



Biochemistry and Molecular Biology

**BUILDING POLICIES
for
MATEER HALL
and
SEVERANCE HALL**

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THE COLLEGE OF
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Program in Biochemistry & Molecular Biology

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Introduction

In this Handbook you will find information concerning research policies that are specific for Severance/Chemistry and Mateer/Biology. This information is SUBJECT TO CHANGE. Also, your advisor may wish to give you additional information or guidelines specific to your particular project.

Emergency Numbers

General Emergency Contact Information

Emergency	From a Safe Location Call	Phone Number
Fire	Emergency	911
	Security	2590 or 8888
Spills	Security	2590 or 8888
	Department Safety Officer	BIO: 2822 or 330-202-5234 CHM: 2114 or 9-1-330-461-0626
Personal Injury	Student Wellness Center	2319
	Security	2590 or 8888
Natural Gas	Security	2590 or 8888
Radiation 	Radiation safety Officer	BIO: 2437 or 1-330-464-0915
Power Outage	Security	2590 or 8888
Environmental Concerns	Environmental Safety Officer	2282 or 1-330-317-6005

Emergency telephone numbers are posted on each floor and in each laboratory. Please become familiar with these numbers.

Section I: Severance Chemistry Research & Building Policies

A. Building Policy

Building Hours:

Severance is open for laboratory work during the following hours:

Monday - Thursday	7:00 a.m. – 11:00 p.m.
Friday	7:00 a.m. – 6:00 p.m.
Saturday	9:00 a.m. – 5:00 p.m.
Sunday	1:00 p.m. – 11:00 p.m.

Working in Severance Hall at other times requires the presence of your research supervisor.

The following rules apply for the use of the chemistry building for laboratory work in Senior Independent Study.

1. No senior may do I.S. laboratory work alone at any time; you must have a buddy with you. See the section on **Buddy System Policy** for the specific guidelines to be followed.
2. The faculty of the department will discuss and make decisions on work by Senior I.S. students during breaks, and will notify the students about the decisions before the break begins.
3. The computer classroom in Severance 111 may be used for I.S. work. The computers in Room 207 are reserved for computational research. Do not save your own work on the hard disk of any public departmental computer. It will be removed. Save your work along with a backup, in a secure way.
4. The computers and laser printer in the Departmental Office are for faculty and staff use only.
5. For more information see Computer Use, page 17.

B. Safety Guidelines

Safety is a high priority and the responsibility of all faculty, staff and students in the Department of Chemistry at The College of Wooster. The following General Guidelines, the accompanying Safety Training Session, and the American Chemical Society (ACS) publication “*Safety in Academic Chemistry Laboratories*” are meant to provide information to ensure the safety of everyone in Severance Hall.

Following completion of the training sessions you need to sign the sheet that accompanies this handout and return it to the Safety Coordinator. Your signature will indicate that you have attended the Safety Training sessions, read the ACS publication, received these Safety Guidelines, and that you understand all the material contained in these documents and presentations. Furthermore, in signing, you agree to abide by these guidelines as well as any additional safety instructions adopted by the Department of Chemistry. Students also agree to

follow additional safety instructions from I.S. advisors, principal investigators, and lab instructors.

1. Check with your supervisor to determine whether you need to have a *Safety Buddy* when you are doing laboratory work during the day (M-F, 8 a.m. to 5 p.m.). Depending upon what you are doing, you may need a Safety Buddy with you in the laboratory, in the adjacent desk room, or on the same floor.
2. During evenings and weekends a *Safety Buddy* is required at all times when anyone is doing laboratory work. This is the policy of OSHA, the College, and the Department, and applies to all faculty, staff, and students. One does not need a Safety Buddy if one is doing only written or computer work.

3. There are various levels of risk, and the requirements for *Safety Buddy* change depending upon the risk. Consult your advisor to determine if your planned laboratory work is low-risk or high-risk. If you are unsure, the task should be considered high-risk.

If a person is engaged in *HIGH-RISK EXPERIMENTS* (mixing reactive or toxic chemicals, using gases, fuming reagents, explosives, complex equipment) a Safety Buddy who is properly trained in specific emergency procedures, lab safety, and PPE (personal protective equipment) must be in the room to observe the experimenter directly.

If a person is engaged in *LOW-RISK* activities (making buffers, using certain instruments, or making a visual check on a reaction), then periodic checks by another trained person (such as a Building Monitor) at half-hour intervals will serve.

Certain *EXTREMELY HIGH-RISK* procedures also require a professor, project director, or other specialist to be present.

4. Conduct yourself in a responsible manner at all times. Horseplay, practical jokes, and pranks are dangerous and prohibited.
5. The Material Safety Data Sheets (MSDS) are on file in the entryway to Severance 004. Familiarize yourself with the information on these sheets for any chemical you intend to use in the laboratory. Make a copy for inclusion in a suitable folder. See the links below for information about MSDS and online access:
<http://www.ilpi.com/msds/index.html>
<http://hazard.com/msds/>
<http://www.vwrsp.com/search/index.cgi?tmpl=msds>
6. Be well prepared to work in the laboratory; read procedures, MSDS sheets, chemical labels, and prepare for any hazards prior to starting any experiment. Before undertaking new experiments thoroughly discuss with your supervisor the hazards, procedures, safety regulations, and plans for specific things that may go wrong or become hazardous during the work. Always consider these questions before beginning an experiment:
 - What are the hazards?
 - What are the worst possible things that could go wrong?

- How will I deal with things when they go wrong?
 - What are the best practices, protective facilities, devices, and/or equipment necessary to minimize exposure to hazards?
7. Never smell or taste chemicals. Never pipette by mouth.
 8. The appropriate *personal protective equipment* (PPE) should be worn at all times. This should include but is not limited to safety glasses and lab coat or apron. The appropriate type of glove is often necessary. See <http://www.bestglove.com/site/> No open-toed shoes, sandals, high-heeled or platform shoes or excessively loose or baggy clothing is to be worn in the laboratory. Shorts, short skirts/dresses, or bare midriffs are not permitted. Long hair must be tied back and bulky finger jewelry removed.
 9. Read, understand, and obey all placards and caution labels on chemicals and equipment.
 10. Do not eat, drink, smoke, chew gum, or apply cosmetics in the laboratory. Do not store food, drink, or personal items in the laboratory refrigerators, cabinets, etc.
 11. Know the locations and operating procedures of all safety equipment, including first aid kits, spill kits, eyewash stations, safety showers, and fire extinguishers. There is a private safety shower on the second floor near the elevator.
 12. Know the location of the fire alarms and exits. *In the event of a building evacuation, we will meet in front of Timken Science Library, and remain there until released by the proper authority.*
 13. Know the location of emergency telephones and posted contact numbers.
 14. Fill out the “Accident Report” form to document all spills, accidents, injuries, fires, or any unsafe conditions and give to your supervisor immediately, with a copy to the Safety Coordinator.
 15. All work with toxic, volatile, and hazardous chemicals should be done in a fume hood. Never place your head into a fume hood. Keep the hood sash closed when not in use.
 16. Label all chemicals and solutions with the name of the material, the nature and degree of hazard, appropriate precautions, the name of the person responsible for the container, and the date. All beakers, flasks, bottles, and tubes of chemicals or solutions must be labeled at all times. No anonymous solutions are to be left on the laboratory bench.
 17. Properly dispose of all chemical waste. Broken glass must be disposed in broken glass containers; sharps in sharps containers. Live cell cultures must be disinfected. Pipette tips and other disposable items that have come into contact with live cell cultures must be disposed in the red biohazard bag.
 18. Label all waste containers with a chemical name/description of the material and the date. Waste containers should be securely capped. Use the log sheets for solid waste,

halogenated organic solvents, and non-halogenated organic solvents. Record every addition you make to one of these waste containers.

19. Use *secondary containers* to store or transport chemicals and use the elevator to avoid tripping on the stairs. If you are transporting items that form gases, such as “dry ice”, liquid nitrogen, or gas cylinders, place temporary signs on elevator doors, let the gas-formers ride up in the elevator alone while you take the stairs. (Then remove the signs.)
20. Never leave unattended a hot plate or heating mantle that is not thermally equilibrated. Never heat a closed system. Never leave an open flame unattended. Always complete and post "Unattended Experiment" sheets at the site of the experiment and on the door to the laboratory.
21. Do not allow liquids or solids to be drawn into the house vacuum system.
22. Keep all workspaces neat, clean, and orderly. Clean up after yourself so that the next person to use the workspace may work confidently and safely.
23. Students are not permitted in the chemical stockroom or storage area unless a faculty member, staff member, or stockroom personnel is/are present.

C. Buddy System Policy

1. A Safety Buddy is required at all times when doing laboratory work. This is the policy of OSHA, the College, and the Department, and applies to all faculty, staff, and students. It applies to all times of day or night.
2. One does not need a Safety Buddy if one is doing only written or computer work.
3. Any lab manipulation (and some instrumentation usage) requires a Safety Buddy. These are divided into several types of manipulations, rated by danger, and requiring more or less stringent buddy system rules:
 - a) If a person is engaged in **HIGH-RISK EXPERIMENTS** (mixing chemicals, or using gases, fuming reagents, explosives, complex equipment, etc.) a Safety Buddy who is properly trained in specific emergency procedures, lab safety, and PPE (Personal Protective Equipment) must be in the room with the ability to observe the experimenter directly.
 - b) If a person is engaged in **LOW-RISK** activities (for instance, using certain instruments or making a visual check on a reaction), then periodic checks by another trained person at half-hour intervals will serve.
 - c) If one cannot decide whether the task is low-risk, high-risk, or "medium-risk," the task should be considered high-risk.

- d) Certain **EXTREMELY HIGH-RISK** procedures also require a professor or project director (or other specialist) to be present.

D. Building Etiquette

1. Glassware Don't take other people's glassware.
Don't leave dirty glassware out in the lab.
Dispose of broken glassware properly.
2. Balances Keep the balances clean.
3. Work Areas Respect the work areas; leave them in good condition when you are finished.
Replace paper towels and soap.
Always clean up spills properly.
4. Radios Play radios respectfully – not too loud.
If someone joins you in the lab, ask if you should turn your radio off or down.
If someone asks you to turn a radio off or down, comply graciously.
5. Computers Don't delete departmental items on the hard drive.
Priority of use:
 1. classes
 2. I.S.
 3. individual useWhen you are done, close the applications you were using.
For computer modeling, run long programs in the nighttime hours.
Professors will post a weekly schedule on the door, indicating hours when the computer classroom will be used by classes.
6. Instruments Leave these in good condition.
Priority of use:
 1. classes
 2. I.S.Clean up spills, and don't leave samples behind.
Clean the cells with an appropriate solvent.
7. Samples These should be labeled (with a large label) indicating date, name, contents (name and formula) and laboratory notebook page reference.
8. Carrels Keep to your area.
Don't bring chemicals into these areas.
9. Hoods Close these when not in use, and turn off the lights inside.

Prepared by a Student Committee (Ben Arnold, Jay MacGregor, Amy Graham, Jennifer Penrod, Ian Lauer, Clue Nethero), December 1999.

E. Copier Policy

The photocopier in the Department Office should not be used when professors or office staff need to use it. The copier has a card swipe function.

F. Stockroom Policy

Location: Severance Hall, Room 023
Phone: 330-263-2806

Hours: Monday – Friday
10:00 a.m. - 12:00 noon
1:00 p.m. - 4:30 p.m.

Stockroom Manager: Jerry Patterson
Room 017
Phone: 330-263-2013
E-mail: gpatterson@wooster.edu

1. How to determine what is in stock:

Consult the most recent chemical or equipment inventory lists located at the sign out station in Room 023 to determine the status of the desired item, or ask the Stockroom personnel.

2. How to sign out chemicals/equipment/glassware:

Chemicals, equipment or glassware requests can be made at the Stockroom during open hours. Any request for an in-stock item will be filled as soon as possible. You can call extension 2013 or E-mail "gpatterson" to check the status of your request. Urgent requests will be handled on a case-by-case basis.

All items taken from the Stockroom must be signed out on the appropriate sheet: Chemical Sign Out Sheet, Equipment Sign Out Sheet, or Senior I.S. Sign Out Sheet. This aids the Stockroom personnel in keeping an accurate inventory, and it expedites the tracking of items. Please note on the sign out sheet if you take the last item, so that the item can be reordered and the next person needing that particular item will know its location and availability.

Laboratory chemicals must be accompanied by an MSDS when being transported to a new room.

3. How to order an chemicals or equipment:

If chemicals/equipment are not in stock and the item needs to be ordered, complete a requisition form. Requisition forms can be obtained from the Stockroom or your advisor. Vendor-specific forms are available for Fisher, Aldrich, and Sigma. Vendor catalogs are available in the Stockroom, in the Timken Science Library, or from your advisor. Please make sure all blanks are filled out on the form, including the signature of your advisor. Return the form to the Stockroom Manager and check back via phone/E-mail to see if the requested item has been delivered. Most items will take 3-5 days for delivery. Second day delivery is available in critical situations.

4. Returning items:

Return all items no longer needed to the Stockroom. The Stockroom personnel will cross off returned items from the appropriate sign out sheet. Seniors may not participate in orals until they have returned all items signed out; therefore, be sure to identify any items that are senior I.S. returns (student name, "I.S." and advisor). All items returned must be in ready-to-use condition. All leftover consumables (gloves, paper towels, disposable pipettes) should be returned to the Stockroom. *The MSDS should be removed from the laboratory binder when a compound is returned to the Stockroom.*

It is critical that all empty numbered chemical bottles and/or labels be returned so they can be deleted from inventory.

Do not return unlabeled or partially labeled chemicals/solvents to the Stockroom. It is expensive and potentially dangerous to dispose of unmarked chemicals. You are responsible for proper labeling and disposal (if applicable) as described in the disposal section of this manual. If you have questions, consult the safety manual you received as a first-year chemistry student, your advisor and/or the Stockroom Manager. Please note that items to be returned must be returned during Stockroom hours. No chemicals/equipment may be left in the hall.

5. Gas cylinders:

If you need a gas cylinder, contact the Stockroom Manager. It is best to provide advanced notice for obtaining gas cylinders so that an adequate supply can be maintained. Albright Welding delivers new cylinders on Tuesdays. Special requests can be filled within 24 hours. However, Albright Welding will charge the department an extra fee if the material is delivered on a day other than Tuesday.

6. Liquid nitrogen:

If you need liquid nitrogen, contact your advisor or the Stockroom Manager. The liquid nitrogen is located in Room 045 Severance. In order to obtain liquid nitrogen, you must obtain the key from the Stockroom Manager. The first time you obtain liquid nitrogen you must be accompanied by the Stockroom Manager, or another authorized person, who can show you the

proper procedure for dispensing liquid nitrogen. Dispense liquid nitrogen only into containers designed specifically for holding liquid nitrogen!! If other containers are used, injury may result from pressure build-up and the resulting explosion of the container.

7. Miscellaneous safety procedures:

ALWAYS use the "container within a container" concept for transporting chemicals, glassware and appropriate equipment (for example: keep a tub/bucket in your lab for the purpose of chemical/glassware/equipment transportation).

Obtain a copy of the MSDS (Material Safety Data Sheet) for every chemical signed out. It is imperative that you read the MSDS for each chemical prior to use. Your safety and the safety of others depend on it.

8. MSDS's:

MSDS's (Material Safety Data Sheets) are located on the bookshelf on the west wall of the entry to Room 004 Severance and are arranged alphabetically. MSDS's describe the characteristics and safety procedures for use of each chemical. Always read and understand the MSDS for the chemical you are using. If you do not understand the MSDS, ask your advisor, professor, or the Stockroom Manager for further information. Your safety and the safety of those around depend on it. The MSDS's tell you what PPE (Personal Protective Equipment) you need for working with each chemical. Obtain a compound's MSDS when you check it out and file it into the binder for the lab where you are working.

G. Senior Independent Study Severance Stockroom Policy

This information is a supplement to the general "Stockroom Policy", Section I, Part F.

1. Senior Independent Study chemical, equipment, and glassware check-out:

Each senior will have a master I.S. sign out list, located in a black 3-ring binder. The binder is located at the Stockroom dispensing window. Make sure you use the complete description for items signed out to avoid confusion months later when you sign it back in (for example 1 rb fl. -- should be "x" mL round-bottom flask).

There is an "Open Stockroom" policy for seniors, who may enter the Stockroom (with the permission of the Stockroom personnel) during the Stockroom hours listed above. Only seniors have this privilege, and it is limited to Senior Independent study-related work. This policy does not encompass classroom lab work. Please ask for assistance if you are having difficulty finding an item. Generally, items are arranged categorically (glassware, hardware, safety equipment, instrument supplies). If you do not know the correct location of an item, use the chemical/equipment inventory lists, or Stockroom personnel will assist you.

Come prepared with a list of items needed, as well as sizes needed (for example, tubing inner/outer diameter, ground glass joint size, container size, etc.).

All equipment and chemicals must be signed out per the stated Stockroom Policy procedures (i.e., chemicals on the sign out sheet; equipment on your I.S. sheet)

At the end of the first semester, return any equipment you no longer need. This will save you valuable time at the end of your Senior I.S. project. Instead of cleaning glassware and returning items at the last minute, you should clean up your I.S. project equipment and return all I.S. equipment and chemicals no longer needed before the end of the semester. The Stockroom will accept returns at any time.

2. Senior Independent Study check-in:

Upon completion of your Senior I.S., you can obtain a copy of your master sign out list. Please consolidate and organize the signed out items, and check what you have in your lab against what you signed out. A complete check-in of consumables borrowed from the Stockroom is required before you can participate in orals. A sign up sheet for check out times will be provided. Do not remove your master sign out list from the Stockroom without permission of the Stockroom Manager.

H. Hazardous Waste Disposal Guidelines

General information:

Read the MSDS for each chemical that you use. Be aware of the proper PPE (Personal Protective Equipment) that must be used. Follow all recommended safety procedures as they pertain to your chemical(s). ALWAYS wear appropriate clothing, safety glasses, and latex or nitrile gloves when working in the lab. Refer to MSDS for additional information.

When you finish using a chemical, do not cap empty containers as pressure may build to dangerous levels.

If it is not possible to retain the inventory label of the spent chemical for return to the Stockroom, copy the inventory tag and the chemical name and bring it to the Stockroom. This allows us to order more chemicals in a timely fashion.

Keep halogenated and non-halogenated organic waste in separate, labeled containers. Label as "Halogenated" and "Non-Halogenated Waste." Solid waste is also to be kept in labeled containers ("Solid Waste").

Keep an accurate list of the chemical identification and the amount of the chemical placed in the waste containers. Prepared list forms are available in the Stockroom for record-keeping purposes. Keeping an accurate inventory of what goes into waste containers helps us to keep the

costs of hazardous waste disposal down and in addition ensures that the chemicals are disposed of in the most environmentally sound manner.

Use a funnel when transferring liquids from containers to waste containers. NOTE: Make sure the funnel is a size that will allow a safe transfer of components, i.e., use the appropriate type funnel (powder/liquid) and do not use a large funnel for pouring into a small container and vice-versa.

Bring your properly-labeled, consolidated waste to the Stockroom for final disposal.

Information on specific types of chemical:

Organics – Rinse the container with acetone. Place acetone solution of the residue in a waste container labeled "Halogenated Waste" (the residue contains bromine, iodine, chlorine or fluorine) or "Non-halogenated Waste." Place the empty container and cap separately under a fume hood overnight. Next, soak the bottle until the label can be removed and render the bottle unidentifiable as to its former contents. Please remember to return the label (if possible) and inventory number to the stockroom. Properly rinsed bottles can be discarded in the trash or recycled in the lab.

Metals – Do not dump metals down the sink. Keep them in their original containers or in separate, labeled containers. Be especially careful with mercury. With the aid of a funnel, pour any mercury into a plastic bottle clearly labeled "Mercury (Hg) Waste."

Inorganics

Do not mix or consolidate inorganics. Consult your advisor regarding disposal.

After emptying containers that held inorganic acids or bases, rinse the containers with copious amounts of water, then allow them to dry overnight. The next day soak the dried container until you can remove the label. **It is very important** to give the Stockroom Manager the inventory number and name of the chemical that was in the empty container. If possible, bring the removed label and inventory number to the Stockroom. Render the bottle unidentifiable as to former contents and discard.

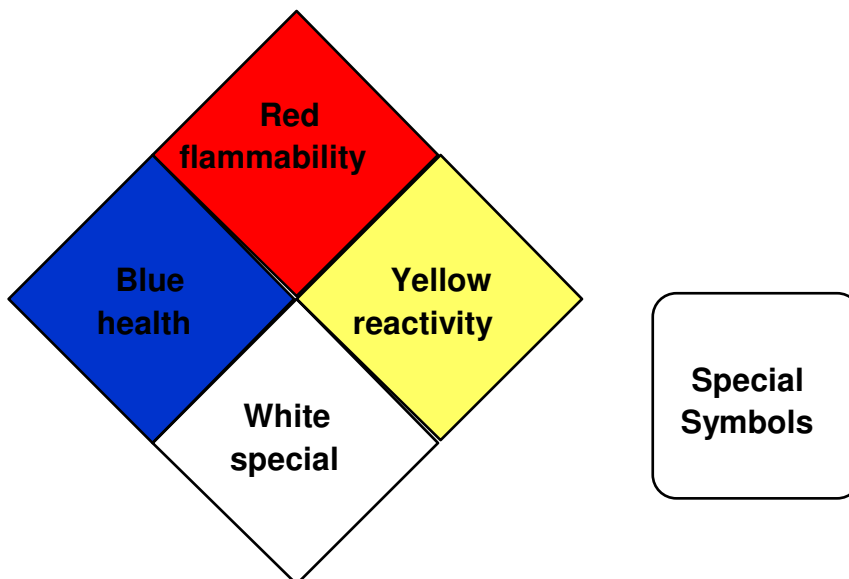
Neutralize strong acids and bases using a chemical approved by your advisor. Always add the more concentrated solution to the less concentrated solution; i.e. add strong acids/bases to water. **DO NOT ADD WATER TO A STRONG ACID/BASE. A VIOLENT REACTION MAY OCCUR.** When neutralizing a strong base/acid, first dilute it to give an approximately 1 M solution, then add the neutralizing reagent drop-wise. Check the pH often using litmus or pH paper. After you have neutralized the solution, discard it down the drain and let water run for at least 15 minutes. When neutralizing a solution, work with a small amount initially to see how vigorous the reaction is. Use the container-within-a-container concept for mixing components if

possible, i.e., when neutralizing solutions, perform the neutralization with the chemicals placed in a tub as a secondary container.

I. NFPA Chemical Hazard Label

NFPA Rating - The National Fire Protection Association (NFPA) has developed a standard system (ANSI/NFPA 704) for indicating the health, flammability, and reactivity hazards of chemicals. In addition, a special precaution symbol may be used where necessary.

This system of identifying hazards associated with various materials was developed primarily for fire protection and emergency personnel but can be useful to anyone who needs to handle potentially hazardous material. As stated in NFPA 704, "This standard provides a simple system of readily recognizable and easily understood markings, which will give at a glance a general idea of the inherent hazards of any material and the order of severity of these hazards as they relate to fire prevention, exposure, and control".



NFPA Hazard Rating Index:

Health (Blue)

4 – Danger

Materials which upon very limited exposure could cause death or major residual injury even though prompt medical treatment is given, including those which are too dangerous to be approached without specialized protective equipment. This degree should include:

- Materials which can penetrate ordinary rubber protective clothing;
- Materials which under normal conditions or under fire conditions give off gases which are extremely hazardous (i.e., toxic or corrosive) through inhalation or through contact with or absorption through the skin.

3 – Warning

Materials which upon short-term exposure could cause serious temporary or residual injury even though prompt medical treatment is given, including those requiring protection from all bodily contact. This degree should include:

- Materials giving off highly toxic combustion products;
- Materials corrosive to living tissue or toxic by skin absorption.

2 –Warning Materials which on intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical treatment is given, including those requiring use of respiratory protective equipment with independent air supply. This degree should include:

- Materials giving off toxic combustion products;
- Materials giving off highly irritating combustion products;
- Materials which either under normal conditions or under fire conditions give off toxic vapors lacking warning properties.

1 –Caution Materials which on exposure would cause irritation but only minor residual injury even if no treatment is given, including those which require use of an approved canister type gas mask. This degree should include:

- Materials which under fire conditions would give off irritating combustion products
- Materials which on the skin could cause irritation without destruction of tissue.

0 - Materials which on exposure under fire conditions would offer no hazard beyond that of ordinary combustible material.

Flammability (Red)

4 –Danger Materials which will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or which are readily dispersed in air, and which will burn readily. This degree should include:

- Gases;
- Cryogenic materials;
- Any liquid or gaseous material which is a liquid while under pressure and have a flash point below 73°F (22.8°C) and having a boiling point below 100°F(37.8°C). (Class IA flammable liquids.)
- Materials which on account of their physical form or environmental conditions can form explosive mixtures with air and which are readily dispersed in air, such as dusts of combustible solids and mists of flammable or combustible liquid droplets.

3 –Warning Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures or, though unaffected by ambient temperatures, are readily ignited under almost all conditions. This degree should include:

- Liquids having a flash point below 73°F (22.8°C) and having a boiling point at or above 100°F (37.8°C) and those liquids having a flash point at or above 73°F (22.8°C) and below 100°F (37.8°C). (Class IB and Class IC flammable liquids);
- Solid materials in the form of coarse dusts which may burn rapidly but which are generally do not form explosive atmospheres with air;

- Solid materials in a fibrous or shredded form which may burn rapidly and create flash fire hazards, such as cotton, sisal and hemp;
- Materials which burn with extreme rapidity, usually by reason of self-contained oxygen (e.g., dry nitrocellulose and *many organic peroxides*);
- Materials which ignite spontaneously when exposed to air.

2 –Caution

Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not under normal conditions form hazardous atmospheres with air, but under high ambient temperatures or under moderate heating may release vapor in sufficient quantities to produce hazardous atmospheres with air. This degree should include:

- Liquids having a flash point above 100°F (37.8°C), but not exceeding 200°F (93.4°F);
- Solids and semisolids which readily give off flammable vapors.

1 -

Materials that must be preheated before ignition can occur. Materials in this degree require considerable preheating, under all ambient temperature condition, before ignition and combustion can occur. This degree should include:

- Materials which will burn in air when exposed to a temperature of 1500°F (815.5°C) for a period of 5 minutes or less;
- Liquids, solids, and semisolids having a flash point above 200°F (93.4°C);
- This degree includes most ordinary combustible materials.

0 -

Materials that will not burn. This degree should include any material which will not burn in air when exposed to a temperature of 1500°F (815.5°C) for a period of 5 minutes.

Reactivity (Yellow)

4 –Danger

Materials which in themselves are readily capable of detonation or of explosive decomposition or explosive reaction at normal temperatures and pressures. This degree should include materials which are sensitive to mechanical or localized thermal shock at normal temperatures and pressures.

3 – Danger

Materials which in themselves are capable of detonation or of explosive reaction but which require a strong initiating source or which must be heated under confinement before initiation. This degree should include materials which are sensitive to thermal or mechanical shock at elevated temperatures and pressures or which react explosively with water without requiring heat or confinement.

2 –Warning

Materials which in themselves are normally unstable and readily undergo violent chemical change but do not detonate. This degree should include materials which can undergo chemical change with rapid release of energy at normal temperatures and pressures or which can undergo violent chemical change at elevated temperatures and pressures. It should also include those

materials which may react violently with water or which may form potentially explosive mixtures with water.

1 –Caution

Materials which in themselves are normally stable, but which can become unstable at elevated temperatures and pressures or which may react with water with some release of energy but not violently.

0 –Stable

Materials which in themselves are normally stable, even under fire exposure conditions, and which are not reactive with water.

Special Notice (White)

The fourth, white, field of the hazard signal can have variable content, depending on who prepared the signal. The 1990 edition of the National Fire Codes (section 704, chapter 5) specifies only two symbols. Additional symbols are commonly included. The field may also be left blank if no special hazards are present.

OX

Denotes materials that are oxidizing agents. These compounds give up oxygen easily, remove hydrogen from other compounds, or attract negative electrons. In other words, these materials might burn or explode when mixed with other compounds. (Example: ammonium nitrate, the fertilizer used in the Oklahoma City bomb.)



Denotes materials that are water-reactive. These compounds undergo rapid energy releases on contact with water. In other words, these materials might burn or explode upon contact with water. (Example: magnesium metal.)



Denotes materials that are radioactive.

NFPA Special Precaution Symbols

NFPA Rating - The National Fire Protection Association (NFPA) has developed a system for indicating the health, flammability, and reactivity hazards of chemicals. In addition, a special precaution symbol may be used where necessary. The following are special precaution symbols which may be found in addition to the NFPA chemical hazard diamond.



Flammable!



Explosive!



Corrosive!



Poison!

J. Computer Use

Many of the computers in the Chemistry Department are available to Senior I.S. students to support their research activities. This "open user" environment, while convenient, also requires vigilant maintenance and reasonable standards of conduct on the part of its users. A great deal of the department's instrumentation is computer-operated; a hardware or software problem could have a serious impact on the department's capacity to carry out research.

The faculty has agreed upon the following guidelines for fair and reasonable use of the departmental computer facilities:

- Departmental computers that are interfaced with an instrument are to be used only by authorized users for academic purposes such as Senior I.S. research, class assignments, faculty-sponsored research, or staff projects.
- Students are to consult with a faculty member before installing ANY software (even device drivers, operating system updates, and "simple" applications).
- All users are expected to comply with the College's policy on computer use published in *The Scott's Key*. Users are also to respect software licensing and copyright laws.

The purpose of this policy is to advance the educational goals of the department and the college while promoting the smooth operation of their facilities.

Use of the computers in Severance 207 is reserved for computational projects or data analysis that requires software found only on those computers. The installation of software and other system changes should be carried out only by faculty or I.T. personnel. General computer use (e-mail, word processing, etc.) should be conducted in Severance 111. Computers running unattended calculations or simulations should be left clearly marked so that other potential users understand the limitations of current use and do not interrupt. Personal items left in Severance 207 should be stored on the shelves at the ends of the room. Follow posted protocol for saving data to the computer (or ask your advisor).

At the completion of I.S., clear personal files from departmental computers, back-up data files on a CD for your advisor, and place files in the computer folders as required by your advisor.

You may find it helpful to use your Novell file space for portability and backup of data and important documents. You can use the Novell client (if it is installed on the computer) or native file access (described at www.wooster.edu/technology/help/networking/NFA.html).

K. Instrument and Equipment Use

The Department of Chemistry has a wide variety of instrumentation that can be used by students to carry out their Independent Study projects.

It is impossible to simply walk up to an instrument and know how to operate it safely or correctly. Before using an instrument there are several things each student is required to accomplish before using it on his/her own:

1. Know and understand what you are using the instrument for and what information the analysis will provide. This is the key to understanding whether or not you are operating the instrument correctly and/or your data is any good.
2. Familiarize yourself with the operating manuals.
3. **(Most important)** Obtain instruction from your advisor or another faculty member before using any instrumentation or equipment, especially equipment maintained by individual professors for their group's use. A quick lesson from another student is not satisfactory! On some instruments, such as the NMR, you may also consult trained student operators.
4. Run a standard sample that you know will work to verify your proficiency before running any of your research samples.

If many people need to use the same instrument, we will establish a schedule. Please sign-up for a time when you are certain that you will be able to use the instrument. If there is a log book for the instrument, be sure to sign it.

Section II: Mateer Biology Research & Building Policies

A. Safety Procedures

To the student: You are required to read, understand and implement the safety precautions indicated in your laboratory manual or laboratory handouts, which are summarized below. **Your signature on the attached sheet indicates your absolute willingness to abide by these precautions while you are in the laboratory.**

1. Work in the laboratory only as authorized by your instructor. Do not perform unauthorized experiments.
2. You are required to wear safety goggles as directed during some laboratory sessions.
3. Learn emergency procedures and know the locations of the nearest eye wash and chemical cleanup materials.
4. If you are injured or if any type of accident or fire occurs, IMMEDIATELY call your instructor for assistance.
5. Carefully read all instructions and thoroughly plan your work.
6. Wear appropriate clothing and shoes, not sandals, in the lab. Confine long hair.
7. Carefully read all labels on chemical bottles and familiarize yourself with the number/color hazards codes. Never return excess chemicals to the stock bottles. Do not put a pipet or a dropper directly into a commercial stock reagent bottle. Instead, pour an aliquot of the reagent from the stock bottle into a beaker. Use premixed lab reagents as directed in the instructions for specific laboratory exercises.
8. Do not eat, drink or smoke in the lab. Never taste chemicals. Smell chemicals cautiously by wafting the vapors toward you.
9. When mixing or heating chemicals in a test tube, point the test tube away from people.
10. Do not use bunsen burners or other sources of spark or flame in the vicinity of flammable liquids. Note that most organic solvents are flammable.
11. Dispose of all acidic & alkaline solutions by pouring them into containers labeled for disposal.
12. While mixing acid and water, always add the acid to the water, not vice-versa.
13. Fill a pipet by using a pipet bulb or mechanical pipettor only; never pipet by mouth.

14. If a spill occurs during regular hours, refer it to your instructor or other trained person immediately. If a minor spill occurs when no senior person is available, clean it up immediately by using the appropriate cleanup materials found in each lab's spill kit. If a major spill notify individuals in the building and seek assistance. A spill cart is located in room 213A (janitor closet on second floor). You are required to be familiar with its contents, function and purpose.

15. Dispose of chemicals as directed by your instructor and in a manner consistent with federal, state and local hazardous waste disposal regulations. Organic solvents are never to be disposed of down the sink; receptacles will be provided as needed for their collection.

B. Emergencies

Fire: Go to an alarm box . Pull the alarm to alert those in the building of a fire. **Leave the building and go to the front lawn of Morgan.** Call the City Fire Department, **9-264-2222**, and carefully report the fire. Then call **Security, 2590 (Phone available in the department office)** OR **Dial 911** and tell the authorities you want to report a fire. .

Personal Injury: Go at once to The Longbreak Student Health Center, call **2319**, or **Security 2590**.

Emergency telephone numbers are posted on each floor and in each laboratory. Please become familiar with these numbers. There is also an eye wash station and first aid kit available in each laboratory.

Do **not** use the elevator during a fire. Locate the nearest stairwell and determine the best route of escape in case of fire.

C. Mateer Stockroom

- 1) The chemical stockroom is located in Mateer 213. Chemicals can be obtained from the department stockroom during normal weekday hours (9:00 am-5:00 pm Monday-Friday). You must have permission from your instructor to remove chemicals from the stockroom. No other faculty member will provide you with access to the stockroom. If you move a chemical stock bottle from the stockroom, or if you move a chemical from one room to another, you must sign the chemical out from the room where it is housed, indicating to what room it has been taken. Sign-out sheets will be posted by the door into the hallway. You must also locate the MSDS for that chemical, copy it, re-file the original MSDS, and *place the new copy in the MSDS folder in the lab* where you are now using the chemical. When you are finished with the chemical, return it to its original location and sign the chemical back in. Access to the stockroom after 5:00 pm or on weekends can only be obtained from your advisor or instructor.

- 2) The Material Safety Data Sheets (MSDS) for every chemical in the building are on file in the main lobby of Mateer Hall. These are your first source of information for understanding the proper use of a chemical and any hazards which it might present. In addition, any laboratory which uses chemicals should have a file with MSDS sheets for all the chemicals which is stored *in that room*. Be sure you know where that file is. Familiarize yourself with the information on these sheets for any chemical you intend to use in the laboratory. You should also make a copy of the MSDS for materials you are using, and keep them in your IS folder
- 3) Any time you put a substance into a vial, bottle, or beaker, the new vial, bottle, or beaker **MUST BE LABELED**. Label all chemicals and solutions with the name of the material, the nature and degree of hazard, appropriate precautions, the name of the person responsible for the container, and the date. *All beakers, flasks, bottles, and tubes of chemicals or solutions must be labeled at all times*. No anonymous solutions are to be left in labs, on shelves, or in refrigerators. Failure to appropriately label such materials puts others at potential risk, and could result in the department undertaking expensive disposal protocols that are, in fact, unnecessary.
- 4) Ask your supervisor to be sure that you dispose of all chemical waste properly. Information on proper waste disposal can also be found on the MSDS. Label all waste containers with a chemical name/description of the material and the date. Waste containers should be securely capped. Record every addition you make to any waste container. Be sure to separate wastes if appropriate. When full, waste containers should be brought to the stockroom and stored under the hood for final disposal.
- 5) Use *secondary containers* to store or transport chemicals and use the elevator to avoid tripping on the stairs. If you are transporting items that form gases, such as “dry ice,” liquid nitrogen, or gas cylinders, place temporary signs on elevator doors, let the gas-formers ride up in the elevator alone while you take the stairs. (Then remove the signs.)

Equipment Return Policy

Glassware must be returned **washed** and **dried** or it will **not** be accepted. Any chemical must be **properly labeled** (chemical name, chemical alert, date and user name) when returned.

No equipment is to be removed from the building **without** the consent of your faculty adviser or the laboratory technician. These must be signed out at the administrative coordinator's office.

C. Mateer Special Facilities

Greenhouse and Warm Animal Labs

Check with your adviser if you require the use of any of these rooms. Directions are posted in some of these rooms. Be sure to follow them.

Distilled and Deionized Water

The still is located in Room 306. Faucets are located in Room 306, 210 and 107 only. These rooms may be locked, so make arrangements to access during normal building hours.

Autoclave Sterilizer

Following training by a qualified individual, students may use the autoclave in Room 306. (The sterilizer in Room 107 is for staff use only.) Instructions for use are also posted near the autoclave.

Any problems with operation of the autoclave should be reported at once to the department technician, administrative coordinator or night guard.

Warm Animal Facility

Permission from the **Institutional Animal Care and Use Committee** must be secured before animals can be ordered and housed. Please secure the form from the **Biology** administrative coordinator's office

D. Ordering Chemicals

After you determine what chemicals you will need for your research project, check the chemicals database to determine if the items are already in the Department. (Returning unnecessary chemicals can be expensive.)

A database of chemicals is available on the web at the following: <https://filemaker8/fmi.iwp>. You will log in using your Novell name and password and open The Biology Chemical Inventory. If you experience any difficulty please contact Biology Department Administrative Coordinator or IT.

Fill out an order form (available from the administrative coordinator) using approved companies, if possible (Flinn, Fisher, Sigma, Spectrum). List the name and address of the company, catalogue number of item being ordered, quantity, and cost. Your Independent Study adviser **must approve** the order. Give this form to the administrative coordinator and she will place the order. **Please state if there is a rush or a particular date when the material is needed.** Help is available if necessary.

Catalogues are located in Room 104. Although most orders are received within a week of placing the order, it may take from 3-5 weeks for delivery from the time you hand the order to the administrative coordinator until it is received.

When the order is received, you are responsible to mark the container with your name, location it will be stored, date of receipt of the chemical and any appropriate warning labels (available from the laboratory technician or administrative coordinator). Flammables or corrosives must be stored in an appropriate cabinet (IS lab, stockroom, 308, or 108). All other chemicals must be

stored in your LOCKED carrell or the refrigerator or freezer, as appropriate. Make sure the administrative coordinator receives the packing list and MSDS for any chemical you receive.

E. Syringe and Needle Policy

If you require syringe and needles for your Independent Study, you will need to secure these from your adviser, the departmental technician, or the administrative coordinator. You will be held accountable for all items that you use and must dispose of them properly in a sharps disposal container located in each lab. If you are not clear on the proper disposal of these items, check with the departmental technician or the adviser.

F. Mateer Building Policy

In addition to normal business hours (Monday - Friday, 8:00 - 5:00 p.m.), Mateer Hall is open Sunday - Thursday evenings until 11:00 p.m., Friday evenings until 9:00 p.m. and Saturday and Sunday afternoons from 1:00 PM - 6:00 PM. During these extended hours, you **MUST** sign in with the building monitor when you enter the building. Note that access to the building after 6 PM is through the front door only. The building monitor stationed in the main lobby will open laboratory doors upon request.

If you require access to the building at times other than these, you must obtain permission from your adviser and make arrangements with the department administrative coordinator for access.

Security will remove anyone from the building who does not have an Extended Hour Pass.

G. Carrel Sign Up and Keys

Independent Study carrels are located in room 301. If you wish to use a carrel, please see the administrative coordinator to sign up. Keys to individual carrels will be issued upon request and the payment of a \$25.00 deposit in the administrative coordinator's office. Deposits will be returned when your carrel is cleaned and the key returned.

You are responsible for keeping desks, hood, refrigerator, drawers and cabinets clean. The custodian cleans only the floors and empties the large garbage cans. Key deposit will **not** be returned and **grades will be withheld** until carrels are cleaned to the satisfaction of the laboratory technician or administrative coordinator. You will receive notice by mail when carrels must be cleaned. Please report to the laboratory technician or administrative coordinator when your carrel is ready to be inspected. Chemicals obtained from the stockroom for your project should be returned there. Chemicals purchased for your project should be taken to the technician in Room 107 for recording, storage or disposal. All chemicals and solutions made must be labeled with your name, date, and contents.

APPENDICES

THE COLLEGE OF
WOOSTER
Department of Chemistry

Accident Report Form

(Please print clearly.)

Author of Report: _____

Advisor/Supervisor (if not Author of Report): _____

Individual(s) involved: _____

Location of accident: _____

Date of accident: _____ Time of accident: _____

Give an exact description of the accident, including its nature (chemical fire, injury, etc.) and its cause if known.

Give an exact account of the emergency procedure(s) used and aid given, explaining why each step was taken. List these in chronological order.

Continued on Reverse

Assess the effectiveness and efficiency of the emergency response. What should have been done differently? What additional safety items would have made the response more effective and efficient?

List any preventative measures or actions that should be instituted as Departmental policy in order to prevent a similar accident in the future.

List safety supplies or equipment that must be restocked, recharged, or tested. Specify item(s) and location(s):

Signature of Author of Report: _____

THE COLLEGE OF
WOOSTER
Department of Chemistry

Unattended Experiment Form

Post two copies of this notice, one near the reaction and the other on the door to the laboratory.

Experimenter's Name _____ Phone Number(s) _____

Faculty Advisor _____ Phone Number(s) _____

Date and Time Started: _____
(Date) (Time)

Date and Time to be Finished: _____
(Date) (Time)

Lab Room Number _____ Hood Location or Number _____

Have you discussed this reaction with your advisor? Yes No

-
- A. Draw the reaction scheme including all stoichiometry, solvents, reagents, expected products, etc.

B. List the potential hazards (flammability, air or water sensitivity, toxicity, biohazard, etc.).

C. What are the anticipated consequences and/or hazards associated with an untimely loss of each of the utilities listed below? (If there is no hazard associated with the loss of the utility, write "NONE.")

Water

Heat

Electricity

Gas Flow

Other

D. If there are hazardous consequences listed on this page, suggest how one might minimize or counteract them if possible. (Otherwise write "NOT POSSIBLE.")