Chemical Hygiene Plan
Science Group

Neumann University

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Neumann University
Chemical Hygiene Plan

Forward

This document is designed to comply with OSHA (Occupational Safety and Health Administration in the Department of Labor) Standard 29CFR 1910.1450. This regulation, sometimes referred to as the Laboratory Standard, regulates occupational exposure to hazardous chemicals in chemical laboratories. Laboratories, including educational laboratories that use hazardous chemicals, are required to meet this standard and develop a Chemical Hygiene Plan (CHP). This Chemical Hygiene Plan for Neumann University describes the policies and practices used in the instructional chemistry laboratories to accomplish the following goals:

- That all chemicals are handled, stored and disposed of in a safe manner
- Minimize any potential exposure of faculty, student assistants and students to hazardous chemicals.
- Implement an institutional policy that assures continuity of good laboratory practices.
- Provide appropriate safety training to students and student assistants to recognize the hazards of chemicals with which they are working and to comply with safe operating procedures for doing so.
- Maintain a system of documentation to demonstrate compliance with the safety policy.

Section 1: Scope of Plan and Program Responsibilities

1.1 This plan applies to the laboratories used for instruction of all courses and the chemical storage areas. Specifically included are laboratories and satellite accumulation areas in rooms 323, 342, 345, 348, 349, 354, 355, 358, and the chemical storage areas in rooms 345A, 349, 350, and 359.

1.2 This plan covers all faculty and support personnel directly involved in the all programs such as the Laboratory Manager and student assistants.

1.3 While not a requirement of the standard, where deemed relevant and appropriate, this plan shall also apply to students working in the laboratory.

1.4 The Laboratory Manager is the designated Chemical Hygiene Officer with the following responsibilities.

- Work with faculty and staff to develop and implement the CHP.
- Oversee the training of laboratory assistants.
- Conduct periodic safety inspections of the chemistry laboratories and storage areas.
- Monitor storage, use and disposal of chemicals used in the chemistry programs.
- Review the CHP annually and make any necessary revisions.

1.5 The faculty are responsible for the following:

- Instruct students on the Standard Operating Procedures (SOP) for the laboratories. These are described in section 4.1 and in the safety section of the lab manuals used in the laboratory courses.
- Instruct students on the location and proper use of safety equipment available in the laboratory. This includes any eye wash stations, showers, fume hoods, fire extinguishers, and fire blankets.
- Design and use instructional experiments that minimize the amounts used and exposure to hazardous chemicals.
- Instruct students prior to the start of an experiment of any particular hazards associated with chemicals they may use in the experiment and insure that students are using the required personnel protection.

1.6 Human Resources Department

The HR Department shall establish and maintain for each individual an accurate record of any measurements taken to monitor individual exposures and any medical consultation and examinations including tests or written opinions required by this standard. These records shall be maintained by the HR Department in accordance with 29 CFR 1910.1020. Records for medical evaluations shall be kept for a period of 30 years following the last date of employment for each individual. Records for exposure evaluations shall be kept for a period of 30 years. In addition, the HR Department is responsible for:

- Maintaining all medical records according to state and federal confidentiality requirements.

- Scheduling medical evaluations and surveillance, as recommended by medical personnel or an Industrial Hygienist.
- Screens job descriptions for baseline medical surveys, with the assistance of an Industrial Hygienist.
- Manages all Workers' Compensation claims and the Neumann University Workers' Compensation program.
- Maintains training records for a period of three years unless otherwise specified by associated regulations. Training records shall include the name and signature of the attendee, the name of the training course, the name of the instructor and the date the course was administered.

Section 2: Training and Information

2.1 Chemical hazards

Student assistants employed by the University and under the direction of the Science Laboratory Manager (Dr. Matt Mastropaolo, Ph.D. Bachmann 349), with the responsibility to prepare laboratory solutions and set up labs will receive the training. Full time and Adjunct faculty will also receive training and must complete the online training quiz for the chemical hygiene plan. Training will be the responsibility of the Science Laboratory Manager or a designated member of the faculty. Training topics shall include the following items.

- Read the CHP with emphasis on the SOPs.
- Learn to recognize hazardous chemicals via signage or container labels.
- Good laboratory practices including how to handle safely chemicals and limit potential exposure by wearing eye protection, lab aprons and appropriate gloves, clothing and closed toe and backed shoes.
- Know how to access information on hazardous chemicals using the Safety Data Sheet, (SDS).
- Know the specific hazards of chemicals used.
- Understand Permissible Exposure Limits (PEL) for OSHA regulated chemicals and Threshold Limit Values (TLV) for chemicals they use so they can avoid overexposure.
- Know how to appropriately dispose of any waste or unused chemicals.
- Know how to respond to an emergency such as a spill, fire or injury.

2.2 Biological Hazards

Student assistants employed by the University and under the direction of the Laboratory Manager, with the responsibility to prepare laboratory solutions and set up labs will receive the training. Full time and Adjunct faculty will also receive training and must complete the online training quiz for biological hazards. Training will be the responsibility of the Science Laboratory Manager or a designated member of the faculty. Training topics shall include the following items.

- Read the CHP with emphasis on the SOPs.
- Learn to recognize biological hazards via signage or container labels.
- Good laboratory practices including how to handle biological samples safely and dispose of these samples in the proper containers.
- Limit potential exposure by wearing eye protection, lab coats, and appropriate gloves, clothing and closed toe and backed shoes.
- Know the specific hazards of any chemicals used in the laboratory.
- Know how to respond to an emergency such as a spill, fire or injury.

Section 3: Control Measures

The intent of control measures is to limit potential exposure to hazardous chemicals and biological agents. The exact control measures used must fit the nature of the hazard and the potential for exposure. The chemistry instructor or other chemical professional is expected to use their best professional judgment to determine what specific control measures may be needed to address any particular situation. Biology instructors should make sure that students are working in the biological safety cabinets when they are working with pathogenic bacteria. In the instructional setting at Neumann University the main control measures are 1) laboratory fume hoods, 2) biological safety cabinets, 3) personal protective equipment, 4) ventilated chemical storage cabinets, and 5) emergency equipment.

3.1 Fume Hoods

Fume hoods are located in 345, 358, and 359 and should be used when working with:

- Odorous, annoying, or irritating materials.
- Volatile solvents where the vapor concentration may approach the flammable limits.
- Volatile chemicals where the vapor concentration may approach the TLV.
- Fume hoods shall be inspected quarterly as part of the lab safety inspection to check 1) that the facial velocity is sufficient and 2) that chemicals are stored properly and without clutter.
- Fume hoods will also be serviced once a year.

3.2 Biological Safety cabinets

Biological safety cabinets are located in 342 and 349 and should be used when working with:

- Bacterial cultures only and are not intended for work with chemicals.
- Will not be used for storage of chemicals.
- For the transfer and storage of bacterial cultures.

3.3 Personal Protective Equipment for all Laboratories

- **Eye protection**. Anyone entering a laboratory is required to wear eye protection. The minimum required eye protection is safety goggles with side shield protection. Even casual visitors to the lab must wear safety goggles. When working with corrosive materials goggles must provide a tight seal around the eyes.
- **Face protection**. Full-face shields may be required or desirable for certain operations such as handling concentrated mineral acids or in situations where spattering of corrosive materials could occur.
- **Protective clothing**. In general anyone working in a lab should wear clothing that minimizes skin exposure. This includes long sleeve shirts and blouses, long pants and closed shoes. Laboratory

aprons or coats are required whenever corrosive materials, such as mineral acids or bases, are used.

- **Hand protection**. Gloves should be worn whenever there is any possibility of hand contact with corrosive or toxic materials. Gloves must be chosen that are compatible with the material being handled and should be inspected before use.
- **Respiratory protection**. In the instructional setting at Neumann there should never be a necessity to wear a respirator as a protective devise. Therefore, respirators are not available.

3.4 Ventilated storage cabinets

These cabinets are in the storage room within room 345. Organic chemicals that are liquids are stored in these cabinets. Spill containment should be used in these cabinets where appropriate.

3.5 Emergency equipment

- **Fire extinguishers**. These are located at the entrances of all labs. Annual inspection is the responsibility of the Neumann University Safety and Security Department. The Laboratory Manager will work with other on campus staff in campus safety to set up and inspect extinguishers for routine maintenance on a monthly and year basis.
- **Safety shower**. The shower, located in rooms 345, 348, 354, 355, and 358 shall be flushed and checked for proper operation annually by the Neumann University Facilities Department. The Laboratory Manager is responsible for arranging for this inspection.
    - Keep all passageways to the shower clear of any obstacle, even a temporarily parked chemical cart.
    - Showers should be checked routinely to assure that access is not restricted, and that the start chain is within reach. Extensions to the start chain may be required to accommodate handicapped or shorter individuals.
    - The flow through the safety showers should be tested before each semester and summer instructional and research sessions to ensure sufficient flow (approximately 30 gallons per minute).
    - Monthly inspections of showers should be documented in writing in order to ensure continued compliance. This is best achieved by affixing a maintenance record tag to the eyewash itself. Inspections should evaluate the following items:
        - Lack of contamination/coloration
- Sufficient flow **Eye Wash Stations**. The eye wash stations in each lab must be flushed and checked for proper operation as part of the quarterly safety inspection.
    - Keep all passageways to the eyewash clear of any obstacle, even a temporarily parked chemical cart.

- Eyewashes must be accessible within 10 seconds from any potential chemical hazard, and access may not be restricted (i.e., there cannot be a potential for locked doors, etc.).
- Eyewashes should be checked routinely by laboratory personnel to be certain that water flows through it. Allow them to run for several minutes once per week to clear out the supply lines.
- Monthly inspections of eyewashes should be documented in writing in order to ensure continued compliance. This is best achieved by affixing a maintenance record tag to the eyewash itself. Inspections should evaluate the following items:
    - Presence of caps
    - Ability for caps to "pop off" when water flow is engaged
    - Even height of water flow from both nozzles
    - Adequate water flow from all nozzles
    - Lack of contamination/coloration
    - Tepid temperature, not cold
    - Requires operation by means that does not require continued pressure to operate, and must turn on within one second.

Section 4: Standard Operating Procedures for Laboratories, Chemicals and Compressed Gas Cylinders

4.1 Rules for the Science Labs. These can also be found in the introduction to the laboratory manuals used for each course.

- Safety goggles, laboratory coat/apron, and closed toe/backed shoes are to be worn at all times in the laboratory. Personal eyeglasses are not acceptable as safety goggles. Contact lenses are not recommended for use during any laboratory work. Any student wearing contact lenses must inform the instructor at the first lab meeting.
- Laboratory work is permitted only when a qualified instructor is present. Student assistants are not permitted to work alone or unsupervised.
- No food or beverage is permitted in the laboratory at any time, even when laboratory course is not in session.
- Learn the location of safety equipment: fire extinguishers, safety shower, eye wash stations, fire blanket, first aid kits, and any other specified equipment.
- Dispose of all chemical waste properly in the appropriate waste containers. Any reagents or solutions requiring special disposal will be identified at the beginning of each lab. Dispose of solids in the waste cans provided, never in the sinks. Dispose of glass in the specifically designated container.
- Disposal of all biological waste properly and in the appropriate containers. Any glassware or glass slides containing biological samples must be placed in the appropriate biohazard sharps container. Any solid waste, such as media, must be placed in the appropriate biohazard container. Any pipet tips, swabs, disposable loops, and other implements must be disposed of in the biohazard containers and not the regular trash. Any liquid containing glass tubes will be placed in the biohazard sharps container or marked biohazard bin. Students are not allowed to remove any contaminated material from the labs.
- All biohazard waste will be transferred in bags to the larger collection box in each laboratory when full. Students are not allowed to remove the bags when full.
- All full biohazard boxes will be removed from the labs by the Science Laboratory Manager or other qualified faculty and moved to the chemical/biological storage area in room 350. Students are not allowed to remove any boxes from the rooms.
- Read labels on reagent bottles before using. Never put unused reagent back in a reagent bottle.
- Use a funnel to transfer liquids into container with a small opening.
- If used, the Bunsen burner requires particular care. Never reach over a lit burner. Never leave a lit burner unattended. Tie back long hair. Never point a heated test tube at a person. Never use a Bunsen burner when flammable liquids are on the bench.

- Never put a chemical, reagent solution or pipette in your mouth.
- When diluting acid, always add the acid slowly into water.
- Follow directions given for the experiment. Do not innovate.
- Flush any chemical spills on the skin immediately with cold water.
- Immediately report all accidents, spills and breakage to the laboratory instructor.
- In the event of a spill, follow the instructions of the Laboratory Instructor promptly and carefully.
- Clean and dry all glassware and replace it and all laboratory hardware in the correct laboratory drawers or cabinets before leaving the laboratory.
- Thoroughly wash hands with soapy, running water or designated cleansing solution before leaving the laboratory.

4.2 Chemicals Procurement, Handling and Storage.

- Faculty is urged to minimize the inventory of all chemicals and keep quantities on hand consistent with the needs of the instructional labs.
- Only chemicals ordered through the University purchasing department may be stored.
- No container should be accepted that is not properly labeled and for which a Safety Data Sheet, SDS, is not available.
- Manager shall maintain a file of SDS for each chemical used by the laboratories.
- Chemicals shall be stored only in designated and secure storage areas.
- Incompatible chemicals must be segregated. (Appendix V)
- The chemical storage areas shall be inspected as part of the regularly scheduled safety inspections.
- Before using any chemical read the label on the container to identify the contents and note any hazard information.
- Liquids and solutions shall be stored in trays of sufficient size to contain a spill due to leakage from or breakage of the largest container.
- Acids and bases shall be stored separately in trays in the designated cabinets.
- Organics shall be stored in the chemical storage room within room 345. Liquid organics shall be stored in the ventilated cabinets in this room.
- Solutions and other chemical reagents shall be stored in trays in room 345A, 349 and 359.
- Solutions and other chemical reagents requiring refrigeration shall be stored in the chemical refrigerator 345A, 349, or 359.

- Flammable chemicals requiring refrigeration are **only allowed to be stored in the refrigerator in room 359.**
- Stock solutions shall be labeled clearly indicating the contents, concentration and date prepared.
- The following materials shall not be purchased, stored or used: 1) perchloric acid, 2) metal cyanides capable of reacting with acids to form hydrogen cyanide, 3) picric acid.
- Ethyl ether shall always be stored in the original container. The date on which the sample was received shall be recorded on the label as well as the date on which the container was opened. Opened containers shall be stored away from heat and shall not be stored for more than 6 months.

4.3 Handling and Storage of Compressed Gas Cylinders.

- Cylinders of compressed gases are hazardous for several reasons. They are under high pressure and therefore contain a large amount of energy. They may contain a toxic or flammable chemical.
- The only cylinders of compressed gas used by the chemistry labs at Neumann contain helium or nitrogen. Helium and nitrogen are inert, non-toxic and nonflammable. Note however, that release of a large quantity of either gas in a poorly ventilated area could displace enough oxygen in the surrounding atmosphere to cause asphyxiation.
- Cylinders should always be stored and used in a well-ventilated area and away from any heat source.
- A stored cylinder must always have a cylinder cap and be strapped firmly in place.
- A cylinder in use must be firmly secured with a strap or chain to insure that it cannot tip or fall.
- An empty cylinder must be tagged and labeled as “EMPTY” or “MT”.
- A cylinder can only be moved with a cylinder cart and must be strapped onto the cart.
- A cylinder should be checked for leaks when first put into service.
- The proper two-stage regulator shall always be used. The regulator should be inspected prior to use.
- Regulators must never be lubricated. Teflon tape may be used on fittings to insure a snug fit.
- Following delivery of compressed gas cylinders to the lab, only a chemistry faculty member may handle them.

4.4 Safety Inspections

- The Laboratory Manager along with WasteStrategies are responsible for conducting a joint safety inspection of all the laboratories and chemical storage areas, using the AuditPRO software.
- Inspections will be conducted on an ongoing basis throughout the year.
- Results of the inspection will be documented on the WasteStrategies web portal. Access to the web portal, including findings from Lab Inspections will be provided to all approved personnel.

Section 5: Chemical Spills, Accidents, and Emergencies

5.1 Emergency Response. The university's emergency response procedure shall be posted at the entrance to all labs and chemical storage area. Phone numbers of the faculty to be contacted in the event of an emergency shall be kept in the security office.

5.2 Fire. In the event of a fire the first response should be to sound an alarm by 1) calling security at ext.5555 by using a phone located in the lab or using the emergency phones located in the hall outside the labs or pulling the nearest fire alarm box and 2) warning others in the area. Fire extinguishers can be used to extinguish a small or contained fire provided the individual using the extinguisher has been trained in its proper use.

5.3 Chemical Spills. The proper way to respond to a spill is to be familiar with the hazard properties of the spilled chemical. Spill containment and clean up materials are available in labs 345 and 358. Students or assistants should first contact a chemistry faculty member or the Laboratory Manager before attempting to clean up a spill. A decision can then be made about the appropriate response, which will depend on the size of the spill and the hazard potential of the chemical.

5.4 Significant Exposure. Students and student assistants shall be instructed on the location and correct use of the emergency shower and eye wash stations.

5.5 Medical Emergency. The University policy on medical emergencies is posted at the entrance to the laboratories.

5.6 Safety Data Sheets (SDSs). The Laboratory Manager receiving the chemicals for the laboratory has the responsibility for obtaining and properly archiving all SDSs for each chemical in the laboratory. MSDSs must be "readily available" to all individuals working in the laboratory.

- All MSDS or SDS sheets are located in 349. Each laboratory also contains their own SDS/MSDS binder with chemicals used in the class room.
- All chemical MSDS sheets currently in use in the Science labs are also located on Neumann University's MSDS online account. These can be accessed by the Chemical Hygiene Office and provided to anyone who request this information within 2 working days.
- If SDSs have not arrived with the chemical shipment, request a copy from the distributer or obtain a copy from the vendor online. They must provide a copy within 10 working days, upon request.
- If you have problems obtaining, or finding an SDS for an older chemical currently in storage, call the Chemical Hygiene Officer for assistance.
- SDSs should be maintained for as long as you have your chemical and then archived for 30 years. MSDS sheets currently in use are to be kept for the same period as the SDS sheets once the chemicals have been used.

- MSDS online system is available to the Chemical Hygiene Officer and any information requests from Neumann University personnel directed to the Chemical Hygiene Officer and information will be provided in a timely manner.
- Any questions should be directed to the Chemical Hygiene Officer.

Section 6: Particularly Hazardous Chemicals and Biologicals

6.1 Chemical hazards

Within the definition of hazardous substances, the OSHA Laboratory Standard includes a subcategory called "particularly hazardous substances". These are:

Substances with High Acute Toxicity (Appendix III)

1. any chemical with an oral LD_{50} equal or less than 50 mg/kg
2. any chemical with a dermal LD_{50} equal or less than 200 mg/kg when administered by continuous contact for 24 hours
3. any chemical with an LC_{50} equal or less than 200 ppm by volume or 2 mg/L of mist, fume or dust over 1 hour of inhalation

Carcinogens (Appendix III)

1. regulated carcinogens listed in subpart Z of the OSHA standard
2. listed as "known to be carcinogens" in the Annual Report on Carcinogens published by the National Toxicology Program
3. a Group 1 carcinogen "carcinogenic to humans" as well as group 2A and 2B "reasonably anticipated to be carcinogens" listed by the International Agency for Research on Cancer, IARC.

Reproductive Toxins (Appendix III)

1. mutagens or substances causing chromosomal damage
2. teratogens or substances having an effect on a fetus

A few chemicals meeting the definition of a particularly hazardous chemical are used in the instructional labs. When this occurs, in addition to following the usual lab rules, the following procedures should be used.

- Keep quantities to an absolute minimum. This normally means that less than 60 ml of a solution or liquid reagent should be at each work station or that the materials shall only be used in a hood.
- Students should be informed of the particular hazard by way of written or verbal warnings.
- Volatile chemicals should be used in the hood and students will be closely supervised by the laboratory instructor.
- Materials should always be used with spill containment.
- Students may be required to wear specific gloves depending on the material handled.
- Students should wash their hands following use of these materials.

In the event that a student worker is required to handle a particularly hazardous chemical each of the applicable requirements listed above will be followed with the addition provision that the work may only

be done at the direction of and with the direct supervision of the laboratory manager or a chemistry faculty member.

6.2 Biological hazards

All biological hazards shall be listed in the SOPs for each class that uses bacterial cultures and human samples. Faculty will instruct students on the proper methods for handling and disposal of such items. All biological hazards and regulations are located in the Exposure control plan.

Section 7: Medical Examinations and Consultations

7.1 Need for a Medical Exam or Consultation. In certain situations an employee or student should be referred to a physician for an examination or consultation. These situations include:

- A lab worker exhibits symptoms of a chemical exposure
- There is possible significant exposure due to an accident or spill
- When requested because of suspected exposure to a hazardous chemical

7.2 Procedure for Referral to a Physician. All arrangements shall be made through the university medical department.

7.3 Information Provided to the Physician. The following information shall be supplied to the physician.

- The identity and quantity of the chemical in question.
- A description of the circumstances surrounding the exposure.
- A description of the symptoms exhibited.

7.4 Physician Report. The physician shall provide a written report to the Vice President for Human Resources and Risk Management (for confidentiality reasons) and should include the following:

- Results of the examination and any tests conducted.
- Any recommendations for a medical follow up.
- Any medical finding that may place the patient at an increased risk of any chemical exposure.
- Any medical findings unrelated to the suspected exposure shall not be part of this report.

Section 8: Record Keeping

The Laboratory Manager shall keep the following records:

- Student and Faculty acknowledgements of laboratory SOP's for 7 years.
- Records of the periodic safety inspections, corrective actions taken or planned.
- Safety Training (Appendix II)

Appendix I: Neumann University Chemistry – Lab Inspection Check List

Date: _____ Inspected by: _____

	Lab 358	Lab 345	Storage 345	Storage 350	Action Taken/Required
General Housekeeping Lab tidy, floors, doorways, access to emergency equipment clear					
Emergency Procedures/Equipment Eye wash stations, fire extinguishers, fire blanket, spill control materials, procedures/phone numbers posted					
Fume Hoods Facial velocity checked, free of clutter, no improper storage					
Chemical Storage Proper location, in trays, properly labeled					
Waste Handling Proper containers, waste segregated where appropriate, labeled, storage					
Electrical Overall condition, frayed cords, proper extension cords, GFI's					

Appendix II: Safety Training Checklist – Science Department

Responding to an emergency

_____ Location of emergency phones

_____ Warn people in vicinity

_____ Inform supervisor or faculty member

_____ Location of first aid box

_____ Location of fire alarm pull boxes

_____ Closest fire exits

Work Rules

_____ Work only under direct supervision of lab manager or faculty

_____ Wear proper protective gear: goggles, lab coat/apron, proper clothing, and closed toed/backed shoes

Working with Chemicals

_____ Read CHP prior to training and know location of CHP

_____ Know laboratory SOPs

_____ Know location of SDS binder

_____ Understand how to identify hazards of chemicals

_____ Know proper method to transport chemicals

_____ Use of fume hoods

_____ Explain what to do in case of a chemical spill

_____ Explain what to do if a chemical is splashed on the body

_____ Report all spill or splash incidents to the lab manager or supervising faculty

_____ Know location of eyewash stations and safety shower

_____ Explain label requirements

_____ Know waste disposal requirements

Working with Biohazards

_____ Wear gloves and proper personal protective equipment

_____ Wipe bench top with 10% bleach at end of work session

_____ Dispose of all contaminated materials in biohazard labeled red bags or boxes

_____ Place all “sharps” in biohazard “sharps” container

Appendix II: Safety Training Checklist – Science Department

I have received the training checked above.

_____	_____	_____
(signature)	(date)	(print name)

The above individual received the training checked above

_____	_____	_____
(signature of lab manager/faculty)	(date)	(print name)

Appendix III: Neumann University Science Laboratory Safety Policy (Faculty)

NEUMANN UNIVERSITY

SCIENCE LABORATORY SAFETY POLICY (Faculty)

This policy applies to all science laboratory courses offered at Neumann University. Each laboratory course has an additional laboratory safety sheet that is specific for that course. PLEASE READ THIS ENTIRE SAFETY POLICY SHEET and sign the statement at the end. A student may not perform laboratory work unless the Laboratory Safety Policy and specific course Laboratory Safety Rules Sheet have been signed and submitted to the laboratory instructor.

LABORATORY SAFETY: **Students must be aware of these overall safety requirements for laboratory courses and be prepared to be in compliance with these requirements.**

Faculty must instruct students and follow these rules themselves:

- Know and appropriately abide by the safety regulations for specific science laboratory courses. (Included as a separate sheet.)
- Know the location of all safety features in a laboratory area, including, but not limited to, fire extinguishers, eye wash and shower stations, and spill control agents.
- **Never bring food, beverages or tobacco into any Neumann laboratory area at any time, whether or not a laboratory class is in session.**
- Wear closed-toed shoes in the lab at all times (sandals, flip-flops, ballet flats, etc. are not allowed).
- Do not sit on the floor at any time!
- Wear personal protective clothing and/or equipment, which is appropriate for the nature of the specific laboratory course, at all times during a laboratory session.
- Take precautions to prevent exposure of self and others to hazardous materials, including proper disposal when the materials are in your classroom whether you are actively using the materials or not.
- Initiate appropriate emergency response measures when required.
- ***Do not enter the laboratory when another lab is in session.***
- ***Cell phone use is not permitted in the laboratories. The use of cell phones to have outside conversations by talk or text is disruptive to both students and faculty in the room.***

MEDICAL CONDITIONS and/or DISABILITIES: **Students are to inform you of any medical conditions or allergies as explained below.**

Any student who has a medical condition/disability (such as, but not limited to, severe allergy, asthma, pregnancy, etc.) that may interfere with his/her ability to perform in the laboratory course must notify each laboratory instructor. The following information must be submitted 1) a statement of intent to continue the laboratory course during the semester, and 2) a letter that states the student has discussed enrollment in each laboratory course with his/her attending physician/medical practitioner.

In order to earn course credits, the student must meet the course objectives. If, at any time, the physician/medical practitioner and the student decide that the activities of the student must be limited, written documentation from the physician/medical practitioner must be given to the laboratory course instructor. The science faculty will determine whether the limitation can be accommodated in a manner

that would permit the student to successfully achieve the course objectives and satisfy the requirements of the course. Medical conditions which prevent achievement of course objectives will necessitate a medical withdrawal of the student from the course.

A student who has identified a medical condition/disability that may interfere with the ability to perform in the laboratory course must submit the required documentation prior to participating in any laboratory work. A student who becomes aware of a medical condition/disability during the course of the semester must inform the instructor as soon as possible and provide all necessary written information. **Any student with a medical condition/disability performing laboratory work without informing the course instructor or his/her own physician/medical practitioner must take full responsibility for any consequences.**

If you, the faculty member, have any allergies/medical conditions that will prevent you from completing the tasks in class or will miss class please inform the Dean's office (610-558-5509) and the Science Lab Manager (610-358-4240).

I have read, understand, and agree to abide by all of the above general safety rules for the all Science Laboratories.

Course Name, Number & Section: _____

Signed _____ Date _____

Print Name: _____

Appendix IV: Neumann University Science Laboratory Safety Policy (Students)

NEUMANN UNIVERSITY

SCIENCE LABORATORY SAFETY POLICY

This policy applies to all science laboratory courses offered at Neumann University. Laboratory courses may have an additional laboratory safety sheet that is specific for that course. **PLEASE READ THIS ENTIRE SAFETY POLICY SHEET and sign the statement at the end.** A student may not perform laboratory work unless the Laboratory Safety Policy and specific course Laboratory Safety Rules Sheet have been signed and submitted to the laboratory instructor.

LABORATORY SAFETY

Students must be aware of these overall safety requirements for laboratory courses and be prepared to be in compliance with these requirements.

Students must

- Know and appropriately abide by the safety regulations for specific science laboratory courses. (Included as a separate sheet.)
- Know the location of all safety features in a laboratory area, including, but not limited to, fire extinguishers, eye wash and shower stations, and spill control agents.
- **Never bring food, beverages or tobacco into any Neumann laboratory area at any time, whether or not a laboratory class is in session.**
- Wear closed-toed shoes in the lab at all times (sandals, flip-flops, ballet flats, etc. are not allowed).
- Do not sit on the floor at any time!
- Wear personal protective clothing and/or equipment, which is appropriate for the nature of the specific laboratory course, at all times during a laboratory session.
- Take precautions to prevent exposure of self and others to hazardous materials, including proper disposal when the materials are in your classroom whether you are actively using the materials or not.
- Initiate appropriate emergency response measures when required.
- ***Do not enter the laboratory when another lab is in session and never begin working without a qualified instructor present.***
- ***Cell phone use is not permitted in the laboratories. The use of cell phones to have outside conversations by talk or text is disruptive to both students and faculty in the room.***

MEDICAL CONDITIONS and/or DISABILITIES

Any student who has a medical condition/disability (such as, but not limited to, severe allergy, asthma, pregnancy, etc.) that may interfere with his/her ability to perform in the laboratory course must notify each laboratory instructor. The following information must be submitted 1) a statement of intent to continue the laboratory course during the semester, and 2) a letter from the student's attending physician/medical practitioner that states the student has discussed enrollment in each laboratory course with his/her attending physician/medical practitioner.

In order to earn course credits, the student must meet the course objectives. If, at any time, the physician/medical practitioner and the student decide that the activities of the student must be limited, written documentation from the physician/medical practitioner must be given to the laboratory course instructor. The science faculty will determine whether the limitation can be accommodated in a manner that would permit the student to successfully achieve the course objectives and satisfy the requirements of the course. Medical conditions which prevent achievement of course objectives will necessitate a medical withdrawal of the student from the course.

A student who has identified a medical condition/disability that may interfere with the ability to perform in the laboratory must submit the required documentation prior to participating in any laboratory work. A student who becomes aware of a medical condition/disability during the course of the semester must inform the instructor as soon as possible and provide all necessary written information. **Any student with a medical condition/disability performing laboratory work without informing the course instructor and his/her own physician/medical practitioner must take full responsibility for any consequences.**

I have read, understand, and agree to abide by all of the above general safety rules for the all Science Laboratories.

Course Number & Section: _____

Signed _____ Date _____

Print Name: _____

Appendix V: Hazardous Waste Policy

This policy describes guidelines for the identification, collection, storage and disposal of hazardous chemical waste. The guidelines apply to the chemical waste generated in the chemistry instructional labs but may also be applied to other generators of hazardous waste at Neumann such as the biology, art and photography faculty. They do not apply to radioactive, biohazards or infectious waste.

Hazardous wastes are regulated by the U.S. Environmental Protection Agency (EPA), the U.S. Department of Transportation and the Pennsylvania Department of Environmental Protection. The EPA enforces these regulations at academic institutions including those academic institutions that operate only instructional labs. Enforcement can be strict and very large fines can and have been assessed against academic institutions including small colleges and community colleges. Adherence to these guidelines can help assure that hazardous chemical wastes are properly identified, handled, and disposed of and that the laws are not violated.

What is a Waste?

A waste can be 1) a used, spent or abandoned material, 2) a material beyond its expiration date, 3) an empty chemical container

What is a Hazardous Waste?

Determining that a substance or mixture is hazardous is not always straightforward. If you are unsure it is better to be prudent and identify the material as hazardous. The SDS of the material in question can be checked for guidance. The definition of hazardous materials below is a guideline and is not exhaustive.

The EPA defines a hazardous waste as one that meets any <u>one</u> of the following criteria.

1. Flammable. A material with a flashpoint less than or equal to 140°F (60°C).
2. Corrosive. A material with a pH less than 2.0 or greater than 12.5.
3. Reactive. A material that is unstable or prone to react violently under certain conditions. These include materials that 1) are strong oxidizers, 2) react violently with water, 3) can generate toxic gases or fumes when contacted with water, 4) are capable of detonation or explosion at standard conditions or when heated in a confined space.
4. Toxic. Specifically listed by the EPA as a toxic material. Many materials not listed by the EPA may be toxic. The National Institute of Occupational Health and Safety (NIOSH) defines toxic as any material that can exert an adverse chronic or acute health effect on the body when exposed. In general a material with an acute oral LD_{50} less than 2500 mg/kg, acute dermal LD_{50} less than 4300mg/kg or an acute inhalation LD_{50} less than 10,000 ppm (gas) can be regarded as toxic or poisonous. Other materials that may pose risks include carcinogens, mutagens, and teratogens.

A list of suspected carcinogens, mutagens and teratogens is available from the laboratory manager and at the web sites listed at the end of this document.

This is a list of chemicals that fail the Toxicity Characteristic Leaching Procedure. A waste containing any of these materials is a regulated EPA hazardous waste.

Arsenic	1,2-dichloroethane	Methyl ethyl ketone
Barium	1,1-dichloroethylene	Pentachlorophenol
Benzene	2,4-dinitrotoluene	Pyridine
Cadmium	Endrin	Selenium Chlordane
Carbon tetrachloride	Heptachlor	Silver
Chlorobenzene	Hexachlorobenzene	Tetrachloroethylene
Chloroform	Hexachloroethane	2,4,5-trichlorophenol
Chromium	Lead	2,4,6-trichlorophenol
Cresols, *o, m, p*	Lindane	2,4,5-TP Silvex
2,4-D	Mercury	Vinyl chloride
1,4-dichlorobenzene	Methoxychlor	

How to Collect Hazardous Waste

Containers. Containers must be chemically compatible with the waste contents. Solid waste can go into glass or heavy gauge polyethylene bags. Liquid waste may go into glass or thick walled, chemically resistant PE or PP. Never place corrosive materials in metal cans. Never mix incompatible waste. All waste containers must be placed in trays large enough to contain all the waste. All containers must be tightly sealed with a screw cap. Corks or rubber stoppers are not acceptable.

Labels. Every waste container must have an attached label or preferably a tag. The tag must be labeled "Hazardous Waste" and contain the following information.

Contents: the full chemical name must be used. Formulas, abbreviations, trade names or reagent names are not acceptable.

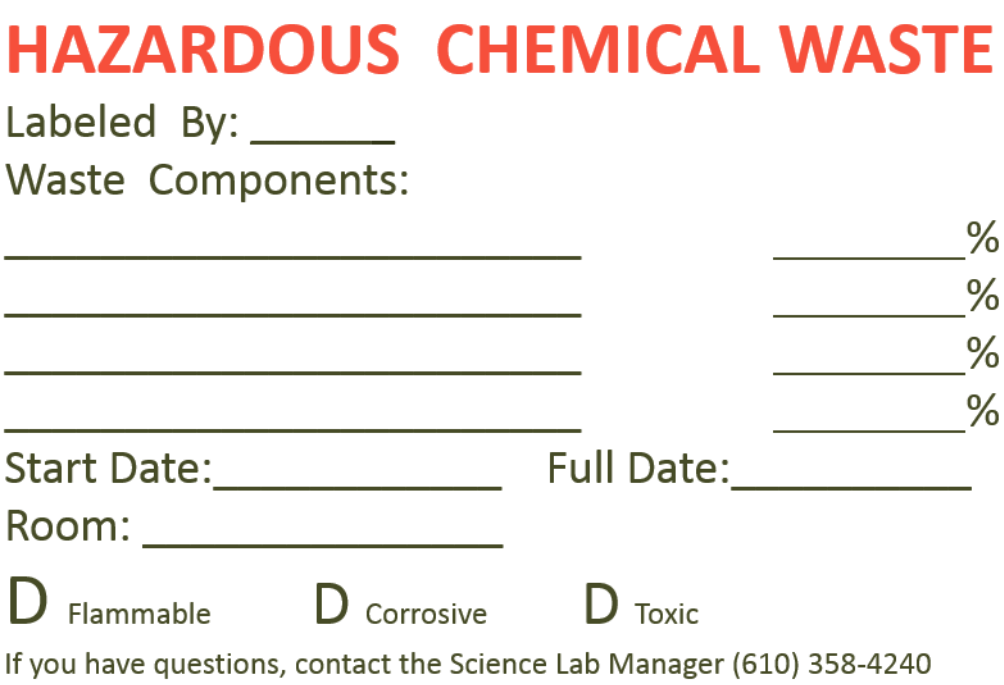
Amount: mass percent of each component, if a mixture, and total mass. Mass percentages must add to 100.

Category: identify the waste as toxic, reactive, corrosive or flammable. More than one category may apply. In the case of particularly toxic or reactive materials additional cautionary information should be given.

Generator: name of the individual responsible for generating and completing the waste tag.

Date: the date the container is filled or ready for pick-up.

Waste tags and labels are available from the lab manager.


HAZARDOUS CHEMICAL WASTE

Labeled By: _____

Waste Components:

_____ _____%

_____ _____%

_____ _____%

_____ _____%

Start Date:_____ Full Date:_____

Room: _____

D Flammable D Corrosive D Toxic

If you have questions, contact the Science Lab Manager (610) 358-4240

Sample Waste Tag

How to Store Hazardous Waste

When the collection process is completed the container should be placed in the area designated for hazardous waste storage. This area must be identified with sign stating “Caution: Hazardous Waste”. Containers must be tagged as described above and must be placed in tray with a volume sufficient to contain the waste. Incompatible materials must never be stored together.

Non-Hazardous Waste

Not all chemical waste is hazardous. A non-hazardous waste can be disposed using trash or drain.

Non-Hazardous Solids.

Empty chemical containers can be put in the trash provided they contain no liquid or solid residue. Containers that once held a P listed hazardous material must be rinsed three times using a rinse volume of 10% of the container volume and the rinse collected as a hazardous waste.

Organics: sugars, starch, amino acids, citric acid, lactic acid, nucleotides, surfactants.

Inorganics: sodium, potassium, calcium, magnesium and ammonium salts of sulfates, carbonates, oxides, chlorides and borates.

Lab materials not contaminated with hazardous chemicals: filter paper, glassware, absorbents, plastic or rubber protective gear.

Non-Hazardous Liquids and Solutions

Aqueous solutions of the organics and inorganics listed above can be disposed of in the sanitary drain. Additionally, soluble combinations of certain cations and anions may also be put down the drain. Quantities disposed of in this way should be kept small and be flushed with larger quantities of water.

Cations	Anions	
Aluminum	Acetate	Chloride
Ammonium	Bicarbonate	Iodate
Calcium	Bisulfite	Iodide
Iron	Borate	Sulfate
Lithium	Bromate	Sulfite
Magnesium	Bromide	Thiocyanate
Potassium	Carbonate	Thiosulfate
sodium	Chlorate	

The laboratory manager has a file of carcinogens, mutagens, and teratogens.

Websites with more information:

1. NIOSH list of chemicals immediately Dangerous to Life or Health Concentrations: http://www.cdc.gov/niosh/idlh/intridl4.html
2. OSHA List of Highly Hazardous Chemicals, Toxics and Reactives: http://www.osha.gov/ (go to 1910.119 App A)
3. List of Known and Suspected Teratogens: http://ptcl.chem.ox.ac.uk/MSDS/teratogens.html
4. List of Group 1 and 2A Carcinogens: http://www-cie.iarc.fr/monoeval/crthgr01.html
5. Partial List of Mutagens: http://ehs.ohio-state.edu/docs/labsafe/Table10-11-00.pdf

Appendix VI: Chemical Storage Compatibility

- Mineral acids, acetic and formic acids should be stored in trays in the designated areas in room 359. Nitric acid is segregated from other acids. Perchoric acid is considered too dangerous to be in the chemical inventory.
- Bases are stored in trays in the ventilated storage cabinets in room 345.
- Flammable and combustible liquids are stored in the ventilated cabinets in room 345.
- Volatile toxics are stored in the ventilated cabinets in room 345.

Chemical Compatibility Guidelines

These guidelines are incomplete and apply only to chemicals (left column) in the Neumann University chemical inventory.

Chemical:	**Incompatible with:**
Acetic acid	Chromic acid, nitric acid, hydroxyl compounds, ethylene glycol, perchloric acid, peroxides, permanganates
Acetone	Hydrogen peroxide, concentrated nitric and sulfuric acid mixtures
Alkali and alkaline earth metals (powdered aluminum, magnesium, calcium, lithium, modium, potassium	Water, carbon tetrachloride, other chlorinated hydrocarbons, carbon dioxide, halogens
Ammonium nitrate	Acids, powdered metals, flammable liquids, chlorates, nitrites, sulfur, finely divided organic combustible materials.
Aniline	Nitric acid, hydrogen peroxide
Arsenicals	Any reducing agent
Azides	Acids
Bromine	Ammonia, acetylene, butadiene, butane methane, propane, hydrogen, sodium carbide, benzene, finely divided metals, turpentine
Calcium oxide	Water
Carbon, activated	Calcium hypochlorite, all oxidizing agents
Carbon tetrachloride	Sodium
Chlorates	Ammonium salts, powdered metals, finely divided organic or combustible materials
Chromic acid, Chromium trioxide	Acetic acid, naphthalene, camphor, glycerol alcohol, flammable liquids
Copper	Acetylene, hydrogen peroxide
Flammable liquids	Ammonium nitrate, chromic acid, hydrogen peroxide, nitric acid, sodium peroxide, halogens

Hydrocarbons	Halogens, chromic oxide, sodium peroxide
Hydrogen peroxide	Copper, chromium, iron, most metals and their salts, alcohols, acetone, organic materials, aniline, nitromethane, combustible materials
Hypochlorites	Acids, activated carbon
Iodine	Acetylene, ammonia (aqq. & anhyd.), hydrogen
Nitrates	Sulfuric acid
Nitric acid (conc.)	Acetic acid, aniline, chromic acid, hydrogen sulfide, flammable liquids and gases, copper, brass, heavy metals
Nitrites	Acids
Oxalic acid	Silver, mercury
Potassium chlorate	Sulfuric acid, other acids
Potassium perchlorate	Sulfuric acid, other acids
Potassium permanganate	Glycerol, ethylene glycol, benzaldehyde, sulfuric acid
Silver	Acetylene, oxalic acid, tartaric acid, ammonium compounds, fulminic acid
Sodium nitrite	Ammonium nitrate and other ammonium salts
Sodium peroxide	Ethyl and methyl alcohols, glacial acetic acid, acetic anhydride, benzaldehyde, carbon disulfide, glycerin, ethylene glycol, ethyl acetate, methyl acetate, furfural
Sulfides	Acids
Sulfuric acid	Potassium chlorate, potassium perchlorate, potassium permanganate