

CHEM A106L

Spring 2016

Course Syllabus

Chemistry 106 Lab Schedule – Spring 2016

Week of:	Topic	Reading
1/11	Safety and Lab Orientations, Syllabus Overview and Locker Check-in (<i>goggles and lab coat required</i>)	pp. 1 - 31
	Mathematics in Chemistry and MicroLab™: Homework Assignment	Lab 1
1/18	Week of Alaska Civil Rights Day – No Labs	
1/25	Mathematics in Chemistry and MicroLab™ In-class Assignment	Lab 1
2/1	Chemical Kinetics: Measuring Reaction Rates	Lab 2
2/8	Chemical Equilibrium and the Equilibrium Constant	Lab 3
2/15	Analysis of Vinegar by Titration	Lab 4
2/22	Determination of Buffer Capacity	Lab 5
2/29	Determination of a K_{sp} Using Spectrophotometry	Lab 6
3/7	Spectrophotometric Determination of the pK_a of BTB	Lab 7
3/14	Spring Break – No Labs	
3/21	Simultaneous Spectrophotometric Quantitation	Lab 8
3/28	Determination of Oxalate by Titration	Lab 9
4/4	Formal Lab Report	Lab 9
4/11	Dependence of Cell Potential on Concentration	Lab 10
4/18	Job's Method of Continuous Variation	Lab 11

General Course Information

Prerequisites

The prerequisites for this course are CHEM A106 with a minimum grade of C or concurrent enrollment and CHEM A105L with a minimum grade of C. Any student who does not meet these prerequisites shall be administratively dropped from this course.

Course Description

CHEM A106L is the second semester of this introductory chemistry laboratory course sequence. Experiments are designed to reinforce concepts such as the basics of laboratory equipment, data collection, data analysis, and reporting. This course illustrates, augments and applies concepts covered in CHEM A106.

Course Activities

Students will explore concepts and solve problems relevant to experimental and theoretical chemistry. Pre-lab assignments prepare students for the safety, mathematical, and theoretical chemistry rigors they may encounter during a particular experiment. Exercises and experiments provide students with chemical models and/or chemical data followed by questions to guide them through the learning cycle, building conceptual understanding in a process emulating the scientific method. Quizzes verify retention and reiterate the importance of concepts. The instructor will assist the learning process through a variety of methods that may include lecture, group discussions, demonstration and/or discussions with individuals, groups or the entire class.

Instructional Goals

This course is designed to fulfill the needs of general education requirements and to provide a foundation in general chemistry and the general chemistry laboratory. It is intended to be an introduction to the chemistry laboratory. Safety in the laboratory environment, the proper use of glassware and equipment, and an integration of chemistry concepts, mathematics, technology, problem solving and kinesthesis are emphasized.

The instructor will:

1. Provide students with a safe, supervised environment.
2. Supply students with standard operating procedures for each experiment and examples of experimental setups to instruct proper lab technique.
3. Present models of the periodic table, atomic and molecular structure, chemical bonding and reactions for development of observational skills and conceptual foundations in chemistry.
4. Present questions to initiate discussion, help students integrate chemistry concepts, and explain models and solutions.

Student Learning Outcomes

The student will:

1. Safely and correctly repeat previously covered skills in the chemistry laboratory.
2. Conduct laboratory work systematically by following procedures as outlined by the curriculum.
3. Recognize and interpret chemical models of the periodic table, atomic and molecular structure, bonding and chemical reactions.
4. Demonstrate science methodology with emphasis on exploring and verifying measurements and chemical equations.
5. Demonstrate effective communication skills for discussing, applying and verifying chemistry concepts.

Required Materials

- Kennish, J.M.; Schlabaugh, A.: General Chemistry II – Laboratory Manual, University of Alaska Anchorage, Chemistry Department, Spring 2016.
- Indirectly-vented, splash-proof goggles (ANSI standard Z87.1–2003 or Z87+)
- Lab coat, 40" (knee-length, style 1346 if purchased through UAA)
- 1½" three-ring binder with a plastic cover (fabric covers are not permitted in lab)
- Scientific or graphing calculator (your cell phone calculator may NOT be used)

Recommended Materials

- Tro, N.J.: Chemistry: A Molecular Approach, 3rd Edition, Pearson Prentice Hall, 2014.
- Any College Algebra textbook or equivalent mathematics resource.

Computer Labs

Several computer labs across campus are available for student use. Two of these have computers with the software that you will be using to complete some of your assignments from lab. Their locations and hours of operation are:

SciCom Lab

NSB 204

Monday – Friday: 7 am – 10 pm

Saturday: 8 am – 10 pm

Sunday: Closed

Chemistry Resource Center

CPSB 302 K

Monday – Friday: 8 am – 5 pm

Saturday: Closed

Sunday: Closed

Chemistry labs do not have “open” hours. You will have access to your chemistry lab during your scheduled class time only. Computer work assigned for completion outside the chemistry lab may be completed using the two computer labs mentioned here if MicroLab™ is required. Blackboard and word processing work may be completed at any other computer lab, or using your own computer. Free Wi-Fi access is available across campus for use with your personal laptop, tablet, or smart phone.

UA E-mail Account

Each student registered for classes at UAA has a UA e-mail account. The university and most of your instructors will use your UA e-mail address to communicate with you. It is your responsibility to ensure your account has space available to receive these e-mails. It is also your responsibility to check your UA e-mail frequently to ensure you are receiving these e-mails in a timely fashion. If you don't know your login and password, you can go to <https://me.uaa.alaska.edu> and follow the directions on the screen. This site will allow you to manage your university identity.

Computer Etiquette

When e-mailing an instructor, consider the following:

- a) Students should identify themselves clearly in each e-mail. The following information is required *in every e-mail*:
 - Your full first and last names. Please don't identify yourself with a nickname.
 - The course(s) and section(s) in which you are enrolled.
 - A summary of the reason for your e-mail.
 - It is appropriate to list this information in the e-mail subject box. Our faculty members receive many e-mails every day. If you don't clearly identify yourself and your course, your e-mail may end up in the Junk Mail folder.
 - Appropriate example: "Subject: John Doe Jr. / Chem 103L – 602 / Question about lab"
 - Inappropriate example: "Subject: John from your class"
 - As an alternative to the subject box, you may list this information at the end of your e-mail, but then your actual subject information must address the reason for your e-mail very explicitly.
- b) Students should keep the tone of their e-mail respectful. There are times during the semester when students may get very frustrated or even upset. An angry tone will not net a desirable response.
 - Appropriate example: "Dear Mr. Doe, I had a quick question about our homework... Sincerely, Nathan"
 - Inappropriate example: "Bro, You must help me."

- c) E-mails that do not meet the guidelines in a) and b) above, may simply be deleted by the instructor.
- d) Send e-mails in a timely manner. Most faculty members will need 24 to 48 hours to respond to an e-mail. Urgent issues should be addressed in person or by phone.

When you work with computers in the chemistry lab, please pay attention to the following:

- Do NOT surf the web while in lab.
- Do NOT check or send e-mails unrelated to chemistry while in lab.
- Do NOT print materials unrelated to your course work in lab.
- Do NOT connect a USB mass storage drive to the lab computers.
- Do NOT open any attachments, unless directly from your lab Blackboard shell or e-mail attachment from your lab instructor.
- Do NOT access any social networking sites.
- Ask the instructor if there are questions about the appropriate use of laboratory computers.

Blackboard

Most of our instructors utilize the University Blackboard to post announcements, grades, supplemental materials and assignment feedback. You may be required to complete quizzes and submit assignments through Blackboard. Be sure to access Blackboard frequently. The web page may be found at:

<http://www.uaa.alaska.edu/classes/>

In order to use Blackboard, you must have a UA electronic username and password. These are the same as that of your UA e-mail account.

Disability Support Services

If you experience a disability and would like information about support services, contact Disability Support Services, located in RH 105 at 786-4530.

Chemistry Department Information

If you have any questions you think the chemistry department may be able to help you with, please call the following number: (907) 786-1298.

The department website has useful information about the chemistry department, class schedules, labs, lectures, instructor and faculty contact information, and more. The URL is:

<http://www.uaa.alaska.edu/chemistry>

Laboratory Attendance Policy

At UAA we take student, staff, and faculty safety very seriously. The following prerequisites SHALL be met by each student who wishes to attend a chemistry laboratory course:

- a) All students shall attend a mandatory, semesterly safety orientation in its entirety. Safety orientations are offered each semester during the first week of classes, during regularly scheduled lab meeting times. If the chemistry department does not have safety orientation records on file for a student, said student shall be prohibited from entering department laboratory facilities after the first week.
- b) Students shall enter the laboratory no later than the start time of the lab session unless approved extenuating circumstances exist.
- c) *Only students who have completed and submitted the pre-lab questions for a lab shall be permitted to attend said lab.*
- d) Any student who enters a chemistry laboratory who is not prepared for the appropriate lab procedure may be asked by the instructor to leave.
- e) Any student that demonstrates behavior that is out of compliance with the Chemistry Department's safety procedures and protocols may be asked by the instructor to leave.
- f) In reference to d) and e) above, it is at the instructor's discretion to determine whether a student's unpreparedness and/or noncompliance makes them a safety risk to themselves and/or others, in which case the student will not be permitted to participate in that week's lab.

In addition to the safety prerequisites above, the following policies are strictly enforced:

- g) Attendance of all labs is mandatory. If a student doesn't show up for a lab, the lab will be recorded as unexcused and the student will receive zero points for all affected assignments. A *Missed Lab Form* must be submitted with a signature on the bottom of the second page.
- h) If a lab is missed due to an emergency or if a student knows in advance that they will miss a lab for reasons outlined below, a *Missed Lab Form* and written proof from a source of authority is required for the lab to be considered excused. The note must be signed and dated, state the reason(s) for the lab being missed, and provide contact information for the signee. Unless the missed lab is made up during the same week it was missed, excused lab grades will be exempted or averaged.
- i) Only 2 missed labs will be permitted (excused or unexcused). Any request beyond this must be submitted to the department Chairperson in writing.
- j) Students who miss more than 2 labs during the semester will be dropped from the lab roster and will not be permitted to participate in future labs. Failure to withdraw from the course will result in a failing grade (F) for the course.
- k) *Non-attendance of formal skills evaluations will result in a failing grade (F) for the course.*

Chemistry 106 Laboratory – Missed Lab Form

Fill out this form if you are planning on missing (or have missed) a lab. Regardless of whether your missed lab is granted excused or unexcused status, you are allowed to miss no more than two labs. Upon missing your third lab, you will be dropped from the class roster and not be allowed to participate in any future labs during the same semester. You will receive an F on your transcript if you don't withdraw from the course before the withdrawal deadline. It is in your best interest to communicate with your instructor at your earliest, safest convenience, regarding your missed lab.

Student Name: _____ Section #: _____

Missed Lab Title: _____ Missed Lab #: _____

After consulting with your instructor, indicate whether your lab qualifies as an excused or unexcused lab.

Check the appropriate box:

Excused Lab
(Read through and complete the appropriate section below.)

Unexcused Lab
(Read through and complete the appropriate section on the next page.)

Excused Labs

For your missed lab to be considered excused, you must attach to this form written, verifiable proof for the absence. A make-up lab can be scheduled for an excused lab only during the same week of the missed lab and only if space and your schedule allows. Only the lab coordinator schedules make-up labs.

Check the appropriate box:

Jury duty (jury notice required)

Acute illness (doctor's note required)

Traveling for business (employer letter required)

Non-elective surgery (doctor's note required)

Military assignment (supervisor letter required)

Other, explain:

By checking one of the boxes (on the next page), you understand that you are allowed to make up this lab, but only during the same week of the missed lab and only if space and your schedule allows. If a make-up lab is scheduled and you do not attend, your reported grade will be zero. Only one make-up lab is scheduled per excused lab.

- My schedule does not permit me to make up my missed lab.
- All labs are full and a make-up is out of the question. (For coordinator use only.)
- I would like to make up my missed lab this week.

Your e-mail address: _____ Phone number: _____

Make-up lab section: _____ Make-up date: _____

The lab coordinator will contact you to verify space in the requested lab section. When you attend your make-up lab, be sure to:

- Show up or get a zero! (Show up prepared!)
- Sign the attendance sheet.
- Follow the instructor's directions.
- Submit your completed report with spreadsheets, graphs, etc. by the appropriate deadline.

Hand this form to your instructor.

Instructor signature: _____

Coordinator signature: _____

Make-up lab instructor signature: _____

Unexcused Labs

Unexcused labs include labs you miss because you oversleep, have babysitter problems, miss your ride, drop someone off / pick someone up from the airport, leave early on vacation, return late from vacation, have automobile problems (excluding emergencies), go hunting, and various other reasons.

By signing below you indicate that you understand that you will earn a grade of zero for your missed lab. It is up to your instructor whether you will be allowed to participate in another lab during the same week, but there has to be a slot available in one of YOUR instructor's classes, you must come to lab prepared and you will not receive any credit for the lab. You are still responsible for this material in future labs, since lab concepts build on one another.

Your signature: _____

Hand this form to your instructor.

Chemistry 106 Laboratory – Missed Lab Form

Fill out this form if you are planning on missing (or have missed) a lab. Regardless of whether your missed lab is granted excused or unexcused status, you are allowed to miss no more than two labs. Upon missing your third lab, you will be dropped from the class roster and not be allowed to participate in any future labs during the same semester. You will receive an F on your transcript if you don't withdraw from the course before the withdrawal deadline. It is in your best interest to communicate with your instructor at your earliest, safest convenience, regarding your missed lab.

Student Name: _____ Section #: _____

Missed Lab Title: _____ Missed Lab #: _____

After consulting with your instructor, indicate whether your lab qualifies as an excused or unexcused lab.

Check the appropriate box:

Excused Lab
(Read through and complete the appropriate section below.)

Unexcused Lab
(Read through and complete the appropriate section on the next page.)

Excused Labs

For your missed lab to be considered excused, you must attach to this form written, verifiable proof for the absence. A make-up lab can be scheduled for an excused lab only during the same week of the missed lab and only if space and your schedule allows. Only the lab coordinator schedules make-up labs.

Check the appropriate box:

Jury duty (jury notice required)

Acute illness (doctor's note required)

Traveling for business (employer letter required)

Non-elective surgery (doctor's note required)

Military assignment (supervisor letter required)

Other, explain:

By checking one of the boxes (on the next page), you understand that you are allowed to make up this lab, but only during the same week of the missed lab and only if space and your schedule allows. If a make-up lab is scheduled and you do not attend, your reported grade will be zero. Only one make-up lab is scheduled per excused lab.

- My schedule does not permit me to make up my missed lab.
- All labs are full and a make-up is out of the question. (For coordinator use only.)
- I would like to make up my missed lab this week.

Your e-mail address: _____ Phone number: _____

Make-up lab section: _____ Make-up date: _____

The lab coordinator will contact you to verify space in the requested lab section. When you attend your make-up lab, be sure to:

- Show up or get a zero! (Show up prepared!)
- Sign the attendance sheet.
- Follow the instructor's directions.
- Submit your completed report with spreadsheets, graphs, etc. by the appropriate deadline.

Hand this form to your instructor.

Instructor signature: _____

Coordinator signature: _____

Make-up lab instructor signature: _____

Unexcused Labs

Unexcused labs include labs you miss because you oversleep, have babysitter problems, miss your ride, drop someone off / pick someone up from the airport, leave early on vacation, return late from vacation, have automobile problems (excluding emergencies), go hunting, and various other reasons.

By signing below you indicate that you understand that you will earn a grade of zero for your missed lab. It is up to your instructor whether you will be allowed to participate in another lab during the same week, but there has to be a slot available in one of YOUR instructor's classes, you must come to lab prepared and you will not receive any credit for the lab. You are still responsible for this material in future labs, since lab concepts build on one another.

Your signature: _____

Hand this form to your instructor.

Laboratory Grading Policy

In this course students will complete 11 labs with associated assignments and one formal lab report.

Pre-lab Questions (30 %):

Your instructor will let you know when and where to submit a paper or digital copy of your pre-lab questions.

- To receive all possible points for pre-lab questions, all questions must be answered fully, correctly, **independently**, and submitted on time. Pre-lab questions submitted on time will be graded for accuracy and returned to students no later than the start of the associated lab.
- If submitted pre-lab questions are incomplete, the student may not be allowed to participate in the associated lab. Make-up labs shall not be permitted.
- If completed pre-lab questions are submitted late, but no later than the start of lab, the student shall be allowed to participate in the associated lab, but the student shall receive a grade of zero for the pre-lab questions.
- If pre-lab questions are not submitted by the start of lab, the student may not be permitted to participate in the associated lab. The student shall receive a grade of zero for the pre-lab questions and report and a make-up lab shall not be permitted.

Lab and Report Completion (20 %):

In the laboratory, each student must successfully complete each experiment by doing at least the following: students must come to lab thoroughly prepared, follow all safety rules and procedures, follow all verbal and written directions from the instructor, start and finish the lab when instructed to do so, complete the entire lab, clean all common use areas, clean and dry glassware and other equipment (such as balances) and return them to the proper locations, clean and dry bench workspace, appropriately discard all paper waste in waste containers, appropriately discard all chemical waste as indicated by the instructor, and refrain from wasting any chemicals or distilled water. *At the end of each lab, each student should request that their instructor perform a station check-out and assign lab completion grades.* Students should then complete the entire lab report, answer all questions, and submit the lab report with spreadsheets and graphs (when applicable) by the stated deadline. In addition, in order to receive all possible points for reports, data must have been obtained **independently** and evaluated correctly. Reports should be completed in your lab manual, but may or may not need to be submitted through Blackboard. Lab reports are due no later than the start of the following lab session unless otherwise specified by your instructor or lab manual. *After reports are graded and returned, students should **independently** correct previous erroneous answers within one week.* Student reports should be kept in a three-ring

binder and brought to all future lab sessions. The instructor will announce at different times during the semester which lab reports will be collected and graded fully. Labs 1 and 9 will be graded in full from the beginning, and therefore, not according to the rubric below.

All other reports will be scored according to the following rubric:

Category	Points	Explanation
Safety	1	No safety violations.
	0	One or more safety violations.
Glassware and Equipment	1	All glassware clean, dry, and stored in the appropriate locations. All equipment turned off / logged off / cleaned / stored appropriately, including stools.
	0	One or more pieces of glassware not clean, dry, or stored in the appropriate locations. One or more pieces of equipment not turned off / logged off / stored appropriately.
Time management and procedural accuracy	1	Experiment / Exercise and cleanup completed in a timely fashion and all procedural steps properly followed.
	0	Poor time management and / or experimental procedure not followed.
Calculation accuracy	1	All calculations are completed, all or near-all calculations are accurate, and all or near all significant figures, digits of precision, and units are appropriate.
	0	More attention needs to be given to the successful completion of calculations.
Completion	1	Lab report is complete with all answers provided and all spreadsheets and graphs attached (when appropriate).
	0	Lab report is incomplete.

Quizzes (20 %):

In addition to the entrance quiz (which may contain a combination of safety, syllabus, and prerequisite math questions), a cumulative quiz will be given at the start of approximately every other lab session. Students who are tardy may miss their opportunity to take the quiz. To receive all possible points on each quiz all questions must be answered fully, correctly, **independently**, and within the allotted time. *All work must be shown for full credit.* The use of notes or books shall NOT be permitted while students are completing quizzes. Resources, such as the Periodic Table of the Elements, will be provided at the instructor's discretion.

Fully Graded Lab Reports (20 %):

The reports for Labs 1 and 9 will be fully graded and not graded according to the rubric given previously. All other reports will first undergo completion grading. *Once they are returned to students, each student will have one week to **independently** identify erroneous answers and make corrections.* The instructor will request that students submit their corrected reports of a specific lab on two or more occasions throughout the semester. For example, while Lab 5 is in progress, your instructor may request that all students submit Lab 3 to be graded. These lab reports will be graded for accuracy and given a score out of 100 points. Students who do not have the requested lab report with them at the time of the announcement will receive a grade of zero for the report. The grade for Lab 1 will be included in this category. The grade for Lab 9 will not be included in this category.

Formal Lab Report (10 %):

Each student will write up a formal lab report for Lab 9 per the outline given in Lab 9. As with all lab reports, this one must be completed **independently** and submitted by the given deadline.

All assignment grades count toward a student's overall grade. No grades will be dropped. There will be no opportunities for extra credit in this course.

Grade Scale:

The Standard University Grade scale is as follows:

A:	90%- 100%
B:	80% - 89%
C:	70% - 79%
D:	60% - 69%
F:	0% - 59%

Class averages that fall below 70% will be set at 75% and the scale will be adjusted accordingly to assure fairness in the final grades. This average grade will be calculated from the grades of all the students who complete the lab course.

Academic Dishonesty:

All forms of academic dishonesty (plagiarism, grade tampering, etc.) will result in a grade of zero for the first affected assignment, and an F in the course for any subsequent violation. In addition, the Dean of Students and University Police will be involved where necessary, which will result in additional repercussions.

The Chemistry Laboratory, Plagiarism and Referencing

The chemistry lab is a unique environment. Not only do you have the opportunity to learn fun and exciting concepts related to the practical aspect of this science, but you also have the opportunity to reinforce some of the concepts already learned in the lecture portion of this course. Each student comes into the chemistry lab somewhat apprehensive. The level of apprehensiveness is inversely proportional to the student's previous experience in chemistry labs, if any. For this reason, and in the interest of giving each student the best possible learning experience, each student will have their own equipment and lab station at which to work and will be required to perform their own experiments, unless otherwise specified by the instructor. We strongly encourage students to discuss concepts, but we ask that the actual work, practical and written, be performed individually. During evaluations (practical or written), each student will be tested on their own work and knowledge. In order to prepare adequately for this, students should come to lab sufficiently prepared for each experiment, complete their experiments independently and complete their pre-lab questions, quizzes, reports, and research separately. Group work and collaboration will not be tolerated in the chemistry lab, even though it may be encouraged in chemistry lectures. If students work together on any part(s) of their lab assignments or evaluations, all involved parties will receive a grade of zero. These are considered forms of plagiarism, per the University of Alaska's 'Student Code of Conduct,' which can be found in section 5 of the University Catalog.

When you try to pass someone else's work off as your own (authorized or not), or if you do not reference the work of another person or institution (intentional or not), it is considered plagiarism. In addition, work submitted for credit in one course cannot be submitted for credit in another course unless preapproved by the instructor. When you plagiarize, you are only cheating yourself because you are not going through the intended learning experience. Per the University of Alaska's 'Student Code of Conduct,' students who participate in plagiarism shall be held accountable and disciplinary action may be taken against them.

To prevent plagiarism, never copy someone else's work. When doing research in order to answer questions, always list your references and paraphrase or quote the referenced materials. Remember that quotes are best reserved for when you can't say something in a better way than the original author. Never quote entire passages. Keep quotes short. Make sure you actually understand the material you are referencing and that you are not just writing down something for the sake of getting words on the page. Never limit your work simply to other people's ideas. Always expand on their thoughts and show that you've put some reflection into your work.

Please review the following website that addresses academic honesty and integrity.

<http://www.uaa.alaska.edu/deanofstudents/academic-integrity/index.cfm>

In this course you will be required to use reputable sources when researching any materials. Remember that you are responsible for the material you are referencing.

If the referenced content is incorrect, you will be the one losing points, not the original author. You will also be required to use the MLA style guide to reference sources. Become familiar with this style guide as it may also be required in other courses. When you cite your materials, remember that the reason behind referencing your source is so that the person reading your work can easily find your reference. Below are some resources you may want to consult before citing any of your sources:

- MLA Handbook for Writers of Research Papers by Joseph Gibaldi
- The MLA Pocket Handbook: Rules for Format & Documentation by Jill Rossiter
- MLA: The Easy Way! By Peggy M. Houghton Ph.D., Timothy J. Houghton Ph.D., Michele M. Pratt (Editor), and Sandra W. Valensky (Editor)
- Writer's Reference 6e & MLA Quick Reference Card by Diana Hacker, and Barbara Fister (Author)

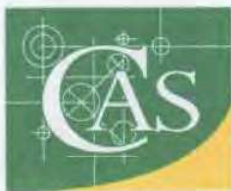
If you have any questions, be sure to consult your instructor BEFORE your weekly lab.

Helpful Hints for Preparing for the Laboratory

In this course students have approximately 2 hours to complete each in-lab assignment. Lab time is a valuable commodity. Always arrive at lab meetings prepared. Suggestions for lab preparation are given below:

- Read the lab write-up from your lab manual and the indicated required reading from your textbook before attempting to perform the experiment.
- Write a brief synopsis of the experimental procedure, outlining the sequential steps involved in the experiment. It is not necessary to memorize details of the procedure such as volumes or concentrations; rather, attempt to establish a basic understanding of the experiment's objective and the methods used to attain that objective. Some students prefer to sketch the experimental setup to summarize portions of the procedure.
- If the experiment requires calculations that can be performed prior to your lab meeting, complete them in advance.
- Complete pre-lab questions well in advance of the submission deadline so your instructor can be consulted during office hours if help is needed.
- If there are questions about the procedure, consult your instructor during office hours. During the experiment, instructors may be busy helping other students and assuring safe operation of the lab.

Students are expected to complete each lab. Poor preparation and a waste of lab time will be a significant handicap.



UAA College of
Arts and Sciences
UNIVERSITY of ALASKA ANCHORAGE

August 1, 2012

Dear Science Students,

We join with our faculty in welcoming you to the study of science. As part of our university's commitment to promote and protect the health and safety of our students, our employees, and the environment, the College of Arts and Sciences has developed rules and policies for laboratory safety. The Chemical Hygiene Plan uses a "Safety First Philosophy" as a requirement for education and also industry. We train for the future.

We expect that you will read the Laboratory Safety Agreement and Procedures carefully and ask questions about those that are unclear. Signing the agreement means that you have read, understand, and agree to follow the rules at all times.

The following sanctions represent the minimum response to violations of the Laboratory Safety Agreement and Procedures:

- First offense – a verbal warning with a written record kept of the warning in the laboratory manager's office. Should the student not violate the rules and procedures again the written record will be removed from the file at the conclusion of the semester.
- Second Offense – a written warning with the rule reviewed and a statement signed by both the student and the instructor stating that the rule is understood and will be followed
- Third Offense – a temporary restriction from attending the lab until a conference is held with the student, the laboratory manager, and the instructor. The student will decide whether he or she will sign an agreement to consistently adhere to the rules and procedures from that point forward. Should the student refuse to sign the agreement, the temporary restriction from being in the laboratory will continue and the student will be referred to the Dean of Students for formal university disciplinary action for violation of the UAA Student Code of Conduct, which may include permanent removal from the course.
- Fourth offense – Should the student sign the agreement upon the third offense and fail to strictly adhere to the rules and procedures, the student will be temporarily restricted from being in the laboratory and referred to the Dean of Students for formal university disciplinary action for violation of the UAA Student Code of Conduct, which may include permanent removal from the course.

Science is an exciting, fun, and safe field of study if one follows the prudent practices outlined in the Laboratory Safety Agreement. Thank you in advance for adopting the "Safety First Philosophy", adhering to the Laboratory Safety Agreement and Procedures and making our labs a safer place for all. We wish you a positive, healthy, and safe learning experience.

Sincerely,

A handwritten signature in blue ink that reads "John R. D. Stalvey". The signature is fluid and cursive.

John R. D. Stalvey, Ph.D.
Dean, College of Arts and Sciences

**UAA Chemistry Department
Lower-Division Teaching Laboratory
Safety Agreement and Procedures**

1. General Procedures

- a. Any person who intends to use chemistry department teaching laboratory facilities (lab or laboratory herein) shall first participate in a safety orientation conducted by trained university personnel. This safety orientation shall include, at a minimum, an overview of the UAA Chemical Hygiene Plan (CHP) and the Chemistry Department Teaching Laboratory Safety Agreement and Procedures (SAPs).
- b. All students, visitors, and employees shall abide by and all employees shall enforce the CHP and SAPs. These protocols are in place to minimize health and safety risks. Failure to do so shall result in administrative action.
- c. Pets are not allowed in chemistry laboratories. Service animals are permitted in accordance with ADA regulations.
- d. Chemicals, equipment, and other university property may not be removed from chemistry labs without notification of the lab coordinator and the expressed written consent of the laboratory manager.

2. Laboratory Safety

- a. Students shall not gain access to teaching labs without the presence or permission of their instructor. If a teaching laboratory contains students, lab instructors shall not be absent from said teaching laboratory for longer than five minutes at a time. If only one student is present / remains, the student shall physically leave the lab whenever the instructor leaves the lab. Said student shall not re-enter the lab without the presence of the instructor.
- b. The number of students permitted to each lab shall not exceed the number of stations available in the laboratory.
- c. Visitors are not permitted in laboratories without the expressed written permission of the laboratory coordinator, safety training as outlined in section 3.7 of the CHP, and notification of the lab manager and Department Chair. Request for entry is evaluated on a per case basis. Lab instructors should contact the lab coordinator directly regarding this matter.
- d. Horseplay and unauthorized experiments are strictly forbidden.

- e. Laboratories shall be kept clean and orderly. Chemicals and equipment stored in laboratories should be organized and not pose any hazards or be in violation of fire codes.
- f. Spills involving innocuous solutions should be wiped up immediately. If the spill involves hazardous compounds, or if it is uncertain whether the solution is hazardous, the instructor should be notified immediately to ensure cleanup using the appropriate materials. Classmates should be informed of the spill so they can avoid the area.
- g. If an experiment has special safety considerations not covered in these SAPs, the lab instructor and the lab manual shall instruct students explicitly on how to safely perform the experiment and appropriately discard waste.
- h. Waste should be deposited in the appropriate receptacle.
 - i. If glassware is broken, notify the instructor immediately and prevent students from accessing the area containing the broken glass. The instructor will clean up the broken glass using a brush and dustpan and discard the materials in a broken glass disposal box.
 - ii. Hazardous chemicals should be disposed in labeled waste containers in the fume hood(s).
 - iii. Non-toxic, non-hazardous aqueous solutions with a pH between 6 and 8 should be disposed down the drain only if permitted under all current applicable EPA, CDC, NIH, DEC, and MOA regulations and policies.
 - Non-toxic, non-hazardous aqueous solutions with a pH below 6 should be disposed in an acid waste container.
 - Non-toxic, non-hazardous aqueous solutions with a pH above 8 should be disposed in a base waste container.
 - iv. Non-hazardous solid waste should be disposed in a garbage bin labeled "Non-hazardous Waste".
 - v. Recyclable paper should be discarded in recycling bins.
- i. Injuries and incidents should be reported to the lab instructor immediately. An online report shall be completed by the affected party and lab instructor as soon as possible, but no later than 8 hours after the incident. The online report portal can be found at <http://www.uaa.alaska.edu/ehsrms>.
- j. Knowledge of the location and operation of all emergency equipment is prudent. Emergency equipment includes safety showers, eyewash basins, fire extinguishers, fire blankets, fume hoods, first aid kits, glass disposal boxes, protective gloves, phones, and MSDS / SDS binders.
- k. Emergency equipment, including showers and eyewash basins, shall always remain unobstructed within a 36" radius.

- l. All exits shall be clearly marked, be unobstructed at all times and be used during an emergency, natural disaster, or ordered building evacuation. Emergency escape routes shall be posted by all doors.
- m. In the advent of a visible fire or the sound of a building fire alarm, everyone should remain calm and follow their instructor's directions for evacuating the building. See the current University Incident Action Plan for employees and students "Fire Alarm - Academic Building" at:

<http://ehsrms.uaa.alaska.edu/Incident%20Action%20Plans/IAPforEmployees-Alarm.pdf>

- n. In the event of an earthquake, everyone should remain calm, get under a bench or stand against an inside wall. Do not stand in a doorway or against windows. When the shaking stops, check for personal injuries and then determine whether anyone else is injured. Promptly follow the instructor's verbal directions regarding any building evacuation.
- o. During a building evacuation, if time and safety permits, shut off all electrical devices and stop any chemical procedures. Collect personal belongings then calmly proceed to exit the building via the nearest and safest exit. Do not use the elevators. Offer aid to injured parties. Once outside, stay at least 50 to 100 feet from any buildings. Do not leave the class evacuation assembly point until the instructor has personally accounted for everyone in your class.

3. Personal Safety

- a. Consult your healthcare provider prior to attending any chemistry laboratory if you have any special medical conditions (asthma, epilepsy, pregnancy, breastfeeding, etc.) or any other medical concerns. Voluntarily inform your instructor of any relevant medical condition(s) that could pose a safety hazard to yourself or others.
- b. Smoking, eating and drinking are strictly forbidden in laboratories. Any visible food / drink container shall be discarded in a garbage bin. Gum and mints are considered food items. Food and beverage containers may not be left on the floor outside laboratory doors as they pose tripping and slipping hazards. Finish consuming all food and drink items prior to entering lab, and place empty containers in the garbage bin outside the laboratory or in a backpack. Shelves outside labs may be used to temporarily store unfinished food and drinks.
- c. Appropriate attire is required in all laboratories at all times. The function of clothing in the chemistry laboratory is two-fold. It serves as a modesty shield and provides a temporary barrier between spilled chemicals and bare skin. Clothing should be chosen appropriately. Shorts, capris, tights, skirts, and sleeveless shirts are not appropriate forms of clothing. Pants / jeans / slacks should be worn with the pant legs covering both legs completely. Long-sleeved shirts

should have tight-fitting sleeves to prevent catching on and knocking over glassware and equipment. Shirts should cover the entire torso. Feet should be covered completely with the appropriate shoes, up to the ankle and including the heel. Open-toed shoes, sandals, crocs, slip-ons, and high heels are inappropriate footwear. The function of shoes in the chemistry laboratory is to prevent glass from penetrating the foot, prevent chemicals from soaking into the shoes, prevent the trapping of chemicals next to the skin, and to prevent slipping. Non-suede leather shoes with a non-slip tread is strongly recommended.

- d. Long hair must be tied back or restrained in such a way that vision will not become impaired and hair will not come in contact with any chemicals or equipment.
- e. Dangling jewelry is not permitted and must be removed before entrance to the laboratory is gained. Whenever contact with chemicals is anticipated, all jewelry and other personal ornaments worn below the elbow (including watches and rings) should be removed and stored in a secure location.
- f. The application of all make-up, including lip balm and Chap Stick®, is strictly prohibited in laboratories.
- g. Specific procedures must be fully read and understood prior to gaining entrance to a chemistry laboratory. All hazardous characteristics of chemicals should be known prior to lab. These may be found in the Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) for each chemical and / or the lab manual.
- h. Students shall notify their instructor at the beginning of each lab meeting if contact lenses are being worn. Avoid the use of contact lenses in the chemistry lab unless absolutely necessary. In addition, it is the student's responsibility to research whether a specific chemical used in lab is incompatible with contact lenses. This information may be found in the MSDS / SDS for said chemical. If not, the information may be obtained from an eye doctor or chemical manufacturer. This should be done prior to any lab meetings / classes.
- i. All laboratory occupants shall take necessary and prudent measures to minimize direct chemical exposure. Personal protective equipment (PPE) shall be worn by all persons in the laboratory, appropriate to the PPE recommendations in the MSDS / SDS of the chemical(s) in use, or as stated by the instructor. This includes but may not be limited to goggles that meet ANSI standard Z87.1-2003 or Z87+ and are indirectly vented and splash-proof, lab coats, and non-permeable gloves. At a minimum, all laboratory occupants shall wear goggles when chemicals and / or glassware are in use. In addition, the fume hood shall be used anytime hazardous chemicals are present. These are chemicals considered as toxins, small particulate matter, volatile, offensive, or flammable. Personal lab coats shall be worn whenever encounters with chemicals are anticipated. When a personal lab coat is worn, it must be placed in an adequately

sized plastic bag at the end of each lab session in order to prevent contamination of backpacks, books and other clothing. Said lab coat shall be laundered thoroughly and by itself after each lab session, even if no spilling occurred. If a major spill occurs on a lab coat, the coat shall be removed promptly and the instructor shall outline the appropriate procedure for cleaning the contaminated lab coat. The student shall then be given a loaner lab coat with which to finish the lab session (if appropriate).

- j. To minimize accidents, always plan the use of appropriate glassware and chemicals prior to starting experimentation. Always use the smallest container feasible and always use the smallest amount of a given chemical to accomplish the goal of the experiment. Never pour directly from a very large container into a very small container as spilling may result. Always use intermediate sized containers to progressively pour from the larger to the smaller container. Where possible, always add acid to water, not the reverse.
- k. Never intentionally inhale any chemicals (solid, liquid or gas). Never ingest (drink or eat) any chemicals. If chemicals come in contact with skin, follow the measures specified in the MSDS / SDS which usually involves rinsing the exposed areas with copious amounts of tepid water. A major spill on a person will require use of a safety shower. Enter the shower as soon as possible, and as soon as possible begin to remove all clothing. Modesty should not prevent one from taking the appropriate safety measures. Chemical contact with eye(s) should be interrupted by flushing both eyes for a minimum of 15 minutes at the eyewash basin. Contacts should be removed as soon as possible after an initial rinsing. The instructor's directions should be followed calmly.
- l. All powered equipment in the chemistry laboratory pose a risk of electrical shock if used inappropriately. It is each student's responsibility to follow all prudent safety measures when working with electrical equipment.
- m. When in use, hotplates pose a burn hazard. It is each student's responsibility to follow all prudent safety measures when working with hotplates.
- n. Individuals who pose a danger to themselves or others by being under the influence of any drug, inhibiting medication or who become violent or threatening will be removed from any laboratory by UAA University Police. See the current University Incident Action Plan for employees and students "Disorderly or Disturbed Person" at:

<http://www.uaa.alaska.edu/upd/upload/DisorderlyIAP-2.pdf>

- o. The use of electronic equipment such as cell phones, audio equipment, Bluetooth devices, etc. while in attendance of any laboratory course is prohibited except when placing or receiving an emergency call. All cell phones should be turned off or placed in the silent or vibration mode and be kept in a pocket, purse, or backpack. Before handling a cell phone, gloves must be removed and hands

washed to prevent chemical contamination. If a call is received regarding a family or medical emergency, calmly inform the instructor and leave the room to continue the call. If an emergency occurs inside the laboratory, the hard-wired phone inside the laboratory or a cell phone may be used to contact emergency personnel.

- p. When making an emergency call, dispatch will need to know:
 - i. Your name and location (building, room number, building address)
 - ii. The nature of your emergency
 - iii. Type and severity of injuries
 - iv. The suspect description and direction of travel (if applicable)

See the current University Incident Action Plan for employees and students “Calling – In an Emergency” at:

[http://ehsrms.uaa.alaska.edu/CMS/Safety_and_Emergency_Information/Posters and Postings/Reporting an Emergency.pdf](http://ehsrms.uaa.alaska.edu/CMS/Safety_and_Emergency_Information/Posters_and_Postings/Reporting_an_Emergency.pdf)

4. Laboratory Etiquette

- a. Upon entering the chemistry laboratory, students should do the following:
 - i. Sign the attendance sheet as soon as possible. This sheet is used to track attendance and to verify student safety should an emergency evacuation occur.
 - ii. Place all non-essential personal items, coats, and non-relevant books in a designated cubby in order to keep bench tops and aisles clutter-free. These items shall not be placed on the floor, bench tops, or in cabinets under sinks. If present, chairs / stools shall be pushed under counter tops when not in use, as to minimize tripping hazards.
 - iii. Submit all work that is due.
 - iv. Clean lab benches with water and paper towels.
 - v. Wash hands with soap and water.
 - vi. Wait for the conclusion of the pre-lab presentation and for all lab occupants to don goggles before removing glassware from drawers and starting the experiment.
- b. Faulty or inoperative equipment should be reported to the instructor immediately.
- c. Never contaminate equipment or solutions unnecessarily. For example, it is inappropriate to pipet directly from a stock solution. Doing so contaminates the stock solution and renders it unusable by anyone. It also results in the wasting of resources.
- d. All cabinets and drawers should be kept closed when not in use to avoid catching and bumping hazards.

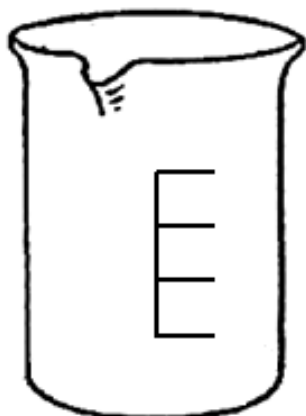
- e. All glassware should be cleaned and stored following the protocol below:
 - i. Organic solutions must be disposed in the appropriate waste container. Additionally, this glassware must then be rinsed with distilled water and rinsings disposed in the appropriate waste container before washing the glassware in a sink.
 - ii. Inorganic solutions that are toxic or damaging to the environment must be disposed in the appropriate waste container. Additionally, this glassware must then be rinsed with distilled water and rinsings disposed in the appropriate waste container before washing the glassware in a sink.
 - iii. Always clean used glassware at the lab sink using soap, tap water and a brush.
 - iv. Rinse with distilled water before drying each piece carefully and storing it in the appropriate drawer.

- f. Prior to exiting from the laboratory, verify the following:
 - i. Glassware is clean, dry and placed in the appropriate drawer.
 - ii. Common-use equipment and areas are clean (balances, etc.).
 - iii. Hotplates, MicroLab™ boxes, and thermometers are turned off (where applicable).
 - iv. The computer is logged off or shut down (section dependent).
 - v. Chairs / stools are pushed underneath the counter (where applicable).
 - vi. The lab bench is washed with water and wiped with paper towels.
 - vii. Hands are washed with soap and water.
 - viii. Students are signed out from the lab.
 - ix. All personal belongings are removed from the bench top and other designated locations.
 - x. All coffee cups, water bottles, and food are removed from the shelf outside the lab.

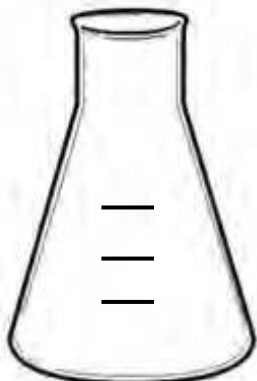
- g. If uncertainty exists regarding any safety measures, request clarification from your instructor.

If you have read and agree to abide by this safety agreement, please sign and date the acknowledgement form provided by your instructor. This form will be on file in the laboratory coordinator's office in CPSB 302Q.

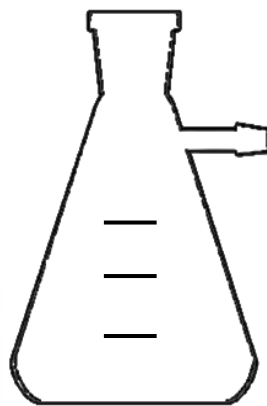
Common Laboratory Glassware and Equipment



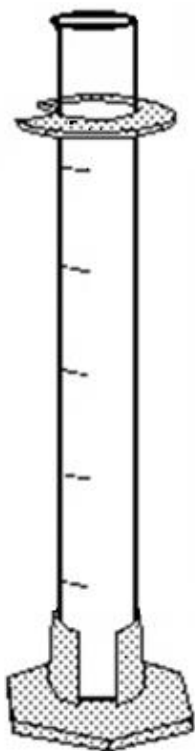
Beaker



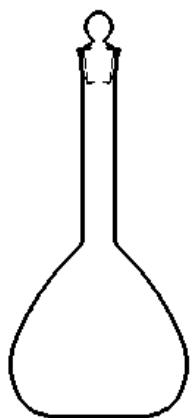
Erlenmeyer Flask



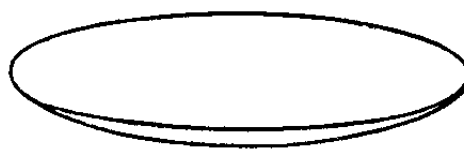
Filtering Flask



Graduated Cylinder



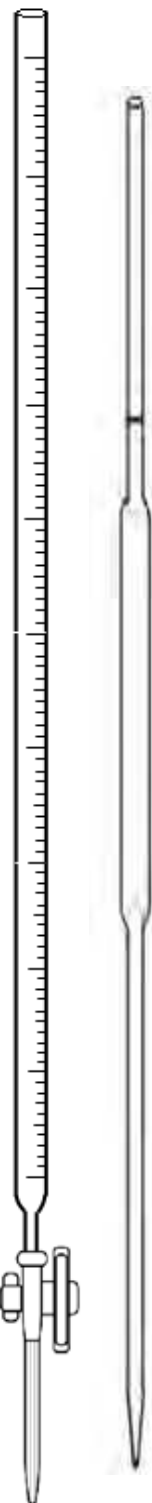
Volumetric Flask



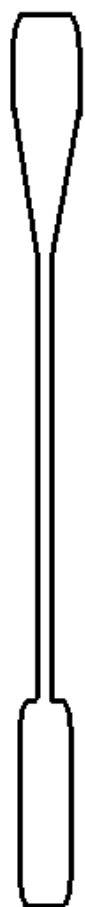
Watch Glass



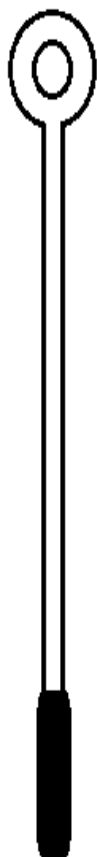
Glass Stir Rod



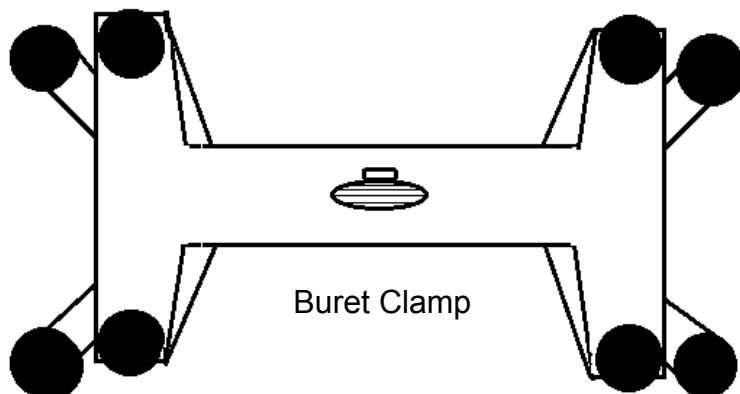
Buret
Volumetric Pipet



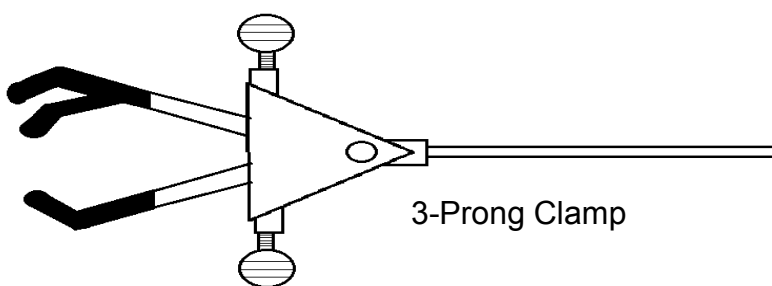
Spatula



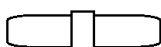
Magnetic Stir Bar Retriever



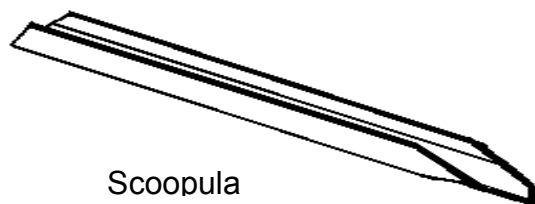
Buret Clamp



3-Prong Clamp



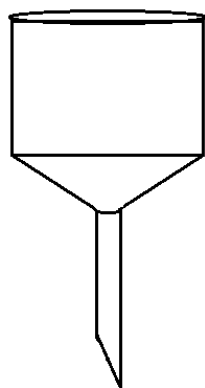
Magnetic Stir Bar



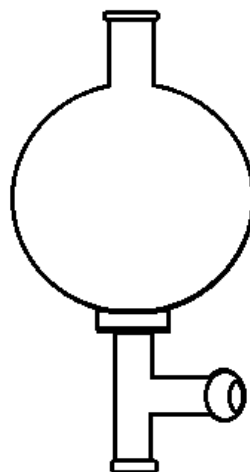
Scoopula



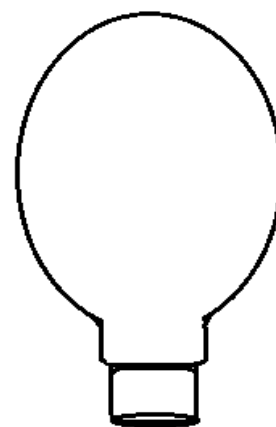
Eye Dropper



Buchner Funnel



3-way Pipet Bulb



Pipet Bulb

Notes:

Chemistry Lab Locker Inventory – Chem 106L

Student Name	Lab Section Day / Time	Station #
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Instructions:

- Check in each item by placing a check mark or number on the “Check-In” line.
- If an item is absent, place an “X” or “0” on the line.
- Do not leave any lines empty.

Bench Top

Item	Qty.	Check-In
1. Digital Hotplate Stirrer with Ring Stand	1	
2. MicroLab™ Interface Box	1	

Drawer # 1

Item	Qty.	Check-In
3. Buret, 25 mL	2	
4. Dropper, Medicine	1	
5. Dry-erase Marker	1	
6. Pipet Bulb, Standard	1	
7. Pipet Bulb, Safetypette	1	
8. Pipet, Volumetric, 25 mL	1	
9. Pipet, Volumetric, 20 mL	1	
10. Pipet, Volumetric, 15 mL	1	
11. Pipet, Volumetric, 10 mL	1	
12. Pipet, Volumetric, 5 mL	1	
13. Pipet, Volumetric, 1 mL	1	
14. Pipet, Volumetric, 0.5 mL	1	
15. Pipet, Transfer, Plastic	8	
16. Spatula / Scoopula	1	
17. Stir Bar, Magnetic	1	
18. Stir Bar Retriever	1	

Drawer # 2

Item	Qty.	Check-In
19. Beaker, 600 mL	1	
20. Beaker, 400 mL	1	
21. Beaker, 250 mL	3	
22. Beaker, 100 mL	1	
23. Beaker, 50 mL	1	
24. Beaker, 30 mL	1	
25. Beaker, 20 mL	1	
26. Bottle, Distilled water, 250 mL	1	

Chemistry Lab Locker Inventory – Chem 106L

Drawer # 2

Item	Qty.	Check-In
27. Cuvets, 14.45 mm, with caps	12	_____
28. Cuvets, 22.45 mm, with caps	12	_____
29. Cylinder, Graduated, 100 mL	1	_____
30. Cylinder, Graduated, 50 mL	1	_____
31. Cylinder, Graduated, 10 mL	1	_____
32. Flask, Volumetric, 100 mL, w/ glass stopper	1	_____
33. Flask, Volumetric, 25 mL, w/Teflon stopper	8	_____
34. Flask, Volumetric, 10 mL, w/Teflon stopper	12	_____

Drawer # 3

Item	Qty.	Check-In
35. Binder, Blue	1	_____
36. Buffer Solution, pH 4	1	_____
37. Buffer Solution, pH 7	1	_____
38. Buffer Solution, pH 10	1	_____
39. Clamp, Buret	1	_____
40. Clamp, Thermocouple Assembly	1	_____
41. Electrode, Copper Metal	1	_____
42. Electrode, Zinc Metal	1	_____
43. Half-cell Module	1	_____
44. Probe / Electrode Holder, Plastic, 5-holes	1	_____
45. Probe, pH Electrode	1	_____
46. Probe, Thermocouple	1	_____
47. Probe, Voltage	1	_____
48. Thermometer, Digital	1	_____

Signature

Date

Students are responsible for returning all equipment to the appropriate locations.

Chemistry Laboratory Student Agreement

I, _____ the undersigned student in CHEM A _____ section _____, acknowledge the following:

I have read and agree to abide by the policies and procedures outlined in the "Laboratory Safety Agreement and Procedures". I further agree to follow the directions given by my laboratory instructor and my laboratory manual regarding the safe use and proper disposal of all materials, as well as the safe and proper use of all equipment. I understand that failure to abide by the aforementioned policies, procedures, and directions shall lead to sanctions as outlined in the letter from the Dean of the College of Arts and Sciences.

Furthermore, I acknowledge that I was informed in writing or verbally, that:

- This course focuses, in part, on the development of kinesthetic intelligence and therefore requires constant **participation** and **attention**.
- This course requires me to **READ** and study the content in my lab manual outside the laboratory and to carefully **follow instructions** and perform tasks inside the laboratory. I understand that failure to do so may negatively impact my understanding of the course material, prevent me from completing tasks inside the laboratory, and will be detrimental to my grade.
- Algebra is used extensively in this course. If my **algebra** knowledge is inadequate, my grade will be negatively impacted. It is my responsibility to review any algebra content I am unsure of.
- The **syllabus** for this course is in my lab manual on pages _____ . I am required to read the entire syllabus and I am responsible for the content.
- The **schedule** for this course is in my lab manual on page _____ . It is my responsibility to be prepared for the applicable assignments every week.
- In order to attend any lab session, my **pre-lab question** set must be completed and submitted to my instructor **before** the start of the **lab**. If I want a grade for my pre-lab, it must be submitted by the appropriate deadline. All deadlines are firm.
- This course requires that I **dress appropriately** for EVERY lab meeting. The dress code is in my lab manual on pages _____. I understand that I will not be able to attend a lab for which I am inappropriately dressed. This will result in a failing grade for all affected assignments and/or assessments.
- I should ask questions of my instructor during **office hours** well before my assignments are due. If I wait until the last minute, I may not receive the help I need to understand the material.
- **Blackboard** and **e-mail** communication is used extensively in this course. If I fail to check Blackboard for announcements or if I fail to check my e-mail with regularity, I may miss important information that may negatively impact my grade.
- If I **plagiarize** or otherwise cheat on any assignment, I will minimally receive a failing grade. Future sanctions are at the discretion of my instructor.
- As a student at UAA I am legally bound to abide by the '**Student Code of Conduct**'. Any violations will be reported to the Dean of Students' office.

Signature: _____ Date: _____