

THE UNIVERSITY OF
CHICAGO

DEPARTMENT OF

CHEMISTRY



Guide for Teaching Assistants

Department of Chemistry
The University of Chicago



4th 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 through the development of their teaching, speaking, writing, problem-solving, and other career enhancement skills. We strive to establish a supportive, 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 independent application of concepts by problem solving both in the laboratory and in written work.

This guide is intended to familiarize first year graduate students in the Chemistry Department with their teaching responsibilities and to provide specific guidelines on the performance of these duties. This information is also of value to experienced Teaching Assistants, as it provides a summary of the most important aspects of the teaching laboratory.

C. Responsibilities

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

As a Teaching Assistant for the Department of Chemistry at The University of Chicago, you have the following responsibilities:

1. Attend Weekly Monday TA Meetings

These meetings are mandatory. The Laboratory Director will discuss important information regarding your 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:

- arriving at the lab 15 minutes before the scheduled class to ensure that everything is ready for the students when they arrive;
- demonstrating new equipment and techniques to your students;

- interacting with students as they complete their experiments and troubleshooting when necessary;
- proctoring the lab until the last student is finished;
- making sure that the lab is left clean and orderly with common equipment returned to where it belongs and instrumentation turned off;
- locking the laboratory before you leave.

3. **Lead One Discussion Section Each Week**

Responsibilities for leading the discussion include:

- arriving at the classroom 10 minutes before your scheduled class to ensure that everything is ready for the students when they arrive;
- being prepared with a lesson plan that incorporates information from weekly TA meetings;
- giving the students important information about the upcoming lab;
- being prepared to review pertinent topics from lecture and providing sample problems on lecture topics for in-class problem solving;
- handing back graded assignments.

4. **Grade Assignments for Your Lab Section**

This includes notebook copy pages, lab reports, homework, and any other assignments given by the teaching faculty. The turn-around for grades will be one-week from the date the assignment was collected. You will be responsible for recording and reporting all grades to the Laboratory Director on a weekly basis.

5. **Proctor and Grade the Midterms and Final Exam**

Your Lab Director will provide you with the proctoring and grading schedule.

6. **Hold Office Hours for 2 Hours a Week**

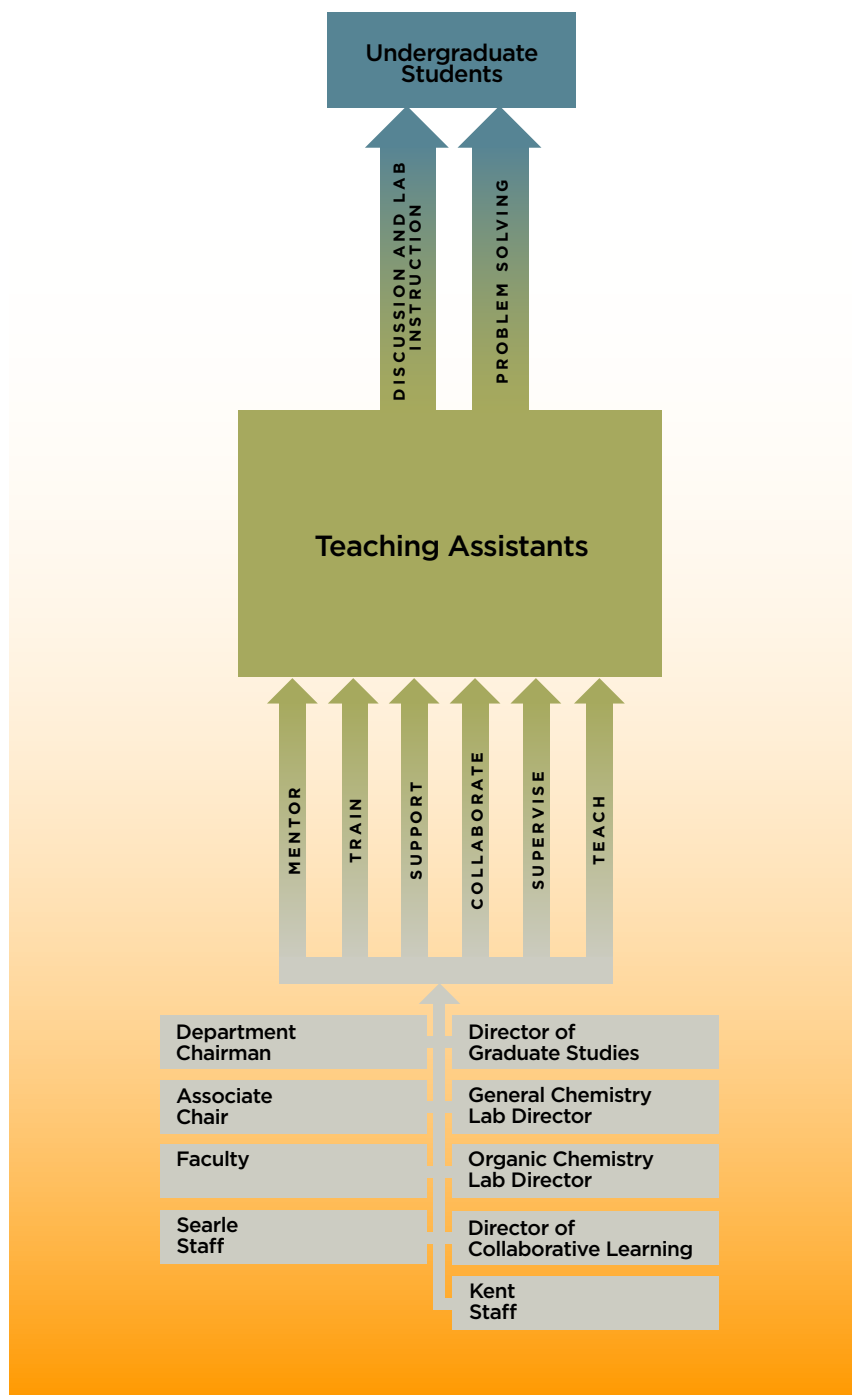
General Chemistry TAs hold one hour of open and hour of closed office hours per week. Organic TAs hold two hours of open office hours per week. Closed office hours are only for students in your section while open office hours are for any student in the class.

7. **Attend Class Lectures**

8. **Be On Call**

One week each quarter you will be required to be on call. While on call, you may be asked to fill in for a sick TA or help the Lab Director.

D. Support Chart



II. General Information

A. Schedule

Teaching assignments will be made by the Lab Directors before classes start each quarter and will not interfere with your own classes. It is your responsibility to communicate any schedule conflicts to your Laboratory Director. Personal preferences or seminar attendance cannot be accommodated. Teaching duties and graduate classes are your top priorities in the first year.

B. Supplies

You will receive keys, textbooks, goggles, gloves, and a lab coat for your teaching assignment. These must be returned to the Laboratory Director when your teaching duties are over.

You will be provided a code that allows you to make photocopies on the departmental copiers. Photocopies should be made for instructional materials only. There is a copier available between Kent and Jones on the third floor.

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. At the end of the quarter, all scores are normalized, which affects the equity of a student's grade if the scheme is not followed.

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

Each TA will be given a grade sheet for recording grades. Always keep the grades and graded work in your possession and secure. Do not leave any graded assignments or rubrics where your students can gain access, such as your TA office. Under federal law (FERPA), you cannot disclose a student's grade to a person other than the student or the instructor(s). Return assignments so that scores are not visible to others.

Every week you will return graded lab reports and homework to students and submit those grades to the Laboratory Director. You must keep your grades up to date. 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 and an evaluation grade (worth the equivalent of one lab report) based on the performance of the student. This is an opportunity for a student to earn credit who has a good attitude and works hard, but runs into unfortunate circumstances in the lab. The evaluation points are up to the TA's discretion. Further details are provided in Section IV, Part C. You are highly encouraged to set your criteria for discretionary points at the start of the quarter and convey these criteria to students. A copy of the Student Evaluation Form, that you will fill out for every student, can be found in the Appendix.

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

D. Guidelines for Proctoring

1. Passing Out the Exams

Before you pass out the exams, make sure students put away all books, notes and personal belongings not related to the exam to include cell phones and other electronics. Count the number of students in a row and pass out only that number of exams. Do not just give them a stack of exams; this is how exams go missing. Once all the exams have been passed out, instruct all students to start at the same time. At this point, count the number of students and the number of extra exams and this should be the number of exams you started with. If there is an exam missing, check through the exam room and outside area to see if it can be found. If needed, make an announcement.

2. During the Exam

Your responsibility is to watch the students. Walk around, and be sure to pay attention to students sitting in the back. Do not bring your computer or reading materials to the exam room. If you suspect a student of cheating, you have every right to let that student know. Do not accuse a student of cheating, but asking the student to keep their eyes on their exam will give the message. If there is any physical evidence of cheating (cheat sheets, writing on their hands, cell phone pictures, etc.), confiscate it. Also, obtain the name of the student and alert the Laboratory Director and the Professor.

3. Collecting the Exams

When the exam time has ended, let the students know and be proactive about collecting the exams. Some students will only stop taking the test when you take the exam from them. Promptly collect exams to prevent students from discussing

questions and changing answers on the way to turning in the exam. Before you leave the room, count the exams again to make sure no one has taken an exam home.

E. Teaching

Each week you will have seven contact hours with your students as outlined in the responsibilities section of this guide. This consists of four hours of lab, one hour of discussion, and two office hours.

The details for teaching in the lab are in Section IV. Due to safety considerations, this is one of the most important parts of your job. Lab is a hands-on exercise, and it is imperative that students receive excellent instruction. The laboratory experience expands upon information that is introduced in lecture, and puts lecture concepts into practice.

Every week you will hold a discussion session, as detailed in Section V. This is when you relay important information about the upcoming lab, review lecture topics and teach problem solving concepts.

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

While you are a Teaching Assistant, performing other teaching roles within the University, such as tutoring, present a conflict of interest and thus are not allowed. These opportunities are available upon the completion of your role as a Teaching Assistant.

F. Evaluation of Teaching

Teaching Assistants are evaluated quarterly by both their students and the Laboratory Director. Standard questionnaires are used, and a copy of both evaluations 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 your 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 you to observe and be observed by your peers and receive constructive feedback on your teaching strategies. The first is during TA training when you will give a practice discussion session in front of the other first year graduate students. The discussion observation form that is 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 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. Attitude and Ethics

A. Attitude

Your attitude towards teaching impacts your students' attitude towards the class. In the classroom, your carefully thought-out and clearly expressed comments will model and encourage similar behavior by your students. You are in graduate school because you are passionate about the field of chemistry, and channeling this excitement to your teaching can be a powerful tool. You are in a professional role as a Teaching Assistant and your attitude should reflect this.

An extremely valuable attribute of a good teacher is enthusiasm, which is second only to having a thorough grasp of the subject matter. If your students sense that you know what you are talking about, that you find chemistry an exciting discipline, that you take pleasure in the learning that they achieve, and that you grade fairly, they will respect you as a good teacher and chemist; even though chemistry may not be their main interest.

While computers are an important tool in regard to teaching, they are also a large distraction and can show the students that their responsibilities (i.e. lecture, lab, exams) are not important. Bringing your computer or phone to lecture for non-class purposes, such as email, shows the students that it is not worth your time to pay attention and sets a poor example. Looking at your personal computer in lab is a safety issue because you are not concentrating on what is happening in the lab and it indicates that the students are not your top priority. Personal computers detract from your focus. Your attention should be focused on your students at all times.

B. Ethics

If you are respectful in your relations with your students, they are more likely to respect you. If you are cold and sharp or condescending in the discussion of their work or difficulties, they may feel uncomfortable and have as little contact with you as they can. Although you will want to be friendly with your students, you must remember that you are not one of their peers. You can learn to be on friendly terms with your students academically without becoming involved in their personal lives and problems. This extends to social media as well. Wait until after your role as a Teaching Assistant concludes to connect with students via social media. It is the long-standing policy of the University to forbid dating students in your classes. This policy will be rigidly adhered to by the Department of Chemistry.

Punctual attendance at all discussions, lab sessions, and TA meetings is required. Your students will look up to you to set and maintain academic and social standards. If you are absent, you may fail to receive instructions which will be important for to be an effective TA. Chronic tardiness or absenteeism will lower the regard accorded you by your students, your colleagues, and your supervisors. Absence from any scheduled session is inexcusable unless you have made prior arrangements for someone to take your place. Always let the Laboratory Director know of any conflict as soon as possible. You must be on time for teaching assignments, which means 10 minutes before the start of discussion and 15 minutes before the start of lab.

Following the rules is important for student equity. Do not approve student requests for extensions on graded work. While you may feel that you are giving your students a break, this also opens the door to allowing an extension to all other students in the class. Your relaxation of the rules makes it difficult for the other TAs to ensure that all students are treated the same. This also sets a precedent for the students to ask for extensions and exceptions.

Be sure that you clearly and fully understand the current course material and how you will teach it in the laboratory and discussions so that your discussions will align well with the faculty lectures. There is nothing more demoralizing to a student than to be told to follow one procedure or method by the faculty member and then receive quite different instructions from the Teaching Assistant.

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

If you find a situation that you think needs correcting, tell the Professor or Lab Director about it so that it can be addressed promptly. As shown in the personnel chart in Section I, Part B., we are all integral to the success of the Kent undergraduate teaching and laboratory operation, and everyone must be treated with respect. Treat the Lab Manager and Technicians with respect, they are part of the team too. Do not complain to the students about the course material, bring the issue to the faculty member teaching the course or the Laboratory Director for resolution.

IV. Laboratory

A. Laboratory Check-In Procedure

At the TA meeting for the first week of lab, you will receive a detailed procedure describing what needs to be done for students checking into the lab. Arrive to lab 15 minutes before the start of class to prepare. Steps include:

1. **Take Attendance**

Students should check-in with you first. Remember to TAKE ATTENDANCE! You will be given a roster of student names and ID numbers. Ask each student for their name. Watch for stragglers. If a student is not on your roster, they should not be in your lab room. Send the student to the Lab Director. Never give permission for a student to join your section. All section changes must go through the Lab Director.

If you haven't done so already, introduce yourself and then start the safety training.

2. **Safety Training**

Each student should have a safety training booklet to follow as you go through the safety briefing. Students may not take the booklet home with them. The booklets will be kept in lab rooms for future reference.

The Lab Director may send students in to your lab to take the safety training that may not be in your section or on your roster. Do not assume these students are added to your section. If the student is not on your roster, they should not be in your lab room in future weeks.

At the end of the safety training, students must complete the Safety Compliance Form. Leave the Safety Booklets and the Safety Compliance Forms in the lab.

3. **Assign Lab Drawers and Keys**

Since you have arrived to lab 15 minutes early, the first thing you should do is to count the keys. After you have taken attendance, pass out the keys one by one to students as they tell you their names. Never let the students grab their own keys. This results in stolen keys and unauthorized students checking into drawers. Hand out keys so that the center bench drawers are used last. Leave your roster with the key numbers recorded in the lab.

4. **Equipment Check**

The equipment list is included in each student lab notebook. 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 from the Lab Tech in Kent 310. Any other extra equipment must be turned in and put in the LOST/ FOUND 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, you must inform the Lab Director.

B. Laboratory Supervision

1. Be Prepared

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

2. Arrive Early

TAs must report at least 15 minutes prior to the beginning of the lab 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. Goggles

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

4. Walk Around Lab

Once class routines are established, you are likely to spend the majority of your time answering questions. Do not remain at the instructor's desk. It is important to observe the students in their actual performance of laboratory work. Effective teaching in the laboratory requires engaging with the students and observing their work. 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.

5. Be an Active Teacher

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

6. 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. The TA will collect the carbonless copies of their students' notebook pages at the end of each lab.

7. **Supervision**

The Teaching Assistant is responsible for all of the students in the room. Do not allow a student from another section to work in your laboratory, unless a permission slip is obtained from the Laboratory Director. The TA, as well as the students, should be in the laboratory throughout the period. **AT NO TIME SHOULD THE 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.

8. **Be Focused**

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

9. **Student Belongings**

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

10. **Clean the Lab**

Keeping the laboratory clean is an important part of TA duties. During the quarter most of the cleaning tasks must be done by the students. You need to make your students aware of this fact. One effective way of encouraging cleanliness is to make sure each student has cleaned and wiped down their hood and benchtop area before you accept their notebook copy pages.

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 clean up and inform the Lab Director. You need to be especially certain 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.

11. **Waste**

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

12. 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. Check the hoods for any undisposed waste chemicals or broken glass. Collect all glassware left behind and return common equipment. Finally, turn off the lights and hoods and lock the lab door.

C. Grading

1. Assignments

- a. Notebook – The TA must check every student's notebook to ensure the student is prepared to perform the experiment. At the end of each lab period, the student will turn in the carbonless copies of their notebook pages for the day's lab experiment.
- b. Lab Report – The lab report must show results and a discussion of the experiment. General Chemistry lab reports must be printed and Organic Chemistry lab reports must be submitted electronically.
- c. Discretion Points – The TA will award every student an evaluation grade based on performance related to following safety rules, pre-laboratory assignments, technical skills, notebook preparation, housekeeping duties, general laboratory demeanor, participation during discussion sessions, etc. For example, if a student needs daily reminders to wear goggles in the lab, this can be figured into the lab grade by reducing the discretion points.

2. Lab Reports

In General Chemistry Lab reports are due one week after the completion of an experiment. The reports are to be handed in as the student walks into the lab at 1:30 p.m. Any labs accepted after 1:30 are considered late. There will be a daily late penalty. Late lab reports must be submitted directly to the Lab Director.

In Organic Chemistry lab assignments are due on the date and time specified in the lab schedule. There is a daily late penalty, and late assignments cannot be accepted by TAs.

3. Grading Scheme

TAs will be given a grading scheme for all reports, prelabs, and notebook copy pages. You must keep your copy of the grading scheme secure. The grading scheme itself must not be left out on your desk or in your lab, since grading schemes have been stolen in the past. These are confidential documents and must be treated as such. Do not distribute the grading scheme to students or post online.

4. Mistakes

Clearly mark on lab reports/notebook pages why points were deducted. This is

how students will know what mistakes not to repeat. Students 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 your students within one week. This helps students avoid making repeated mistakes

V. Discussion Sessions

A. Before Meeting Your Class

1. Be Prepared

Preparing for your discussion session is essential to ensuring a productive and successful session. Work the assigned problems. A problem may look simple and straightforward, but may be more complex than you anticipated. When solving a problem, focus not only on reaching the correct answer, but anticipating common mistakes or misunderstandings your students may encounter. This will allow you to prepare to more readily address these challenges during the session. Read the lab manual and review the materials distributed during the weekly TA meeting so that you can prepare your students for the upcoming experiment.

2. Be Punctual

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

3. Think About Your Appearance

You are the authority figure and leader of your discussion session, and should dress accordingly. Your 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. If you are going to use time effectively, you must know how much time remains in the class period. Students have busy schedules, so respect them by starting/ending class on time.

B. Attitude and Conduct

1. Be Enthusiastic

Project a positive attitude toward your students and the subject. If you have feedback on the way the course is being taught, see the Lab Director – do not

share these opinions with students.

2. Set High Standards for Your Students

The students will rise to the standards you set for them. 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

You are a central part of the teaching structure, and your professionalism reflects on the class as a whole. Be sensitive and sympathetic toward the students, but do not try to be one of their peers. You are an authority figure and need to keep some separation between yourself and the students in order to keep your objectivity. On the other hand, don't flaunt your authority. You can be firm and maintain high standards and still remain compassionate and professional towards your students.

C. Managing a Discussion

1. Learn Your Students' Names as Soon as Possible

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

2. Speak Clearly and Loudly

Make sure your voice can be heard by all students. Face your students instead of talking to the board. This ensures not only the best volume, but also helps establish eye contact.

3. Use the Chalkboard

Write legibly on the board and large enough so as to be readable from the back of the room. You can help emphasize points by writing them as you speak. Do not erase something before your students have copied it down. Be careful not to stand in front of your writing.

4. Engage Your Students

Discussion section provides an opportunity for students to participate in problem solving. Encourage all students to participate by calling on them by name. Do not let one or two students dominate every discussion. To encourage the more reserved students to participate, you might pose a question and ask students to discuss the answer with a partner before sharing with the class.

When you solicit questions, do so in a way that makes the students feel that you truly welcome the opportunity to answer their questions. By referring to specific material where you know problems are occurring, you can get more engagement than just asking "Does anyone have questions?" Asking a question that requires

more than a yes/no response encourages students to think more deeply about the material. For example, you might ask “what is the most challenging part of an acid/base problem?” After you have answered a question, ask the student if something is still unclear. Be interactive with your students.

5. Be Open and Honest

When a question arises for which you do not know the answer, feel comfortable admitting “I don’t know”. You can try to brainstorm with students to logically arrive at a correct answer and/or find the answer before the next meeting. Do not try to bluff. You will undermine your credibility, and worse yet, the students will get incorrect information.

6. Structure Your Discussion

In your discussion, be very clear about what you are presenting. Writing key points of the problems on the board and carefully labeling parts of the discussion will keep the students engaged. As you proceed with a class, make transitions clear. Summarize points in advance. Verbal teaching requires organization, simplicity, and repetition. Be simple and direct. Make sure students understand which concepts are crucial. Your students are pragmatic about the course. They want to know what will help them succeed. It is your responsibility to help them with this.

VI. The Learning Process

A. First Impressions

On the first day of class you may be nervous and uncertain, but try to project a positive and confident attitude to your students. It is very important to be especially well prepared on your first day of class, so make sure you read all class material and review the notes from TA meeting. First impressions are important.

Teaching is a rewarding and fulfilling experience. With the right attitude and preparation, you will soon realize that you have an ability to guide your students to their potential and beyond.

B. Think About the Learning Process

Although you may never have taken a course in the psychology of education, you have a great deal of experience in the field. You have been a student for over fifteen years, so think about your experience as a chemistry student. Reflect on why some teachers were more effective than others. Your long experience as a student provides a good foundation for your role as a TA. Spend some time thinking about the learning process. The Chicago Center for Teaching (CCT) has programs and events that can help you learn about strategies for teaching and learning.

C. Learning Outside the Classroom

As a teacher, you are not in the classroom to feed information to the students. You are there to guide the students and lead them toward the correct path. Make sure the students are aware of this as well. Remind yourself that most learning takes place outside the classroom and structure your class in a way that encourages students to continue problem solving on their own. You may have students who want you to learn for them, but that is not your mission.

D. Be Adaptable

Students' attitudes and motivations are constantly changing. Be aware of this and try to use it to your advantage. For example, as an exam approaches, it becomes much easier to focus the students' attention. Also, knowing that the majority of your students are interested in other fields, their 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 which 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. You should be aware of this as you teach and should point it out to your students often. Teach in a way that encourages students to be critical and creative.

E. Help Students be Flexible

Help your students learn to be flexible. Chemistry can be difficult for students because it is complicated. Chemical systems are typically influenced by a large number of factors. 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, you should stress flexibility in solving problems. Students cannot solve chemistry problems by memorization. Rather, they must understand the underlying concepts. Therefore, try to use a variety of methods in your teaching.

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. So, you must be careful to use problems that test the students' understanding. They must understand that getting right answers is not their only goal. Try to give some "problems-with-a-twist" in your presentations to prevent students from simply memorizing methods of solving problems.

F. Support Course Materials

Utilize and reference course materials when engaging students. Coaching students to effectively interpret and learn from these resources will help build their confidence when independently studying. You are encouraged to be constructively critical. However, do not discuss your concerns regarding course materials with the students but rather discuss them directly with the Lab Director and/or the faculty.

G. Collaborative Learning in Chemistry

The Chemistry Collaborative Learning courses, Collaborative Learning in General Chemistry (CLiC) and Collaborative Learning in Organic Chemistry (CLOC) are an 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 for the Department of Chemistry and given guidelines for effective teaching in both the laboratory and the classroom. It has detailed your responsibilities as well as general concerns and requirements of a Teaching Assistant. It will serve as a reference for you during your 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. You hold a prominent position in the eyes of the students, the faculty, and the Department, since you play an important and central role as part of the teaching effort in the Department of Chemistry.

With the importance of your role as stated above, communication is the key to not only fulfilling this role, but also more importantly to being successful as a TA. Therefore, you should direct any questions or concerns to the Director of Graduate Studies and your Lab Director, since we are here to support you and want you to be as successful as possible.

We strive to engender a sense of Chemistry community and support for each other and, thus, it is our hope that you will find teaching to be exciting, enjoyable, and rewarding during your time in the Department of Chemistry. Furthermore, the skills you learn while in this program will benefit you in your future endeavors.

Appendix

Chem XXX TA Evaluation - X Quarter 20XX

Please take a few moments to fill out the following evaluation form. You do not have to sign your name. Your TA will be shown the cumulative results of the survey only. Return your completed survey to the envelope provided in lab. Please be sure to include your TA's name and your section number.

Please circle the number that corresponds most closely to your opinion on each of the following statements.

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