week TA training in September as well as quarterly by both their students and the Laboratory Director. Standard questionnaires are used, which can be found in the Appendix. The results are reviewed and tallied by the Lab Director and then sent to the Director of Graduate Studies for review. Each quarter, the faculty will receive a complete teaching evaluation for each TA. If a TA's performance is determined to be unsatisfactory, a mid-quarter meeting with the Associate Chair of the Department will be scheduled.

There are two opportunities for TAs to observe and be observed by peers and receive constructive feedback on teaching strategies. The first is during TA training when each TA will give a practice discussion session in front of the other first-year graduate students. The discussion observation form included in the Appendix is what will be used in that setting. Next, in the winter quarter, there is a one-on-one peer observation opportunity, where TAs observe each other teaching. This session is structured as a module in the Advanced Training for Teachers and Researchers in Chemistry (CHEM 500) course and is designed for TAs to help each other improve their teaching technique and style.

At the end of the academic year, departmental and college-wide teaching prizes are awarded to those TAs who have made the most positive impact on their students.

III. Appropriate Demeanor

A. Attitude

Each TA's attitude towards teaching impacts the students' attitude towards the class. In the classroom, carefully thought-out and clearly expressed comments will model and encourage similar behavior by students. Graduate TAs are in graduate school because of their passion for the field of chemistry, and channeling this excitement into teaching can be a powerful tool. Teaching Assistants are in a professional role and their attitude needs to reflect this.

A valuable attribute of a good teacher is enthusiasm, which is second only to having a thorough grasp of the subject matter. If students sense that their TAs

know what they are talking about, that they find chemistry an exciting discipline, that they take pleasure in the learning that they achieve, and that they grade fairly, they will be respected as a good teacher and chemist; even though chemistry may not be the students' main interest.

While computers are an important tool in regard to teaching, they can also be a large distraction and show students that their responsibilities (i.e., lecture, lab, exams) are not important. Engaging with a computer or phone for non-class purposes, such as email, shows students that their time is not valuable and sets a poor example. Using a personal computer in lab is a safety issue because TAs must pay attention to their students at all times. Proctoring exams is also a time when TAs need to focus their full attention on preventing cheating.

TAs with respectful and professional behavior toward students are more likely to be respected by their students. If a TA is cold, sharp, or condescending toward students in discussing their work or difficulties, students would feel uncomfortable and limit the contact they have with their TA.

B. Professional Expectations

Although Teaching Assistants may want to be friendly with their students, it is important to remember that graduate TAs and their undergraduate students are not peers. TAs should be cordial with students academically without becoming involved in their personal lives, which also extends to social media. Connecting with students via social media is appropriate after the role as a Teaching Assistant concludes. It is important to maintain a professional teacher-student relationship throughout the duration of the class. The University has a long-standing policy forbidding dating between Instructors, TAs, and their students. This policy will be rigidly adhered to by the Department of Chemistry.

Punctual attendance at all discussions, lab sessions, and TA meetings is required. Students will look up to their TA to set and maintain academic and social standards. Missing TA meetings can cause TAs to miss crucial instructions and policy changes, which are important for working as an effective TA. Chronic tardiness or absenteeism will lower the trust and respect of TAs by their students, colleagues, and supervisors. TAs must be on time for teaching assignments, which means 10 minutes before the start of discussion sessions and lab. Absence from any scheduled teaching assignment is inexcusable unless prior arrangements have been made for someone to cover the session. Always let the Laboratory Director know of any conflict or illness as soon as possible.

Following the rules is vital for student equity. TAs should not approve student requests for extensions on graded work without discussing it with the Lab Director or Instructor. Any exception to the rules or deadlines must be equally applied to all students in the class, not just the students in one lab section. One TA's relaxation of the rules makes it difficult for other TAs to ensure that all students

are treated fairly. It also sets a precedent for students to continue to ask for extensions.

TAs must clearly and fully understand the current course material and plan how they will teach it in the laboratory and discussions, which ensures discussions that align well with the faculty lectures. There is nothing more confusing to students than to be told to follow one procedure or method by the faculty member and then receive quite different instructions from the Teaching Assistants.

It is highly recommended that TAs bring practice problems for students to solve in discussion and review sessions. However, if there are problems written by a faculty member, for example old homework or exams, TAs must obtain permission to use it with students. Faculty sometimes reuse problems in order to gauge the performance level of a class and want to keep their problems confidential. TAs are expected to cite their source when using published problems – this shows students that proper citation is taken seriously and credit is given to the person who wrote the problem.

If there are situations that need correcting, such as missing lab equipment or an error on a problem set, let the Instructor or Lab Director know so that the issues can be addressed promptly. TAs should not complain directly to students about issues, as this undermines trust and diminished enthusiasm for the class. The Lab Manager and Technicians need to be treated with respect as well, and can quickly address any problems that arise in lab. As shown in the personnel chart in Section I, Part B., everyone on the teaching team is integral to the success of the Kent undergraduate teaching and laboratory operation.

IV. Laboratory

A. Laboratory Check-In Procedure

At the first weekly TA meeting, TAs will receive a detailed procedure describing what needs to be done for students checking into the lab. TAs must arrive to lab 10 minutes before the start of class to prepare. Steps include:

1. Take Attendance

Students should check-in with their TA first. Each TA will be given a roster of student names. TAs should send any student who is not on their roster to the Lab Director. TAs do not have the authority to give permission for a student to join a lab section. All section changes must go through the Lab Director. Students must complete the online safety training before starting their first experiment. No exceptions will be made.

Each TA will then introduce themselves and start the introductory walk-

through.

2. Introductory Walk-Through

Each TA will walk through the lab pointing out important safety equipment and the placement of common items. This includes, but is not limited to:

- aprons
- safety shower
- eyewash stations
- chemical dispensing hoods
- waste bottles
- broken glass boxes
- fire extinguishers
- exits

3. Assign Lab Drawers

Every student will be assigned a workspace and includes a shared drawer with glassware and common equipment. TAs will show students where the extra glassware and equipment are stored in the lab and instruct them on the importance of leaving the shared workspace clean and stocked for the next students. Missing and dirty glassware creates more work for the next person.

4. Equipment Check

The equipment list is included in each drawer. Students should check all lab equipment in their lab drawer against the equipment list. Any missing or broken equipment should be replaced before lab starts. Missing glassware may be obtained in the lab or from the Lab Tech in Kent 310. Any other extra equipment must be put in the appropriately labeled drawer.

The common items located on the central bench are for all sections to use. Students cannot keep these items in their drawers. If any common item is broken during the experiment, the TA must inform the Lab Tech or Lab Director.

B. Laboratory Supervision

1. Be Prepared

Before coming to the laboratory, it is expected that each TA study the experimental procedures in the Laboratory Manual and the TA meeting notes which the Lab Director has distributed at the weekly TA meeting.

2. Arrive Early

TAs must report at least 10 minutes prior to the beginning of the lab to get pertinent information from the Lab Director and ascertain that the necessary chemicals and equipment are available. TAs need to turn on the ventilation system for the chemical fume hoods before every lab session and turn it off after all students have left the lab.

3. Notebooks

It is required that TAs ask to see the students' written record of data and observations as recorded in their lab notebook. TAs should check notebooks as students walk into lab to verify that they are prepared. Students' lab notes must be written directly into their notebooks and the TA needs to make sure that the students record their own observations.

4. Goggles

The TA and students **MUST WEAR SAFETY GOGGLES** in the lab **AT ALL TIMES**. Safety goggles are mandated not only by the Office of Research Safety and Environmental Health and Safety, but also by Illinois State Law. Only goggles approved by the Safety Department and issued by the Department of Chemistry are allowed in lab.

5. Introductory Announcements

TAs need to let students know of any changes to the procedure before they start the experiment. If a new technique or piece of equipment is used in the experiment, the TA needs to show the class where it is located and how to use it. Once introductory announcements are done, the TA should use this time to take attendance. Any student missing should be reported to the Lab Director.

6. Walk Around Lab

Once class routines are established, TAs are likely to spend the majority of their time answering questions. It is important that TAs observe the students in their actual performance of laboratory work. Effective teaching in the laboratory requires engaging with the students and observing their work. Each TA should make a definite effort to visit every student at least once during each laboratory period. While proctoring lab, the TA should ask questions about the experiment or discuss the quality of the students' work. Other activities beyond lab teaching will not be allowed, e.g., using computers or phones, grading students' homework and lab reports, reading newspapers and/or research papers, etc.

7. Be an Active Teacher

Watch regularly for opportunities to help students develop good laboratory techniques and safety. For example, TAs should instruct students on the need to keep the front sashes of the fume hoods at the appropriate levels, the necessity to keep corrosive chemicals away from balances and other special apparatus, etc. Occasionally, the TA can go from one student to another to ask questions concerning the experiments. For example, asking what the student is doing, and expecting an answer without consulting their notebook. TAs can challenge them to explain why this is an important step in the laboratory procedure or explain what reaction is occurring.

8. Supervision

The Teaching Assistant is responsible for all of the students in the room. No TA should allow a student from another section to work in their laboratory, unless alerted by the Laboratory Director. The TA, as well as the students, should be in the laboratory throughout the period. **AT NO TIME SHOULD STUDENTS BE LEFT ALONE IN THE LAB!** Students should not be allowed to leave the laboratory before they finish the experiment without permission from the Laboratory Director, nor to wander around and visit. Students completing their work early must continue wearing safety goggles until they leave the laboratory.

9. Be Focused

The laboratory session is a time to focus and actively engage with students. TAs cannot grade papers or study for their own courses. Laptop computers are not to be brought to the lab. Use of cell phones or other personal electronics is also prohibited, including personal audio devices.

10. Student Belongings

Students and TAs cannot bring their backpacks, coats, electronic devices, and personal items into the lab for safety considerations and to prevent chemical contamination. Lockers are available outside the lab for their possessions. Students must provide their own locks. Many items have been stolen over the years, so students should either not bring valuables or ensure they are surely locked.

11. Clean the Lab

Keeping the laboratory clean is an essential part of TA duties. During the quarter, most of the cleaning tasks must be done by the students and TAs need to remind students in the lab. One effective way of encouraging cleanliness is to make sure each student has cleaned and wiped down their hood and benchtop area before they are allowed to leave for the day.

When chemicals are spilled, students are responsible for cleaning up after themselves to the best of their ability. In the event of a major spill, the TA will assist the students in cleaning up and inform the Lab Director. TAs must be especially sure that the balances and other common areas are kept clean. Each TA is responsible for ensuring that the laboratory room is clean for the next class.

12. Waste

Proper disposal of waste chemicals is an important moral and legal obligation. TAs must pay close attention to the details of waste disposal procedures presented in the lab manual and at the weekly TA meetings. In the event that a waste bottle becomes full, contact the Lab Director to obtain a new one.

13. End of Lab Day

The TA is to remain in the laboratory room until the last student leaves. The TA must check for open water, gas, nitrogen, vacuum, and air outlets before leaving the lab. All balances and instruments must be turned off, and the instrument room must be secured. Hoods must be checked for any undisposed waste chemicals or broken glass. Glassware left behind must be collected and returned to the common equipment drawers. Finally, the lights and hoods must be turned off and the lab door locked. TAs must check in with the Lab Director before leaving to ensure the lab has been left in good condition.

C. Grading

1. Notebook

TAs must check every student's notebook to ensure the student is prepared to perform the experiment. Observations and data must be recorded in lab, not after the fact. Once the experiment is concluded, students must electronically submit their notebook pages through Canvas.

2. Lab Reports

Lab reports are due one week after the completion of an experiment and must be submitted online via Canvas before the scheduled deadline. TAs will not accept any emailed submissions. Late lab reports will result in a daily late penalty as posted to the class syllabus.

Before going to the lab, General Chemistry students must be well prepared for the experiment, including:

- a) Submitting pre-lab assignments before the scheduled lab period. Pre-lab submissions after scheduled lab will receive zero credit.
- b) Preparing and submitting lab preparation notes for the experiment before going to the lab. Students can take their prepared lab notes to the lab, but the lab manual will not be permitted. Students will only be allowed to perform experiments with prepared notebook submissions.
- c) After the experiment, students must submit lab notes and lab data within 30 minutes after the conclusion of the lab class. Without on-time data submission, it will be considered not valid and the corresponding lab report will not be graded for credit.

Organic Chemistry students will also arrive to lab having completed both the lab preparation notes and pre-lab questions, but these will be graded as part of the notebook pages.

3. Grading Scheme

TAs will be given a grading scheme for all reports, pre-labs, and notebook copy pages. TAs must keep copies of the grading scheme confidential and secure. The grading scheme must not be left out on a desk, in the lab, or on a public computer as these files have been stolen in the past. These are confidential documents and must be treated as such, and cannot be distributed to students or posted online.

4. Mistakes

Clearly mark on lab reports and notebook pages why points were deducted. This is how students will know what mistakes not to repeat and will appreciate constructive feedback. Refrain from writing unnecessary comments on student's work and make sure to maintain professionalism.

5. Turn-Around Time

Graded lab reports must be returned to students within one week. This helps students avoid making repeated mistakes, especially when mistakes can be repeated weekly in lab.

V. Discussion Sessions

A. Before Class

1. Be Prepared

Preparing for discussion is essential to ensuring a productive and successful session. A problem may look simple and straightforward but may be more complex than anticipated, so working through all assigned problems is essential. When solving a problem, focus not only on reaching the correct answer, but also anticipating common mistakes or misunderstandings the students may encounter. This will allow preparation to more readily address these challenges during the session. Reading the lab manual and reviewing the materials distributed during the weekly TA meeting ahead of time is required and prepares students for the upcoming experiment.

2. Be Punctual

Arriving early to class conveys to students that the TA prioritizes and values the time with students each week. Students will be more likely to reflect this sentiment and also arrive on time. The time allotted for discussion is short and students should have the benefit of instruction for the entire period.

3. Dress Appropriately

As the authority figure and leader of their discussion session, the TA should dress accordingly. TAs' attire should convey a sense of professionalism and respect for the classroom environment.

4. Be Aware of the Time

Some of the discussion rooms may not have clocks. TAs must know how much time remains in the class period in order to use time effectively. Students and TAs alike have busy schedules, so starting and ending class on time shows respect.

B. Attitude and Conduct

1. Be Enthusiastic

TAs should project a positive attitude toward both their students and the subject. Any negative feedback on the way the course is being taught should be shared with either the Lab Director or Instructor. TAs should not share these opinions with students, as it undermines their trust in the class.

2. High Standards for Students

The students will rise to the standards set for them. TAs should be positive, treat them like the talented people they are, and encourage them to reach their potential. These students are training to be future scientists and healthcare professionals, so precision, accuracy, and thoroughness are expected in their work.

3. Professionalism

Teaching Assistants are a central part of the teaching structure, and their professionalism reflects on the class as a whole. They should be sensitive and sympathetic toward the students, but not try to be one of their peers. Objectivity can be achieved by maintaining separation between the TA and undergraduate students. TAs can balance being firm, maintaining high standards, and still remain compassionate and professional towards students.

C. Managing a Discussion

1. Learn Students' Names as Soon as Possible

TAs should call each student by name. This will help create a safe environment where the students feel part of a learning community, and their efforts are valued. They should be personally involved in the learning process.

2. Speak Clearly and Loudly

In order to make sure their voice can be heard by all students, TAs should face their students instead of talking to the board. This ensures not only the best volume but also helps establish eye contact.

3. Use the Chalkboard

It is best practice to write legibly on the board and large enough so as to be readable from the back of the room. Since each classroom has a different arrangement, it is helpful to write on the board and then sit in the farthest seat to gauge legibility. Lecture points can be emphasized by writing them as spoken and left on the board long enough for students to copy it down. Care must be taken to not stand in front of the writing. If electronic documents are used in class, such as PowerPoint slides, share them with students.

4. Engage Students

The discussion session provides an opportunity for students to participate in active problem-solving. All students should be encouraged to participate and care should be taken to not let one or two students dominate every discussion. To encourage the more reserved students to participate, the TA might pose a question and ask students to discuss the answer with a partner before sharing it with the class.

When the TA solicits questions, it should be done in a way that makes the students feel they truly welcome the opportunity to answer their questions. By referring to specific material where problems are occurring, the TA can get more engagement than just asking “Does anyone have questions?” Asking a question that requires more than a yes or no response encourages students to think more deeply about the material. For example, they might be asked “What is the most challenging part of an acid/base problem?”

5. Open and Honest

When a question arises for which TAs do not know the answer, they should feel comfortable admitting, “I don’t know.” Brainstorming with students to arrive logically at a correct answer or finding the answer before the next meeting are other good alternatives. When a TA tries to give an answer that they are not sure of, it will undermine the TA’s credibility; even worse, the students will get incorrect information.

6. Discussion Structure

In discussion, TAs should be very clear about what they are presenting. Writing key points of the problems out and carefully labeling parts of the discussion will keep the students engaged. As the class proceeds, transitions should be made clear and points summarized. Verbal teaching requires organization, simplicity, and repetition. Students need to understand which concepts are crucial. They want to know what will help them succeed. It is the TA's responsibility to help them with this.

VI. The Learning Process

A. First Impressions

First impressions are important. Most people are nervous and uncertain on the first day of their class, but TAs should try to project a positive and confident attitude toward students. It is imperative to be exceptionally well prepared on the first day of class, so reading all class material and reviewing the notes from the TA meeting can be helpful.

Teaching is a rewarding and fulfilling experience. The right attitude and preparation enhance every TAs' ability to guide students to their potential and beyond.

B. Reflection on the Learning Process

Many TAs in science may never have taken a course in the psychology of education but do have a great deal of experience in the field having been a student for over fifteen years. Evaluating the learning process starts by thinking about past experiences as a chemistry student. The varied examples as a student provide a good foundation for the role of a TA. Before starting a new lesson plan, the TA should spend some time thinking about the learning process and reflecting on why some teachers were more effective than others. The Chicago Center for Teaching (CCT) has programs and events that can help both new and experienced TAs learn about strategies for teaching and learning.

C. Learning Outside the Classroom

A good teacher in the classroom is not just feeding information to their students, but rather acting as a guide to lead them toward the correct path. This starts by modeling and encouraging good problem-solving skills since most learning takes place outside the classroom. The class should be structured in a way that encourages students to continue problem-solving independently. Some students may want teachers to learn for them, but that is not a teacher's mission.

D. Be Adaptable

Students' attitudes and motivations are constantly changing and TAs can use it to their advantage. For example, as an exam approaches, students' attention becomes much easier to focus. Student's interest in chemistry will rise when they are shown how concepts are related and applied to their interests.

Chemistry is important because it provides excellent general training for the mind. In order to solve a problem in chemistry, a student must be able to think critically and creatively and must be careful and logical. Problem-solving is a skill that is highly useful to anyone: scientist, doctor, attorney, laborer, etc. Many curricula require chemistry because chemical knowledge is important and because chemistry, as a discipline, provides an excellent vehicle for learning to think critically. Students should be taught in a way that encourages them to be critical and creative.

E. Help Students be Flexible

Students should learn to be flexible with their problem-solving. Chemistry can be challenging for students because it is complicated. Chemical systems are typically influenced by a large number of factors and because of this, a fail-safe method usually cannot be given even for a particular type of problem. Students must learn not to be locked into a particular method, but to let the problem guide them toward its solution. To help them learn to do this, flexibility should be emphasized in solving problems. Students cannot solve chemistry problems by memorization. Rather, they must understand the underlying concepts.

Most students will never have to solve a stoichiometry or resonance problem in the real world, but an understanding of chemical principles may well be important for many of them. Using problems that test students' understanding, not just memorization, are optimal. They must understand that getting the right answers is not their only goal. Students should be asked to justify their answers, even when correct.

F. Support Course Materials

Teaching Assistants should utilize and reference course materials when engaging with students. Coaching students to effectively interpret and learn from these resources will help build their confidence when independently studying. TAs are encouraged to be constructively critical. However, concerns regarding course materials should not be discussed with the students, but rather directly with the Lab Director and/or the Instructor.

G. Collaborative Learning in Chemistry

The Chemistry Collaborative Learning courses, Collaborative Learning in General Chemistry (CLiC) and Collaborative Learning in Organic Chemistry (CLOC), are optional, limited enrollment workshops for students concurrently enrolled in the Comprehensive General Chemistry or Organic Chemistry courses. In these weekly workshops, undergraduate Team Leaders guide small groups of students in weekly workshops. The workshops focus on the analysis of problem sets designed to augment and complement the Chemistry course material. Instead of tutoring or lecturing, Team Leaders coach students as they work collaboratively in small groups on the assigned problems by referencing and reinforcing class lectures and assigned reading materials. Additionally, these workshops aim to develop communication skills, cooperative attitudes, and promote a teamwork environment.

The CLiC/CLOC personnel include the Collaborative Learning Director, upper-level graduate Teaching Assistants, and undergraduate Team Leaders. It serves a supporting role to the overarching chemistry courses, and approximately 20-30% of students elect to enroll in these workshops.

VII. Conclusion

This manual has covered the teaching policies of the Department of Chemistry and guidelines for effective teaching in both the laboratory and the classroom. It has detailed Teaching Assistant responsibilities as well as general concerns and requirements of a TA. It will serve as a reference for all graduate students during their tenure as a Teaching Assistant.

As shown in the personnel chart, TAs have important interactions relating to all aspects of teaching and learning, ranging from students and faculty to the teaching staff and other support staff. They hold a prominent position in the eyes of the students, the faculty, and the Department since they play an important and central role as part of the teaching effort in the Department of Chemistry.

With the importance of the TA position, as stated above, communication is the key to fulfilling this role and, more importantly, being successful as a TA. Therefore, any questions or concerns should be directed to the Director of Graduate Studies and the Lab Director, since they are here to support graduate students and want them to be as successful as possible.

The teaching faculty and staff strive to engender a sense of Chemistry community and support for each other and, thus, it is their hope that graduate students will find teaching to be exciting, enjoyable, and rewarding during their time in the Department of

Chemistry. Furthermore, the skills learned while in this program will be beneficial in future endeavors.

Appendix

Chem XXX TA Evaluation - X Quarter 20XX

Please take a few moments to fill out the following evaluation form. Your TA will be shown the cumulative results of the survey only.

The TA in my section:	Disagree					Agree				
1. is always well prepared for lab.	1	2	3	4	5					
2. gives directions clearly.	1	2	3	4	5					
3. is always in control of the lab section.	1	2	3	4	5					
4. is available to answer questions during lab.	1	2	3	4	5					
5. is generally helpful and offers useful advice.	1	2	3	4	5					
6. is always prepared for discussion section.	1	2	3	4	5					
7. answers questions thoroughly in discussion and/or makes an effort to find the correct answer when unsure.	1	2	3	4	5					
8. enforces safety regulations and policies	1	2	3	4	5					

Do you feel this TA has a severe problem communicating due to a language or accent problem?

Yes No

If your TA were to be available next quarter, would you want this person as your TA?

Yes No

TA: _____

Section number: _____

What are your TA's strengths?

How could your TA improve his/her teaching abilities (please be specific and constructive)?

Chem XXX TA Evaluation - X Quarter 20XX

TA:

Section number:

	Unsatisfactory			Satisfactory	
Dependability:					
Completes grading on time	1	2	3	4	5
Is punctual and begins teaching as scheduled	1	2	3	4	5
Attendance at TA meetings	1	2	3	4	5
Makes appropriate arrangements for absences	1	2	3	4	5
Ensures safety in the laboratory	1	2	3	4	5
Ensures laboratory clean up	1	2	3	4	5
Remembers to secure labs and instrument rooms	1	2	3	4	5
Knowledge:					
Recognizes priorities and how teaching relates to other responsibilities in and outside the department	1	2	3	4	5
Quality:					
Shows initiative	1	2	3	4	5
Implements improvements	1	2	3	4	5
Communicates well with others on common goals	1	2	3	4	5
Accepts guidance willingly	1	2	3	4	5
Attitude:					
Toward students	1	2	3	4	5
Toward supervisors	1	2	3	4	5
Student Evaluation:	1	2	3	4	5
Overall Rating:	1	2	3	4	5
Comments:					

1: Poor performance on all levels (unsatisfactory)

2: Poor performance on some levels, such as student evaluations or irresponsible behavior (unsatisfactory)

3: Adequate performance, did just enough to fulfill responsibilities (conditional satisfactory)

4: Good performance, did some things exceptionally but adequate with others (satisfactory)

5: Exceptional performance, exceeded expectations (satisfactory)

General/Organic Chemistry TA Discussion Observation

TA Name _____

The following are areas that you have either mastered or need to improve on in your discussion. These topics come directly from the TA guide, and more information can be found there.

1. How well prepared was the TA? Were topics presented thoroughly?
2. How was the TA's time management? Did topics proceed too quickly or too slowly?
3. Was the TA enthusiastic about the material? Did he/she criticize the course materials?
4. Were the students treated in a respectful manner? Was the TA professional in attitude and appearance?
5. Did the TA speak clearly and loudly? How well did the TA communicate with students? Did the audience have difficulty understanding the TA's diction or accent?
6. How well did the TA use the chalkboard?
7. Did the TA lecture to the students or was the presentation a class discussion with student participation?
8. How well did the TA answer questions? Was the TA open and honest if he/she didn't know the answer? Were directions given clearly?
9. What were other strengths of the class?
10. How can the TA improve his/her discussion?

NOTES