GENERAL NOTES

Objectives

The main objective of this laboratory is to teach you the practical techniques and procedures of experimental organic chemistry. A further objective is to enhance your understanding of the facts and theories of organic chemistry by having you consider them in a laboratory setting. It is hoped that at the end of the course you will understand the physical and/or chemical consequences of each step of a procedure as you carry it out and that you will be able to troubleshoot small experimental errors and salvage experiments. The spring semester course is designed to extend these original goals and to have you begin to work like real chemists in that you will be utilizing more library resources and working more creatively and independently.

Organic chemistry is a creative science in which the synthesis of complex and previously unknown molecules plays an important role. The first semester laboratory course will build the foundation for more complex synthesis in the spring. In the first semester, you will learn how to purify molecules, how to identify molecules and how to synthesize simple, relatively well known molecules.

Many of you who carry out chemical, biological, or medical research in the future will use the training you receive in this laboratory directly in that research. All of you, I hope, will use the mental development, organizational skills and manual dexterity gained by this course in many facets of your life. Hopefully, you will be excited by what you learn, but you will also realize how little we really know, how much more there is to learn. There is an infinite amount of studing to be done and discoveries to be made!! One's understanding can always be enhanced!!

"I am the wisest man alive, for I know one thing, and that is that I know nothing."

Socrates

Texts

If you ever find you need more background on any subject covered in this virtual manual, please just refer back to the schedule (cover page) of this manual, It is very important that you be very focused in on the schedule page of the virtual lab manual. It is the source of information (including this!!!). There, you will find links to the labs, links to very helpful YouTubes (we hope). There are YouTubes on nearly every subject, please make use of them. Seeing the technique done in our lab is a great advantage before coming. References to these youtubes will be highlighted. Also, you should refer to your text, as needed.

Notebook and Lab Reports

The required notebook for this course, is the "Laboratory Research Notebook", which is available from the College Book Store. It is fine to substitute another notebook, as long as it has alternating pages (each pair having the same page number) with which you can make a carbonless copy of all your work. Your notebook is to be a **complete (and immediate)** record of every record you gather and every observation you make in this laboratory. This aspect of the lab will be greatly emphasized in that copies of all notebook pages for each lab will be collected at the end of each lab and returned to you within a few days with a grade. We have found that this process greatly improves every aspect of the lab, besides being standard practice in a laborator .

Unlike your general chemistry experience, you are expected to prepare your lab notebook the way a scientist would before lab. We want you to switch from thinking of the lab notebook as a place where you do your lab write-up (though you can do this), from a place where you prepare for lab and record data and observations. The notebook before lab should have an introduction (a very brief statement about the purpose of the lab). The net reaction if the lab involves a reaction and the mechanism if the involves a reaction. The procedure for the day should be written out in a way that you can follow with a reference to where you obtained the procedure. The procedure should be written in a way that enhances your ability to function in the lab, e.g., a flow charts or just notes on each step. You should review all relevant Youtubes and any notes you have on repeating procedures (you can put these notes in your lab notebook). You should draw a diagram of any apparatus you have to build. Before coming to lab, you should try to visualize what you will do in lab. You will find this enables you to work much more independently and shifts your focus from the building and carrying out of procedure to what the lab is about. Also, your knowledge will build with each lab and you will start to feel much more confident and competent. Most importantly, your notebook is where you record all observations (and observations should be detailed and continuous) and raw data. We don't care if the notebook is neat, it just has to be a place that you document all information in a meticulous manner. We have an acronym to help you remember what to write each week. The acronym is IMMPDD (I Make Molecules Productively During Daytime = Introduction, Main Reaction, Mechanism, Procedure with reference, Diagrams of apparatus, Data and Observations). You should use this for each new procedure. Please see the Rubrik below. Points will be deducted from your lab manual grade if you are not prepared, even if your notebook is prepared. I think it is important to realize that organization in the lab is very much related to your organization. You have to have studied and thought about the lab enough so you have an idea about what you are doing and do not need constant guidance. Some labs will be more than a week long and for those labs, you are just recording observations and data on the second and perhaps third weeks. I hope this makes sense. There is guidance in the cover pages about what you need to do each week. You will find when you get to the spring and are doing a seven week lab, that keeping a notebook in this fashion is essential.

Rubric for Laboratory Notebook

Introduction (statement of purpose, big picture) 10 points
* Main reaction 10 points (only for synthetic labs)
* Mechanism 20 points (only for synthetic labs)
Procedure from literature, or lab manual with scaling, give reference for source of procedure 20 points
Diagrams of apparatus (optional)
Data and Observations from the days lab (20 points)
General Preparedness (notebook ready, on –time and clean up from lab) 20 points
*Some labs are not synthetic and would not include these sections.

Also, some weeks, you are simply recording data and most sections are not included and in investigative experiments, you will not record a main reaction or mechanism. **You must use common sense on these weeks.**

At the end of each laboratory period, the yellow copies of the pages you have used in that period should be removed neatly from your laboratory notebook, stapled together, and handed in to your Teaching Assistant. This protects you from suffering a disaster if your laboratory notebook is misplaced, lost, or accidentally destroyed. It also allows regular evaluation of your preparation. Please do not fuss excessively about these pages. Not everyone will have the same observations and may not be in the same place. The TAs are aware of this, but also if they do constructively criticize what your notebook, please implement the changes in the next notebook entries.

Your lab report may also be written using a computer, but the raw data must be in your notebook. These sheets will be collected each week. DO not keep your laboratory data on loose pieces of paper, your hand, etc. This is very bad lab practice. You should feel naked in the lab, if you do not have your lab goggles on or if you do not have your lab notebook nearby.

Except for some modifications described in individual experiments (e.g. the first few labs and the form write-ups), you are to follow the detailed instructions given for each write-up in the lab manual. Reserve the first three pages of your notebook for an index, and keep this current each week. Note that part of the write-up for a given experiment is to be completed **before** you come to lab.

Note, that keeping the notebook is separate and distinct from your lab report, though you can write your lab report in your notebook, it might more typically be done on a computer. The lab notebook preparation and lab notes and observations have to be done in class in your notebook.

> Science is built of facts the way a house is built of bricks; but an accumulation of facts is no more science than a pile of bricks is a house.
>
> Henri Poincare, *La Science et l'hypothese* (1902)

HONOR CODE Guidelines

Try to jump into the spirit of adventure of the course. If you are given a choice of reagents, try something new. Do not come into class having discussed the lab with a student from a prior section, planning to mimic their experience. Be a positive deviant, ready to explore and learn. Your goal is to be working as a member of a research team by the middle of the course – a team that is balanced and fair-minded. It is important to make a reasonable contribution to all lab work and all writing assignments. It is important to be a part of all activities or at least take turn with all activities and experiences. All lab reports and papers are written in groups this semester, but groups should work as an independent team. It is OK to get guidance from resources, but it is not permissible to paraphrase or copy other's work without proper citations. We will gradually move toward American Chemical Society style as the course procedures toward the project. It is not permissible to consult exams, reports or papers from prior versions of the course. Please consult your instructors/TAs if you have questions about how to proceed. Please

A Little about Grading

Lab reports are graded by Teaching Assistants (except one or two) the first semester. There are grading keys for the TAS and the grading is monitored by the lab instructor. The instructor is responsible for all other grading. In the second semester the TAs grade three of four lab reports and the instructor grades everything else.

The grading breakdown for the spring semester is as follows.

30%	Lab Reports (nothing dropped this semester)
40%	Synthesis project and associated assignments
12%	Lab Quizzes (weeks of 03/20 and 04/17) ***Administered through Moodle, due according to th dates given on the schedule.***
10%	Laboratory Technique
8%	Laboratory Note Book

Use your judgement with this breakdown. Obviously the lab reports and synthesis projects are most important for determining your grade and these are done in groups. The lab grade constitutes thirty percent of your overall grade. The TAs grade thirty percent of thirty percent in this semester. This means they contribute about ten percent of your total grade.

Generally, do your best and use your judgment when putting in time on things. It is not our expectation that you will put all your time into lab. This is why we provide time in lab to work on reports, we are doing group reports, are doing drafts on the paper and have a lot of office hours. Please take advantage of the resources provided. The topics on the quizzes will be announced in advance – they are already posted and there will be review before. Come to the reviews and really focus on the topics and you will be OK.

Hours and Attendance

You will be permitted to work in the laboratory **only** during the hours and on the particular day of the week that your laboratory section is scheduled, **except** that you may weigh solid products and determine their melting points during any time the lab is open. The lab will be generally open from 10-5:30 each day, including Friday. **DO NOT ASK A TEACHING ASSISTANT OR ANOTHER INSTRUCTOR TO OPEN THE LAB OR SUPERVISE YOU AT UNSCHEDULED TIMES.** This is not their responsibility, and they have been instructed to refuse such requests. When the lab is not in session and no arrangement has been made with the lab instructor, you may not do any work.

If you are unable to attend **one** of your scheduled laboratory periods for a legitimate reason (e.g., illness, religious holiday, invitation to the White House, etc.) you will, in most instances, be allowed to make up that missed laboratory work during another section's scheduled period **provided** you obtain explicit permission from the instructor **in advance.** Otherwise, you may be scheduled, once again with the instructor's permission **in advance,** to make up a missed laboratory period on one of the several afternoons during each semester that have been designated specifically as make-up sessions. In so far as possible, please give advance notice of any expected absences. One make-up lab per semester per student is quite acceptable. The view by the student that the lab and the instructor are totally flexible is unreasonable. Remember often times there are 150 students in the course. There may not be room at your bench on another lab day. Sometimes your make-up lab is chemically or physically incompatible with the one scheduled to be carried out.

If you miss a laboratory session without a legitimate excuse (the pressure of exams or papers in a course is **not** a legitimate excuse), you will **not** be given permission to make up the work and you will receive no credit for that particular experiment.

A fifty minute lab lecture will be given on Monday at 8:00 AM in the physics lecture room and on Tuesday at 1 PM in the Chemistry Lecture room (room 180). The theory behind each lab will be covered in this lecture. The main purpose of these shorter lectures is to go over the experimental procedures for the lab. Please make every effort to attend. Attendance is taken at these sessions. Though they will be taped using the tegrity lecture capturing program, this is not guaranteed and it is most important that you attend lecture. People who attend lecture are better prepared. This is a fact. Please make every effort to attend lab lecture.

FREE EXTENSION FORM

This is only for one lab report, it is not for the lab notebook.

Name: _____

T.A.: _____

Section:_____

Name and number of lab to be submitted:_____

Date lab was carried out: _____

DATE LAB REPORT WILL BE SUBMITTED: _____

(this date can't be more than a week beyond official due date)

Signature: _____
Staple this form to the front of late report when you are turning it in. Form is not transferable to another student or another semester. If you have a late prelab only, please see your instructor.

SAFETY

Please view the safety videos linked into the virtual schedule/lab manual entry associated with this lab.

1. You **must** wear the required safety goggles **at all times** while you are in the laboratory. There will be **no exceptions.** If a TA or an instructor finds you without goggles on, you will be reminded of the rule; after the first such reminder on a given afternoon the second instance of non-compliance with the rule on your part will lead to a reduction in your grade of **10 points** for that experiment. Subsequent violations may result in your **having to leave lab for the day**.
2. Contact lenses can be worn in organic chemistry laboratory, but if you wear them you absolutely must have your goggles on at every minute because of the potential hazard of getting chemicals trapped under the lens. If you tend to take your googles off, you might consider replacing the lenses with glasses while in lab. The required goggles are large enough to fit over regular glasses.
3. You are required to wear nitrile gloves (provided in the lab) aprons (provided in lab) for all labwork.
4. **Closed shoes (no flipfops) must be worn at all times in the laboratory. Sandals, flipflops and bare feet are prohibited. It is very dangerous to wear open shoes as spilled chemicals tend to fall on your feet.**
5. Avoid wearing shorts and new clothing in the lab.
6. Long hair should be tied back while carrying out experiments.
7. **Smoking, eating, or drinking in the laboratory will not be permitted. You cannot bring water bottles or coffee into the lab. This is VERY IMPORTANT!!!!!! You can leave them in the hall.**
8. **No unauthorized preparations or experiments may be attempted at any time.**
9. **No unsupervised lab work is permitted.**
10. **All lab work should be carried out in your assigned fume hood with the hood door down as far as possible.**
11. Avoid unstable assemblies of apparatus consisting of books, pencils, matchboxes, etc.
12. When inserting glass tubing in a stopper, use a small amount of vacuum grease as a lubricant and wrap both the stopper **and** the glass in a towel. Hold the glass tubing close to the point of entry into the stopper.
13. Do not use cracked or chipped glassware; replace it.
14. Never heat a closed system of any kind.
15. NEVER EVAPORATE ETHER ON A HOT PLATE; use a hot water bath.
16. **Do not place highly volatile solvents in a beaker,** even for short periods of time; use an Erlenmeyer flask with a cork. Beakers should be used only for solids and aqueous solutions. Do not use beakers for recrystallizations, use Ehrlenmeyers.
17. Wear goggles, gloves and aprons while washing glassware. Never wash glassware with hot water.
18. Many organic substances are toxic or corrosive. Avoid inhalation of organic vapors or skin contact by organic substances.
19. Keep the laboratory floors free of jackets, books, spilled ice, dropped stirring rods, stoppers, and pencils, and any other hazards that might cause someone to trip or slip.
20. Keep your lab bench neat and orderly; a cluttered laboratory is a dangerous place in which to work.

21. Advise your instructor of any health problems you have that may be aggravated by working in the organic lab, e.g., migraine headaches, allergies, etc.
22. **(WASHING GLASSWARE)** Allow glassware to cool completely, then rinse it several times in the cup sink in the fume hood. Proceed to the normal sink. Wash (wearing gloves) with cold water and soap. Gradually increase the temperature of the rinse water. Rinse with acetone, then distilled water.

IN CASE OF ACCIDENT

The occurrence of an accident of **any kind** in the laboratory should be reported promptly to the instructor.

CHEMICAL EXPOSURE

For Chemicals in your eyes, remove googles, any contact lenses. Hold the effected eye open and flush for fifteen minutes with cool water. Report accident to your instructor.

For chemicals on clothes or skin. Remove exposed clothes. Flushed the area of skin for fifteen minutes with cold/cool water.

FIRE

Your first consideration is to remove yourself from any danger, not to extinguish the fire.

If your clothing is on fire, DO NOT RUN; rapid movement will only fan the flames. Roll on the floor to smother the fire and to help keep the flames away from your head. Your neighbors can help to extinguish the flames by using fire blankets, laboratory coats or other items that are immediately available. Do not hesitate to provide this aid if your neighbor is involved in such an emergency, since a few seconds delay may result in serious injury.

A laboratory safety shower can be used to extinguish burning clothing.

If burns are minor, immerse the affected area in ice water for a period of time. In case of serious burns, professional help should be sought at once. Report all accidents to your instructor.

CHEMICAL BURNS

Areas of the skin with which corrosive chemicals have come in contact should be washed immediately and thoroughly with water (fifteen minutes with cold water). This means that one should rinse the area involved for at least fifteen minutes with cold water. All injuries must be reported to the instructor. Be prepared to see a physician if you are instructed to do so.

Bromine burns can be particularly serious. These burns should first be washed with soap and water and then thoroughly soaked with saturated sodium thiosulfate solution for three hours. Be prepared to see a physician if you are instructed to do so. In the current course, we are not using bromine.

If chemicals, particularly corrosive or hot reagents, come in contact with the eyes, hold eyes open and immediately flood with water from the specially designed eyewash fountain that is available in the

laboratory. Do not touch the eye. Point the eyewash hose upward and turn it on gently so as to produce and soft arc of water. Your contaminated eye should be placed in the arc so that a soft flow of waters crosses your eye. The eyelid as well as the eyeball should be washed with water in this manner for **15 or more minutes.** Be prepared to see a physician if you are instructed to do so.

Most of the organic chemicals you will encounter in this laboratory are not seriously corrosive, but many are at least mildly toxic. In the event you inadvertently get an organic chemical on your skin, it should be removed promptly by washing thoroughly with copious amounts of warm water and soap. The area should be rinsed for at least ten minutes with cold water. Do **not** use an organic solvent such as acetone or ethanol to remove chemicals from your skin.

Thermal Burns and Cuts

For thermal burns, tell your instructor and rinse with ice cold water and then apply an ice pack.

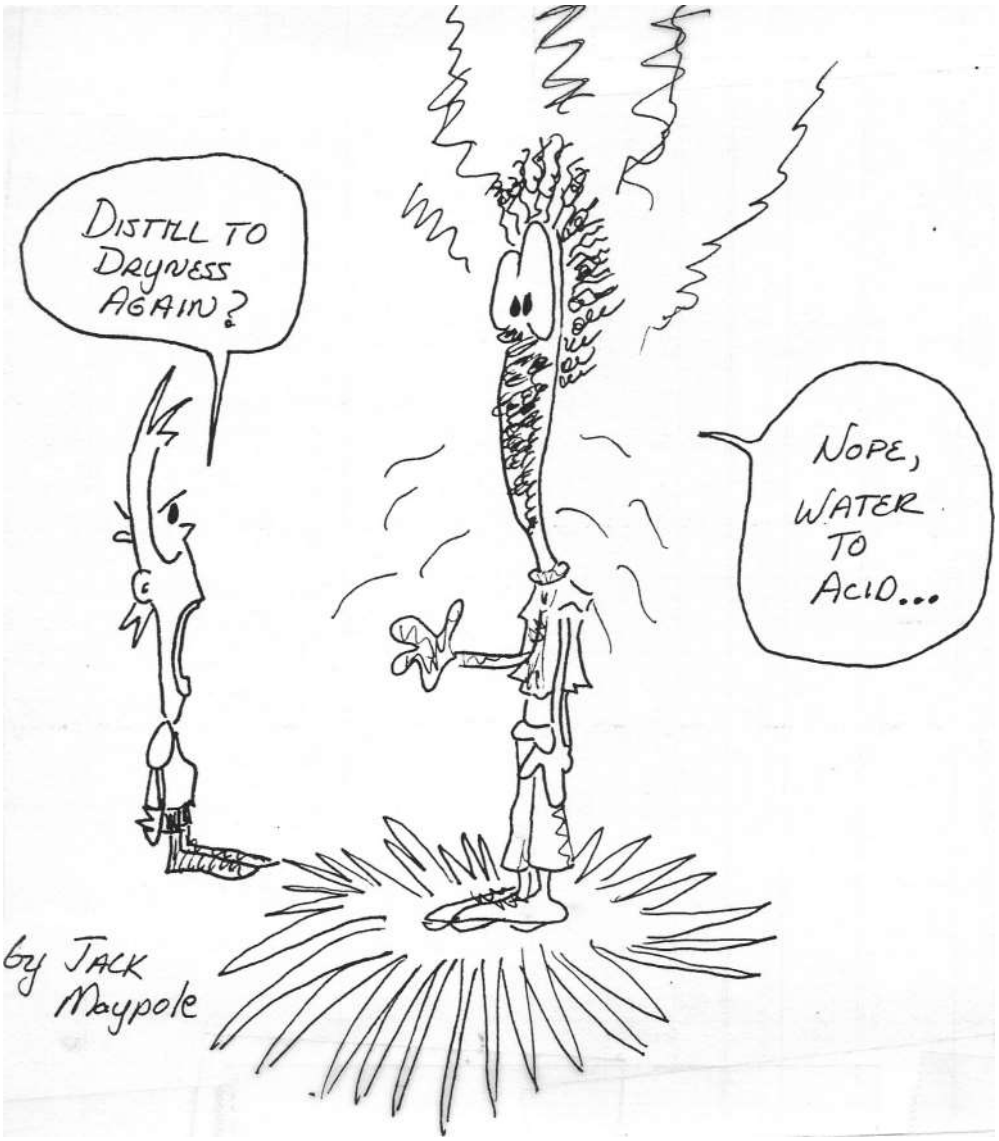
For cuts, make sure there is no glass in the cut. Rinse thoroughly with cold water to remove any contamination and then raise the wound and apply pressure with a piece of sterile gauze.

CUTS

Minor cuts may be treated by first-aid procedures; seek professional medical attention for serious cuts. If severe bleeding indicates that an artery has been severed, attempt to stop the bleeding with compresses and pressure. Arrange for emergency room treatment at once.

Persons who are injured severely enough to require a doctor's treatment should be accompanied to the infirmary, even if they protest that they are all right and can make it on their own. Persons in shock, particularly after suffering burns, are often more seriously injured than they appear to be.

IN CASE OF EMERGENCY CALL SECURITY AT 911



PROCEDURES

1. It is critical for your success and your safety in carrying out the experiments in this course that you prepare yourself for each laboratory period by acquiring **in advance** a thorough understanding of the work to be undertaken in that period. The assigned Pre-Lab Exercises must be turned in to your TA **immediately upon entering the lab.** WHEN YOU WALK INTO THE LABORATORY, YOU SHOULD KNOW EXACTLY WHAT YOU ARE GOING TO DO AND WHY YOU ARE GOING TO DO IT. If you have any questions, ask your TA or instructor at the beginning of the period, during or after the pre-lab lecture. Without detailed advance planning, you may find yourself working too inefficiently to complete some of the more demanding experiments within the scheduled periods, and you may make mistakes that could lead to injuries to yourself or others in the laboratory. **Be sure to check the marker board** as soon as you come into the laboratory for last-minute instructions and/or helpful hints. This can happen and it should not be alarming. In addition to being very prepared, having a plan and having VISUALIZED the experiment, you should also be ready for change. In research, we are constantly learning and this is research. When we learn we implement what we learned right away.
2. There are many laboratory operations that require considerable time but little attention (e.g., refluxing a reaction mixture, allowing a sample to crystallize by cooling, allowing solvent to evaporate from a re-crystallized sample, etc.). You should plan your work so that you use that slack time during these operations as effectively as possible by preparing for a subsequent step, taking a melting point from a previous experiment, making a label (perhaps with some blanks remaining to be filled in) for a sample to be submitted later, etc.
3. All reagents needed for your experiments are in the dispensing areas in the laboratory. Liquids will be found in the two dispensing hoods and solids will be found near the balances. After you have used a reagent, return it to its proper place. DO NOT TAKE BOTTLES TO YOUR WORK AREA. Reagents with irritating vapors will be dispensed in a hood, and must be taken to your work area in a **stoppered** container.
4. Liquids will generally be dispensed from bottles. READ LABELS. This is one of the most important aspects of working in lab. I also feel it is good life training. Do not grab a bottle and use it simply because you saw a peer doing it. Read the label yourself. When dispensing a liquid from a small bottle with a penny head stopper, remove the stopper from the bottle by gripping the penny head between your index finger and middle finger. While gripping the stopper in this way, lift the bottle using the same hand and pour. When dispensing liquids from a large bottle, unscrew the top and lay it on its back on the bench. Approximate the quantity of liquid needed by measuring it into a beaker. Then dispense the liquid from the beaker into a graduated cylinder. Can you guess the reasoning behind these procedures? We will also dispense liquids from specially designed squeeze bottles with graduated spouts and using pumps out of large reagent bottles. It is extremely important to not cross contaminate. Do not put pipets in bottles. Do not pour excess liquids back in bottles.
5. Do not weigh samples directly on a balance pan; instead, use a tared piece of paper, a watch glass, a weighing boat, or a beaker as a container for the sample while it is being weighed. Again READ LABELS before measuring out solids.
6. **Clean up spilled chemicals immediately.** Consult your TA if necessary.
7. Do not throw waste or excess organic chemicals into a sink. Waste solvent containers will be provided. **Always** consult your T.A. or instructor before disposing of wastes!
8. Do not put insoluble materials (including boiling stones, paper, and broken glass) in the sinks.
9. **Washing glassware. It is rarely desirable to wash glassware at the beginning of lab.** In many experiments, you will work with water sensitive reagents. Very often that little bit of "crud" at the bottom of a flask is less harmful to a reaction than the water

introduced by washing. **Sometimes water is your enemy (meaning, some reagents react with water and can become inactivated by tiny bits of water).** When you do need to clean glassware, **always wear gloves, goggles and an apron.** A regular good general procedure for washing involves wiping all grease off with a paper towel and then washing the glassware using a brush/ soap and cool water (why cool?). After washing, the glassware can be rinsed with a **small** amount of acetone, followed by a rinse with distilled water. The glassware can be dried by baking it in the drying oven under your hood (watch out for plastic in the ovens - it melts). While this is a good general procedure, **often times glassware does not require much attention.** For example, If the only material coming in contact with the glassware is an organic solvent such as hexane, it is usually adequate to simply wipe the grease off and allow the glassware to air dry. If you are ever in doubt as to what to do, ask your TA or instructor. Believe it or not, unnecessary washing can cost you thirty to sixty minutes each lab period. Never wash hot glassware. If chemicals are particularly noxious or corrosive, rinse them several times in the cup sink in the hood with cold water.

10. Before you leave the laboratory at the end of an afternoon, thoroughly clean your bench top with a sponge, and make sure that all of your vacuum, gas, and water connections are turned off and that all electrical equipment (hot plates, stir plates and power mites) are turned off, unplugged, and put away. Return all borrowed equipment. Put all equipment back where you found it.

Please leave the lab as you found it at the beginning of the lab period.

Working Greener

1. Use two sided copying to print out this manual.
2. Try to print out, lab manual pages , spectra and data off the web only once.
3. Recycle unused paper yourself or in appropriate containers.
4. Only take the amount of reagent you require for a reaction.
5. Do not repeat seemingly failed reactions, consult your instructor and salvage the reaction.
6. We do not start over unless there is no other way. SERIOUSLY!!!
7. Dispose of and recycle chemicals as directed (ask if you don't know)
8. Use traps as directed.
9. Do not allow the water to run continuously while washing.
10. Reuse acetone when cleaning glassware.
11. Unplug equipment. Close you hood at end of the day or if you are not using it.
12. Turn off your oven at the end of lab
13. Turn off the melting point machines when you are done and all the individual lights in your area.

SUBMISSION OF SAMPLES

Compounds are submitted and stored in vials. We are very strict about the labeling of samples. It is extremely important for vials to be labelled. WHY? You should use the tape provided in the lab to label your samples. We use the following acronym for labels. The label should include (legibly written) The Name of the Compound, Your name, Your TAs name, the date, This I have to look up. NMR tubes too.

+ +

> ...Every chemistry student, faced by almost any treatise, should be aware that on one of those pages, perhaps in a single line, formula, or word, his future is written in indecipherable characters, which, however, will become clear "afterward": after success, error, or guilt, victory or defeat...
>
> So it happens, therefore, that every element says something to someone (something different to each) like the mountain valleys or beaches visited in youth. One must perhaps make an exception for carbon, because it says everything to everyone, that is, it is not specific, in the same way that Adam is not specific as an ancestor.
>
> -- Primo Levi, *The Periodic Table*

CHECK-IN AND ORIENTATION

1. Before coming to the laboratory, study all the pages preceding this one, paying particularly close attention to the material on safety.
2. Meet your laboratory instructor and teaching assistants, and ask any questions you have about the course. Find your assigned locker.
3. Using the locker lists and accompanying pictures given in the pages that follow, check-in your equipment. Consult your TA or instructor if you need help in identifying any items or if any of the equipment is missing or damaged and therefore needs replacing. If any of your equipment is dirty, clean it with soap and water.
4. Become familiar with the location of hardware, reagent shelves, hoods, distilled water, balances, melting point apparatus, gas chromatographs, infrared spectrometers, etc.
5. Complete the following two forms, tear them out of your lab notebook and give them to your TA:
    - acknowledgment of receipt of equipment and understanding of safety rules
    - student information sheet

Organic Chemistry Lab

Acknowledgment

1. I acknowledge that all of the equipment listed in the Locker List, Category A (see lab manual), is in my locker, and I agree to leave it in clean condition and to pay for the replacement of any items broken or lost.

2. I have read and understand the Safety Rules and accident procedures given in the safety lecture and laboratory manual, and I agree to abide by them.

Signature: _____

Name (printed):_____

Section (day and time):_____

Teaching Assistant's name:_____

Locker Number:_____

Date: _____

Student Information Sheet
Chem 211/212

Name:_____ Chem 211/212 Lab Day:_____

School (BMC, Haverford, Swarthmore, etc.):_____

Class (17', 18', …..PB .....) or other: _____

Where and when two semesters of General Chemistry were successfully completed:

Health conditions that may be an issue in lab. Submitting this information is optional and if preferred, you can talk to your instructor directly. Realize we may be able to improve conditions for you to accommodate any need you might have. _____

Telephone numbers at school and at home:

_____

Email address:

_____

LOCKER LIST

Note: You do not have to pay for glassware. The prices (which are only about half the real price) are there to give you an idea about the value of the equipment. Please treat the equipment with respect.

CATEGORY A (LOCKER DRAWER)

Beaker, 50 mL	1.50
Beaker, 100 mL	1.40
Beaker, 250 mL	1.30
Beaker, 400 mL	1.60
Beaker, 600 mL or 800 mL	2.00
Cylinder, graduated, 10 mL	2.10
Cylinder, graduated, 100 mL, with bumper	2.90
Flask (2), Erlenmeyer, 25 mL	1.60 ea.
Flasks (2), Erlenmeyer, 50 mL	1.60 ea.
Flasks (3), Erlenmeyer, 125 mL	1.60 ea.
Flasks (2), Erlenmeyer, 250 mL	2.00 ea.
Flask, filter, 125 mL	6.40
Flask, filter, 250 mL or 500 mL	6.40
Flask, round-bottomed, 24/40, 50 mL (optional)	7.00
Flask, round-bottomed, 24/40, 100 mL (optional)	7.00
Funnel, 5.1 cm, Buchner OR 7.8 cm Hirsh	6.50
Funnel, 8.5 cm, Buchner	13.40
Funnel, separatory, with stopper, 125 mL	18.00 (28.00 with stopcock)
Funnel, separatory, with stopper, 250 mL	21.50 (33.00 with stopcock)
Funnel, stemless, 5 cm	1.00
Funnel, stemless, 7 cm	1.50
Micro Distillation Kit** (see below)	400.00 To be checked out as needed
Micro Vacuum kit *** (see below)	60.00 To be checked out as needed
Pan, enamel **OR** plastic	2.03
Spatula, nickel	3.00
Stirring rod, glass, 20 cm.	3.00
Vials, 4 dram (6), with caps	0.20 ea.
Watch glasses (2)	1.00 ea.

Microdistillation Kit
**25mL round bottom flask
50 mL round bottom flask
100mL round bottom flask
100 mm West condenser
vacuum adapter
three yellow Keck clips
still head
2 septum caps

Claisen adapter
dropping funnel

Microvacuum apparatus
*** micro Hirsh funnel
25 mL vacuum flask
Micro neoprene adapter

CATEGORY B (LOCKER DRAWER)

Adapter, filter, Neoprene, No. 2 or 3
Adapter, filter, black Neoprene, No. 4
Adapter, thermometer, red Neoprene
Boiling stones, 1 vial
Filter paper, 4.25 cm, No. 1, 1 pack
Filter paper, 7 cm, 1 pack
Filter paper, 12.5 cm, No. 4
Rubber policeman
pH paper (1 vial)
Pipettes (6), Pasteur
Rubber bulb, 2 mL
Test tube holder
Weighing dishes (2)

CATEGORY C (GREEN CABINET)

Hot plate
Stirplate

CATEGORY D (LARGE BUCKET UNDER SINK)

Clamps 2 prong with holders (2)
Clamp 3 prong with holder (1)
Heating mantle (100 mL)
Heating mantle support
Iron Rings (1 large and 1 small)
Rubber tubing, black (2 pieces)
Rubber tubing, red (3 pieces)

CATEGORY E (SMALL BIN, CRATES, RACKS ON BENCH)

Copper Wire
Grease
Rubber bands
Thermometers
Miniclamps and Medium sized clamps (please be neat with these0

CATEGORY F (CABINET UNDER SINK)

Acetone bottle
Soap bottle

Wire brushes (1 large and 1 small)

PLEASE MAINTAIN YOUR AREA AS DESCRIBED ABOVE!

BREAKAGE AND LOSS

DO NOT REMOVE EQUIPMENT/GLASSWARE FROM OTHER DRAWERS

The glassware and equipment used in the is course is extremely expensive. The prices list on page G-27 are a fraction of the real cost. Please treat the glassware/equipment with **Respect**. Students are not charged for breakage in this course, but you should handle the equipment like you own it.

The equipment in Categories A and B should be stored in your locker and will only be used by you. The equipment in Category C will be stored in the cabinet under you hood and be shared by all those who work at your lab station. The equipment in category D will be stored in the "F" drawer at each stations and will be shared by all who work at your lab station. The equipment in Category E will be stored in special bins on the lab bench and the equipment in Category F will be stored in special crates under your sink and will be shared by all who use your sink. Realize that you will be sharing the sink and hood with someone else during your lab period. Because of this you will notice that the Category C and D equipment is duplicated in the oven cabinet and "F" drawer. One set is for you and the other for your neighbor. It is very important to return equipment to its proper location at the close of lab. Do not lock common equipment in your locker.

HONOR CODE – A BIT MORE

We have some key issues due to the age of the lockers. Please be respectful of others lockers. Realize that almost all lockers are assigned in the course and if you reach into someone elses locker during lab and take something, you are taking others equipment. If you put common equipment in the drawer, we have to find it.

"He says, you have to study and learn so that you can make up your own mind about history and everything else but you can't make up an empty mind. Stock your mind, stock your mind. You might be poor, your shoes might be broken, but your mind is a palace."

— Frank McCourt ***(Angela's Ashes)***

"It's lovely to know that the world can't interfere with the inside of your head."

— Frank McCourt (Angela's Ashes)