College of Science and Mathematics

Laboratory Handbook for Faculty, Staff and Research Students

Fall 2014

Preface

This handbook is presented as an information and reference source to be used, along with other materials, as a guide to proper and safe practices in the laboratories of the College of Science and Mathematics at Kennesaw State University.

The productive and safe operation of our laboratory space is a team effort. We have a collegial community of undergraduate students, graduate students, staff and faculty all working towards the same goal; the fostering of a safe and supportive working environment. No person is exempt from laboratory policy and regulations. Everyone using or visiting the laboratories must comply with the policies regarding lab safety, equipment use and lab etiquette.

9.12.4 Environmental and Occupational Safety

The Board of Regents is committed to achieving excellence in providing a safe working and learning environment, and supporting environmentally sound practices in the conduct of institutional activities. Each institution shall, at a minimum, comply with applicable environmental and occupational safety laws and regulations, and shall designate a key member of its administrative leadership team to oversee compliance. In the absence of specific laws or regulations, each institution will follow industry standards and good management practices.

Each institution shall maintain policies and procedures to govern activities to meet the goal of comprehensively integrating occupational safety and environmental considerations, and will periodically review and update such policies and procedures.

The USG chief facilities officer is responsible for developing standards, guidelines, and processes to promote, support, and access the implementation of environmental and occupational safety management programs and initiatives.

The USG chief facilities officer shall require institutions to provide reports related to environmental and occupational safety performance and shall report such data to the Board on an annual basis (BoR Minutes, June 2009).

Remember that **you** are responsible for:

- Your own health and safety.
- The health and safety of those around you.
- The security and the safe use of equipment and facilities that you have been authorized to use.
- Understanding and complying with all laboratory policies

Safe and proper participation in the laboratories is a requirement whether as an employee or student. Failure to do so may result in loss of laboratory privileges or termination of employment.

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Definitions

The term “lab” has been used for several different meanings. For the purpose of our safety information, the following definitions will be used:

- Lab or Laboratory: A room where scientific scholarship activity takes place using hazardous chemicals or materials.
- Prep room or prep lab: A room where materials are prepared, stored and staged for instructional laboratory activities.
- Instructional Lab or Instructional laboratory: A room used for instructional activities.
- Instructional Laboratory Activity. Procedure performed for the purpose of instruction.
- Field Research or Study: Scientific scholarly activity conducted in an outdoor setting, on or off campus.
- Academic Field Trip: A course related activity which normally involves travel for the group of students enrolled in a class.

Emergency Procedures

This section is to provide instructions for some common occurrences. Refer to the Kennesaw State University Chemical Hygiene Plan and the Emergency Action Plan for more information. **http://www.kennesaw.edu/sss/planning/planning.html**

Fire Alarms

Become Familiar with emergency evacuation plans for your building. When the fire alarm sounds, you must evacuate the building. Remind all in the room to take their Personal belongings (coat, keys, books, etc.) with them. You may be out of the building for a prolonged period of time.

Practice fire drills do not occur unless well planned and announced repeatedly in advance. Treat every alarm as a serious matter. You may only have seconds to evacuate.

Outdoor Sirens

The sirens outside are warnings to seek shelter indoors. In those types of situations, such as a tornado warning, other methods of notification such as automatic cell phone, text and computer pop-up will occur for those indoors.

Severe Weather

There are two types of tornado alerts issued by the National Weather Service:

TORNADO WATCH- *The formation of tornadoes is possible within and near the watch area*

TORNADO WARNING- *A tornado has been spotted on the ground or by Doppler radar. If you are in the warning area, should take action immediately to protect your life and the lives of others.*

If a **TORNADO WARNING** is issued, you may receive that information through the campus alert system. The sirens outside are to warn people outdoors and may not be heard indoors. In addition, there is no sure way to always predict and notify in the event of a tornado. It is in your best interest to stay informed of changing weather conditions and be prepared to take action.

During a Tornado Warning you may need to direct your students or others to safety during a storm warning. In general, you want to be away from windows and on the lowest floor possible. Here are some safer areas in our buildings. You should go to these areas immediately if a tornado warning is issued.

Clendenin Building: The first floor classrooms are windowless and would be the safest in that building. The Clendenin hallway is also a location as long as you stay away from the east doors or the lobby.
Science Building: SC109 is windowless as is the lab wing, 1st floor service hallway. Also the south area of the 2nd floor lab wing.

Science Lab Building: Use the southwest stairwell to access the first floor corridor to the mechanical rooms as the safety area.
Avoid the lobbies of all three buildings because of the glass windows. If you have classes in other buildings, you need to contact the crisis coordinator of that building in advance to learn the designated shelter areas. You can find a list at the Strategic Security and Safety website, under the Crisis Coordinator tab.
http://www.kennesaw.edu/sss/

While taking shelter for a few minutes during a tornado warning may be an inconvenience in your classes or work, the goal is to make sure we all are safe.

Injury or Illness

For any serious injury or illness, contact KSU Public Safety at 470-578-6666, then notify the lab safety officer or the department office and administer first aid if necessary. Do not call 911. While the local 911 center will dispatch EMS, the same response will occur through KSU Dispatch, but KSU officers will be on the scene much faster to render aid. In addition, KSU public safety will be coordinating with responders about directions and location minimizing response time.

Minor illness and injury can be handled by contacting the lab safety officer.

Any injury or illness no matter how small, requires an incident report to be filled out for our records (see Appendix D)

Laboratory Accidents not Resulting in Injury

Contact the lab safety officer or lab coordinator immediately in the case of other accidents. Those will be handled as per the CHP and EAP.

Power Failure

Remain calm. Power failure is often short term. However, if a power failure lasts for more than 15 minutes, the building must be evacuated. Emergency lighting is only for the purpose of providing light to assist evacuation, not for continuity of activities. In addition, laboratory ventilation will not be functioning in a power failure.

Whenever there is a loss of laboratory ventilation for any reason, all laboratory activities involving hazardous chemicals, chemically preserved specimens or open flame must cease as well.

Student Stress and Health

Student Success Services (SSS) is a comprehensive service center where students obtain help with educational, career, and personal concerns from a trained staff of counselors, specialists,

and advisors. Such assistance is intended to support Kennesaw State University's academic programs by offering relevant resources that facilitate the students' orientation to the university, contribute to personal development, enhance academic success, and facilitate career skills.

Student Success Services is located on the 2nd floor in Kennesaw Hall or call 470-578-6600.

Student Success Services is made up of the following main areas:

Behavioral Response Programs
Behavioral Response Programs takes a planned and proactive approach to identifying and assisting students who are distressed and/or exhibiting abnormal, threatening, or dangerous behavior.

Campus Awareness, Resource & Empowerment [C.A.R.E.] Center
As part of Counseling & Psychological Services, the C.A.R.E. Center is designed to offer support for students dealing with homelessness or are at-risk of being homeless.

Center for Young Adult Addiction and Recovery
The Center for Young Adult Addiction and Recovery (CYAAR) provides the Collegiate Recovery Community (CRC), a community of students in recovery from addiction; Addiction Education and Intervention Services; and Collaborative research in young adult addiction and recovery.

Counseling & Psychological Services
Counseling & Psychological Services Center (CPS) offers an array of services such as short-term personal counseling, group counseling, career counseling, crisis intervention, workshops and educational programming, referral services, and consultation for members of the KSU community.

First-Year & Undeclared Advising Services
First-Year & Undeclared Advising Services (FYUAS) is responsible for enforcing the First-Year Advising Requirement which mandates that first-year freshmen meet with an academic advisor two times in the first year at KSU.

Office of New Student, Parent, and Family Orientation Programs
The KSU Office of New Student, Parent, and Family Orientation Programs assist in the successful transition of new students and their family members to the University by conducting a series of one-day orientation sessions throughout the year for first-year students, transfer students, and their family members.

Student-Athlete Success Services
The Kennesaw State University Student-Athlete Success Services Program (SASS) is committed to providing the necessary support to assist all student-athletes in reaching their full potential academically, personally, and professionally.

Testing Services
Testing Services provides a wide range of testing services to Kennesaw State University students and surrounding community.

Veterans Resource Center
KSU's Veterans Resources Center (VRC) is committed to servicing the Veteran Community (i.e. Veterans, Service members, Dependents, and Survivors) by providing a welcoming environment, where members can gather and meet other fellow community members.

Women's Resource & Interpersonal Violence Prevention Center
Women's Resource & Interpersonal Violence Prevention Center is a gathering place for students, offering programming, crisis intervention and resource information.

Student Success Services is located on the 2nd floor in Kennesaw Hall or call 470-578-6600.

Student Health Services
Kennesaw State University has established three health care facilities to provide KSU students with cost-effective, high quality, and accessible healthcare. These services include health promotion, disease prevention, the diagnosis and treatment of illnesses, mental health, and social services.

Laboratory Safety Guidelines

The College of Science and Mathematics is committed to providing a safe environment for all. However, laboratory safety is a mutual responsibility and requires full participation and cooperation of all involved persons - students, faculty and staff. The following Lab Safety Guidelines have been established for your protection as Faculty, staff, student or visitor. These guidelines are a part of the Chemical Hygiene Plan and will be rigidly and impartially enforced. Noncompliance may result in a grading penalty and/or dismissal from lab, or termination of employment.

Personal Protection

1. Safety glasses must be worn in the lab when safety precautions for the activity require it. In general, if anyone using glassware, heat, sharps, projectiles and/or hazardous materials, or any other activity that may cause injury to the eye, everyone in the room is required to where safety glasses. The glasses must be of the impact protection type with splash guards and must meet ANSI Z87.1 specifications. Other eye/face protection may be required with specific procedures. We want all to be in the mindset that as you pass through the atrium, across the bridge or up the ramp into the lab areas your safety glasses go on
2. Contact lenses are discouraged. The safety of wearing contact lenses in laboratories has been hotly debated over the last several years. Both the ACS and OSHA have issued statements indicating that contact lenses can be worn if and only if proper protective eyewear is also worn. In addition, they cannot be worn when working with specific chemicals or situations. The College of Science and Mathematics recognizes that some eye conditions require contacts for certain vision correction therapies. However, students who choose to wear contacts must recognize the inherent increased risks - they are difficult to remove if chemicals get in the eye, they have a tendency to prevent natural eye fluids from removing contaminants, and sudden displacement can cause visual problems that create additional hazards. Soft contact lenses are especially problematic because they can discolor and also absorb chemical vapors causing damage before the wearer is alerted to the problem. If you choose to wear contacts, please tell your lab instructor or PI and check the SOP for the procedure you are doing.
3. Appropriate gloves will be provided when needed.
4. Use of gloves is required for handling chemicals, microorganisms and chemically preserved specimens.
5. Remove your gloves and wash your hands before exiting a lab room. Do not wear your gloves in the hallway. Use the “one glove rule” when transporting materials in the hall.
6. Appropriate clothing is required. Your clothing is a barrier between your skin and chemicals. No bare midriffs or shoulders. You must be covered to the ankle to protect

your legs. Knee length shorts and dresses are only acceptable in physics labs or computer labs, where chemicals are not being used, but not recommended. Lab coats are recommended and can be purchased from the bookstore or other sources.

7. Shoes must be worn. No sandals open toed or open heeled shoes. Shoes must cover the entire foot.
8. Secure loose clothing and long hair when working with equipment, open flame, any chemicals or biological substances.
9. Do not eat, drink (including coffee cups, sport bottles and water bottles). Do not store food in the labs.
10. Do not apply cosmetics in the lab. You should avoid touching your eyes and mouth in the lab.
11. Smoking or use of other tobacco products is prohibited.
12. Wash hands after working with chemicals and biological agents.
13. It is the recommendation of this department that all students of reproductive age, especially women who have recently conceived or are anticipating conception during the semester, discuss the course content and reagents with their physician if they are working with reproductive toxins.

General Lab Rules

1. Conduct yourself in a responsible manner at all times in the laboratory.
2. Avoid working in the lab alone. Some procedures are forbidden while working alone. It is best to employ the "buddy system" to have someone with you while working in the lab. If necessary, a friend may accompany you with the approval of the lab safety officer.
3. Learn where the safety and first-aid equipment is located. This includes fire extinguishers, fire blankets, and eyewash stations.
4. Read all instructions carefully and plan your work. Understand the experiment and if in doubt, ask.
5. When first entering a lab room, do not touch any equipment, chemicals, or other materials in the laboratory area until you are instructed to do so.
6. Follow the Standard Operating Procedure (SOP) or lab instructions – Any deviation from this must be in writing and approved beforehand.
7. Treat any equipment with care and respect. Be aware of any related hazard. Do not operate any equipment without proper permission and instruction. Follow the SOP for that equipment.
8. Lab tables should be as uncluttered as possible to allow work space and avoid accidents. Also, keep the aisles clear to prevent tripping over your gear, and so that other people can pass unhampered. Place book bags, pocketbooks, etc. under the lab tables. In some labs, seats or stools are not to be used during labs – individuals need to be mobile to avoid possible spills and are not to place themselves under the edge of the lab bench where chemicals may spill.
9. Leave the lab area clean. Put equipment and chemicals away and wipe off the bench top.
10. Treat chemicals with respect and understand the chemicals you are using. Read the label carefully when removing a chemical from the shelf. Read the Safety Data Sheets

(MSDSs) before you begin to work with the chemical. SDS are available in the red binders in each room. Do not remove the SDSs from the binders. Bring the binder to the Department office to request a copy.

11. Always label a culture or chemical with the proper information. Name of item, date made, concentration, your name/initials, hazard information and class or procedure. Each room has a poster detailing how to create a secondary container label.
12. Use the chemical fume hood to carry out procedures in which noxious fumes are produced or there is a danger of explosion or when using a concentrated form of a chemical. Do not use a biological safety cabinet/ laminar flow hood for this purpose.
13. When preparing a dilute acid solution, never pour water into concentrated acid; always pour acid into water while stirring constantly. Cool the solution if necessary while mixing.
14. Handle all living organisms used in a laboratory activity in a humane manner. Preserved biological materials are to be treated with respect and disposed of properly
15. Treat all microorganisms as potential pathogens. Always us sterile (aseptic) technique when handling cultures. Use a biological safety cabinet with potential airborne pathogens.
16. Students are never permitted in the storage rooms or preparation areas unless given specific permission. Research students, faculty and staff are only allowed in areas where authorized.
17. Lab activities require your undivided attention. No loud music or other entertainment allowed in labs. Radios, IPods and other entertainment devices should be played at a low volume so that you can hear what is happening in your surroundings. The use of headphones is prohibited.
18. CSM lab computers are for laboratory business only
19. No cellular phone use is allowed while you are performing any laboratory activity. It is recommended you keep your cell phone on your person to summon help if needed.
20. Notify the lab safety officer or lab coordinator immediately in case of an accident, no matter how small it seems. Contact information is located in every lab room.

Disposal of Wastes:

1. Do not dispose of chemicals in the sink. (Rule of Thumb: If you don't want to drink it, don't dump it in the sink). There is a waste collection area in every room. Be sure to dispose of chemicals in the proper waste collector. Do not mix chemical waste without being instructed to do so**. Any container that is used to collect chemical waste must be properly labeled and closed at all times unless actively pouring into it.**
2. Properly dispose of animal tissue, cultured cells and microbial plate cultures in the red or orange biohazard bags. Never throw biological or biohazardous waste in lab garbage cans. Never place biohazard bags in the trash cans until properly sterilized.
3. Dispose of broken glass in the cardboard "broken glass box" in your lab.
4. Place "Sharps" (scalpels, needles, razorblades, etc) in the sharps boxes.

Do not place general trash in the any of the specialized collection containers.

Who to Contact

If you have any questions, the following are your safety resources:

- Department of Biology and Physics Laboratory Safety Officer,

  Dale A. Zaborowski, SC 309, 470-578-6165, dzaborow@kennesaw.edu

- Chemistry and Biochemistry Laboratory Safety Officer,

  Benjamin Huck SC409 470-578-6404, bhuck@kennesaw.edu

- Environmental Health and Safety, 470-578-3321, ehs@kennesaw.edu

Guidelines for the Use of Chemicals

Safety Data Sheets (SDS, formerly MSDS)
Every laboratory room should have an SDS manual (red binder) in the front of the room, out in the open for instant access. Every chemical in the room should have an SDS in the binder. If you are bringing in a chemical, you must also add the SDS to the binder.
Please keep the SDS binders in plain sight and near the front of the room if possible.

Chematix
Chematix is the chemical database (https://chematix.kennesaw.edu/Chematix/) used to procure, maintain and dispose of all chemicals at KSU. All chemicals need to be recorded in the system. No purchases can be made or no chemicals can be brought on campus without going through Chematix.

Chematix allows us to locate any bottle in any room, at any time, provided that transfers are done when bottles are moved.

A question like "do we have any XXXXX?" can be answered immediately, including room # and even the location.

A barcode reader makes reconciliation easy.

Simple rules to follow:

1. Do not bring any chemical on campus without adding it to the Chematix inventory.
2. Do not take any chemical off campus without removing it from the Chematix inventory.
3. Record any relocation of materials from one room to another.
4. Save empty bottles so they can be removed from the inventory. Collector bins are in each research lab and prep room. Do not discard any empty containers.
5. Please do not use the collector bins for any other purpose or do not hide the bins.

Currently, Chematix can be handled centrally by your department Lab Safety Officer and the Lab Coordinator or faculty can handle their own inventory

Note: Chemicals should only be stored or used in rooms that are designed with the proper ventilation and fire protection for such a purpose. Do not store or use chemicals in classrooms or offices. If hazardous chemicals are to be used outside of the laboratory areas, consider safer alternatives and/or develop a SOP for their use.

Storage of Chemicals
It is unsafe to simply store chemicals alphabetically. Our chemicals are stored by classification, identified by color using vinyl tape. Due to the lack of a true universal classification system, we have adopted the ChemAlert Safe Storage Plan with one modification of dividing corrosives into two categories, acids (white) and bases (black).

The color classification is as follows:

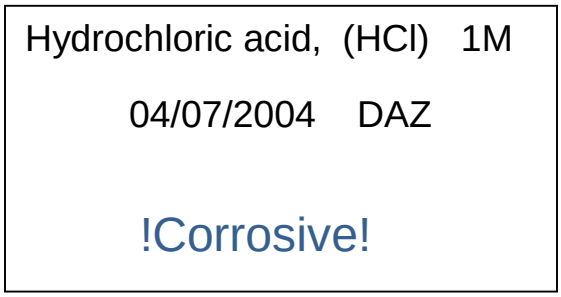
Gray No particular storage hazard.
Red Flammables
Yellow Oxidizers
Blue Health hazards
White Acid
Black Bases

In addition, some chemicals are kept in poison cabinets, flammable cabinets and corrosive cabinets.

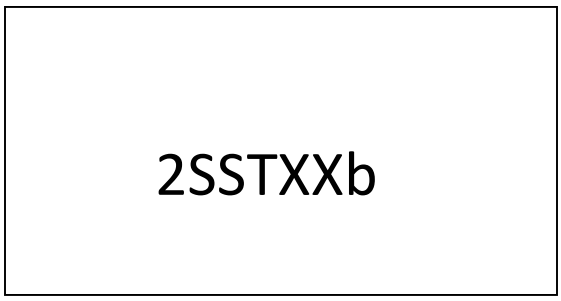
Flammables and acids also have the caps wrapped with electrical tape to prevent the escape of fumes.

Secondary Container Labeling
Any container that is not empty has to have a label. Even if it is just water, it has to say so. Labels for secondary containers have to be in the following form:

1. Chemical name, and formula
2. Concentration
3. Date prepared
4. Your initials
5. Hazard warning (flammable, oxidizer, poison, health hazard, etc). Add the specific hazard if it is known or listed in the SDS (carcinogenic, etc.)
6. **Never** have a container of any kind unlabeled, for any length of time (even if it is only water).



A correct label has all the necessary information



WRONG!
This label does not give information if it is spilled, splashed, involved with a fire, etc. Labeling is to protect others who encounter it and might not know the contents and or hazards!

Waste
All chemical waste **MUST** be marked as **"HAZARDOUS**" or "**NON-HAZARDOUS**."
DO NOT set out a container that says "waste" or "acetone waste." That is a violation and **WE WILL BE INSPECTED, WE WILL BE FINED**.

All chemical waste containers must have a tight fitting lid and be closed AT ALL TIMES unless you are actively pouring into it. Otherwise, that is a violation and we will be fined. **Foil, parafilm, plastic, an upside down beaker, or the like are not a tight fitting lid!**

Proper labeling and dating are very specific in regulation and differ for the type of waste. Disposal of waste should be planned in advance to ensure proper handling for safety and compliance.

If a project is completed, disposal of unused chemicals will prevent an unsafe accumulation of unwanted hazardous materials.

Leftover materials from kits should be discarded if you have no immediate use for them. Any leftover chemicals from pre-packaged kits have to be entered individually in Chematix to be stored on the shelves. Unless there is an immediate plan to use the leftover material, let's not put it on the shelves.

See the Lab Safety Officer to arrange for a disposal plan for any type of leftover materials or waste you may be generating.

Safe Fume Hood Use Guide

Fume hoods are devices designed for work with toxic or hazardous chemicals with the effect of safely capturing the harmful gases, vapors, and fumes generated and exhausting them to the outside air. The fume hood is very effective if installed and used properly and maintained in good working order. Fume hoods are not just fixtures but are installed into the ventilation system of a building and so affect the ventilation of the entire building and the exhaust at the stack. As a result, fume hood function and proper installation not only affects your safety but the safety of others in the building.
The primary parts of the fume hood are:

Face – The face of the hood is the opening where air capture takes place.

Sash – The sash is the glass "window" that travels in the plane of the hood face that opens or closes the hood and protects the user during use.

Baffles – The baffles are located in the back of the hood and direct air in the appropriate direction. The baffles can also be adjusted to account for different vapor densities of chemicals (heavier than air and lighter than air).

Duct – The duct connects the hood to the ventilation system and exhausts to the outside air.

Air foil – The air foil is fixed to the bottom front edge of the hood and is a vent that keeps a minimum gap open at all times but more importantly gives aerodynamic properties that allow better, less turbulent air flow and better capture.

Function:
As the user works at the sash, the air is drawn in at a laminar (even) flow and ideally at about 100 feet per minute. With regard to capture, we are only concerned with velocity (fpm) because this is what actually carries vapors and particles. The air volume is of more concern to the designers of the ventilation system. The air is drawn around the baffles and up to the duct like a chimney. The space around the baffles (slots) can be adjusted so air flow is concentrated at desired areas of the hood. For instance, if a chemical of high vapor density is being used, such as Chloroform, then the baffles may be adjusted to draw more air from the bottom of the hood where the vapors are expected to collect. Standard baffle setup (middle selection) is recommended for most operations with a variety of chemicals and other configurations may be explored if the work is mainly a specific application. It is important for there to be at least an inch or two opening for the rear lower baffle since many vapors handled in hoods are heavier than air.

Types of Hoods

Variable Air Volume (VAV) – VAV hoods maintain a constant velocity as the sash moves but changes the volume of air. This can be done by a variety of methods including changing motor speed or closing or opening baffles in the duct. This is desirable since lower sash heights results in less air being used, which translates into substantial energy savings on heating and cooling. Some of the hoods in the Science Lab Building are of this type

Standard or Bypass –With standard hoods the volume of air changes as the sash moves so that as the sash is lowered the velocity increases. Bypass hoods are the same design but have a vent in the top so that as the sash is lowered and the sash opening is closed, it simultaneously opens the top (bypass) vent. In this way, even though the sash opening is getting smaller, the proportion of air volume flowing through the face is smaller and the velocity remains more constant. This does not save as much energy as a VAV hood, but performs better than a standard hood. None of these are on the KSU campus

Auxiliary Air – These hoods not only draw air but also have a blower that injects air at the face of the hood. These hoods are no longer used much and their performance is not as good as VAV and bypass hoods. None of these are on the KSU campus

Ductless hoods – These hoods are not ducted to outside air but remove contaminants from the air and return it back to the room. The contaminants may be removed by a variety of means such as HEPA air filters, carbon adsorption or catalyst reactions filters. The filters should be changed on a schedule according to the manufacturer and the appropriate filter should be used for the particular contaminant being removed. It is vital that these units work properly since the air is recirculate and exposure is eminent. In order to select the best filter and to make sure the unit is working properly, the EHS Department must conduct a consultation with the lab and evaluate each chemical used in that hood. If any new chemicals are introduced, then EHS should be called to evaluate that chemical. Please call 470-578-3321 for assistance. It is recommended that ductless hoods not be purchased unless the benefits outweigh the hazards and inconvenience because potential for problems. Also, ductless hoods are not indicated when using many liquid, non-aqueous chemicals since the vapors of these chemicals are heavier than air and ductless hoods do not generally have a rear baffle. As a general rule EHS does not recommend the use of ductless hoods.

Clean hoods – Clean hoods are sometimes called laminar hoods but these should not be confused with the type of hood mentioned below. These hoods are safety devices designed to bath the work area with HEPA filtered air to protect sensitive processes from contamination. They are commonly used in clean rooms. These hoods draw the majority of air through a filter and drop the air gently from the top of the hood into the work area and draw only a small percentage of air through the face of the hood (about 10%). The result is face velocities that are lower than other hoods, however, the hood is designed to capture well in this fashion. Due to this style of capture, it is important to have a visual capture test (such as a dry ice test) done on these hoods at least annually.

Biosafety Cabinets (BSC) – These units are used for biological applications to remove potentially infectious agents such as microbes and spores. The air is passed through a HEPA filter and back into the room. The filter removes small particles but not vapors and gases, so BSCs should not be used with chemicals (a little Ethanol or Isopropanol for decontamination is OK). It is the responsibility of the EHS Department to have these tested and certified by a third party on an annual basis. These units will have an EHS ID sticker for inventory purposes.

Non-Hood units

Laminar Flow – These units are not safety devices. They protect the work (such as RNA), not the user. The air flows back at the user away from the work through many tiny holes in a laminar pattern. These units will have an EH&S ID sticker for inventory purposes.

Canopy – Canopy hoods are basically to capture exhaust from a unit such as a furnace. The velocity is generally much lower and is not designed for lab work. These units will have an EH&S ID sticker for inventory purposes.

Bench top extractors – These are safety "hood type" devices that are used for small scale, specific work on a bench-top that needs ventilation such as a scale to weigh hazardous chemicals or soldering. These are safety devices but since there is no real standard to test them, we do not inventory them. We will be happy to test the face velocity if requested. These devices should only be used in very specific applications when a fume is not realistic, such as when weighing Acrylamide.

Safety Guidelines for fume hoods

- Keep the sash as low as possible to minimize the risk of exposure. The sash acts a safety shield and protects your face, so you should be looking through the sash to perform your work. The green arrows are a good guideline for sash position, but sash height should be adjusted depending on the height of the person using the hood.
- If an airfoil is not installed on your hood, consider having one installed. This will provide more laminar air flow and better capture of contaminants.
- Always use an airflow indicator. This is a small piece of crepe paper (or similar) attached to the bottom of the sash that blows with the air current. This is the only way to know for certain that air is flowing through the hood in the proper direction. The indicator should be blowing into the hood (sometime the flow is reversed by accident during maintenance). Please note, an airflow indicator only indicates the direction of airflow and does not indicate whether the fume hood has the proper face velocity.
- Keep lab doors and windows closed. These extra sources of inlet air can: affect the performance of the hood, cause turbulent air currents in the room or cause the room to loose its negative pressure.
- Limit traffic near hoods when in use. Pedestrian traffic or fast movement in front of hoods can cause turbulence and can negatively affect the capture ability of the fume hood.
- Reduce clutter and do not store large amounts of chemicals in the hood. Excess clutter and chemicals can impede airflow especially to the lower openings. Necessary bottles and equipment should be elevated an inch or two to allow airflow underneath to the rear baffles (a small shelf or blocks of some kind will work for this). Excess chemicals can be a hazard in themselves due to their properties. Store chemicals in cabinets or on shelves, except for the chemicals you need immediately for the work at hand.
- Work at least 6 inches into the hood from the plane of the sash. This will reduce the risk of eddy currents blowing vapors back at you and will maximize capture ability of the hood.
- If hoses or cords must be inserted through the face of the hood, run them underneath the airfoil so the sash can close completely.

Other considerations

- If there is a potential for an explosion hazard due to the chemicals you are using or the experiment you are conducting, special shielding should be used in addition to the sash.
- Protect against blockage of ducts. Lightweight materials such as aluminum foil or tissues can be sucked into the vents and reduce the performance of the hood.
- Run water in hood drains periodically so they do not dry out. Open drains can possibly affect airflow and can cause nuisance odors.

- In a power outage, lower the sash to within an inch or two so the chimney effect will keep some air flowing into the hood and contain any vapors.
- Other than sash height and baffle adjustment, never make changes to the hood without the advice of EHS.
- If other apparatus requires venting, the exhaust should not be injected into the face of a hood but rather should be ducted to the ventilation system. This kind of work should be cleared through Facilities Planning and Design.
- Evaporations and digestions using Perchloric acid should only be done in a specially designed Perchloric acid fume hood with a wash down function. Heated Perchloric acid can form shock sensitive crystals in the duct work that can explode. **KSU does not have the proper hood type for this work. Therefore, heating perchloric acid is not allowed at KSU**
- Whenever you are not using the fume hood, always close the sash of the hood as low as possible. Closing the fume hood sash provides added protection of better capture ability of any chemicals being stored in the hood as part of an experiment and also greatly enhances energy conservation measures for the laboratory.
- Some hoods have an emergency exhaust that can be employed in an emergency. These hoods are located in the Science Lab Building and are VAV hoods.

Compressed Gases

Many laboratories require the use of compressed gases for a variety of different operations.

Compressed gases present a unique hazard. Depending on the particular gas, there is a potential for simultaneous exposure to both mechanical and chemical hazards.

Gases may be:

- Flammable or combustible
- Explosive
- Corrosive
- Poisonous
- Inert
- or a combination of hazards

If the gas is flammable, flash points lower than room temperature, compounded by high rates of diffusion, present a danger of fire or explosion. Additional hazards of reactivity and toxicity of the gas, as well as asphyxiation, can be caused by high concentrations of even "harmless" gases such as nitrogen.

Since the gases are contained in heavy, highly pressurized metal containers, the large amount of potential energy resulting from compression of the gas makes the cylinder a potential rocket or fragmentation bomb

Careful procedures are necessary for handling the various compressed gases, the cylinders containing the compressed gases, regulators or valves used to control gas flow, and the piping used to confine gases during flow.

The contents of any compressed gas cylinder must be clearly identified. Such identification should be stenciled or stamped on the cylinder or a label. Commercially available three-part tag systems may also be used for identification and inventory.

No compressed gas cylinder should be accepted for use that does not legibly identify its contents by name. if the labeling on a cylinder becomes unclear or an attached tag is defaced to the point the contents cannot be identified, the cylinder should be marked "contents unknown" and returned directly to the manufacturer.

Never rely on the color of the cylinder for identification. Color coding is not reliable because cylinder colors may vary with the supplier. Additionally, labels on caps have little value because caps are interchangeable.

Handling & Use

Gas cylinders must be secured at all times to prevent tipping.

Cylinders may be attached to a bench top, individually to the wall, placed in a holding cage, or have a non-tip base attached. Chains or sturdy straps may be used to secure them.

If a leaking cylinder is discovered, move it to a safe place--if it is safe to do so--and inform the Environmental Health & Safety Department. You should also call the vendor as soon as possible.

Under no circumstances should any attempt be made to repair a cylinder or valve.

Standard cylinder-valve outlet connections have been devised by the Compressed Gas Association (CGA) to prevent mixing of incompatible gases. The outlet threads used vary in diameter; some are internal, some are external; some are right-handed, some are left-handed. In general, right-handed threads are used for non-fuel and water-pumped gases, while left-handed threads are used for fuel and oil-pump gases. To minimize undesirable connections, only CGA standard combinations of valves and fittings should be used in compressed gas installations; the assembly of miscellaneous parts should be avoided. The threads on cylinder valves, regulators and other fittings should be examined to ensure they correspond and are undamaged.

Cylinders should be placed with the valve accessible at all times. The main cylinder valve should be closed as soon as it is no longer necessary that it be open (i.e., it should never be left open when the equipment is unattended or not operating). This is necessary not only for safety when the cylinder is under pressure, but also to prevent the corrosion and contamination resulting from diffusion of air and moisture into the cylinder after it has been emptied.

Cylinders are equipped with either a hand wheel or stem valve. For cylinders equipped with a stem valve, the valve spindle key should remain on the stem while the cylinder is in service. Only wrenches or tools provided by the cylinder supplier should be used to open or close a valve. At no time should pliers be used to open a cylinder valve. Some valves may require washers; this should be checked before the regulator is fitted.

Opening of Cylinder Valves

Cylinder valves should be opened slowly. Oxygen cylinder valves should be opened all the way. Open up the oxygen cylinder valve stem just a crack. Once the needle on the high pressure gauge has stopped, open up the valve all the way. This back-seats the valve. Oxygen cylinders must have the valve opened up all the way because of the high pressure in the cylinder. There is a back-seating valve on the oxygen cylinder. This prevents the high-pressure gas from leaking out through the threaded stem.

When opening the valve on a cylinder containing an irritating or toxic gas, the user should position the cylinder with the valve pointing away from them and warn those working nearby.

Cylinders containing flammable gases such as hydrogen or acetylene must NOT be stored in close proximity to open flames, areas where electrical sparks are generated, or where other sources of ignition may be present.

Cylinders containing acetylene shall never be stored on their side.

An open flame shall never be used to detect leaks of flammable gases. Hydrogen flame is invisible, so "feel" for heat. One common practice is to use a natural bristle broom to "sweep" the air in front of you. All cylinders containing flammable gases should be stored in a well-ventilated area.

Oxygen cylinders, full or empty, shall not be stored in the same vicinity as flammable gases. The proper storage for oxygen cylinders requires that a minimum of 20 feet be maintained between flammable gas cylinders and oxygen cylinders or the storage areas be separated, at a minimum, by a fire wall five feet high with a fire rating of 0.5 hours. Greasy and oily materials shall never be stored around oxygen; nor should oil or grease be applied to the fittings.

Regulators are gas-specific and not necessarily interchangeable!

Always make sure that the regulator and valve fittings are compatible.

After the regulator is attached, the cylinder valve should be opened just enough to indicate pressure on the regulator gauge (no more than one full turn) and all the connections checked with a soap solution for leaks. ***Never*** use oil or grease on the regulator of a cylinder valve.

If there is any question as to the suitability of a regulator for a particular gas, check with the Environmental Health & Safety Department or call your vendor for advice.

The following rules should always be followed in regards to piping:

- Copper piping shall not be used for acetylene.
- Plastic piping shall not be used for any portion of a high pressure system.
- Do not use cast iron pipe for chlorine.
- Do not conceal distribution lines where a high concentration of a leaking hazardous gas can build up and cause an accident.
- Distribution lines and their outlets should be clearly labeled as to the type of gas contained.
- Piping systems should be inspected for leaks on a regular basis.
- Special attention should be given to fittings as well as possible cracks that may have developed.

A cylinder should never be emptied to a pressure lower than 172 kPa (25 psi/in2) (the residual contents may become contaminated if the valve is left open). When work involving a compressed gas is completed, the cylinder must be turned off, and if possible, the lines bled.

When the cylinder needs to be removed or is empty, all valves shall be closed, the system bled, and the regulator removed. The valve cap shall be replaced, the cylinder **clearly marked as "empty,"** and returned to a storage area for pickup by the supplier.

Empty and full cylinders should be stored in separate areas.

Where the possibility of **flow reversal** exists, the cylinder discharge lines should be equipped with approved check valves to prevent inadvertent contamination of cylinders connected to a closed system. "Sucking back" is particularly troublesome where gases are used as reactants in a closed system. A cylinder in such a system should be shut off and removed from the system when the pressure remaining in the cylinder is at least 172 kPa (25 psi/in2). If there is a possibility that the container has been contaminated, it should be so labeled and returned to the supplier.

Liquid bulk cylinders may be used in laboratories where a high volume of gas is needed. These cylinders usually have a number of valves on the top of the cylinder. All valves should be clearly

marked as to their function. These cylinders will also vent their contents when a preset internal pressure is reached, therefore, they should be stored or placed in service where there is adequate ventilation.

All compressed gas cylinders, including lecture-size cylinders, must be returned to the supplier when empty or no longer in use.

Always use safety glasses (preferably with a face shield) when handling and using compressed gases, especially when connecting and disconnecting compressed gas regulators and lines.

Transportation of Cylinders

The cylinders that contain compressed gases are primarily shipping containers and should not be subjected to rough handling or abuse. Such misuse can seriously weaken the cylinder and render it unfit for further use or transform it into a rocket having sufficient thrust to drive it through masonry walls.

1. To protect the valve during transportation, the cover cap should be screwed on hand tight and remain on until the cylinder is in place and ready for use.
2. Cylinders should never be rolled or dragged.
3. When moving large cylinders, they should be strapped to a properly designed wheeled cart to ensure stability.
4. Only one cylinder should be handled (moved) at a time.

Safety Training and Laboratory Access

Safety Training

Everyone having access to the laboratories is required to have the appropriate training. All new employees and research students will attend a new employee lab safety training session before having access to any of the labs. All personnel will also have to take an annual refresher either online or on campus. Access will be granted by the Lab Safety Officer following the KSU campus policy after the appropriate training. Key or card access could be withheld if the new employee or annual training is not completed.

Training shall cover the appropriate topics and a record of the training will be maintained by EHS and the Lab Safety Officer.

The website for the KSU EHS Department online training is:

https://ksu.skillport.com/skillportfe/custom/login/ksu/login.action

Lab Visitors

Short-term, casual visitors, such as those touring a laboratory or several labs and outside repair vendors will be accompanied and supervised by qualified KSU personnel. They are also required to follow all safety rules as well. It is the responsibility of the chaperone to enforce the safety rules.

Children are not allowed in the laboratories at any time unless part of an organized KSU sponsored or approved program. The supervising faculty or staff member of the program is wholly responsible for enforcement of the safety rules.

KSU has a policy for volunteers who may want to work in a lab (see Appendix B). Volunteers, as well as other visitors such as consulting researchers, service workers and Plant Operations personnel will require proper training before receiving access to the lab areas.

Laboratory Access

Key or card access will be granted by the Lab Safety Officer after training following the KSU campus policy for key and card access. After-hours access will be granted after a background check. The Lab Safety Officer can assist with that procedure

The following pages contain the outline for on-campus training topics and the sign-in as the record.

Kennesaw State University
College of Science and Mathematics
Laboratory Safety Training Outline

This training outline provides list of topics to be covered in on-site laboratory safety training. This outline is intended to supplement, but not replace the Chemical Hygiene Plan. The Chemical Hygiene Plan offers laboratory safety information and outlines how the department complies with the federal Occupational Safety and Health Administration (OSHA) Laboratory Standard. In addition to Laboratory Safety Training, additional training may be required depending on the work and materials involved, including work with specific equipment, biological materials, or other.

Occupational Safety and Health Administration (OSHA)

1. Purpose
2. Laboratory Standard
3. Right to know

Chemical Hygiene Plan (CHP)

1. Description

Emergency Action Plan (EAP)

1. Description

Bloodborne Pathogen Exposure Control Plan

1. Description

Laboratory Handbook

1. Description

Personal Protection

1. Proper attire
    a. Clothing
    b. Shoes
    c. Accessories and hair
    d. Electronic devices
2. PPE
    a. Eye protection
        1. Safety glasses
        2. Goggles
        3. Face shields.
        4. Contacts
    b. Gloves
3. Food and Drink
4. Awareness
5. Handwashing

General Lab Rules

1. Conduct
    a. Be responsible
    b. Locks
    c. Computers
    d. Working alone
2. Cleanliness
3. Equipment
    a. Training
    b. Use
    c. Moving
    d. Repair
4. Glassware
    a. Washing
    b. Breaking
    c. Proper type
    d. heating
5. Compressed Cylinders
    a. Hazards
    b. Storage and Handling

Supplies

6. Safety Shower
7. Eye wash
8. Fume hood
9. Flow hood
10. Waste Disposal
11. Spills

Chemical Handling

1. Chematix
2. Storage codes
3. Labeling
4. Waste

Directed study students.

1. Plan ahead
2. Watch materials
3. Make your supervisor supervise!
4. Room Access

Student assistants:

1. Be punctual, both in showing and responding
2. Plan your studying
3. Take charge of your area
4. You are a representative of the department
5. Room Access

Kennesaw State University
Department of Biology and Physics

Laboratory Safety Training
Participant Record

Trainer_____ Date _____

Duration of Training_____

Name (print)	KSU #	Position and Dept.	Signature	Supervising Faculty

Positions: D = Directed Study/Methods Student, SA = Student Assist., F = Faculty, S = Staff, G= Grad student, O = Other

Field Study Guidelines

Field research and study are an integral part of the biological sciences. Frequently, the nature of data collection or study requires the investigator to encounter physical and biological hazards as part of their fieldwork. Recognizing the inherent hazards associated with field work can help prevent injuries and illnesses associated with the tasks and result in a successful collection or field study. This document is intended to prevent illness and injury associated with field work and to serve as a guideline for all labs, field courses, and research conducted through the College of Science and Mathematics.

Before Entering the Field

Safety must be considered as an integral component of any course or research project. The faculty advisor presiding over a course or project is ultimately responsible for safety. Graduate student instructors or other designated persons present in their absence may be designated as supervisor and will be directly responsible for general prudence and ensuring proper safety practices under these guidelines. Before taking visitors or students into the field, or allowing them into the field without direct supervision, consider hazards that will be encountered including terrain, biological hazards, weather, crime, disease, or trauma and follow the protocols included in this document along with any other specific procedures identified in site-specific or process-specific plans. Consider the students' (and your own) relative fitness level before sending them on arduous tasks. In regions of elevated temperature, consider heat stroke, heat stress, and dehydration. In cooler climates or areas of water saturation, consider hypothermia. Leave an itinerary on file with the department including dates, contact information, and locations for all field excursions. Emergency contact information must be collected from each student beforehand. Students should be queried regarding special conditions (visible or hidden disabilities), special medical conditions (e.g., diabetes, allergies, epilepsy, etc.), or special accommodations. First aid kits should be carried in the field with adequate capacity to treat potential injuries that can be encountered. GSIs or instructors should be trained in First Aid. Consult your checklist to ensure all information and equipment are accounted for.

Safety Equipment

A list of safety equipment should be prepared and checked over before leaving. Examples include emergency road repair kit, flashlights, flares, proper clothing, water purification, medications, and specialized equipment (GPS, compass, charts, climbing gear, etc.).
Each PI or supervisor should create an equipment and safety checklist specifically designed and routinely modified for the location of their project (SOP). Use the equipment and safety checklist *before* you leave for the field.

Working in the Field

Use teamwork or at a minimum the buddy system for field classes or special assignments requiring arduous or dangerous fieldwork. Know your own and your field associate's limits and do not exceed them. One injured, ill, or seriously exhausted team member can reduce the functioning of the entire team. You should never be alone in the field. If you get separated, retrace your steps, back to the start point if necessary, until you find your group. Students are to tell their supervisor where they are working and are to stick to their prescribed routes or locations.

Conduct of Students and Workers
Dangerous horseplay, or other risky behaviors not related to research (e.g., firearm use, rock climbing, placing oneself in other harmful situations unnecessarily), will not be tolerated. The use of alcohol and non-medicinal drugs during University business is prohibited.

Accidents
Most accidents are related to slip, trip or fall. Wear proper footwear and choose paths of travel carefully, paying particular attention to streams, loose rocks, and steep pitches.

Communications
Students entering remote areas should bring a cell phone or use two-way radios. Emergency numbers and contacts should be compiled in advance. In areas of poor communication, or during a field emergency, one person should be appointed as the communications liaison. If necessary, a runner can be used between the central communicator and field unit.

Crime or Violence
Areas with dangerous activities should be approached with prudence. Some areas very close to home can be potentially dangerous when alone or if working at night. If a threatening condition occurs, relocate to a safer location such as locked car, populated area, or well-lighted area if possible. Keep belongings, particularly small and expensive items (cameras, instruments, backpacks, etc.) either locked up or with you at all times. Maintain a group or buddy system when working in areas of crime See resources below.

Vehicle Safety
Students taking their own vehicle or driving others in their personal vehicles are responsible for the welfare of all riders. Vehicle load limits apply and seatbelts must be available for each person. Any driver of a University vehicle, or a vehicle rented by the university, must meet the minimum age specified on the rental agreement, have a valid Georgia driver's license, meet all KSUand DOAS requirements and must follow all vehicle safety laws. Vehicles must be rented through a company that has a KSU rental agreement.
Most fatal field accidents are related to vehicle travel. Drivers will use common sense and operate their vehicles in a conservative manner. Drivers should constantly remember their responsibilities and that their actions could affect the safety and lives of their occupants.
Stop if too tired to continue safely. All highway and local by-laws, rules, and regulations must be strictly adhered to. Private and university vehicles are not to be used for recreational or unsafe purposes while conducting university business.

Boats and Watercraft
Operation of boats or watercraft must comply with all pertinent regulations dictated by the United States Coast Guard, local authorities, or meet the requirements of the jurisdictional waters they apply. Any student operator must be checked out by an experienced faculty or field advisor. This includes the operation of human or sail-powered watercraft such as sailing dinghies, kayaks, canoes, etc. Safety equipment shall include PFDs, flares, handheld radio, and emergency supplies as deemed appropriate for the situation. All equipment and supplies should be checked before each excursion.

Medical and First Aid
Health risks are specific to area of travel. Consult health advisories for necessary immunizations or other precautions. Sites such as consulates, the CDC (see resources) are good sources for information. Carry a copy of your medical insurance agreement for emergency treatment.
First aid training is recommended for all participants. Environmental conditions such as exposure, dehydration, heat stroke and heat exhaustion must be considered in advance.
Make a first aid kit checklist (cold compresses, burn kit, dressings, etc.).
Standard first aid kits usually need augmentation tailored to specific field conditions. Antihistamines, analgesics, disinfectants, and in some cases sutures and anti-venom may be necessary. Preexisting conditions placing field workers at risk, or those under medication that may affect their ability in the field, must be identified to the field supervisor in advance.

Special Field Considerations
Recognize the potential for wildlife encounters with venomous insects and dangerous plants (poison oak, briar, etc.) and animals (snakes, mountain lions, jellies, etc.).
Animal sampling, trapping and handling techniques must be written into a protocol that includes the safety risks.
Consider communicable diseases (hemorrhagic fever, hanta virus, rabies, Lyme disease,etc.).
Consider training options. Discuss risks and hazards and incorporate preventative measures.

Each Field Station or site should have specific safety protocols outlined that also must be observed. These will detail specific hazards associated with that location.
Most field sampling activities should have an SOP. Be sure to follow the proper procedure.

Chemical Safety
Prudent practices used in the laboratory extend to the field. Proper personal protection (gloves, dust masks, respirators if necessary) should be worn. All chemicals transported (fixatives, solvents, etc.) must be transported in a labeled and durable secondary container. Any hazardous wastes must be disposed of properly and legally. SDS sheets should be available in the field handbook and the hazards and safe handling reviewed by anyone who may come into contact with the chemicals.

Emergency Notifications
Lab Safety Officer and/or Department chair must be notified of any serious injury, fatality, or other tragedy associated with the Department as soon as possible, but absolutely within 24 hours.

Academic Field Trip Guidelines

Academic field trips have long been part of the curriculum at Kennesaw State University. In recent years, growing concern about travel and increasing attention to the need to manage risks associated with virtually all University activities prompts us to look at the manner in which academic field trips are conducted and to recommend certain best practices that are consistent, clearly communicated and offer the greatest likelihood of student safety, recognizing that the University cannot provide absolute assurances in this regard. For purposes of this document, an ***academic field trip*** is defined as a course related activity which normally involves travel for the group of students enrolled in a class. Independent study, internships, class meetings, off campus work on an individual project are not considered an Academic Field Trip. An academic field trip serves educational purposes and occurs outside of the classroom at a location other than the campus on which the course is regularly taught. Such trips may be scheduled during normal class hours or for extended periods outside of class.

General Guidelines for Faculty

- Academic field trips are University sponsored events.
- Whenever possible, academic field trips should be clearly identified in the course syllabus (as to location, time, means of transportation, and with some reference to inherent risk associated with the particular activity). The syllabus should also identify the academic field trip as "required" if this is the case. In addition to the description of risks in the syllabus, faculty members should discuss in appropriate detail with students the risks associated with the activity, relevant emergency preparedness information, as well as expectations for behavior during the activity (including transit to and from the location(s)).
- If there are students who will be participating for whom special accommodations are potentially necessary (as a result of disabilities), faculty should discuss these matters with the student(s) in individual settings. If needed, the Office of Disabled Student Support Services can assist with planning for accommodations.
- A College/department may require a student to sign a standard "informed consent" waiver that acknowledges risks associated with this activity.
- A faculty member or other designated University representative must accompany all academic field trips. Only Faculty, staff and students registered for the course are authorized to attend the trip. No spouses, friends, children are allowed to participate.
- Whenever practical, the site of the academic field trip should be reviewed by the faculty member or an appropriate University representative in advance to evaluate potential risks and to mitigate, to the extent possible through effective planning, risks associated with the location.
- The University, through the Department, School or College, should have complete information about the location, duration and transportation route for each academic field trip on file and accessible prior to the occurrence of the event.
- The University, through the Department, School or College, should have a complete list of all participating students including emergency contact information on file and accessible prior to the start of the event.
- The faculty or staff member in charge of each academic field trip should ensure that s/he has access to communication (e.g., cell phone) throughout the event.

- Each department should have a designated contact person on campus with information about the academic field trip and participants in the event that emergency communication is necessary.
- Faculty members should not use their private cars to transport students on field trips. It is recommended that they use University System vehicles or rent vehicles for this purpose. KSU employees who drive their private cars in the course of their official job responsibilities are excluded from liability coverage under the University System's automobile insurance policy. The University is covered, but employees' only coverage for their liability is whatever they have under their personal automobile insurance. Further, the University System's general liability policy excludes coverage for claims arising out of the use of an automobile.
- Students should not be required to drive their own vehicles to a field trip site; neither should they be required to provide rides to other students.

General Guidelines for Students

- Students participating in college-sponsored field trips are expected to conform to the same standards of behavior as published in the Students' Rights, Rules and Responsibilities. Any violation of the student code of conduct or local, state, or federal laws may result in disciplinary action or sanctions by the College/University. No alcohol, illegal drugs or firearms are allowed during any portion of the trip.
- The University does not have liability or automobile coverage for students driving themselves or other students to University-sponsored events. Automobile insurance policies held by the students are the primary and only policies covering them for injuries to themselves and others, as well as damage to their vehicles or other vehicles.
- Departments should notify students who choose to ride in a private automobile that they do so of their own free will.

Vehicles

- University vehicles or chartered buses should be used for field trips.
- Anyone who operates a University owned vehicle for field trip activities must be qualified as per the policy of the State of Georgia.
- If a chartered bus is used, the bus service must be approved by Purchasing. KSU has a bus charter contract with *American Coach Lines of Atlanta*. Ccontact Shane Shipman by e-mail, rshipman@coachamerica.com or phone 770-449-1806 ext. 120 Also, KSU Departments and Organizations may now charter bus service through the Department of Parking & Transportation with the ***Big Owl Bus*** (***B.O.B.***) For additional information on charter bus service with B.O.B. please visit this web page: https://web.kennesaw.edu/auxiliaryservices/content/charter-bus-services.
- If a personal vehicle is used for a University field trip, the driver's own insurance policy serves as the primary policy.
- Any traffic and parking violations are the responsibility of the driver, not the institution.

Foreign Study

- For foreign study, please refer to the Study Abroad Program.

Acquiring Materials and Supplies

Laboratory materials can be provided from many funding sources. There are many sources for funding and can be specific as to what can be purchased. These budgets require approval from the department chairs and/or Dean for any purchases. In addition, any purchases made with the student lab fee fund must be used for items that students will be directly involved in. Equipment and supplies purchased with student fees cannot be used for individual faculty research.

Equipment and supplies purchased for instructional laboratory activities are for those uses only. Do not take items from the instructional laboratory rooms and the prep rooms. Neither of these areas maintain general supplies for all to take. Instructional labs and prep rooms are not for research equipment or supply storage without special permission as per the College of Science and Math Space Policy. A rule of thumb, unless you are prepping an instructional lab, you do not belong in the prep room nor can you take anything from there.

A limited amount of general supplies can be signed out from the general stock room, **LS2015**. However, those supplies are limited

Purchase Requests

Always consult with the Lab Safety Officer or others who are making purchases for you before you begin to search for products to purchase. There are specific rules for several different commodity categories involving vendors and preapprovals.

When requesting a purchase, provide the list with description of the items, catalog number, vendor and quantity. Please do this by email (preferred) or some other written form. DO NOT send large spreadsheets or complicated Word documents. A simple list is all that is needed.

Custom primer orders require a specific format. Consult the purchaser before sending a request.

Quotes

Prior to requesting a quote from a vendor, consult the Lab Safety Officer or other purchaser to ensure compliance with all appropriate policies.

Inventory

Most equipment items are inventoried. Approval is required before taking anything off of campus. Loaning equipment is not allowed without special approval.

Repairs

Contact the Lab Safety Officer or other purchasers if equipment purchases are needed. Special procedures and approvals may be needed before a service technician can begin service.

Standard Operating Procedures

Standard operating procedures (SOP) are required for all lab or field activities. The SOP could be for:

- A specific research project
- A PI's Laboratory
- A common procedure or operation
- Use of a specific material

An SOP manual shall be located in each room where required. It will contain all SOP for common activities.

In addition, Directed Study and Directed Method student projects will have an SOP for each project.

Appendix A contains the forms and examples of a correct SOP.

Guidelines for Student Laboratory Assistants

Student Laboratory Assistants for the College of Science and Mathematics are part-time employees of Kennesaw State University. The assistants are a vital part of a team effort directed toward the education of students in the sciences. As such, they are depended upon to be responsible and reliable support personnel in a variety of laboratory settings.

Responsibilities of Student Laboratory Assistants include any or all of the following: Preparation of media and solutions, care of laboratory animals and plants, setting up of experiments, care of laboratory instruments, equipment, glassware and facilities. Duties and assignments range from semi-skilled routine tasks to highly specialized technical procedures.

General Personnel Information

Student Laboratory Assistants are employed on a semester-to-semester basis as the need for assistants arises. Student laboratory assistants are assigned to courses or "at large' at the beginning of the term. Student Laboratory Assistants are employees of KSU and are expected to act in a professional manner, follow and encourage others to follow safety rules, practice good personal habits and be able to work productively with others. Failure to do so could result in re-assignment or termination.

Supervision

Student Laboratory Assistants are hired by the Laboratory Safety Officer of the department and supervised by the same as well as the laboratory coordinators, with cooperation of the faculty and staff of the department.

Pay Period

- The work week for Student Laboratory Assistants starts on Saturday at 12:01 am and ends the following Friday at midnight. **Student laboratory assistants are permitted to work a maximum of 19 hours per week.** However, there is seldom that much work available. The maximum applies even if a student works in more than one department. The combined total should not exceed 19 hours. Some special situations may require students to work more than 19 hours per week, but **never** more than 40 hours per week. In addition, no promises are ever made to provide a student a consistent number of hours each week.
- For purposes of payroll, the two-week period is the official pay period. Each individual week is considered separately regarding compensation time calculations.
- Students are paid on Friday of the week following the due date for electronic timecard system, ADP.

Overtime

- Working hours that exceed 40 hours within the KSU workweek is considered overtime. Compensation is calculated at 1 ½ times the hourly rate for all time in excess of 40 hours. **Student laboratory assistants are not allowed to work overtime, either in a single KSU department or a combination of KSU departments.** In the event of an emergency, before any employee can work more than their assigned hours, they must complete the ***Prior Authorization for Non-Exempt Overtime/Compensatory Time*** form. This form must be approved, in advance, by the Department chair and the Dean of the College of Science and Mathematics.

Attendance, Tardiness and Absenteeism

- All Student Laboratory Assistants are advised of their work hours when they are hired. For the University and the Department to maintain a smooth and consistent operation, its employees must report to work at the designated time and remain on duty in accordance with his/her schedule.
- All Student Laboratory Assistants are expected to report to work promptly at the beginning of their workday and after meal breaks. There are seldom replacements for someone tardy or absent so make arrangements to cover your labs. If any employee finds it necessary to be absent or late for work, such absences or tardiness must be immediately reported to the lab safety officer, lab coordinator and/or the main biology office. **It is important that you speak to a live person rather than leave a message or send an email** so your duties can be covered by someone else.
  It is important that you plan your studies and your work schedule carefully. It is better for the department to plan on having someone else do the job from the beginning than to replace you at the last minute. You have two important responsibilities; you are a student and a student assistant.

A record of tardiness or absenteeism may result in disciplinary action, and can eventually result in termination of employment. In addition, disruptive or uncooperative behavior will not be tolerated among the student assistant workforce. Those doing so will be terminated.

Reporting Hours

In all cases, student laboratory assistants are expected to maintain and report the appropriate information on their ADP time cards. Send an email to your supervisor for any clocking errors or discrepancies.

The ADP time records must be a true reflection of the time worked each day. Any attempt to defraud KSU by supplying false information will result in termination.

Duties of the Student Laboratory Assistants

For those assigned to a specific course, section, of courses, or room, the student assistants are responsible for setting up labs, making solutions, supplying all glassware, instruments, and equipment, and monitoring the successful completion of experiments, keeping the lab clean and in order at all times, as well as other duties not listed here. All student laboratory assistants will receive job-specific safety and operational training

Special attention should be given to the chemicals and supplies. You should check two weeks in advance of what will be needed to allow for supplies to be ordered. If supplies are needed it should be brought to the attention of the lab coordinator as soon as possible It is best to do so in writing so it is not forgotten (note, email, etc.). The same attention should be given to the equipment. If something is not functioning properly, it should be brought to the attention of your supervisor. When setting something aside for repairs, label it with the condition, your name and the date. Inform the lab coordinator as soon as possible.

If you are assigned a course or an area, you must meet with the lab coordinator prior to and during the semester to receive syllabi and further instructions for the semester. Keep the lab coordinator informed as to what is happening in your assigned area. If you are an "at large" assistant, your duties will often change from day to day. You will receive specific instructions as to the tasks you are to perform.

Some guidelines to follow for all student laboratory assistants

- Wear eye protection whenever you are in the lab.
- Lab prep is a team effort. We have a community of student assistants, staff and faculty all working toward the same goal. No single person has ownership of a lab or priority over others.
- If you cannot come in to prep a lab, find a replacement and/or contact the lab coordinator or lab safety officer. You must talk to a live person to make sure your prep is being covered. Do not just leave a message or send an email.
- Make sure all materials and supplies are returned to their proper location.
- Plan enough time to complete your prep. Biol 2107~ 2 hours, A & P ~ ½ hour, etc. It is far better to be done early than not be ready by class time.
- There will be several communications sent out during the semester by email or Facebook. Respond promptly when asked for information.
- Report any accidents to the instructor or lab coordinator no matter how small they may seem.
- Always wear the proper attire. A lab coat is recommended.
- Do not force glass tubing or thermometers through rubber stoppers. Lubricate the tubing and introduce it gradually and gently. Grip the glass near the insertion point to prevent

excess torque. Protect your hands with a towel when you are inserting lubricated tubing into stoppers or when you are cutting glass.

- Check glassware for chips or cracks before washing. Place glassware for repair in a designated area.
- Always rinse glassware immediately after use. This rinse minimizes the amount of cleaning later on. Once a chemical has dried on glassware, it is difficult to remove. Some special situations may require rinsing with deionized water.
- Don't stick a wet brush into the carton of Alconox; always make up a soap solution in a pail or pan. Alconox, Sparkleen and other scientific glassware soaps are concentrated and need to be diluted.
- Scrub **all** surfaces of the glassware with a brush. Remove **all labels** and any dried on dirt. Sometimes a razor blade and/or solvent can be used to scrape off labels.
- Rinse each piece of glassware 3 times with water to remove soap film. Check it and rinse again if needed. Most soap leaves a film that must be removed. Also, soaps react with some chemicals and will denature enzymes and proteins.
- Do not put your fingers into glassware; especially clean glassware you are putting away.
- If glassware has soap spots or needs additional cleaning, wash again or place in a soaking solution. Do not put dirty glassware away. Hang all brushes to dry to prevent rusting.

Replacing Glassware

- All glassware should be put away in a manner to avoid collecting dust, such as beakers upside down.
- Do not stack glassware in such a way to create a hazard.
- Do not put dirty glassware away.
- Glassware with cracks or chips should be marked and set aside for repair or discarding.

Other

- If you take equipment or supplies from another room, leave a note in the space you took it from. Leave your name and what room it was moved to.
- Return any borrowed items to the original location.

Contacts

- Biology and Physics main office 470-578-6158
- Chemistry and Biochemistry main office 470-578-6159

- Dale Zaborowski, Lab Safety Officer, 470-578-6165 office
  Biology and Physics 770-633-3202 cell

- Benjamin Huck, Lab Safety Officer, 470-578-6404 office
  Chemistry and Biochemistry 770-891-7852 cell

- Sarah Jordan, Lab Coordinator, 470-578-3633 office
  Chemistry and Biochemistry 770-843-2595 cell

- Nanette Reese, Lab Coordinator 470-578-2235 office
  Biology and Physics 770-363-5899 cell

- Ellen Winant, Lab Coordinator 470-578-7630 office
  Biology and Physics 678-925-0153 cell

- Matthew Rosenberg 470-578-7645 office
  Chemistry and Biochemistry

- KSU Public Safety 470-578-6666
- KSU Environmental Health and Safety 470-578-3321

Guidelines for Directed Methods and Directed Study Students

Because the College of Science and Mathematics laboratories and equipment are shared by the faculty for research and our lab classes, special considerations have to be taken in order to have an equal opportunity to successfully and safely complete your research. All persons using the lab facilities must read and comply with the following policies regarding lab safety, equipment use and lab etiquette.

Remember that you are responsible for:

- Your own health and safety.
- The health and safety of those around you.
- The security and the safe use of equipment and facilities that you have been authorized to use.
- Understanding and complying with all laboratory policies.

Be prepared to work hard and work independently, especially if your project is an ambitious one. Laboratory procedures require patience and techniques that only practice can teach. Long hours of observation may be involved. Things do not always go as expected and they rarely go according to a predetermined schedule. Be sure you have adequate time to do the work and have an alternate plan ready in case you reach one of the infamous dead ends.

With that said, keep in mind that the rewards of a successful project are great. The techniques you will learn are applicable in the many career paths in today's job market. Your project will look great on a resume or graduate school application!

Before beginning any project, it is important to learn as much as possible about the methods you will be using. You don't want to waste your valuable lab time learning something you could have read in a textbook or published paper.

Keep in mind that each project will need a unique set of methods and techniques. A method that works for one project may be the wrong method for your project. You will need to find out more specifics about your application.

Finally, be sure you have what you need to complete this project. We cannot always supply many of the consumable items you will need such as chemicals or microorganisms at the last minute. Most of our supplies are for laboratory classes only and are very limited.

Laboratory Policies

In order to manage risks, it is necessary to limit access to equipment, laboratories, supplies and certain storage areas. The following general policies apply to ALL laboratories within the College.

Access

Directed Study students will be assigned an area to work in. Other areas are off limits unless given specific permission. You may not enter any other lab, stockroom, storeroom or office

unless you have been specifically authorized. If you are granted access to the laboratory for a particular project, you are permitted to work on only that project and not on an unauthorized project.

Having swipe card or key access does **NOT** mean you are authorized to access a lab. To be authorized, you **MUST** have been trained in the appropriate hazards and control measures by the supervising faculty or laboratory coordinator. Once authorized, you may gain access only to that laboratory for the time you have been approved for.

Where access to a room is restricted, such as by a swipe card or lock, you are **NOT** authorized to allow entry by people who do not have authorization for access to that facility. This means that you are **NOT** allowed to unlock the facility or provide entry for someone else or have friends visiting you in the lab.

In ideal circumstances, work in the labs would be completed during normal working hours. In practice, however, it is sometimes necessary or desirable for staff or students to work on campus at other times. In these circumstances there is an increased risk to health because of the lack of supervision and a lower availability of assistance if someone is incapacitated due to accidental injury or sudden illness. Such risk is greater in certain laboratories or where there are particular hazards. Our goal is to ensure that appropriate measures are taken to minimize risk to the health and safety of staff or students who work on campus in laboratories after hours.

Prior to students working after hours in a designated laboratory, they:

(a) must have completed appropriate training, including emergency evacuation and other necessary emergency procedures;
(b) must notify their supervising faculty of their intentions;
(c) must obtain their supervisor's authorization to perform any designated high-risk procedures; (note: approval will not be given for such procedures to be performed by anyone intending to work *alone)*

Students working after hours in a designated laboratory:

(a) must not perform any designated high-risk procedures if working *alon*e;
(b) must comply with all normal safety procedures and take any special safety precautions as previously agreed with their supervising faculty and the lab coordinator;
(c) must follow the background check procedures through KSU Human Resources and Card Services for after-hour access.

It is best to use the "buddy system" in order to have a second authorized person present in the laboratory to summon help in case of an accident. However, if you are working alone in the lab, it is recommended that you keep your cell phone on your *person* so it is within reach at all times, not in your book bag or on the lab bench.

Supplies and Reagents
Directed Study students must make a realistic list of the supplies needed for their project. The list must be discussed with the supervising faculty and the lab coordinator prior to the start of the project so supplies can be ordered.

Write out your calculations before obtaining and mixing chemicals. Don't be shy about asking your faculty supervisor to check your calculations. Keep this information recorded in your experimental lab notebook, reviewing it often.

Materials in the lab are for class use. All material for projects must be purchased using the project's budget, identified as to the project, and separately stored on a space available basis. **The cost of unauthorized use of materials will be directly charged to you**.

Unless given permission, Directed Study students are not allowed to take stock supplies, solutions or media prepared for instructional labs. Do not "borrow" class materials for a special project or project materials for a class. Plan ahead. Even with permission, let someone know when you take supplies. Never take the last of anything without asking first.

Student lab assistants are a great source for information when locating items and making solutions. However, they are there to prep for the lab classes and are not expected to work on your project.

It is a good practice and part of the learning experience to prepare your own media.

You are not permitted to bring materials and/or chemicals into the lab without approval from the lab coordinator.

All materials must be stored in viable, closed containers. These containers must be labeled with the original manufacturer's label, or a reasonable facsimile.

Each and every container used for materials must have the common compound name (no formulas or abbreviations) or the solution content and strength, the users' name, the date, and appropriate hazard information. This policy applies to all containers or glassware whether the material is hazardous or not (i.e. water, buffers, etc.) including solvent waste containers. Each room has a poster explaining proper labeling

The Safety Data Sheet (SDS) must be read for all materials in use. The forms may be obtained in the room where the chemical is found, from web sites or through the lab coordinator. All researchers must have a printed copy of the SDS on file in the lab for all chemicals being used**.** Photocopy them if necessary, and keep them in your lab notebook. All the necessary information that you require to carry out your lab work should be kept in the lab and within reach.

Housekeeping
When you set up your area for experiments, check the fume hoods, lab bench, etc. for space and cleanliness. You want to insure that nothing else is going to interfere with your experiments. If the area requires cleaning, use nitrile gloves (or other glove types) even if you are using a lab bench cleaner. Better to be safe!

Keep the work area clean and tidy. Keep common work areas clean. When you have finished for the day, make sure all tools, equipment, and supplies are returned to their proper storage, and the equipment is shut down. All glassware must be cleaned before it is put away. Be courteous to your colleagues--CLEAN UP!

All the glassware, containers, bags, that you use are to be properly labeled. Follow the Department guidelines. Make sure that you have all the relevant information on your containers (name, dates, etc.). Never store anything without labeling. It will likely be tossed out by the lab coordinator.

Each student is responsible for cleaning all of his/her glassware at the end of each day. It is never acceptable to leave dirty glassware in the sink for someone else to clean. Glassware must be cleaned properly immediately after use to avoid having solutions and compounds dry on the surface. Persons not cleaning their glassware immediately after use will no longer be permitted to use glassware. This rule is strictly enforced.

Arrangements for storage and disposal of hazardous material must be made in advance prior to using the lab. Proper waste disposal is an important part of our lab chemical hygiene program and subject to fines from the State if not handled properly. All waste should be placed in the proper container for the appropriate disposal method and should be properly labeled, then placed in the designated Waste Consolidation Area in each room. Please also be sure that the waste bottle is capped AT ALL TIMES unless you are adding waste. Notify the lab coordinator when you have full containers.

Sharps (blades, disposable syringes and syringe needles) must be disposed of in the red sharps containers. Sharps must never be disposed of in the wastepaper baskets for any reason!

Hazardous material spills must be dealt with immediately and appropriately. This includes the proper cleanup of workspaces, glassware and equipment as well as the proper cleanup and disposal of consumables.

All instruments, counter tops, exhaust hoods, tool kits, and work spaces must be left in a clean and operable condition following the completion of work.

All data stored on computers must be backed up and deleted within 48 hours or it will be removed. In all circumstances, data on the computers is stored at the researchers own risk.

Normally, all lights are to be turned off when leaving the lab and all doors checked as locked.

Safety

Research with a variety of materials presents potential hazards of exposure that need to be carefully considered. Guidelines for safe use of rDNA, viruses, bacteria, select agents and toxins, blood and human tissue, and other biological materials as well as hazardous chemicals require that safe practices and procedures be in place to reduce or eliminate these exposure risks. First and foremost, read our Lab Safety Guidelines (pg 9). It explains the important safety considerations. Also, you need to know the specific risks of the materials you will be working with.

Users must be aware of appropriate emergency procedures *before they are needed.* All users must know the location of telephones, fire extinguishers, eyewash stations, showers, and spill clean-up stations. All users must also know the location of emergency contact information.

The safety of self and others is the personal responsibility of each and every lab user in the CSM labs. Users must constantly be aware of the hazards associated with the chemical and biological materials present throughout the lab and the instrument they are using.

In all circumstances, the use of hazardous materials must be restricted to the exhaust hoods or biological safety cabinets. Users should be aware of the operating principles of the safety hoods.

The appropriate level of protective clothing and eyewear must be worn when using hazardous materials.

You should locate posted information regarding emergency contact information and identify the location of fire extinguishers and eye washes (if appropriate) within the laboratory.

You should review and understand all additional posted access, safety warnings, and safety policies for the laboratory.

All injuries that occur in the laboratory must be reported immediately to the lab coordinator.

If you create a hazard you must control it. It is important to notify and involve a faculty member or the lab coordinator where the hazard is located.

Consumption of food and drink is prohibited in all laboratories.

APPROVED EYE PROTECTION MUST BE WORN AT ALL TIMES WHILE IN THE LABORATORY WHENEVER THERE IS A RISK OF EYE INJURY, regardless of whether you are a visitor or you are working on the project. Eye protection includes protective goggles or safety glasses with side shields.

NO SHORTS, TANK TOPS, SANDALS, OR OPEN HEEL or OPEN-TOE SHOES ALLOWED. Long hair must be tied back, long sleeves must be cuffed or rolled up, and loose jewelry secured when working on machinery.

IT IS YOUR RESPONSIBILITY TO KNOW THE SAFETY REGULATIONS GOVERNING THE OPERATION OF ANY EQUIPMENT PRIOR TO USING SUCH EQUIPMENT.

Additional safety equipment can be made available to you if necessary. Masks, specialty gloves, etc. can be obtained from the lab coordinator.

Never, ever walk down the hallway with a chemical or sample that is not securely covered and contained! There may be someone walking around the comer, or rushing out the door running into you, increasing the risk of both of you being injured. It is advised that you use a card to transport materials.

Wear a lab coat. It is available from the KSU bookstore or many other sources and it's cheap!

Locate the safety shower and the spill kits. Know how to treat spills ahead of time by asking the lab coordinator.

You should follow the safety rules set forth in the ***College of Science and Mathematics Laboratory Safety Guidelines*** (pg 9).

Handling glassware

- Do not force glass tubing or thermometers through rubber stoppers. Lubricate the tubing and introduce it gradually and gently. Grip the glass near the insertion point to prevent excess torque. Protect your hands with a towel when you are inserting lubricated tubing into stoppers or when you are cutting glass.
- Check glassware for chips or cracks before washing. Place glassware for repair in a designated area.
- Always rinse glassware immediately after use. This rinse minimizes the amount of cleaning later on. Once a chemical has dried on glassware, it is difficult to remove. Some special situations may require rinsing with deionized water.
- Don't stick a wet brush into the carton of Alconox; always make up a soap solution in a pail or pan. Alconox, Sparkleen and other scientific glassware soaps are concentrated and need to be diluted.
- Scrub **all** surfaces of the glassware with a brush. Remove **all labels** and any dried on dirt. Sometimes a razor blade can be used to scrape off labels.
- Rinse each piece of glassware 3 times with water to remove soap film. Check it and rinse again if needed. Most soap leaves a film that must be removed. Also, soaps react with some chemicals and will denature enzymes and proteins.
- Do not put your fingers into glassware; especially clean glassware you are putting away.
- If glassware has soap spots or needs additional cleaning, wash again or place in a soaking solution. Do not put dirty glassware away. Hang all brushes to dry to prevent rusting.

Replacing Glassware

- All glassware should be put away in a manner to avoid collecting dust, such as beakers upside down.
- Do not stack glassware in such a way to create a hazard.
- Do not put dirty glassware away.
- Glassware with cracks or chips should be marked and set aside for repair or discarding.

Equipment Use
The laboratories and their equipment must be maintained in manner that allows for clean, safe use by all persons in the KSU science community. Persons operating in a manner that jeopardizes the research and safety of others or in a manner that damages or renders instruments or lab facilities unusable to others may have their lab privileges suspended or revoked.

Respect the rights of others to use the instrument, and honor their reserved times on the instrument.

Conflicts in schedules are best resolved when all parties work in cooperation. Persons refusing to cooperate when asked to do so may have their lab privileges suspended or revoked.
Instructional lab courses have priority in equipment use.

In all cases, the lab coordinator has final say in instrument scheduling and usage.

In the laboratories, only students qualified and approved to run equipment may do so. Approval is by faculty knowledgeable of equipment operation and safety or the lab coordinator, you are not to "teach" unapproved students how to use equipment. **YOU ARE REQUIRED TO COMPLETE TRAINING ON ANY EQUIPMENT PRIOR TO USE**

If you have any questions regarding the operation of a machine, ask for help from a qualified faculty member or the laboratory coordinator.

Do not attempt to modify or repair any equipment or apparatus unless you have been authorized to do so.

Do not use equipment that is broken, dangerous or malfunctioning. Report all such items to the lab coordinator.

Follow guidelines posted on the walls of the lab and, in some cases, on the individual pieces of equipment.

In order to prevent injury to you and damage the equipment, DO NOT ATTEMPT TO OVERLOAD THE CAPABILITIES OF THE MACHINERY**.**

Electric shock, high temperature, moving parts or magnetic field hazards are associated with some analytical instruments. Users must be aware of the hazards associated with the specific instrument and exercise proper care in the vicinity. The bottom line: Know your instrument, know your materials, and know what to do in an emergency.

Notify the lab coordinator when maintenance or repairs are required for an instrument.

Field Study

Field studies have their own risks. Streams, lakes, forests, fields, roadsides and other types of places outdoors hold significant risks. Working responsibility for safety in field research rests primarily upon the persons who directly supervise and carry out the research on location. Such persons are expected at all times to use good common sense. The College of Science and Mathematics concern in this policy is to require that due diligence be exercised by all concerned parties in giving attention to the nature of, and the means for dealing with the risk that may be associated with each location and kind of field research. It is the intention of the College that participants enter into field research on the basis of their informed understanding of the associated risks and their consent to the means for dealing with such risks. Refer to the **Field Study Guidelines** on page 31 for more information. It is best to use the "buddy system" in order to have a second person present in the field to summon help in case of an accident. However, if you are working in the field, and you are working alone, it is always advisable that you leave your name, telephone number, and the amount of time that you will be in the field, with someone you know, and that is reliable. Your faculty supervisor would be a good person to contact.

Know the surrounding area that encompasses your study plot. Find out where phones, police stations, etc. are located, in case of an emergency. If you have a cell phone, take it into the field with you. Keep it on your person at all times if possible. Always bring a small backpack-sized first aid kit with you. If you are allergic to stinging insects it's best to obtain a treatment kit from your doctor. You should not take chances especially when you are out in the field and far away from a hospital or clinic. Overall, your faculty supervisor is the most valuable and knowledgeable person in the department who knows and understands your research project. Clarify the protocols and the use of chemicals and equipment with them before starting your research. **Always keep safety in mind. It may save your life!**

When in the field, remember you are a representative of KSU in the community. You should conduct yourself in a responsible and professional manner at all times.

Violations and Enforcement

Faculty, staff and lab assistants will strictly enforce laboratory policies and safe use practices.

Anyone found under the influence of drugs or alcohol or is impaired in such a way as to compromise safety will immediately be asked to leave. Offenders will have their lab privileges revoked for the semester. Any violation of laboratory policies or witness of an unsafe act can result in the loss of authorized laboratory access.

Failure to Comply

All students, faculty, staff and visitors who work in the laboratories at Kennesaw State University are expected to comply with the procedures published in the Chemical Hygiene Plan and the Laboratory Handbook.

In instructional laboratories, the instructor or the graduate teaching assistant assigned to teach the course is responsible for enforcing that students enrolled in the course are in compliance with safety procedures. Students who do not comply may be subject to a reduction in their grade and/or dismissal from the laboratory, according to the policies established in the course syllabus.

In research laboratories, the principal investigator assigned to the laboratory space is responsible for enforcing that all personnel in their group (including but not limited to undergraduate research students, graduate students, postdoctoral fellows, research scientists, and short-term visitors) are in compliance with safety procedures.

Failure of faculty and staff to comply with safety procedures may result in negative performance reviews, loss of laboratory privileges, and possibly termination of employment, subject to University guidelines for personnel review.

Laboratory Safety Violation Report Form

The Laboratory Safety Violation Report Form is the method used to inform a PI, faculty or staff of a safety violation. It is created and given to the non-compliant party by the Laboratory Safety Officer, the Department Chair and EHS together after an investigation. This form is not meant to be a punishment. It is a method of informing the need for changes to be in compliance.
Other action may come as the result of a collection of violations or violations of considerable danger (see Laboratory Safety Standards). That action is done by the dept. chair, etc. However, this form is not that process, only a way to inform of a violation and the way to resolve it. This process focuses on safety and compliance only. Corrections of safety violations could be viewed as a positive action and favorable for a PI, faculty or staff member.
Maintaining records of such actions demonstrates KSU's proactive response and commitment to safety. It also provides a record of cooperation with compliance corrections or demonstrates a pattern of non-compliance.
Safety violations can be for any regulation we are subject to (see BOR Statement, pg 2)

Kennesaw State University

LABORATORY SAFETY VIOLATION REPORT

This form is given to the Kennesaw State University employee by the Department Chair along with the Laboratory Safety Officer and the Department of Environmental, Health and Safety. The purpose is to inform the employee of the need for changes to be in compliance with any regulations we are subject to or to eliminate a hazardous situation. Other action may come as the result of this violation, a collection of violations, or violations of considerable danger. However, the first and foremost purpose of this form and proposed action described is to eliminate hazards and be in compliance.

Date: _____

Employee(s):

_____

_____

_____

Department:

_____

Violation Classification:

☐	☐	☐	☐
Imminent Danger	Serious Violation	Non-Serious Violation	Documentation Violation

Summary of Violation (attach additional information):

_____

_____

_____

_____

_____

_____

Response Meeting

In Attendance:

_____

_____

_____

Date: _____ Time: _____

Comments:

_____

_____

Corrective Action:

_____

_____

_____

_____

Additional Training Required:

_____

_____

_____

_____

I have read and understood the above safety violation report. I further understand that I have received a written warning and that failure to correct the violation may result in further disciplinary action.

Employee Signature: _____ Date: _____

Supervisor Signature: _____ Date: _____

Laboratory Safety Standards

The health and safety of workers and building occupants is the most important factor to consider in laboratory work. In addition to these health and safety concerns, compliance with OSHA, State of GA and EPA regulations is also important because of the severe financial consequences, especially related to EPA hazardous waste regulations. Fines for seemingly minor violations, e.g., improper labeling, lids not screwed-on tight, etc., may run into the tens of thousands of dollars, therefore compliance with these regulations must receive special attention.
Sources of environment, health and safety standards and key compliance issues include:

Standard	Key Compliance Issues
OSHA Laboratory Standard	Laboratory Safety Plan, training of staff, MSDSs, emergency plan, secure compressed gas cylinders, outdated peroxide-formers
EPA/State Hazardous Waste regulations	Lids, labels, mixing incompatibles, secondary containment, location
Fire/Life Safety Codes	10-gallon open storage flammables limit, clear laboratory egress, hallway storage
Biological Safety, Security	Biological agents and toxins use practices, containment, facilities, management and security
University and BOR policies	Training, prevention of injuries, personnel policies, grant proposal review,
Consensus standards of good laboratory practice	Hazardous material inventory minimization and storage compatibility, housekeeping, appropriate attire, food & drink within designated area

VIOLATION SEVERITY CLASSIFICATIONS

The University uses the following categories of violations:

Imminent danger

a process, action, or condition where there is reasonable certainty a hazard exists in a KSU laboratory that can be expected to cause serious physical harm.

Serious violation

a process, action, or condition in a KSU laboratory that will probably lead to physical harm or significant exposure to biological or physical agents or violates regulatory standards (e.g. hazardous waste container management).

Non-serious violation

a process, action or condition that has a direct relationship to health and safety in a KSU laboratory but probably would not cause serious physical harm or significant exposure to biological or physical agents. Related non-serious violations may result in a serious violation where in combination they present a substantial probability of exposure, injury or physical harm.

Documentation

Required KSU laboratory EHS documentation has not been completed, updated, submitted, and/or retained.

ENFORCEMENT POLICIES

Imminent danger

Environmental, Health & Safety, along with the Department Chair and Lab Safety Officer, notifies lab personnel to immediately cease operations and close the laboratory, then notifies the EHS Director who in turn notifies the department head of the affected PI to request assistance in abatement of the problem. The EHS Director also notifies the Facilities to secure the area if necessary. EHS will perform follow-up inspections to ensure compliance.

Serious violation

Environmental, Health & Safety, along with the Department Chair and Lab Safety Officer, notifies lab personnel and PI, if available, of the violation and sets a deadline for abatement, and may recommend that the PI shut down the operation until abated. Follow-up notification, in writing, goes to the PI and safety supervisor. EHS will perform follow-up inspections to ensure compliance if appropriate. ALL laboratory personnel, including Principal Investigators, may be required to complete additional training. All lab members must complete the training course within two weeks of the laboratory safety inspection report date. If not all lab personnel complete the training within two weeks, EHS will act in accordance with the policies of the University and the College. EHS will conduct a follow-up inspection in three months to verify that compliance with the regulations is being maintained.

Non-serious violation

Environmental, Health & Safety, along with the Department Chair and Lab Safety Officer, notifies laboratory personnel of the violation and requests abatement as soon as practicable. EHS sends follow-up notification in writing to the PI. EHS sends a summary report of all inspected PIs to respective department heads annually.

Documentation violations

Environmental, Health & Safety, along with the Department Chair and Lab Safety Officer, notifies laboratory personnel of the violation and requests abatement as soon as practicable. EHS sends follow-up notification in writing to the PI. EHS sends a summary report of all inspected PIs to respective department heads annually.

NOTIFICATION OF GRANTING AGENCIES

For some research, EHS has signed a "Certificate of Environmental and Safety Compliance", a requirement for some granting agencies. This certification requires EHS to notify the granting agency if that laboratory is in violation of any applicable environmental or safety law or regulation.

REPORTS TO DEPARTMENT HEADS AND LABORATORY SAFETY COMMITTEE

EHS will send annual reports to the department head summarizing inspection activities within his or her department. The reports will list the nonserious, serious, imminent danger, and documentation violations for each PI and render a general assessment of Outstanding, Good, Fair, or Unacceptable. EHS will also report these findings at meetings of the Safety Committee, as appropriate.

Appendix A
SOP Information, Examples and Forms

Procedures and protocols for each individual laboratory or group of laboratories should be developed to handle potential emergency situations. Standard operating procedures (SOP) for using specific chemicals or apparatus that could cause injury should also be developed. This appendix will provide guidance as to what procedures or protocols should be developed and what information should be contained within the procedures or protocols. The SOPs should be brief and to the point. If it is too lengthy, it will not be read. SOPs can also be extremely valuable in academic laboratories and can be employed anytime there is procedure that potentially more than one person will use in a research group. They can be written to:

- outline sampling procedures, describe the proper procedures for the transportation of research materials;
- standardize the methods of training for often used experimental methods and/or analytical instrumentation; and to
- document the methods used in data handling and/or analysis.

To be effective, SOPs need to describe not only what needs to be, but who is qualified to carry it out, and under what conditions the procedure can be performed reliably.

SOPs can be invaluable to students involved in undergraduate research in providing written guidelines detailing how to carry out new/unfamiliar methods reliably. The action of authoring an SOP can be beneficial in helping you to think through the procedures you use in a thoughtful step-by-step manner and document clearly and succinctly in writing your understanding.

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Research Laboratory
Standard Operating Procedure
Guidance Document

What information is needed in a laboratory standard operating procedure?

Well-developed Standard Operating Procedures (SOPs), or Standard Laboratory Practices, are essential tools for any laboratory that manipulates biological research materials. SOP's serve as a resource to train new lab staff, supplement recurrent training curriculum, and as a valuable reference in the event of an emergency. The following components should be considered when establishing *minimum* best practices in a research laboratory. However, the value of an SOP only holds merit if it is implemented by all laboratory workers and enforced by the Principal Investigator.

Principal Investigator Responsibilities

The Principal Investigator (PI) has the primary responsibility for ensuring that their laboratory is safe through establishment of the initial risk assessment, administrative controls, and by ensuring that all work is conducted with appropriate engineering controls. PI's must adhere to all applicable guidelines and regulations. The PI is responsible for the safe use of biological agents in their laboratory.

Laboratory Staff/Student Responsibilities

The laboratory staff and students are responsible for knowing the potential hazards contained within their respective work areas, in particular the biological material and appropriate procedures and practices to be used in the laboratory. Laboratory employees must follow approved laboratory procedures and safety guidelines at all times. For information regarding minors working in laboratory areas, please contact EHS.

General Emergency Contact Information

The first page of the SOP should include emergency contact information so that it is quickly and easily accessible. and the laboratory location

Section 1 - Purpose

What is the overall purpose of the SOP?
As an example: *This SOP has been developed to outline the hazards involved with research using bacterial pathogens and how to safely manipulate these materials to avoid any lab acquired infection (LAI).*

Section 2 — Process

List the process or type of process involving hazardous chemicals - for example, "atomic absorption spectroscopy for heavy metals." Include any unique equipment used. If the term "process" does not apply, proceed to Section 3.

Section 3 —Hazardous Chemicals Involved

List the hazardous chemicals (or class of chemicals) involved, including any hazardous products or by-products. Material Safety Data Sheets (MSDSs) for highly reactive or unstable chemicals should be on hand; MSDSs for all chemicals should be readily accessible. MSDSs for most chemicals are available through the EH&S web site or through the chemical manufacturer.

Section 4—Potential Hazards

Describe the potential dangers for each hazardous chemical or each element of the hazardous process or procedure. Include physical, health, and environmental hazards. To find hazard information, look up the MSDSs (available from the EH&S web site or from chemical manufacturers) or look online for other sources such as Cameo Chemicals , a National Oceanic and Atmospheric Administration (NOAA) database that provides hazard information in a user-friendly format. In addition, the Sigma- Aldrich web site, has technical bulletins that provide detailed information about various processes, equipment and classes of chemicals.

Section 5—Approvals Required

List the circumstances under which a particular laboratory operation, procedure, or activity requires prior approval from the Principal Investigator (PI), laboratory supervisor, or other personnel.

Section 6—Designated Area

Consider establishing a designated area for this operation within the laboratory. A fume hood, portion of the laboratory, or the entire laboratory may be the designated area.

Section 7—Special Handling Procedures and Storage Requirements

Describe special handling procedures and storage requirements including, (but not limited to): specific laboratory techniques; ventilation requirements; temperature controls; chemical incompatibilities; special containment devices; and access restrictions. If applicable, describe safe methods to transport the chemicals.

Section 8—Personal Protective Equipment (PPE)

List the PPE required for each activity or chemical. PPE includes gloves, laboratory coats, safety glasses, goggles, face shields, and respirators. If applicable, indicate the type of PPE (e.g., gloves, splash protection) needed for each phase of a process. For help with PPE selection or to determine if respirator use may be necessary, contact EHS.

Section 9—Engineering/Ventilation Controls

List any engineering controls used. An engineering hazard control is generally defined as equipment or physical infrastructure that reduces or removes hazards from the laboratory. It can include specifically selected and arranged experimental equipment. Common engineering controls include the fume hood, glove box, biosafety cabinet and laser interlock.

Section 10—Spill and Accident Procedures

Describe procedures for handling potential emergencies related to this chemical or process such as accidental releases to the sanitary sewer, spills, fires, chemical burns to skin or eyes, shattered

glassware, etc. Note the location of emergency equipment such as spill kits, emergency eyewash/showers, fire extinguishers, etc. Take care to describe any special procedures for dealing with personal exposures (e.g., calcium gluconate should be used for HF exposures). Identify the location of emergency response phone numbers and emergency contact phone numbers. **Emergency situations** can affect your ability to think clearly. It is important that everyone feel confident in their understanding of proper emergency procedures, including nearby lab members whose work may not be related to this SOP but who may need to respond in an emergency.

Section 11 —Waste Disposal

Describe any unique waste disposal procedures for the chemicals.

Section 12—Decontamination

Discuss any appropriate decontamination procedures for equipment, glassware, and clothing. Where applicable, include controlled areas (e.g., fume hoods, glove boxes) in the text.

Section 13 — Process Steps (Optional)

This section is useful for particularly complex or multi-step processes. List each step of the process or procedure chronologically on the left side of the SOP Template page. On the right side of the page and directly across from the corresponding process steps, list precautionary safety measures to be taken, including the use of specific laboratory techniques and PPE. If possible, describe indicators (visual or otherwise) which show whether the reaction, equipment, etc. is working safely as intended or that a hazardous situation may be developing.

Training

SOPs should be reviewed by the PI or at least one peer who is doing similar research. Once an SOP is written, everyone performing work described by that SOP should read it carefully and sign the SOP Training Documentation page at the end of the SOP Template. The location of SOPs should be noted in the "Standard Operating Procedures (SOPs)" section of each laboratory's Chemical Hygiene Plan.

Laboratory staff should have both instructional and hands-on training for all biological and chemical hazards present in the laboratory. Laboratory-specific training should be provided by the PI, lab manager or senior scientist who has several years' experience working with the biological materials or chemicals and can direct staff in safe handling of the materials so as to avoid any accidental exposures. Technicians and students should demonstrate proficiency in techniques before being permitted to perform laboratory procedures independently.
All training sessions should be documented, to include the training session topic, information covered, instructor, date, and attendees. Depending on the significance of the hazards involved, curriculum training and proficiency testing may be warranted.

Kennesaw State University Kennesaw, Georgia	**EFFECTIVE DATE:** mm/dd/yyyy	**DOCUMENT NUMBER:** EHS- 0000
	NEXT REVIEW DATE: mm/dd/yyyy	**PAGE:** Page 61 of 97
TYPE: **STANDARD OPERATING PROCEDURE**	**ISSUED BY:** DEPARTMENT NAME	
DOCUMENT TITLE: Handling and Disposal of Phosphonates and other Potential Nerve Agents		

Approved By:	
director of Environmental Health and Safety	Date

1. Purpose

Diethyl (hydroxymethyl)phosphonate, other phosphonates, and similar phosphorus-containing compounds may be nerve agents and should be handled and disposed of with care. Supplies and glassware that come in contact with these chemicals must also be handled properly.

Potential rooms SC 465

Emergency contact Gregory Gabriel; office: 678-797-2653; cell: 512-784-0348
Ben Huck; office: 770-423-6404

2. Scope

All student researchers using these chemicals should be trained in their safe handling and disposal.

3. Responsibilities

It is the responsibility of all users to know the proper handling procedures of potential nerve agents or chemical warfare agents (CWA) outlined in the next section. Known phosphonates such as DMMP and Sarin attack the nervous system and lead to loss of muscle control. Lab users should treat all phosphonates, such as diethyl (hydroxymethyl)phosphonate, used in lab room SC 465, as potential nerve agents and CWA. The emergency contacts should be alerted if the user feels any side effects due to contact with the skin or significant inhalation. The emergency contact may recommend going to the KSU clinic or emergency room.

4. Procedure

Handling : Lab students should seek their advisor's supervision before they handle phosphonates. The chemical can be weighed into a vial on a balance outside a hood but once dispensed, all supplies that have contacted the chemical should be placed in a hood.

Before returning the bottle of the chemical back to a vented cabinet it should be closed tightly and wiped down with a wet paper towel and dried.

Disposal: All supplies including gloves, vials, syringes, needles, and glass pipets that have contacted the chemical should be placed in a 1 L beaker containing 500 mL of a 1:1 solution of a commercial bleach, such as Clorox bleach and water. After 48 hrs the 500 mL solution can be safely put in a solvent waste container. The supplies can be rinsed with water one time into the solvent waste container and then disposed of in the normal fashion. For purification of a product from a reaction using these chemicals, the student must seek the advice of their advisor.

Spills: Evacuate the lab room and immediately tell the emergency contacts. The spill will be cleaned up by them using bleach.

Additional Information: The MSDS of diethyl (hydroxymethyl)phosphonate is available online from <www.sigmaaldrich.com>.

Kennesaw State University Kennesaw, Georgia	**EFFECTIVE DATE:** mm/dd/yyyy	**DOCUMENT NUMBER**: EHS- 0000
	NEXT REVIEW DATE: mm/dd/yyyy	**PAGE**: Page 63 of 97
TYPE: **STANDARD OPERATING PROCEDURE**	**ISSUED BY:** DEPARTMENT NAME	
DOCUMENT TITLE: **Title of the Procedure**		

Approved By:	
rector of Environmental Health and Safety	Date

1. The following pages are example of Standard Operating Procedures. Use these to create specific SOPs for operations in your lab. Purpose

I brief description of the purpose of the procedure/policy. You can site what regulatory requirement the procedure/policy seeks to comply with.

2. Scope

Who is going to be affect by the procedure/policy? What, if any, is exempt from requirement of the procedure/policy?

3. Personnel Qualifications and Responsibilities

- Identify any special qualifications users should have such as certification/training or experience before performing the activities being described in this procedure.
- Outline responsibilities of individual or positions having a role in the activity being described.

Emergency Contact

6666

4. Definitions

Identifying and define any acronyms, abbreviations, or specialized terms used

5. Environmental Health & Safety Hazards

Identify specific potential hazard from the operations that could result in personnel/student injuries, illness and loss of life or in environmental contamination. Explaining what will happen if the procedure is not followed or is followed incorrectly. You may need to consult EHS department for help with hazard assessment.

1.0 Hazards Prevention and Control

Describe specific measures that should be taken to protect personnel/students from identified hazards. Prevention and control measure may include:

1.1 Engineering Controls:

Describe any specific engineering controls which are required to prevent employee injury to hazards such biosafety cabinet, fume hood, use of engineered sharps, etc.

1.2 Designated Area:

Identify any designated area require for performing this process and required signage

1.3 Personal Protective Equipment (PPE):

Identify the personal protective equipment required to be used.

2.0 Emergency Procedures

Describe immediate steps required in the event of an emergency situation. This may include;

- emergency contacts and notifications
- evacuation procedure,
- first aid treatment (e.g. antidotes),
- decontamination & spill clean-up response

3.0 Waste Management

Identify waste stream including hazardous waste, bio/pathological waste, solid waste, etc. and describe appropriate methods of handling and disposal of the waste, including unused stock of chemicals, in accordance with the university procedures.

6. Procedure

Outline all pertinent steps, in order, and the materials needed to accomplish the procedure. For instance a lab procedure may include items such as:

- Instrument or Method Calibration and Standardization
- Sample Collection
- Sample Handling and Preservation
- Sample Preparation and Analysis (such as extraction, digestion, analysis, identification, and counting procedures)
- Troubleshooting
- Data Acquisition, Calculations & Data Reduction Requirements (such as listing any mathematical steps to be followed)
- Computer Hardware & Software (used to store field sampling records, manipulate analytical results, and/or report data), and

If reference is made of another KSU procedure or if a particular subject is covered in more details in another procedure, cross reference the procedure, including the title and procedure number.

Standard Operating Procedure

Read the EH&S Standard Operating Procedures Fact Sheet before filling out this form. Print out the completed form and keep a readily accessible hard copy in the lab (also keeping an electronic copy is highly recommended).

Date: _____

SOP Title: _____

Principal Investigator: _____

Room and Building: _____

Lab Phone Number: _____

Emergency Contact Information:
Campus Security:
Environmental Health and Safety:
Safety officer:
Principal Investigator:

Section 1 – Purpose

Section 2 – Process

Section 3 – Hazardous Chemicals

Section 4 – Potential Hazards

Section 5 – Approvals Required

Section 6 – Designated Area

Section 7 – Special Handling Procedures and Storage Requirements

Section 8 – Personal Protective Equipment

Section 9 – Engineering/Ventilation Controls

Section 10 – Spill and Accident Procedures

Section 11 – Waste Disposal

Section 12 - Decontamination

Section 13 – Process Steps

Process Steps	Safety Measures

Training Documentation

Name (Printed)	Signature	Date

Appendix B

Kennesaw State University Volunteer Program

Kennesaw State University is self-insured through the Department of Administrative Services against state tort claims. This coverage is extended to KSU volunteers who are part of a structured program organized, controlled and directed by a Kennesaw State University Department for the purpose of carrying out the functions of the University. The liability coverage is for injuries and/or property damage volunteers may cause others while acting in the course of their official volunteer duties. Liability coverage does not apply when volunteers deviate from the course of their volunteer duties.

Kennesaw State University does not provide volunteers with any accident or medical insurance. Volunteers are not eligible or entitled to any employee benefits. Volunteers are not covered by worker's compensation laws in connection with their officially approved volunteer activities. If the volunteer activities involve the use of the volunteer's personal vehicle, no comprehensive or collision coverage would be provided to their personal vehicles.

Departments that wish to utilize volunteers for the purpose of carrying out the functions of their department must briefly describe what benefit the University derives from their volunteer program and complete the Volunteer Agreement Form. The Volunteer Agreement Form is to include signatures as required and acceptance of the responsibilities associated with this agreement. The volunteer agreement form will establish the guidelines and description of duties for the structured volunteer program.

The following forms are needed to be in compliance with the structured volunteer program:

1. The Kennesaw State University Volunteer Agreement form
2. The Kennesaw State University Volunteer Services Description form

Submit the volunteer agreement and description of duties forms via email to: jhull@kennesaw.edu or to Janet Nash at Mail Drop 1402. The approval will be sent to the Dean or Director.

If there are any questions regarding the structured volunteer agreement or additional information is needed, please call or email Janet Nash at 470-578-6985 or jhull@kennesaw.edu

Volunteer Services Description

Department/Unit: _____

Full Name of Volunteer: _____

Volunteer's Responsible Supervisor:_____

Volunteer Services: From: _____ To: _____

Purpose for Volunteer Services:

_____

_____

_____

_____

Scope of Volunteer's Work and Duties (per responsible supervisor):

_____

_____

_____

_____

Department/Director Approval: _____

Date Approved: _____ Email & Phone: _____

Responsible Supervisor Signature: _____

Volunteer Signature: _____

Parent's Signature (if under 18): _____

Please maintain copies of the *Agreement for Volunteer Service* and *Volunteer Services Description* forms on file with your Department/Unit for at least 2 yrs. Forward original copies to the Risk Manager, Janet Nash at jhull@kennesaw.edu or Mail Drop 1402.

AGREEMENT FOR VOLUNTEER SERVICES

I, _____, agree to work as a volunteer in _____ at Kennesaw State University from _____until _____.

_____ I agree that services are offered strictly on a volunteer basis. I understand that I will not be paid or compensated in any way for my services by KSU, nor will I be considered an employee of KSU for any purpose. I understand that I am not entitled to any worker's compensation.

_____ I agree that my participation in the activities outlined in the attached Description of Volunteer Duties (which is part of this agreement) is not in exchange for any consideration (i.e. payment, employment or the promise of either in the future).

_____ I understand that KSU is self-insured through the Department of Administrative Services against state tort claims. This coverage is provided for volunteers in programs organized, controlled and directed by KSU for the purposes of carrying out the functions of KSU. **I UNDERSTAND THAT COVERAGE DOES NOT APPLY WHEN I DEVIATE FROM THE COURSE OF MY VOLUNTEER DUTIES.**

_____ I release and hold harmless the Board of Regents of the University Systems of Georgia, Kennesaw State University, their members, employees, agents and authorized representatives from all losses, damages, costs, and expenses, claims, demands, rights and causes of action resulting from any personal injury, death, or damage to property arising out of my volunteer activities.

Volunteer's Signature Date

_____

Parent's Signature (If volunteer is a minor) Date

Appendix C
Autoclave Testing and Operations Protocol

The following protocol includes procedures that comply with the Georgia Department of Natural Resources, Environmental Protection Division Rules for Solid Waste Management (Chapter 391-3-4). Specific requirements as they apply to Biomedical Waste (Rule 391-3-4-.15) are also included.

I. Introduction

Moist heat, in the form of pressurized steam under pressure, is the most dependable medium for the destruction of all forms of microbial life. Steam sterilizers (autoclaves) are instruments that produce superheated steam under high pressure, and are used for two processes: decontamination and sterilization. They must be properly used to be effective. The effectiveness of decontamination by steam autoclaving depends upon various loading factors that influence the temperature to which the material is subjected and the contact time. Particular attention must be given to packaging, including the size of containers and their distribution in the autoclave. Containers must have good steam permeability and must be arranged in the autoclave in a manner that promotes free steam circulation. For example, tight-fitting containers do not permit steam penetration, and thus are not acceptable for use in autoclaves. Stacking containers above one another and overloading an autoclave can also result in poor performance. This guidance document establishes the desired protocol for the effective operation of autoclaves for the decontamination of cultures and other potentially biohazardous materials.

Autoclaves should receive routine inspection and testing to determine the need for maintenance and repair. Autoclave door gaskets may become distorted if the door is tightly shut for prolonged periods resulting in leaks. Doors should be kept open or loosely closed except when the autoclave serves as a barrier between clean and dirty areas.

II. Autoclave Testing

Autoclaves shall be tested periodically to ensure effectiveness. Testing parameters include biological indicators (described below), which are used to monitor the sterilization process. Chemical indicators (autoclave tape) are used in conjunction with biological indicators and physical parameters (i.e., pressure and temperature readings). They provide instantaneous feedback to confirm that the load has been sterilized; however, they must not be used as the sole indicator of sterility. The results of biological indicator testing must be kept on file.

Chemical Indicators

Periodicity:

One strip is dated and included in each load of the autoclave.

Method:

Tape indicates that time, temperature, and the presence of steam have been adequate to ensure sterilization. The strip must completely change color (colors

vary by manufacturer) or reveal the word “autoclaved” to ensure effective operation.

Biological Indicators

Periodicity:

Every 40 hours of use (required for autoclaves that are used to deactivate human or non-human primate blood, tissues, clinical samples, or human pathogens), or

Every 6 months (required for autoclaves that are used to deactivate other material).

Method

A commercially available test indicator kit that uses bacterial spores *Geobacillus stearothermophilus* that are rendered unviable at 250 degrees F or 121 degrees C. For the test, ampoules of *G. stearothermophilus* are autoclaved along with a load of waste. Upon completion of the cycle, the ampoules are incubated for 48 hours at 60 º C and then observed for any sign of growth, which would indicate that the autoclave is not sterilizing properly. If for any reason the integrity of the sterilization process is in question, the load should be considered contaminated and should be reprocessed.

III. Autoclave Record Keeping

The following records regarding autoclave operations must be maintained on site:

1. Maintenance records
2. Operations log (each load of deactivated material shall be logged as follows):

Date, time, and operator's name
Type and approximate amount of waste (lbs)
Confirmation of sterilization

- Record the temperature, pressure, and length of time the load is sterilized. Note that temperature sensitive autoclave tape is not sufficient to indicate that the load reached sterilization conditions because the tape will change color at lower temperatures, OR
- Save the autoclave printout, if the autoclave has a working printer.

IV. Autoclave Operating Procedures

A. What Materials Should Be Autoclaved

The following materials need to be autoclaved prior to disposal:

- Culture and stocks of infectious agents (bacteria, molds, viruses)
- Culture dishes and related devices
- Contaminated solids such as paper towels, cloth and plastic pipette tips, pipettes and vials, petri dishes and gloves

- Discarded live and attenuated vaccines
- Recombinant DNA, plant & animal specimens with recombinant DNA
- Animal tissue specimens
- Pathological animal wastes
- Cages of potentially pathogenic animals
- Pathogenic plant matter.

B. Autoclave Cycles

There are three basic autoclave cycles:

1. Gravity or "Fast Exhaust" Cycle—Used to sterilize dry goods, glassware, etc. This cycle charges the chamber with steam and holds it at a set temperature for a set period of time. At the end of the cycle a valve opens and the chamber rapidly returns to atmospheric pressure. Drying time may also be added to the end of the cycle.
2. Liquid or "Slow Exhaust" Cycle—Used to prevent sterilized liquids from boiling, steam is exhausted slowly at the end of the cycle, allowing the liquids (which will be super-heated) to cool.
3. Pre-Vacuum Cycle—For porous materials, animal bedding, etc. This cycle partially evacuates the chamber prior to introducing steam for greater steam penetration. Pre-vacuum cycles are not available on all machines.

C. Written Procedures

A written sterilization procedure should be in place for each workplace. This shall include the following:

1. Parameters

    - Appropriate parameters (temperature and pressure settings) for sterilization shall be determined from the spore vial testing. Also, proper operating procedures and settings may be contained in the unit-specific operations manual. Monitor the autoclave process for proper cycle and length of time. Cycle and time depend on the material being sterilized. For example, liquids require the use of slow exhaust and, while most loads require cycle times of 15 to 30 minutes at 121 degrees C, longer times may be needed to properly stabilize special loads. The decontamination of biomedical waste may regularly require 60 minutes at 121 degrees C.

2. Protocol

    - Identify standard treatment containers and proper load placement.

- Operation—Our autoclaves on campus are automatic and will complete the entire process once the cycle is initiated. Refer to the operations manual and or the instructions on the wall for unit-specific operating procedures. The following procedures are typical for most autoclaves on campus.

    1. Basic operating steps:

        a Press the "On/Standby" switch pad.

        b Select the sterilization program time and temperature and press switch pad.

        c Press the "Start" switch pad.

    2. If any warning lights activate during a cycle, the operator should refer to manual and follow specified instructions.

    3. 4. If for any reason the integrity of the sterilization process is in question, the load should be considered contaminated and should be reprocessed. Reasons include, but are not limited to:

        a Any load manually interrupted by pressing the "Stop" or "On/Standby" switch pad.

        b Any load where the recorder print out signals inadequate heat or pressure for the program selected.

        a Any load that fails to convert the sterilization indicator strip.

        b Any loads processed prior to a positive biological test and subsequent to a negative biological test where it is determined the autoclave is working improperly.

3. Any load where the operator questions the integrity of the autoclave process.

Cleaning

- The autoclave and work areas shall be cleaned after every use and the work area shall be disinfected, as needed.
- Ensure no broken glass is in autoclave–may cut hands or waste bags and may compromise the door seal.
- Model-specific preventive maintenance should be performed as recommended by the manufacturer.

D. Containers and Packaging for Effective Sterilization

Items should be autoclaved in autoclave bags and a rigid secondary container (typically polypropylene or stainless steel).

Correct packaging of waste ensures that steam penetrates the load. It is important to remember that the density of the load affects steam penetration. Bags packed to capacity with biohazardous waste will not be properly decontaminated even if autoclave set points are achieved. Therefore, if autoclave bags are not overloaded or the waste purposely compacted inside, the waste should

be properly sterilized. The waste should be put into appropriate polypropylene autoclave bags that are left open during autoclaving. Polypropylene is impervious to steam, if autoclave bags are closed during the sterilization process, the inner temperature of the bag will not be sufficient for decontamination. Bags then need to be placed into shallow, rigid containers to avoid or contain spills.

E. Loading the Autoclave

To effectively sterilize biohazardous wastes, it is important to properly load the autoclave. Adding one cup of water to solid wastes creates additional steam that drives residual air from the bag. It is also important to allow the steam to circulate freely throughout the chamber (i.e., do not overload the chamber with bags that exceed the autoclave's capacity.

While clean and contaminated items may be sterilized in the same autoclave, do not mix them together during the same cycle, since they require different heat exposure times.

Never place sharps (e.g., syringes with needles) in a biohazard bag. All sharps need to be disposed of in sharps containers, which will be incinerated.

To prevent spills and accidents, be sure that the exhaust setting is appropriate for the type of material you are autoclaving. Use FAST exhaust for solid items (solid waste, instruments) and SLOW exhaust for liquids and liquid wastes.

To eliminate the possibility of injury, Do not use the FAST exhaust setting.

Use the following Personal Protective Equipment (PPE):heat-resistant autoclave gloves for loading and unloading autoclave

- fluid-resistant gloves to eliminate contact with contaminated wastes
- lab coat to protect your apparel
- splash goggles if a splash hazard is present.

F. Unloading the Autoclave

When the cycle is complete, wait until the chamber pressure gauge reads zero before attempting to open the autoclave. A waiting period of several minutes before removing the bag from the autoclave will allow the chamber and any residual liquids to cool, significantly reducing your chances of getting burned. It is safest to stand back and allow steam to escape through the open door before reaching in to remove items. Also be aware of molten agar that may have collected in the secondary container during the cycle. Use special caution when autoclaving containers that may have become pressurized. Never autoclave a sealed container of liquids as this may result in an explosion of super-heated liquid during the cycle or when the container is opened.

Place treated autoclave bags into an opaque (non see-through) black bag and close them securely before disposing. To assure that the black bag does not rupture, do not put multiple autoclaved bags in a single black bag.

V. Autoclave Training and Operation

Principal investigators and/or supervisors must train and qualify their staff for operation of autoclaves. Qualified autoclave users should understand the time, temperature, pressure relationships required for proper materials decontamination. Additional training on handling materials to be decontaminated should also be provided. Supervisors should maintain a permanent record of training provided to their staff. *Biology lab coordinator or Lab safety officer is available for autoclave training. Please call ext. 6165 for assistance*

VI. Autoclave Maintenance

Follow manufacturer recommended routine maintenance procedures. For repair, use manufacturer warranty if possible. For autoclaves out of warranty, contact the Biology Lab Coordinator.

VII. Autoclave Usage Tips

- Regularly inspect your autoclave components for proper operation. If a problem is found, promptly notify your area supervisor who will call facilities or maintenance. **DO NOT OPERATE AN AUTOCLAVE UNTIL IT HAS BEEN PROPERLY REPAIRED**.

- Never place sealed containers in an autoclave. Large bottles with narrow necks can simulate sealed containers if filled with too much liquid.

- Don't autoclave items containing solvents, volatile or corrosive chemicals (phenol, trichloroacetic acid, ether, chloroform, etc.) or any radioactive materials. Contact the Biology lab coordinator if you have questions regarding waste disposal.

- After loading and starting the autoclave, processing time starts ***AFTER*** the autoclave reaches normal operating conditions of 121 degrees C (250 degrees F) and 15 psi pressure.

- Decontamination conditions vary with type of load therefore processing times will vary according to the conditions. A minimum of 30 minutes is needed to decontaminate biological waste.

- At the end of a decontamination cycle make sure that the pressure in the autoclave chamber is near zero before opening the door. Slowly crack open the autoclave door and allow the steam to gradually escape from within the autoclave.
  CAUTION: Opening the autoclave door too quickly may result in glassware breakage and/or steam burns on your skin.

- Allow materials inside the autoclave to cool for 10 minutes before removing them from the autoclave.

- After autoclaving, waste can be disposed of as solid waste.

- Always follow written lab procedures; however, dry goods typically require about 30 minutes sterilization, plus about 20 minutes drying time (dry time may need to be increased for enclosed items such as pipette tips or bottles with lids).

- Average liquid sterilization times (add an additional 10 to 20 minutes for crowded items):

<500 ml, 30 minutes	500 ml - 1 L, 40 minutes	2 L - 4 L, 55 minutes	4 L, 1 hour

- Not all plastics can be autoclaved. Polypropylene and polycarbonate will survive, but polyethylene and high density polyethylene will not. The different types of plastic can be identified by looking for initials imprinted on the bottom of containers (PP=polypropylene, PC=polycarbonate, PE=polyethylene, HDPE=high density polyethylene). If you are unsure about a new container, place it in an autoclave safe container the first time.

- To prevent the bottoms of bottles from breaking, place them in a tub with 1 to 2 inches of water.

Autoclaving new glassware for 90 minutes will partially temper it, increasing its strength.

Appendix D

Supervisor's Accident / Injury Report Form

Name of Supervisor: _____

Email address:

Personal Information				
☐	*Student*	☐	*Employee*	
Full Name:				
Department:				
Phone Number/Ext.:				
Email Address:				
Building Information				
Building Name:				
Room Number:				
Incident Information				
Date of accident/injury:		*Time of accident/injury:*		
Type of accident/injury (please choose all that apply)				
☐	*Strain or sprain*	☐	*Fracture*	☐ *Wound*
☐	*Skin*	☐	*Foreign body*	☐ *Amputation*
☐	*Chemical Exposure*	☐	*Slip/trip/fall*	☐ *Puncture*
☐	*Cut/Laceration*	☐	*Assault*	☐ *Contusion*
Other (please list):				
Body part affected (please choose all that apply)				
☐	*Eyes*	☐	*Head*	☐ *Face and Neck*
☐	*Feet*	☐	*Legs*	☐ *Finger*
☐	*Arms*	☐	*Hands*	☐ *Upper Back*
☐	*Lower Back*	☐	*Chest (Respiration)*	☐ *Trunk/internal organs*
Other (please list):				
Name(s) of witness(es):				
How did the accident/injury occur?				
Please state how the injury/illness occurred. Include equipment, materials or chemicals in use when the accident/injury occurred.				
What caused the accident/injury?				
Please state why the event occurred including conditions that contributed to the accident/injury, such as: slippery surface, chemical reaction, failure to use safety equipment, etc.				
Supervisor's signature		*Date*		*Phone number*

Appendix E
Spill Cleanup in Laboratories

Chemical spills and accidents need to be minimized as much as possible. If a chemical spill should occur, a quick response with a stocked chemical spill kit will help minimize potential harm to personnel, equipment and laboratory space. This guidance document provides a list of the minimal equipment required for a spill kit. You may add equipment to the kit, provided all personnel are proficient in its use. An example would be adding a metallic mercury spill kit. Contact the Lab Safety Officer or EHS for information and guidance in construction of a more specialized spill kit (for use with mercury, hydrofluoric acid, etc.). The Principle Investigator or Supervisor should be responsible for reviewing their spill cleanup procedures with you, as outlined in the Chemical Hygiene plan.

These procedures are provided to give guidance to knowledgeable laboratory personnel on the safe and effective way to clean up small laboratory spills. These procedures do not take the place of the Department of Environmental Health & Safety or specially trained responders. If you have ANY questions or concerns about the spill cleanup process, the contacts listed below will be able to help.

Ben Huck	470-578-6404
Dale Zaborowski	470-578-6165
Environmental Health and Safety	470-578-3321
KSU Public Safety	470-578-6666

The majority of chemical spills can be prevented or minimized by:

- Maintaining a neat and organized work area
- Performing a laboratory procedure review prior to conducting new experimental procedures;
- Storing liquid chemicals in secondary containment bins;
- Keeping reagent chemical containers sealed or closed at all times, except when removing contents;
- Ordering reagent chemicals in plastic or plastic coated glass containers whenever possible;
- Using secondary containment to store and move chemicals.
- Place chemical containers being used in a hood or lab bench area that reduces the possibility of accidentally knocking over a container.
- Keep all unused reagents in their appropriate storage area and keep your work area clean of needless equipment and clutter.
- Plan your movements. Look where you are reaching to ensure you will not cause a spill. Avoid transporting chemicals from the stockroom during periods of high traffic in the hallways such as between classes.
- Transport chemical containers in a chemical carrier or cart.
- Place absorbent plastic backed liners on benchtops or in fume hoods where spills can be anticipated. For volumes of liquid larger than what can be absorbed by liners, use trays.

Avoid working alone when hazardous chemicals are involved

Minor or Small, incidental spills

Spills that can be cleaned up by lab personnel without putting themselves or others in danger.

Minor spills do not necessarily need additional assistance. Laboratory workers who have had the proper training and possess the appropriate equipment can safely and effectively handle the majority of chemical spills that occur in the laboratory.

Labs can handle spills involving one liter or less of liquid and one pound or less of a solid. If the spill is large, contact the Lab Safety officer and/or EHS to assist with the cleanup.
Contact The Lab Safety officer or EHS with any questions or concerns about proper spill clean-up practices.
Complete an incident report form. It is important that we track even the smallest incident.

Major or Large or extremely dangerous spills

- *Spills that present an immediate hazard (fire, explosion, chemical exposure, etc.)*
- *Any spill of highly dangerous chemicals*
- *Moderate or large-scale chemical spills*
- *Or if the spill is large or if you're unsure how to classify it*

In addition, spills involving multiple chemicals may pose various hazards. Always contact the Lab Safety Officer or EHS if multiple chemicals are involved in a spill.

If the spill is too large for you to handle, involves materials listed in the table below; is a threat to personnel, students or the public, Evacuate personnel from the spill area and notify adjoining labs.

- Isolate the spill area.
- Remove ignition sources and shut down equipment.
- Call Public Safety at 470-578-6666 (ext. 6666 on campus) from a safe location
- Notify the Lab Supervisor, Lab Safety Officer or Lab Coordinator from a safe location

NOTE: Large or extremely dangerous spills (major spills) are not to be cleaned up lab personnel! Call KSU Public Safety at 470-578-6666

General Spill Cleanup Procedures

In the event of a chemical spill, first decide if you are trained, knowledgeable and equipped to handle the incident. **Immediately evacuate the lab and notify the Lab Safety Officer, KSU Police and/or EH&S if there is a possibility of an acute respiratory hazard present or if you need assistance to clean up the spill. Never proceed to clean up a spill if you do not know the hazards associated with the chemical or if you are unsure of how to clean up the spill. If anyone is injured or contaminated, immediately notify KSU Pubic Safety and begin decontamination measures or first aid, if trained.**

Don the personal protective equipment from the spill kit; splash goggles and nitrile/Silver Shield combination gloves. Always find another for assistance. They should also don splash goggles and nitrile/Silver Shield combination gloves. Make sure that all forms of local exhaust i.e. fume hoods, are operating. If broken glass is involved, do not pick it up with your gloved hands. Use the scoop or tongs to place it in the bag, then place the bag in a strong cardboard box or plastic container. Follow the procedures provided below based on the class and type of chemical.

All tools used in the cleanup need to be decontaminated (plastic scoop, tongs, etc.). Remove all gross contamination with a wet paper towel. Dispose of the contaminated paper towels as waste. Rinse the tools off with copious amounts of water. Dispose of the gloves as waste. Dry the tools off and place back into the spill kit along with the splash goggles.

Liquid Spills other than flammable liquids

Spread the chemical spill powder over the spill starting with the edges first. This will help to confine the spill to a smaller area. Spread enough powder over the spill to completely cover the liquid. There should be no free liquid. Use the plastic scoop to ensure that the liquid was completely absorbed by the powder. Pick up the powder with the scoop and place in the polyethylene bag. Wipe the area down with a wet paper towel. Dispose of the paper towel with the waste generated from the spill cleanup. Seal bag with tape and attach a completed completed Chematix contaminated waste card to the bag. Create a pick up worksheet in Chematix and submit to EHS for pick up

Flammable Liquid Spills

Control all sources of ignition. Lay the chemical spill pads over the spill. These pads are designed to suppress the vapors emitted by a volatile liquid. Allow pads to completely soak up the liquid. Pick up pads with tongs or other device that minimizes direct contact with a gloved hand. Place in the polyethylene bag. Wipe the area down with a wet paper towel. Dispose of the paper towel with the waste generated from the spill cleanup. Seal the bag with tape and attach a completed Chematix contaminated waste card to the bag. Create a pick up worksheet in Chematix and submit to EHS for pick up

Solid Spills

Use the plastic scoop to place the spilled material into the polyethylene bag. Care should be taken so as not to create dust or cause the contaminated powder to become airborne. After the bulk of the material is cleaned up, wet a spill pad and wipe the area down. Place the pads into the polyethylene bag. Wipe the area down with a wet paper towel. Dispose of the paper towel with the waste generated from the spill clean up. Seal the bag with tape and attach a completed completed Chematix contaminated waste card to the bag. Create a a pick up worksheet in Chematix and submit to EHS for pick up

Note: Precautions must be taken to minimize exposure to the spilled chemical. Be careful not to step in the spilled material and track it around.

First Aid Guide

In case of injury or potential exposure, attend to victim(s) immediately as outlined below:

- For spills affecting small portions of skin, immediately flush with flowing water for at least 15 minutes. If no visible burn exists, wash with warm water and soap, removing any jewelry
- For spills on clothes, don't attempt to wipe the clothes. Quickly begin showering while removing all contaminated clothing, shoes and jewelry. It may be necessary to cut the clothes off in some instances to prevent contamination of the eyes.
- Do not use creams, lotions or salves.
- Avoid breathing the vapors of spilled substances.
- Contaminated clothes should be discarded or laundered separately from other clothing.
- For splashes into the eye, immediately flush with tepid potable water for at least 15 minutes. Hold the eyelids away from the eyeball, moving eye in all directions to wash thoroughly behind the eyelids. Use eyewash for this purpose.
- In all cases, seek medical attention: x6666 for emergency response.

Guide for Chemical Releases to the Environment

If hazardous or regulated materials are spilled outside of buildings or unintentionally released to the environment via a sewer or fume hood:

- Contact EHS at 470-578-3321 immediately
- Be prepared to provide the name of the chemical(s) involved, quantities released and approximate time of the incident.
- EHS will contact the appropriate regulatory agencies and initiate reporting if necessary

Mercury Use and Spill Procedures

Mercury must be used and handled with care since it is a subtle poison with cumulative effects not easily reversed. Metallic mercury and its compounds can be absorbed into the body by inhalation, ingestion or contact with the skin. If spills are frequent and mercury is added to the ambient air level, the combined concentration may reach or exceed toxic limits.
The Lab Safety Officer should be notified in all spills involving Mercury or other highly toxic materials.

Mercury Handling Procedures

Mercury spills can be avoided by using supplies and equipment which do not contain mercury. It is recommended that all researchers seek alternatives to mercury use.
However, if mercury or mercury -containing equipment must be used, proper handling is essential to preventing spills and maintaining a healthful working environment. Use the following guidelines when handling mercury:

- Keep mercury containers closed and stored in secondary containers in a well-ventilated area.
- Transfer mercury from one container to another in a hood over a tray or pan to confine any spills.
- Provide mercury manometers and other mercury containing equipment with spill control and containment devices such as trays or pans.
- Move instruments or apparatus containing mercury in an enameled or plastic tray or pan that can be cleaned easily and is large enough to contain the mercury.

Mercury Spill Guide

Every effort should be made to prevent spills of metallic mercury since the substance is extremely difficult and time consuming to clean up. Globules can get into cracks and crevices, under table legs, under and into equipment. When a spill does occur, the following procedures are to be used.

- Notify people in the immediate area that a mercury spill has occurred and isolate the area to avoid more extensive contamination by tracking.
- If the spill occurred on the floor, determine the extent of the area and mark the boundary of the spill.
- Call the EH&S office for cleanup and removal. It is preferred that the lab or spill area be evacuated until the spill is removed.
- Always thoroughly wash hands, arms and face several times after working around mercury areas.

Cleanup Procedure

- Special mercury vacuum cleaners are for larger spills such as those involving a manometer or larger instrument. Do not use a standard vacuum cleaner to pick up mercury.
- The preferred method of spill cleanup is to collect the mercury because elemental mercury can be recycled. Push pools and globules of mercury together and collect by suction using an aspirator bulb or a vacuum device made from a filtering flask, a rubber stopper and several pieces of flexible glass tubing.
- Metallic mercury from spills, broken thermometers or other equipment, and contaminated mercury from laboratory activities should be contained in thick-walled, high-density polyethylene bottles. Place any discarded rags, sponges, shoe covers and other debris from cleanup activities in a sealed plastic bag for pick up by EHS.
- After the cleanup of a spill involving a significant quantity of mercury, EH&S will monitor the area and cleanup operation with a mercury-vapor analyzer.

Biohazard Spills

Biohazard Spill Cleanup Procedures

The following procedures are provided as a guideline to biohazardous spill cleanup. In each of the following cases, depending on the size of the spill, notify everyone in the laboratory and contact the Laboratory Safety Officer. If a spill contains BSL 2 or higher containment material, or if the spill is considered too large or too dangerous for laboratory personnel to safely clean up, secure the entire laboratory and call EHS immediately for assistance.

Inside the Biosafety Cabinet

- Wait at least five minutes to allow the BSC to contain aerosols.
- Wear laboratory coat, safety glasses and gloves during cleanup.
- Allow BSC to run during cleanup.
- Apply disinfectant and allow a minimum of 20 minutes contact time.
- Wipe up spillage with disposable disinfectant-soaked paper towels.
- Wipe the walls, work surfaces and any equipment in the cabinet with disinfectant-soaked paper towels.
- Discard contaminated disposable materials using appropriate biohazardous waste disposal procedures.

- Place contaminated reusable items in biohazard bags or autoclavable pans with lids or wrap in newspaper before autoclaving.
- Expose non-autoclavable materials to disinfectant (20 minutes contact time) before removal from the BSC.
- Remove protective clothing used during cleanup and place in a biohazard bag for autoclaving.
- Run BSC 10 minutes after cleanup before resuming work or turning BSC off.

In the laboratory, outside the Biosafety Cabinet

- Call the Lab Safety officer if the material is BSL 2 or greater.
- Clear area of all personnel. Wait at least 30 minutes for aerosol to settle before entering spill area.
- Remove any contaminated clothing and place in biohazard bag to be autoclaved.
- Put on a disposable gown, safety glasses and gloves.
- Initiate cleanup with disinfectant as follows:
    - Place dry paper towels on spill then layer a second set of disinfectant soaked paper towels over the spill.
    - Encircle the spill with additional disinfectant being careful to minimize aerosolization while assuring adequate contact.
    - Decontaminate all items within the spill area.
    - Allow at least a minimum of 20 minutes contact time to ensure germicidal action of disinfectant.
    - Wipe equipment and reusable items with appropriate disinfectant.
    - Discard contaminated disposable materials using appropriate biohazardous waste disposal procedures.

Inside a centrifuge

- Clear area of all personnel.
- Wait 30 minutes for aerosol to settle before attempting to cleanup spill.
- Wear a laboratory coat, safety glasses and gloves during cleanup.

- Remove rotors and buckets to nearest BSC for cleanup.
- Thoroughly disinfect inside of centrifuge.
- Discard contaminated disposable materials using appropriate biohazardous waste disposal procedures.

Outside the laboratory, in transit

- To prevent a spill, transport labeled biohazardous material in an unbreakable, well-sealed primary container placed inside of a second unbreakable, lidded container (cooler, plastic pan or pail) labeled with the biohazard symbol.
- Should a spill occur in a public area, do not attempt to clean it up without appropriate PPE.
- Secure the area, keeping all people well clear of the spill.
- Call the Lab Safety Officer or EHS to assist in cleanup.
- Stand by during spill response and cleanup activity and provide assistance only as requested or as necessary

Again, some important numbers to contact if you need assistance or have any questions.

Ben Huck	470-578-6404
Dale Zaborowski	470-578-6165
Environmental Health and Safety	470-578-3321
KSU Public Safety	470-578-6666

Appendix F
Spill Plan Guidelines

Each work area where hazardous substances are used should have a spill plan. Experiments and research projects should always be designed to minimize the possibility of an accidental release of hazardous substances.

An effective spill response procedure should consider all of the items listed below. The complexity and detail of the plan will, of course depend upon the physical characteristics and volume of materials being handled, their potential toxicity, and the potential for releases to the environment.

1. Review Safety Data Sheets (SDSs) or other references for recommended spill cleanup methods and materials, and the need for personal protective equipment (e.g., respirator, gloves, protective clothing, etc.)
2. Acquire sufficient quantities and types of appropriate spill control materials to contain any spills that can be reasonably anticipated. The need for equipment to disperse, collect and contain spill control materials (e.g., brushes, scoops, sealable containers, etc.) should also be reviewed..
3. Acquire recommended personal protective equipment and training in its proper use. For example, if an air purifying respirator or self-contained breathing apparatus are needed, personnel must be enrolled in the Respiratory Protection Program and attend annual training and fit-testing.
4. Place spill control materials and protective equipment in a readily accessible location within or immediately adjacent to the laboratory.
5. Develop a spill response plan that includes:
    - Names and telephone numbers of individuals to be contacted in the event of a spill.
    - Evacuation plans for the room or building, as appropriate.
    - Instructions for containing the spilled material, including potential releases to the environment (e.g., protect floor drains).
    - Inventory of spill control materials and personal protective equipment.
    - Means for proper disposal of cleanup materials (in most cases, as hazardous waste) including contaminated tools and clothing.
    - Decontamination of the area following the cleanup.
6. Discuss the spill response plans with all personnel in the area. Share your spill plan with the Lab Safety Officer and EHS

Recommended Spill Control Material Inventory

Personal Protective Equipment

2 pairs chemical splash goggles
2 pairs of gloves (recommend Silver Shield or 4H)
2 pairs of shoe covers
2 plastic or Tyvek aprons and/or Tyvek suits

Absorption Materials

4 3M POWERSORB spill pillows (or equivalent)
1 3M POWERSORB spill sock
2 DOT pails (5 gallon) with polyethylene liners
- 1 filled with loose absorbent, such as vermiculite or clay
- 1 with minimum amount of loose absorbent in the bottom

Neutralizing Materials

Acid Neutralizer
Caustic Neutralizer
- commercial neutralizers, such as Neutrasorb (for acids) and Neutracit-2 (for bases) have built in color change to indicate complete neutralization

Solvent Neutralizer
- commercial solvent neutralizers, such as Solusorb, act to reduce vapors and raise the flashpoint of the mixture

Mercury Spills

Small mercury vacuum to pick up large drops (optional)
Hg Absorb Sponges - amalgamate mercury residue
Hg Absorb Powder - amalgamates mercury
Hg Vapor Absorbent - reduces concentration of vapor in hard to reach areas
Mercury Indicator - powder identifies presence of mercury

Clean-up Tools

Polypropylene scoop or dust pan
Broom or brush with polypropylene bristles
2 polypropylene bags
sealing tape
pH test papers
waste stickers

Appendix G

Kennesaw State University Kennesaw, Georgia	**EFFECTIVE DATE:** mm/dd/yyyy	**DOCUMENT NUMBER:** EHS- 0000
	NEXT REVIEW DATE: mm/dd/yyyy	**PAGE:** Page1 of 5
TYPE: **STANDARD OPERATING PROCEDURE**	**ISSUED BY:** College of Science and Mathematics	
DOCUMENT TITLE: **CSM Central Delivery**		

Approved By:	
Director of Environmental Health and Safety	Date

Purpose

This procedure is written to provide a standardized procedure for receiving and distributing chemicals and laboratory articles in the College of Science and Math.

Scope

- This applies to all personnel handling orders delivered to SL2015 for distribution within the departments of the College of Science and Mathematics

Personnel Qualifications and Responsibilities

- All personnel must have the following:
  1. General laboratory safety training as per the *Laboratory Handbook for Faculty, Staff and Students*, including Right-to-Know
  2. Receive the function-specific training for the CSM Central Delivery operations
  3. Receive Department of Transportation training compliant with 49 CFR 172 Subpart H.
- All personnel will process orders as per instructions include in this SOP.

Environmental Health & Safety Hazards

The personnel working in SL2015 are at risk for potential hazardous chemical exposure.

Hazards Prevention and Control

Administrative Controls

- Only designated and trained personnel will handle delivered packages
- Severely damaged packages will not be accepted. They will return with the shipper.

Engineering Controls

- When possible, open packages in a fume hood and/or a tray to minimize inhalation hazards and spills if the package is compromised.

Personal Protective Equipment (PPE):

- All personnel must wear safety glasses and gloves whenever unpacking shipping containers and handling chemicals

Emergency Contact

6666

Designated Area:

- Place materials to be picked up in designated areas only

Emergency Procedures

- In case of any emergency contact KSU Public at x6666 or 470-578-6666
- In case of a spill, Contact Dale Zaborowski, Ben Huck or Nan Reese immediately. A spill kit is located in the room. However, it is preferred that you wait for the Lab Safety Officer or the Lab Coordinator before using it if possible.

  Small, incidental spills are those spills that can be cleaned up by lab personnel without putting themselves or others in danger

  Large or extremely dangerous spills are those spills that; present an immediate hazard (fire, explosion, chemical exposure, etc.), any spill of highly dangerous chemicals, or if spill is large or if you're unsure how to classify it,

  With any spill, isolate the area to prevent others from becoming contaminated or spreading the contamination.

Security

- **The door to SL2015 is to be locked at all times**
- **Only personnel with card-key access are allowed in the room. No exceptions.**

Procedure

Whenever unpacking boxes, wear safety glasses and gloves. If possible, open the packages in the fume hood if they are chemicals or if you are not sure.
Look for the packing slip **OUTSIDE** the package.
If the item is clearly labeled on the outside, and can be processed accordingly, most professors prefer that you **LEAVE THE BOX UNOPENED**. (petri dishes, bottles, machinery, etc.) However, many items are shipped together in a single box and the packing slip is put in with the products. In that case you will need to open the package.

Do not open any packages that appear suspicious, have no labels, return markings, company logos, etc. These could be security or health risks!

Once the package has been opened and the packing slip retrieved, **check each item** by product name, catalog, and quantity **AND** size. ****Take note of fragile/dangerous items, and handle them carefully.****

1. When processing packages, **CHECK WHAT TEMPERATURE THE CHEMICALS, ETC. NEED TO BE STORED AT.** This is **EXTREMELY** important. If the product is in cold packs or dry ice, leave it in that condition and re-close the package.

2. Find the order form and **DOUBLE CHECK** that the order numbers **MATCH**.
3. Update the delivery distribution spreadsheet.
    - There are some packages in which the order number on the packing slip does not match the order confirmation. Double check that you have the right one with Dale if you need to. There is a separate column for the web order number in these cases.
    - Put each individual item in the order in its own row/box.
    - In the "where is it now" column, leave the room number as 2015 **until it is picked up by its recipient**.
    - The "Checked In By" column is for the initials of the person who processed the box the order came In.
    - In the "Additional Information" column, note who picks up the package.

4. Once you have processed the delivery, log onto the Zimbra email account (login information is saved) and **email the intended recipient**:
    - Address book > Professor's folder > Check off everyone in the folder > Right click on names > New Email.
    - In the CC: section, be sure to add the person who placed the order.
        - i.e. Dale, Nan, Brown, or Huck.

5. Log the item into Chematix for the room it will be going.

6. Check the SDS listing for the room it will be going to. If it does not have an SDS for that chemical, search and print the SDS to be picked up with the chemical.

7. The person picking up the order must sign the packing slip.
8. When an order is complete, make sure it is put into the Completed folder of the person **who placed the order**. (Even if the order was **FOR** Nan, if DALE placed it, the order goes into **HIS** folder).

if you do not know what to do with a package, or have a question, do not set it aside. **ASK SOMEONE FOR DIRECTIONS**

Checking out supplies from stock

1. Log the item checked out and by whom.

The room is to be staffed 8-5 everyday, Monday through Friday.
You must inform the supervisor if you cannot make your scheduled shift.
If the room is to be left unattended, make sure you attach an appropriate sign to the door.
If the room is to be unattended for more than 15 minutes, place the *Deliver to SC308* sign on the door.

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Training Documentation

Name (Printed)	Signature	Date

Appendix H:
Additional Information

Chemical Hygiene Plan

The development and implementation of a written Chemical Hygiene Plan (CHP) is the foundation of compliance required by the Occupational Safety and Health Administration (OSHA) as stated in the publication Occupational Exposure to Hazardous Chemicals in Laboratories (Federal Register, January 31, 1990, pages 3327-3335, part of CFR 1910).

The Chemical Hygiene Plan for Kennesaw State University can be found at:

http://www.kennesaw.edu/ehs/downloads/EOSMS-201-Chemical-Hygiene-Plan.docx

Bloodborne Pathogen Exposure Control Plan

The purpose of this document is to comply with OSHA's Occupational Exposures to Bloodborne Pathogens in Title 29 Code of Federal Regulations 1910.1030 and as revised in 2001 by the Needlestick Safety and Prevention Act P.L. 106-430. The intent of this exposure control plan is to prevent bloodborne infections by eliminating or minimizing employee exposures to blood, blood products, and other potentially infectious materials (OPIM).

The Bloodborne Pathogen Exposure Control Plan for Kennesaw State University can be found at:
(TBD)

Protective Glove Recommendation Guide
http://www.ansellpro.com/specware/