STEM BUILDING
CHEMICAL HYGIENE PLAN

OCCUPATIONAL EXPOSURE TO HAZARDOUS CHEMICALS IN

LABORATORIES STANDARD

29 CFR 1910.1450

NJ Center for Science, Technology & Mathematics &
ILSE – The Institute for Life Sciences Entrepreneurship

Kean University STEM Center
1075 MORRIS AVENUE
UNION, NEW JERSEY 07083

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(Section 7: Appendix 2A -Yellow Section of LSM)

CHEMICAL HYGIENE PLAN FOR

STEM Building:
New Jersey Center for Science, Technology, and Mathematics

INTRODUCTION

The general intent of this chemical hygiene plan for NJCSTM is:

1. To protect laboratory employees from health hazards associated with the use of hazardous chemicals in our laboratories, and,

2. To assure that our laboratory employees are not exposed to substances in excess of the permissible exposure limits adopted by PEOSH. (29 CFR 1910 subpart Z)

The plan will be available to all employees for review and copies will be located in the NJ Center for Science, Technology & Mathematics – main office (513) and Safety Office (118) as well as the Kean Environmental Health and Safety Office in Downs Hall. A copy is enclosed in the NJCSTM Laboratory Safety Manual, a copy of which is in each wet lab in CSTM. An online version is also available.

This plan will be reviewed annually by the STEM Safety Officer, and changes made as needed.

STANDARD OPERATING PROCEDURES **(SOPs) to be followed in the laboratory relevant to safety and health when using chemicals.**

The Standard Operating Procedures which may be found in Appendix A of this Chemical Hygiene Plan are in accordance with those listed in 29 CFR 1910.1450, Appendix A, Section E, and address the following topics:

A) Accidents, spills
B) Avoidance of routine exposure
C) Choice of Chemicals
D) Eating, drinking, smoking, etc.
E) Equipment and glassware
F) Exiting
G) Horseplay
H) Mouth suction
I) Personal apparel
J) Housekeeping
K) Personal protection
L) Planning
M) Unattended operations
N) Use of hoods
O) Vigilance
P) Waste disposal
Q) Working alone

Additional safety SOPs that may be found in Appendix A of this Chemical Hygiene Plan are in accordance with 29 CFR 1910.1450, Appendix A, Section F, and address the following topics:

A) Corrosive Agents
B) Electrically powered laboratory apparatus
C) Fires, explosions
D) Pressurized vacuum operation

CRITERIA FOR USE OF CONTROL MEASURES TO REDUCE EMPLOYEE EXPOSURE TO HAZARDOUS CHEMICALS.

A) There are no areas in the laboratories where food/drink may be stored or consumed or where smoking is permitted.

B) The following operations shall be performed in **CHEMICAL (FUME) HOODS:**

1. Dispensing of volatile chemicals,
2. Consolidation of volatile hazardous waste,
3. Any procedures or experiments that involve work with materials that are listed as inhalation hazards.

[Note: These cabinets are inspected, serviced and certified annually by an outside contractor.]

C) The following operations shall be performed in **BIOLOGICAL SAFETY CABINETS:**

1. Tissue Culture Procedures
2. Virology Procedures
3. Certain types of microbiological procedures as determined by the faculty member in charge of the laboratory.

[Note: These cabinets are inspected, serviced and certified annually by an outside contractor.]

D) The following operations shall be performed in GLOVE BOXES:
N/A in CSTM

E) Appropriate protective apparel compatible with the required degree of protection for substances handled shall be used. The CSTM Safety Officer will advise employees on use of gloves, gowns/lab coats, eye protection, etc. Permeability charts are available in the Safety Office as covered by this Chemical Hygiene Plan.

F) Employees will be instructed on the location and use of eye wash stations and safety showers. The Chemical Hygiene Officer will be responsible for this instruction as part of annual Chemical Hygiene Plan Training

G) Designated employees (in accordance with Kean University's Emergency Action Plan) will be trained annually on the use of fire extinguishers and other fire protection systems. Kean University's Fire Safety Coordinator will conduct this training.

H) Signs and labels will be employed to apprise employees and students of hazards:

1. All chemicals will be labeled as required by Federal and State regulations.
2. All safety showers, eye wash fountains and other safety/first aid locations will be prominently labeled.
3. Warning signs will be posted at all locations where hazardous equipment, materials or procedures are in use e. g. lasers, high vacuum, high magnetic field, X-ray, or particular toxic materials such as Carcinogens, Mutagens, Teratogens, etc. may be present.

MAINTENANCE OF FUME HOODS AND OTHER PROTECTIVE EQUIPMENT

FUME HOODS will be inspected annually by Chemical Hygiene Officer or the Associate Director of EHS or their designee. The adequacy of face velocity will be determined by the use of a velocimeter. Reports of hood inspections will be filed with the Associate Director of EHS office in the Maintenance Building for employee review.

CHEMICAL STORAGE CABINETS will be inspected annually by the Chemical Hygiene Officer or the Associate Director of EHS or their designee to ensure the integrity of the cabinet and the condition of the chemical being stored inside. The results of the inspection will be recorded on a laboratory inspection form and be filed with the Associate Director of EHS office in the Maintenance Building for employee review.

EYEWASH STATIONS will be inspected monthly to ensure that they are working properly. The CSTM Safety Officer will be responsible for conducting this informal inspection. A formal annual eyewash station inspection will be conducted by Facility Department personnel and the results of this inspection will be recorded. The inspection forms created from this activity will be maintained by the Associate Director of Facilities.

SAFETY SHOWERS will be inspected annually for proper operation by Facilities Department personnel. The results of these inspections will be maintained by the Associate Director of Facilities.

EMPLOYEE INFORMATION AND TRAINING

Each employee covered by the Laboratory Standard will be provided with information and training so that they are apprised of the hazards of chemicals present in their work area. This training will be given at the time of initial assignment and prior to new assignments involving different exposure situations. Refresher training will be given annually.

The training/information sessions shall include:

1. The contents of 1910.1450 and its appendices. A copy of the standard shall be available to employees in the STEM Safety Office and at the Associate Director of EHS office in the Maintenance Building.
2. The availability and location of the written chemical hygiene plan.
3. Information on PEOSH permissible exposure limits (PELs) where they exist, and other recommended exposure limits.
4. Signs and symptoms associated with exposure to hazardous chemicals in laboratories.
5. Location of reference materials, including all MSDSs and NJ Hazardous Substance Fact Sheets received, on the safe handling of chemicals in laboratories.
6. Methods to detect the presence or release of chemicals (ie., monitoring, odor thresholds, etc.).
7. The physical and health hazards of chemicals in laboratory work areas.
8. Measures to protect employees from these hazards include:

    a) Standard operating procedures
    b) Work practices
    c) Emergency procedures
    d) Personal protective equipment
    e) Details of the chemical hygiene plan

The CSTM Safety Officer and/or the EHS Safety Officer are responsible for arranging the training sessions. The training sessions will consist of slides, lectures and videos on topics addressed in the Chemical Hygiene Plan. An outline of the general training program may be found in Appendix B.

Each employee who attends Chemical Hygiene Plan Training will sign a form documenting that they have received training (Appendix C).

The STEM Safety Officer is responsible for developing standard operating procedures for STEM and is responsible for the portion of the training on standard operating procedures (SOPs).

PRIOR APPROVAL FOR SPECIFIC LABORATORY OPERATIONS

Certain laboratory procedures which present a serious chemical hazard require prior approval by the Chemical Hygiene Officer before work can begin. For this facility, these procedures include:

A) Work with select carcinogens
B) Work with teratogens
C) Work with acutely hazardous chemicals
D) Work with corrosive agents

If your lab will be using any of these chemicals, please contact the CHO/Safety officer to make a Request for Use, which shall include

(a) reasons for use of the chemical;
(b) research as to whether a safer chemical can be substituted for the hazardous chemical;
(c) how the chemical will be handled in the lab, including
- establishment of a 'designated area'
- use of containment devices such as fume hoods/glove boxes
- procedures for safe removal of contaminated waste
- decontamination procedures

See SOP #16 for details in working with these types of chemicals.

MEDICAL CONSULTATION AND EXAMINATION

Kean University shall provide to affected employees medical attention, including follow-up examinations, at the medical facility arranged by the Human Resources department (HR). This service will be provided under the following circumstances:

Whenever an employee develops signs and symptoms associated with a hazardous chemical to which he/she may have been exposed, the employee shall be provided an opportunity to receive an appropriate medical examination.

When exposure monitoring reveals an exposure level routinely above the PEOSH action level (AL) or in the absence of an action level, exposure above the PEOSH permissible exposure level (PEL) for PEOSH regulated substances for which there are medical monitoring and medical surveillance requirements, medical surveillance shall be established for that employee.

Whenever an event takes place in the work area, such as a spill, leak, explosion or other occurrence resulting in the likelihood of a hazardous exposure, the affected employee shall be provided an opportunity for a medical consultation. This consultation is for the purpose of determining the need for a medical examination.

All medical examinations and consultations are arranged by the HR department. All aspects of these examinations are provided by a licensed physician, or supervised by a licensed physician. These examinations are provided without cost to the employee, without loss of pay, and at a reasonable time and place.

The Associate Director of EHS will provide the following information to the physician:

a. Identity of the hazardous chemical to which the employee may have been exposed.
b. A description of the conditions of the exposure including exposure date if available.
c. A description of signs and symptoms of exposure that the employee is experiencing (if any).

The written opinion that the employer receives from the physician shall include:

a. Recommendations for future medical follow-up.
b. Results of examination and associated tests.
c. Any medical condition revealed which may place the employee at increased risk as the result of a chemical exposure.

d. A statement that the employee has been informed by the physician of the results of the examination/consultation and told of any medical conditions that may require additional examination or treatment.

The material returned to Kean by the physician shall not include specific findings and diagnosis which are unrelated to occupational exposure.

RESPONSIBILITIES UNDER THE CHEMICAL HYGIENE PLAN

The Safety/Chemical Hygiene Officer is responsible for the implementation of this Chemical Hygiene Plan for STEM.

A chemical hygiene committee will be formed which includes the Chemical Hygiene Officer, the Associate Director of EHS, and either a laboratory supervisor or faculty member from each of the departments covered under this Chemical Hygiene Plan. The membership list and minutes of the committee's meetings will be filed with the Associate Director of EHS and will available for employee review in the EHS Office located in the Maintenance Building.

ADDITIONAL PROTECTION FOR WORK WITH SELECT CARCINOGENS, REPRODUCTIVE TOXINS, AND CHEMICALS WITH HIGH ACUTE TOXICITY

When any of these chemicals are used, the following provisions shall be employed where appropriate:

a. Establishment of a designated area.
b. Use of containment devices such as fume hoods or glove boxes.
c. Procedures for safe removal of contaminated waste.
d. Decontamination Procedures

The procedures listed in Appendix A of 29 CFR 1910.1450 shall be implemented and made part of this plan (*see* SOP 16 for additional details).

APPENDIX A: STANDARD OPERATING PROCEDURES

1. CHEMICAL INVENTORY

This Standard Operating Procedure describes the process for the procurement, receipt, and inventory of chemicals. An important program goal is to establish a centralized chemical stockroom in each department from which chemicals are procured, received, inventoried, and distributed to individual laboratories. Centralizing these activities:

Allows better monitoring of chemicals stored and used and their location within the facility
Reduces the waste involved in duplicate purchases
Reduces waste disposal costs
Facilitates compliance with regulations

Department-Wide Computerized Inventory

Each CHO should develop a department-wide computerized inventory for all chemicals purchased, transferred, and disposed of. The computer inventory should contain the following information:

Name and Chemical Abstract Service (CAS) registry number of the chemical
Chemical supplier's name and address
Department name requesting the chemical(s)
Name of person performing inventory
Amount of chemical purchased
Date purchased
Date received
Expiration date
Type of container
Quantity received with units of measure
Destination/location (building name, room number and location within the room where chemical is stored and/or used)
Hazard warning code:
-Acute health hazard: highly toxic, irritant, corrosive, sensitizer.
-Delayed health hazard: carcinogens, mutagens, teratogens.
-Fire hazard: flammable, combustible, air-reactive, oxidizer.
-Pressure hazard: explosive, compressed gas.
-Reactive: unstable reactive, organic peroxide, water reactive.
Ability to monitor the quantity used and remaining

All chemicals currently on shelves and in storage areas must be inventoried. All personnel involved in inventory work must have annual Chemical Hygiene Plan Training. They must also be provided with the proper personal protective equipment, must have access to safety showers and eyewash stations. They must know what to do in the event of an emergency involving the

chemicals being inventoried. In addition, spill control equipment and fire extinguishers must be checked before the inventory is taken, to ensure that the appropriate type is available.

While taking the inventory, minimize the picking up and moving of bottles and never move potentially explosive materials. Chemicals must be arranged and segregated so that incompatible materials are not stored next to each other.

The departmental chemical inventory must be updated on an annual basis to ensure that it reflects what is currently used and stored in laboratory facilities.

Each lab must ensure that chemical inventories are provided on an annual basis to the Safety Officer. This inventory will be used to fulfill reporting requirements of the NJ Worker & Community Right-to-Know Act.

Chemicals in storage areas must be evaluated for deterioration, container integrity, and their age at least once a year. Chemicals whose storage limits have expired must be marked for destruction or disposal or, if warranted, given a new expiration date. Particular attention must be paid to unstable chemicals such as ethers and other peroxidizable materials.

No potentially explosive chemical whose shelf life has expired may be handled or moved by any laboratory employee taking inventory until the Safety Officer is contacted. It is better to be overcautious under these circumstances.

2. CHEMICAL PURCHASING AND PROCUREMENT

When purchasing chemical supplies for laboratories, the following requirements will be fulfilled:

- A copy of all new chemical purchase order requests will be sent to the Safety Officer.
- Efforts will be made to acquire no more of any chemical than a year's supply at a time, preferably no more than a quantity which can be used within 6-9 months.
- Efforts will be made to purchase chemicals in small-sized containers. When large containers are purchased, significant portions may remain unused and require disposal. The lesser unit cost for bulk purchases is outweighed by the cost of additional storage and disposal of old, unused materials.
- Check chemical purchases against the chemical inventory to reduce duplicate purchase and stock build-up.
- Before an extremely hazardous substance is ordered, such as carcinogens, reproductive hazards, and acutely toxic substances, consideration must be given to the adequacy of facilities and equipment to safely handle its type and quantity. Consideration must also be given to whether a less hazardous material may be substituted.
- All purchase orders must include a request that a copy of the Material Safety Data Sheets be sent to the CSTM Safety Officer. The CSTM Safety Officer will maintain Material Safety Data Sheets in the main prep room, 1-32 STEM. A copy of unusual MSDS will also be sent to the Associate Director of EHS of Kean University.
- MSDS are available online as well; suggested sites include www.siri.org or www.hazard.com/msds

3. CHEMICAL RECEIVING

All incoming shipments must be inspected by those receiving them. Containers should be refused and returned if they do not meet the following requirements:

- MSDSs must accompany incoming shipments or under separate cover
- Proper labels must be attached
- Containers must be intact and in good condition
- Any leaking containers must immediately be placed in an appropriate secondary container and treated as a chemical spill. See the section on Spills and Discharges (**SOP 17**) for more detailed information about chemical spill response.
- Expiration dates must be determined and assigned to each chemical container coming into the facility that contains any of the following:
  Picrics
  Peroxides
  Polymerizers that react violently
  Other materials known to deteriorate or become unstable or reactive over time
  Perchlorates
  Peroxidizable materials

- Chemicals should arrive with dates assigned. If there is no date, the arrival date will be noted on the container and the expiration date will be no later than one year after the date of acquisition. Chemical containers must also be labeled with the dates on which they are first opened so they can be used up before new containers are opened.
- All areas where shipments of chemicals are received will have appropriate personal protective equipment and spill - control materials available in case of a leaking or punctured container.
- All employees involved in procuring/receiving chemicals must be trained in laboratory safety.

4. POLICY FOR DISPOSAL OF CHEMICALS

The collection of all unwanted chemicals, as well as the disposal of hazardous waste is coordinated by the Safety Officer with Kean EHS.

In general, unwanted chemicals and wastes must be collected in individual, leak-proof containers that can be closed. Glass containers may be safely used for virtually anything, except hydrofluoric acid, acidic fluoride salts, and very strong alkalis. All chemicals and wastes must be stored in containers that are compatible with the material being stored. For example, acids must not be placed in a steel container, and alkalis must not be placed an aluminum container.

Select the smallest container available that will properly hold the materials, allowing sufficient head space above the surface of the liquid to allow room for expansion. This makes for economy and efficiency. Labs that do not have their own containers should request them from the Safety Officer.

All containers must be identified and labeled with the chemical name of the substance. Trade names, acronyms, abbreviations, codes, or formulas are not acceptable.

All 'spent' chemical waste must have a HAZARDOUS WASTE LABEL affixed to its container prior to use. HAZARDOUS WASTE LABELS can be obtained from the Safety Office (x77227).

Each component of a mixture of chemicals in a container must be identified on its label, along with its corresponding concentration. The units of concentration must be on the label together with their numerical values. When the solute is either a liquid or a gas, concentrations may not be expressed simply as 'percent' but must be given as either a 'weight percent' or a 'volume percent'.

Substances which are unidentified (unknowns) cannot be accepted for collection by the Safety Office. This stems from regulations requiring waste haulers to accept only identified materials. Responsibility for establishing the identity of an 'unknown' rests with the Lab wishing to dispose of it. The Safety Office or EHS will, on request, furnish the names of state - certified analytical laboratories.

When the 'spent' chemical waste container becomes full, enter the "accumulation start date" on the Hazardous Waste Label and make arrangements to have hazardous waste moved to the central storage areas in NJCSTM. The Safety Office may be contacted to assist with the removal of waste to the central storage area.

Broken or intact hypodermic needles or syringes that are contaminated by chemicals or that have been used in chemical laboratories only for 'chemical procedures' (such as removal of a solution from a vial through a septum or adding liquid to a gas chromatograph) must be disposed of in an impervious, labeled sharps container as REGULATED MEDICAL WASTE. Contact the Safety Office (or see the BBP-ECP) for information regarding procedures and disposal.

5. LABORATORY WASTE STORAGE REQUIREMENTS

Weekly inspections of the chemical hazardous waste containers in both the laboratory or in designated central waste storage areas must be performed, looking for leaks and for deterioration caused by corrosion and other factors.

Containerized hazardous waste must be segregated in storage by waste type, for example, flammable, poisons, and acids, but must be so arranged that incompatible substances cannot mix.

Incompatible substances must be kept apart. Incompatible substances are those pairs of substances that, when mixed, either react violently or evolve flammable or poisonous gases or vapors.

Below are a few general principles that must be followed in the safe storage and shipping of both unused chemicals and chemical waste material:

Keep acids and bases apart.

Keep acids apart from cyanides or sulfides.

Acids should never be put into steel containers, e.g., cans or drums.

Glass bottles and jars are inert to nearly any chemical except for hydrofluoric acid and some acidic fluorides. (They are also somewhat etched by concentrated aqueous solutions of strong alkalis.)

Organic acid halides, organic acid anhydrides, inorganic acid anhydrides, e.g., phosphoric anhydride (phosphorous pentoxide) and anhydrous strongly acidic salts (such as aluminum chloride, ferric chloride) must all be treated as water - re-actives and strong acids. They must be kept apart from both alkalis and water.

Oxidizing agents must be kept apart from reducing agents; they often react violently when mixed. Oxidizing agents include hydrogen peroxide, chromium trioxide, potassium permanganate, sodium chlorate, and sodium nitrate. Three particularly potent oxidizing agents are perchloric acid, nitric acid, and sodium dichromate - sulfuric acid mixtures (e.g., ChromergeR). Reducing agents include metals and nearly all organic compounds and solvents.

Water-reactives must be stored apart from water, aqueous solutions, and acids. Care must be taken so that the containers in which they are shipped do not break or leak.

Air-reactive chemicals must be packed in containers that are sealed off from the atmosphere. Quite often these containers are sealed glass ampoules or bulbs. Particular care must be taken when packing and unpacking them or handling them so they are not broken. In the case of certain air - reactive gases, the container is usually a compressed gas cylinder or lecture bottle; air - reactive liquids and solids are often sent in sealed glass ampoules, and solids.

Explosive materials and shock - sensitive substances present special risks that require special packaging, shipping, and handling. Consult with the EHS before handling or preparing them for disposal.

Every container must be arranged so that its identification label is readily visible. Hazardous waste must not be placed in an unwashed container in which an incompatible waste has previously been stored.

6. DISPOSAL OF EMPTY CONTAINERS AND EQUIPMENT

Empty bottles or cans that have contained hazardous materials and are to be discarded must be rinsed with a suitable solvent. Destroy or deface the label so as to make it illegible and destroy the cap to prevent its reuse. Place in a proper waste container (glass, metal, etc.), separate from regular room trash. They must not be placed in recycling bins. (Note: The wash solvent may need to be disposed of as a hazardous waste, based on the contents of the container.)

No item of laboratory glassware or any chemical container should ever be put in the ALUMINUM AND GLASS Recycling Bins. The only glass permitted in Glass Recycling Bins is jars and bottles that have contained only edibles – foods and beverages.

Broken glass and other sharp or hazardous objects must be placed in their own appropriate specially marked rigid containers.

Hypodermic needles and syringes (including those used to introduce samples for gas chromatographic analysis) and scalpel blades must be disposed of in a sharps container specially designed for this purpose and disposed of as REGULATED MEDICAL WASTE.

Discarded glassware, broken as well as unbroken, must be put into special puncture - resistant cartons marked “Broken Glass”. These special containers prevent sharp objects from poking through and protect custodians and others who must handle the trash.

Waste paper baskets and plastic trash bags are to be used for waste paper and other office trash.

Equipment must be decontaminated and decommissioned prior to disposal. Please contact the Safety Officer for more information.

7. POLICY FOR DRAIN DISPOSABLE SUBSTANCES

Some laboratories continually produce small amounts of aqueous wastes. In such cases, laboratory workers must decide whether to pour particular solutions down the drain or keep them for pick - up by the Safety Office. This SOP may help them make such decisions. If there is any doubt about whether a substance may qualify for drain disposal, call the Safety Office.

Generally, unwanted chemicals are collected for disposal. This is done in accordance with SOP Number 4 of this Appendix, and the Kean Waste Management Plan. However, certain materials are suitable for drain disposal. These should be carefully considered to ensure they do not violate any local, state or federal regulations, cause damage to the plumbing system or cause other problems such as odors in the building. Materials which are suitable for drain disposal are listed in the following paragraphs and Table 1. Other materials are prohibited from drain disposal without prior approval from the Safety Office. If you have questions about the suitability of other materials for drain disposal, or about the proper disposal of any laboratory material, please contact the Safety Office at 908-737-7227.

Drain Disposal of Dilute Acids and Alkalis - Acids and alkalis which have been rendered neutral by the experimental process may be discarded by drain disposal. Proper care must be taken to adjust the solutions to a pH of between 6 and 9. Generally, 1N hydrochloric acid can be used to neutralize alkaline materials and 1N sodium hydroxide can be used to neutralize acid materials. Remember to SLOWLY add the acid to the water or alkali, not vice versa.

Procedure: Drain disposal is properly done in the following manner:

Protective gear (gloves, laboratory apron, safety goggles) must be worn.

Before pouring the solution, turn on the tap to get a good flow of water to wash it down. Also, make sure that the sink and drain lines are washed free of any substances that will generate noxious gases when mixed with the solutions. Such substances include cyanides, sulfides, bisulfides, sulfites, bisulfites, nitrates, and nitrites.

Pour the solution down the drain slowly, making sure that before, during, and after pouring, the tap is turned on to provide a strong flow of water that aids in washing it down the drain.

TABLE 1: DRAIN - DISPOSABLE SUBSTANCES

SOLUTIONS ADJUSTED TO A pH of 6 - 9		POLYHYDROX - ALCOHOLS
Dilute solutions of:		
hydrobromic acid	sodium hydroxide	1,2 - propylene glycol
hydrochloric acid	potassium hydroxide	glycerol (glycerine)
hydriodic acid	ammonium hydroxide	mannitol
nitric acid	potassium carbonate	sorbitol
phosphoric acid	(potash)	
phosphorus acid	sodium carbonate	
sulfuric acid	(soda ash)	
acetic acid	sodium pyrophosphate	
formic acid	trisodium phosphate	

ALL VITAMINS	ALL NATURALLY - OCCURING AMINO ACIDS	ALL SUGARS
1 - ascorbic acid (vitamin. C)	alanine	arabinose
choline	cysteine	fructose
inositol	glycine	galactose
nicotinic acid (niacin)	histidine	glucose
pantothenic acid	leucine	lactose
pyridoxine (vitamin B6)	lysine	maltose
riboflavin (vitamin B2)	serine	sucrose
thiamine (vitamin B1)	tryptophan	
	tyrosine	

COMMONLY USED CHEMICALS	
acetylsalicylic acid (aspirin)	potassium bitartartrate
alum (sodium aluminum sulfate)	(cream of tartar)
ammonium alum (ammonium aluminum sulfate)	sodium bicarbonate
borax (sodium tetra borate decahydrate)	sodium bisulfate
boric acid	sodium bitartrate
calcium chloride	sodium carboxymethylcellulose
calcium phosphate, monobasic	sodium chloride
calcium superphosphate	sodium citrate
calcium triple superphosphate	sodium dihydrogen phosphate
casein	sodium hypochlorite
citric acid	sodium monohydrogen phosphate
corn syrup	sodium potassium tartrate
dextrin	sodium nitrate (Rochelle salt)
gelatin	sodium sulfate (Glauber's salt)
magnesium sulfate (Epsom salt)	urea
potassium aluminum (potassium alum)	

* for any chemical containing sodium, the corresponding potassium or ammonium compound may be substituted.

8. DISPOSAL OF LABORATORY GLASS

The purpose of this policy is to ensure the safe disposal of all laboratory glass, which includes preventing injuries to anyone who must handle discarded glass. This policy applies to all laboratory glass, intact as well as broken, except for Regulated Medical Waste (RMW) contaminated glass, which are covered under the RMW disposal procedures.

Procedure

Place all glass, intact as well as and broken, into a specially marked rigid container designed for this purpose (refer to "Specifications" section, below). A properly labeled thick - walled, rigid cardboard container may be substituted. The container must be able to withstand penetration by the sharps it contains, and must be lined with a leak - resistant liner (e.g., a polyethylene or polypropylene bag). Seal the container and clearly mark it "BROKEN GLASS" to describe its contents.

Rinse all empty hazardous chemical containers three times with small amounts of a suitable solvent or appropriate detergent solution (triple - rinsing) before discarding. The solvent may be any liquid which is effective (e.g., water or water - detergent solution effectively clean water - soluble substances and water - dispersible substances; mineral spirits is useful in dissolving many oily materials). Collect the rinsate for disposal as a hazardous material (Refer to the POLICY FOR THE DISPOSAL OF CHEMICALS which is SOP 4 in this Appendix). Then deface or remove all labels. After this step, they may be discarded as ordinary trash or as broken glass.

Seal filled glass - disposal containers before placing them for disposal. Ordinary, uncontaminated, discarded glass, when packed in its special container, may be disposed of with the regular trash in small quantities. However, CSTM disposes of large quantities of clean broken glass with a disposal vendor.

Do not put glass originating in the laboratory into a recycling container. Only glass and metal that contained edibles may be sent through standard recycling.

9. LABORATORY HAZARD EVALUATION

Each time a staff member prepares a protocol or conducts a new laboratory experiment that uses new chemicals, that staff member must conduct a laboratory hazard evaluation in order to determine of there are potential hazards that may arise in the use of that chemical. Prior to initiating the new experiment or procedure, the staff member must fill out a hazard evaluation form provided by the Safety Office (see the **Hazard Evaluation Form** that follows this SOP.) These forms will be maintained in a file in order to serve as a reference to all staff members. Container labels and MSDSs, as well as other references, will be used to conduct the evaluation.

Laboratory personnel will be familiar with their own and previous evaluations prior to beginning work and will use appropriate ventilation, protective equipment, and procedures to minimize exposure. The evaluation forms will be used to similarly prepare for the potential for emergency response. Considering the following questions in advance will help you decide when to use substitution, engineering controls (e.g., local ventilation, isolation), or personal protective equipment.

Hazard Evaluation Form

Complete this form by answering all of the following questions and submit the completed questions either in hard copy or electronically to the Safety Office.

1. What are the sequential steps conducted in that experiment, chemicals used in those steps, and by - products of the reactions?

2. Have you referred to labels, Material Safety Data Sheets, or other available references to determine the hazard classes of each chemical used, or by-products of reactions derived in that step?

3. In what form are the chemicals at different stages of the process (e.g., liquid, gas, aerosol, dust, or fume)?

4. What is the potential for health hazard of:
   - Inhalation (through evaporation, gas escape, aerosol formation, or dust production),
   - Eye contact, skin contact and absorption (e.g., splashing, spraying, misting, handling), - - Ingestion (accidental swallowing);
   - Physical hazard: fire (sources of ignition), explosion (static electricity, shock sensitive), or other undetermined hazard?

5. What laboratory occupational and environmental conditions might affect the likelihood or potential for a hazardous exposure? For example, is there insufficient ventilation (fume hoods, local exhaust), or personal protective devices (goggles, face shields, gloves, aprons)? Do humidity, temperature, or light levels enhance a hazardous condition?

6. Are there any reported incidents in the literature associated with this experiment or chemicals used? A number of journals report incidents that involve the use of specific chemicals in experiments or processes, such as the Journal of Chemical Education, Chemical Engineering News and Morbidity and Mortality Weekly Report. Other necessary information is available in science indexes at the library and online.

7. What controls are needed to protect yourself and surrounding workers in the event of an emergency (e.g., safety shield, eyewash, safety shower, fire extinguisher, spill-control equipment)? Make extra copies of the hazard evaluation chart and utilize it for new experiments.

Note: Substitution as a Primary Method of Control

Following a hazard evaluation, laboratory personnel should always consider substituting less hazardous or toxic substances. Only chemicals for which appropriate exposure controls are present may be used.

10. REPORTING LABORATORY INCIDENTS AND UNSAFE CONDITIONS

Report all laboratory incidents, no matter how minor, to the Safety and Chemical Hygiene Officer (CHO). An **Incident Report Form** is attached to this procedure and can be duplicated. Unusual or unexplainable **c**hemical incidents should be discussed with others in the department, to caution others as to the risk of the procedure.

Report any unsafe conditions by contacting the CHO and then file a written report with the EHS so that the condition may be corrected as soon as possible.

Unsafe conditions that must be reported include:

Nonfunctioning hoods in areas where hazardous chemicals are being used
Unsafe storage conditions
Blocked emergency exits
Improperly charged fire extinguishers
Eyewash stations or safety showers that do not work
Absence of personal protective equipment (e.g., goggles, gloves)

Incident Report Form

Use To report any breakage, spill, cut, abrasion, fall, fire, explosion, or any other incident, no matter how major or minor

Date: _____ Department:_____

Name of person filing this report:_____

NOTE: Return this form, when completed, to the STEM Safety Officer (CHO), with a copy to the Associate Director of EHS in Downs Hall.

1. Date and time of incident:_____
2. Place of incident (building, floor and room number):_____
3. Summary of incident (include name of chemical, biological, radioactive or other substances(s) involved.

   _____

   _____
4. Was anyone injured? Yes_____ No_____. Please describe:

   _____

   _____

5. Did you or others in the area experience any signs or symptoms of exposure?

   Yes_____ No_____. Please describe

   _____

   _____

6. Was the incident related to an experiment? Yes_____ No_____

   If so, what was the experiment?

   _____

   _____

7. What was the first indication that you had of the incident?

   _____

   _____

8. What did you observe?

   _____

   _____

9. What did you do in response to the incident?

   _____

   _____

10. Was the proper equipment available to respond to this incident (e.g. fire extinguisher, eyewash station, safety shower, spill equipment, first aid kit)

    Yes_____ No_____

    If "no", what was missing?

    _____

11. Were the emergency telephone numbers posted? Yes_____ No_____

    Comments:_____

12. What else did you see or hear that you think was important?

    _____

    _____

11. PERSONAL HYGIENE

A. Never store food or beverage in storage areas, refrigerators, glassware, or utensils that are also used for laboratory operations.

B. Do not eat, drink, smoke, chew gum, or apply cosmetics in laboratories.

C. Never use your mouth to draw fluid through a pipette. Always use a pipette bulb or other mechanical pipette filling device.

D. Wash areas of exposed skin well before leaving the Lab.

E. Confine long hair and loose clothing.

F. Wear covered shoes at all times in the laboratory. Sandals, open-toed, or perforated mesh shoes are not adequate covers for feet in a laboratory.

G. Always wear long - sleeved and long - legged clothing. While performing laboratory work, never wear short - sleeved T - shirts, short skirts, or shorts.

H. Jewelry should not be worn that interferes with gloves and other protective clothing or that could come into contact with electrical sources or react with chemicals.

I. Use appropriate PPE at all times which in the lab.

12. PROPER USE OF EQUIPMENT

A. Make sure you have been properly trained to use any equipment you require in your work. Do not use equipment unless you understand the proper procedures and safety protocols.

B. Inspect any equipment or lab apparatus for damage before use. Never use damaged equipment such as cracked glassware or equipment with frayed electrical wiring.

C. Shield or wrap Dewar flasks and other evacuated glassware to contain chemicals and glass fragments should explosion occur.

D. Check fume hoods before use to ensure adequate functioning.

E. Select appropriate equipment based on an evaluation of chemical and procedural hazards.

F. <u>PPE – Personal Protective Equipment</u>:
   a. Inspect all personal protective equipment (glasses, goggles, gloves) before use for damage. Do not use damaged PPE.

   b. All personnel, students, and any visitors in locations where chemicals are stored or handled should wear protective goggles and lab coats at all times.

   c. Wear appropriate gloves when there is potential for skin contact with toxic chemicals. Some chemicals can cross different types of glove material. Appendix F contains chemical permeability information.

   d. Use additional personal protective equipment when necessary. In the STEM building, this includes wearing lab coats when in a lab and wearing eye protection during ANY procedure involving chemicals.

G. <u>Centrifuges</u>:
   a. Centrifuges spin at a high rate of speed and, if not balanced, can cause a catastrophic failure, damaging equipment and harming individuals. You must be properly trained to use one.
   b. Do not run without a balanced load and move well away from the machine while it is in motion. Use balances to regulate the weight in opposing buckets.
   c. Be sure to wipe up any spills immediately to avoid spread, solidification and/or corrosion of the machine/containers.
   d. Any corrosive, hazardous, or biological materials should only be centrifuged when appropriate secondary containment systems are in place.
   e. Make sure to clean up any spills and report any breakages and possible damage to the machine.

H. <u>Other equipment:</u> There are user manuals for most of the equipment found in STEM. Contact the Research Facilities Manager for a copy, and **get properly trained in any equipment you need to use.**

13. TRANSPORT OF CHEMICALS

The following guidelines will be used when transporting all chemicals within facilities, from building to building, and on public streets.

A. Hand - carried chemicals should be placed in a secondary outside container or acid-carrying bucket to protect against breakage and spills.

B. Wheeled carts used to transport chemicals should be stable and move smoothly over uneven surfaces without tipping or stopping suddenly, and should have lipped surfaces that would contain the chemicals if the containers break.

C. Lab employees transporting chemicals must wear gloves, goggles and a lab coat or apron in the event that containers break and chemicals are splashed.

D. Compressed gas cylinders: Only trained personnel should work with equipment utilizing pressurized gas cylinders. Always use a cylinder dolly cart to move gas cylinders, do not roll or carry cylinders. Always secure the protective cap on the cylinder when moving. Cylinders should always be properly secured to a stable surface (wall or stable counter) whether in use or being stored.

14. HOUSEKEEPING

A. Keep all work areas, including work benches and floors clean, dry, and uncluttered.

B. Access to emergency equipment, utility controls, showers, eyewash stations, and laboratory exits should never be blocked, even temporarily.

15. WORKING ALONE

A. Under most circumstances individuals should avoid working alone in a lab when conducting experiments involving hazardous substances and procedures.
B. At no time should laboratory workers be alone in the building while working in the laboratory.
C. An instructor or qualified supervisor must be present in the laboratory at all times when undergraduate or high school students are conducting experiments.

16. PROVISIONS FOR EMPLOYEE PROTECTION WHEN WORKING WITH PARTICULARLY HAZARDOUS SUBSTANCES
(CARCINOGENS, REPRODUCTIVE TOXINS, SUBSTANCES THAT HAVE A HIGH DEGREE OF ACUTE TOXICITY, AND CHEMICALS OF UNKNOWN TOXICITY)

Consideration will be given to adopt the procedures described in this section as appropriate, when performing laboratory work with any select carcinogen, reproductive toxin, substance that has a high degree of acute toxicity, or a chemical whose toxic properties are unknown.

For the purposes of the CHP, chemicals in the four categories listed below will be referred to as "**particularly hazardous**".

Select carcinogens: Any substance defined as such in 29 CFR 1910.1450 or other substance described as such in the applicable MSDS.

Reproductive toxins: Any substance described as such in the applicable MSDS.

Substances with a high degree of acute toxicity: Any substance for which the LD50 data described in the applicable MSDS cause the substance to be classified as a "highly toxic chemical" as defined in ANSI Z129.1*.

Chemical whose toxic properties are unknown: A chemical for which there is no known statistically significant study conducted in accordance with established scientific principles that establish its toxicity.

A. Establish a "designated area" in the laboratory for use of the particularly hazardous substance.

B. Designated areas shall be posted and their boundaries clearly marked. Only those persons trained to work with particularly hazardous chemicals will work with those chemicals in a designated area.

C. Designated area: A fume hood, glove box, portion of a laboratory, or an entire laboratory room designated as the only area where work with hazardous chemicals shall be conducted.

D. Store all particularly hazardous chemicals in locked and enclosed spaces with slight negative pressure compared to the rest of the building.

E. Because the decontamination of jewelry may be difficult or impossible, do not wear jewelry when working in designated areas.

F. Wear long - sleeved disposable clothing and gloves known to resist permeation by the chemicals used when working in designated areas. (For further guidance on selection of protective clothing, contact the Associate Director of EHS)

G. Conduct a “dry run” of procedures involving particularly hazardous substances to remove or lessen hazards of use.

H. Use the smallest amount of chemical that is consistent with the requirements of the work to be done.

I. Use high - efficiency particulate air (HEPA) filters or high - efficiency scrubber systems to protect vacuum lines and pumps.

J. Store particularly hazardous chemicals carefully or remove them from storage.

K. Decontaminate a designated area when work is complete.

L. Prepare wastes from work with particularly hazardous chemicals for waste disposal in accordance with specific disposal procedures consistent with the Resource Conservation and Recovery Act (RCRA). (For further information on specific disposal requirements, contact the Associate Director of EHS.)

*ANSI Z129.1 includes chemicals in any of the following categories:

A chemical that has a median lethal dose (LD50) of 50 mg. Or less per kg. Of body weight when administered orally into albino rats weighing between 200 - 300 grams each, or

A chemical that has a median lethal dose (LD50) of 200 mg. Or less per kg. Of body weight when administered by continuous contact for 24 hours (or less, if death occurs within 24 hours) with the bare skin of albino rabbits weighing between two and three kg. Each, or

A chemical that has a median lethal concentration (LC50) in air of 200 ppm by volume or less of gas or vapor, or 2 mg. Per liter or mist, fume, or dust, when administered by continuous inhalation for one hour (or less, if death occurs within one hour) to albino rats weighing between 200 and 300 grams each, provided such concentrations and/or conditions are likely to be encountered in a reasonably foreseeable manner.

17. RESPONSE ACTIONS TO SPILLS/DISCHARGES

In the event of a spill or discharge of a chemical, one must evaluate whether:

the chemical poses a hazard to personnel within the area or the environment, and the chemical can be easily and safely cleaned up.

The attached chemical spill guidelines detail the response actions for spills or discharges which occur indoors.

If the spilled material poses a hazard to the personnel in the area or the environment, immediately notify all to evacuate the area and/or building; this can be done verbally or by sounding the fire alarms that are located throughout the building. Campus Police must be notified as soon as possible.

If the chemical does not pose a threat to the personnel in the area BUT cannot be easily cleaned up, immediately place an absorbent to stop or block the flow (only for liquid), notify the people in the immediate area, then notify Campus Police and then the Safety Office and EHS.

EMERGENCY TELEPHONE NUMBERS
Campus Police - (908) 737-4800 or from on campus 74800

After 5:00 pm, Campus Police will notify the Associate Director of EHS who will coordinate and manage the containment and cleanup of the spilled or discharge material including required verbal notifications to the various agencies.

If the Associate Director of EHS is unavailable, Police will call the University's Spill Response Contractor **(Disposal Consultant Services, Inc., at (866) 522-7746)**.

When calling the Campus Police, try to have as much of the following information as possible, but do not delay the call if you are missing some of this information:

The chemical substance involved in the release, if known;
An estimate of the quantity of material released;
Time and duration of the release, if known;
The location of the release, and where and onto what surface the release occurred;
Any known or anticipated acute or chronic health risks associated with the spill/discharge, if known;
Proper precautions to take as a result of the release, including evacuation, if known; and,
The names and telephone numbers of the person(s) to be contacted for further information.

Chemical Spill Guidelines

Never clean up a chemical spill when working alone.
Do not use paper towels to clean up a spill other than tap water. Use the absorbent materials provided in a Chemical Spill Kit.
Respond only to chemical spills that you are confident you can handle. Do not hesitate to call the EHS or Campus Police.
Use a respirator only if you are certified by the EHS
Fill out an Incident Report Form even if no one was injured.
Inform the responsible investigator and other personnel in the chain of notification.

Dealing with Chemical Exposures and Chemical Spills:

Evaluation

First person on site should determine whether any immediate hazards to life or safety exist, such as injuries, fire, or smoke, electrical hazards, or the presence of other toxic substances.

If there are one or more emergency conditions:

Address the Emergency conditions first,

- Evacuate the area of the spill and keep bystanders away (use barricades or cordon the area off as needed);
- Activate the fire alarm for the building if a fire or smoke condition exists.
- Call public safety (908-737-4800, or x74800 from a campus phone) from a safe location to request assistance, if needed, and then attend to anyone injured or contaminated.
- If needed, request assistance with evacuation or crowd control.
- Public safety can contact EHS at 908-821-4000 (cell)

Chemical Exposure - *to an individual*

Attend to injuries and chemical exposures first. Have someone call for help.

A co-worker, wearing gloves, should assist the exposed individual with the following:

- Remove contaminated clothing.
- Flood exposed area with running water for at least 10 minutes.
- If chemical has splashed in eye, immediately flush eyeball and inner surface of eyelid with water for at least 15 minutes. Hold eye open to ensure effective flushing behind lid.
- If you inhaled chemical vapors, move to an area where fresh air is available.
- Contact Campus Police and seek medical attention immediately.

Minor Chemical Spill – *1 liter or less, not hazardous*

A minor chemical spill is one (1) liter or less of any chemical that is NOT a carcinogen, acutely toxic, or a reproductive hazard.

Minor spills can be safely cleaned up by a trained staff member. If the person on-scene is untrained or unsure how to clean up the spill, they should call for assistance and wait in a safe location.

Instructions for a trained staff member:

- **Review** the Safety Data Sheet (SDS) for the spilled material. If you do not have this information or need spill clean-up supplies, call Campus Police (74800) **or** Facilities and Campus Planning (FCP) (75000) and ask them to contact KU Environmental, Health, and Safety personnel.
- **Wear** appropriate personal protective equipment to prevent exposure to skin, eyes, and respiratory system.
- **Use** the appropriate spill clean-up kit.
- **Form a dike** with the absorbent and mix with spilled material.
- **Collect the residue**, place it in a waste bag and label it. Dispose of the clean-up material through EHS.
- **Call** Facilities & Campus Planning to wet-mop the *cleaned* spill area.

Major Chemical Spill – *toxic or hazardous, or more than 1 liter, or in public space*

If more than a liter has spilled OR the chemical is a carcinogen, highly acutely toxic, or a reproductive hazard, it is a major chemical spill.

Kean EHS will contact our outside spill response vendor and/or HAZMAT, as needed, to respond.

Instructions:

- Turn off all ignition and heat sources, if it is safe to do so.
- If the spill involves solvents or vapors, activate the Emergency Chemical Hood flush system with the override switch at the exit doorway.
- Alert those in the area and evacuate, closing the door behind you.
- From a safe location, call **Campus Police at x74800 or 911 AND Facilities and Campus Planning at 75000. (KUPD 908-737-4800)**
- Give your name and location of the spill.
- Give the name of the chemical.
- Give a phone number where you can be reached for further information.

Location of chemical spill cleanup materials

- STEM prep rooms: spill kits on floors 3, 4, 5 in STEM building: Yellow bin labelled "Spill Kit" or a 5 gal bucket labelled "Spill Kit" with absorbent, neutralizers (citric acid, sodium bicarbonate, activated charcoal), dustpan and broom
- STEM 1-28, Chemical Storage Room, "007" Key
- Maintenance Bldg Loading Dock Hazardous Waste Room, "HAZ" key
- If you have a question or require assistance, please contact EHS Safety Officer Suzanne Kupiec at 973-737-4804 or skupiec@kean.edu.

Emergency Numbers

Campus Police - 911
x74800 or 908-737-4800

Chemical Hygiene Officer
X74804 or 908-737-4804

Facilities & Campus Planning
908-737-5000

Nearest urgent care center:
MD Care Urgent Care Center
400 Westfield Ave, Elizabeth, NJ 07208
(908) 691-3800

Nearest emergency center:
Overlook Medical Center Emergency Services - Union Campus
1000 Galloping Hill Road, Union, NJ 07083
908-522-6300

18. ACCIDENT/ INJURY REPORTING

Injuries must be reported immediately to the Campus Police at (908) 737-4800 or from a campus phone at 74800. Campus Police will call for emergency medical services if needed.

Campus Police or the EHS will help complete an Accident - Illness Report. (See an example of the report on the following page.)

Emergency procedures for lab accidents:

For chemical splashes to the eye: Immediately rinse the affected eye or eyes at an eyewash station for at least 15 minutes.

For chemical contamination of the body: Immediately remove contaminated clothing while rinsing for at least 15 minutes, using an emergency drench shower if necessary.

For thermal or chemical burns: Flush the area with cold water, where appropriate. For extreme burns, call Campus Police to obtain advice from emergency medical services.

When a person and/or their clothing is on fire: Person should **STOP, DROP and ROLL**. A fire blanket or water can be used to help extinguish the flames while the employee is on the floor. Do not wrap a person in a vertical position in a fire blanket to smother the flames.

For gashes, cuts and heavy bleeding: Ask injured person, if capable, to apply compression to the wound to slow bleeding. If unable, employees should don protective latex gloves prior to assisting an injured person.

For signs or symptoms of chemical exposure: Employee should leave the area immediately and get fresh air for chemical exposure signs such as dizziness, nausea, light-headedness or burning sensation in the eyes, nose or throat. Employee should then contact the Campus Police.

ACCIDENT - ILLNESS REPORT

(Other than Automobile)

CHECK ONE:
Employee ____
Student ____
Visitor ____

Case No._____
Date of Report: _____
Reported by:
_____

Name of person affected_____ Date of Accident_____

PLEASE PRINT OR TYPE

Injury ___
Illness ___

Name_____ Age_____ Sex_____
Address_____
Telephone No._____ SS#_____
Curriculum_____ Year_____ Full-Time_____ Part-Time_____
Job Title_____ Employer_____
Married_____ Single_____ No. of Dependents_____
Date of Occurrence_____ Hour_____ A.M._____ P.M._____
Place of Occurrence_____
Description of Injury or Illness_____
_____
_____
_____

Treatment

Did you provide or authorize medical attention? _____
Doctor's Office or Hospital Taken to _____
_____
Transported by: Ambulance_____ Police_____ Private_____
Attending Nurse _____
_____

Witnesses

Secure Names and Addresses of all Witnesses

Name_____ Address_____

Name_____ Address_____
_____

Description of Occurrence

Description of Occurrence

of

Occurrence

_____
_____
_____
_____
_____
_____

cc: Campus Police
Health Services
Patient's Folder

_____
Investigating Officer

19. FIRE SAFETY PROCEDURES

IF FIRE ALARM IS SOUNDING IN BUILDING:

EVACUATE BUILDING USING THE NEAREST EXIT.

Close doors and windows, turn off lights and other electrical equipment. Most labs in STEM have an Emergency Electricity Shutoff button near the exit.
Guide visitors and students to the nearest exit.
Assist handicap persons in exiting the building.
DO NOT use elevator. Take the stairs down to first floor and exit towards Morris Ave.
Move away from the building and out of the way of the fire department.
Gather in the grassy area between STEM and Morris Avenue; check in with your instructor or the Safety Officer before you leave the area.
Do not reenter the building if the fire alarm stops sounding. Only reenter when the Police signal the "all clear."

UPON DISCOVERY OF FIRE OR SMOKE:

Alert building occupants - Activate manual fire alarm if the alarm is not already sounding.
Manual pull stations are located by all exits and near the elevators.

NOTIFY THE CAMPUS POLICE OF THE LOCATION AND EXTENT OF FIRE OR SMOKE.

Use emergency phones which are direct lines to the Campus Police or call Extension 74800 then wait outside for the Campus Police to arrive.

ATTEMPT TO EXTINGUISH FIRE ONLY IF ALL OF THE FOLLOWING ITEMS ARE MET:

The fire alarm is sounding and Campus Police have been called.
You understand the use of fire extinguishers.
The fire is small.
You can attempt to extinguish the fire and still have a safe escape route toward an exit.

EVACUATE BUILDING USING THE NEAREST EXIT.
Close doors and windows; turn off lights and other electrical equipment. Most labs have an Emergency Electricity Shutoff button near the exit.
Guide visitors and students to the nearest exit.
Assist handicap persons in exiting the building.
Read the Fire Safety protocols in the Laboratory Safety Manual for more information on fire prevention and response.

20. POWER OUTAGES:

If there is a power failure in the laboratory, evacuate the building until power is restored.

Turn off gas valves and turn off power switches on sensitive equipment.

Notify Campus Police at (908) 737-4800 or from a campus phone at 74800.

21. CHEMICAL (FUME) HOOD DIRECTIONS

A. Use hoods that have been inspected within the last year.
B. Keep your upper body and head out of the hood when using hazardous materials.
C. Place hazardous materials well inside the hood and at least 6" behind the face of the hood.
D. The hood sash or panels should be lowered to the lowest comfortable working height that is at or below the marked "operating height."
E. Chemical storage should be minimized in the hood.
F. Do not block the air slots at the rear of the hood. If large equipment is to be placed in the hood, contact EHS at 7-4804 for assistance.
G. Do not store papers, paper towels or other lightweight materials in the hood. These can be sucked into the air stream and interfere with the blowers.
H. The hood sash or panels shall not be removed except for approved initial experimental setup and before hazardous chemicals are placed in the hood.
I. Do not close hood completely after use; leave at "Idle" height noted on the hood (this ensures proper ventilation in the room).
J. Emergency override switches at the front of the laboratory will turn hoods on maximum to vent vapors in an emergency.

22. UNATTENDED OPERATIONS

Prior Approval Procedures for Unattended Operations

A. If it becomes necessary to leave during a process or operation (such as running a gel, etc.), responsible personnel should inform their supervisor and the Safety Officer (x77227) on where and what the process is, how long it will continue to be unattended, and how to terminate the process should an emergency arise.
B. For unattended operations, laboratory lights should be left on, and signs should be posted to identify the nature of the experiment and any hazardous substances in use.
C. Arrangements should be made, if possible, for other workers to periodically inspect the operation. Information should be clearly posted indicating who to contact in the event of an emergency.
D. Depending on the nature of the procedure, special rules, precautions, and alert systems may be necessary.
E. Procedures that should NOT be left unattended include (but are not limited to):
    i. Open flames of any kind;
    ii. The use of any compressed liquid or gas cylinder in an unregulated manner;
    iii. Volatilization/evaporation of chemicals;
    iv. Any procedure involving flammable or hazardous materials.

23. WORK WITH ELECTRICALLY POWERED EQUIPMENT

Care should be exercised when using electrical equipment.

A. Do not touch electrical equipment with wet hands or while standing on a wet floor.
B. Do not work with instruments which have frayed or worn electrical cords.
C. Do not use extension cords in series (i.e. more than one) and do not use an extension cord which is not rated for the equipment it is plugged into.
D. All instruments, including household type appliances such as microwave ovens, must be properly grounded.
E. Do not try to repair equipment yourself. This should be done by qualified personnel.
F. Never try to by-pass any safety device on a piece of electrical equipment.
G. In case of fire on or near any electrical equipment, use only carbon dioxide or dry powder fire extinguishers.

24. COMPRESSED GAS CYLINDERS

A. All compressed gases received, used or stored must be labeled according to the Department of Transportation (DOT) regulations. All cylinders must be identified with a label or tag with the name of its contents. DO NOT DEPEND ON COLOR CODES.
B. Always use special cylinder carts when moving cylinders. Avoid dragging, sliding or rolling cylinders.
C. Protective valve caps must be kept in place while cylinder is moved.
D. Do not accept a cylinder which has rust on or near the main valve.
E. Check for any leak in the area where the main valve joins to the cylinder body.
F. Users should be familiar with the particular characteristics of the gas, i.e. flammability, reactivity and toxicity.
G. All cylinders (both stored and those in use) must be secured in an upright position (with the valve up) by means of a strap, chain or non-tip base. (Carts are not acceptable as a base).
H. Cylinders must never be stored near an actual or potential source of heat, or where they may be exposed to extremes of weather or in the vicinity of combustibles. Cylinder temperature must not exceed 125° F.
I. Cylinders must not be stored in an area where they may become part of an electrical circuit.
J. Cylinder valve should be protected with a standard cap when not in use (empty or full). (Do not leave unused cylinders uncapped.)
K. Never use a damaged cylinder or regulator.
L. Never use a high-pressure cylinder without a regulator.
M. Regulator threads must match cylinder valve outlet threads; if connection cannot be readily made, do not force. Check threads, reset if necessary, and try again. Wrenches should only be used for tightening a connection, not making the connection initially.
N. Regulators for different pressure systems must not be interchanged.
O. Never permit the gas to enter the regulator suddenly. Open tank valve slowly.
P. When opening cylinder valve, stand away from face of the regulator and point outlet away from your body.
Q. Always shut the tank valve first and then vent the regulator to zero.
R. Never try to stop a leak between a cylinder and regulator by tightening the union nut unless the valve has been closed off.
S. Valves must be closed and caps secured when returning empty cylinders.
T. Empty cylinders must be marked EMPTY and disposed of promptly.
U. Transferring of compressed gas from one vessel to another is an extremely hazardous operation. This operation must never be done in CSTM. The only exception to this is processes done by properly trained personnel when making dry ice or transferring cryogenic material such as liquid nitrogen or liquid helium.

25. MERCURY THERMOMETERS

Avoid ordering new mercury thermometers. Store mercury thermometers in cases which prevent breakage.

If a Mercury Thermometer breaks and mercury spills,

A. Wear gloves to avoid skin absorption when handling mercury spills.
B. Collect the mercury and any broken glass into a sealable plastic bag or small jar using a wet paper towel, brush and board, or use a Mercury Spill Clean-up Kit, if available.
C. Place the plastic bag into a small box labeled "Mercury" for safe and proper disposal as chemical waste.
D. Never pour mercury down the drain.

26. FLAMMABLE CHEMICALS

In general, the flammability of a chemical is determined by its flash point, the lowest temperature at which an ignition source can cause the chemical to ignite momentarily under certain controlled conditions.
A. Chemicals with a flash point below 100° F (37.8° C) will be considered a "Fire Hazard Chemical".
B. Think before you make a move when handling flammable liquids.
C. Quantities of one gallon or more of flammable liquids must be stored in approved safety containers or cabinets.
D. Small quantities of flammables may be stored on open shelves. Bulk quantities must be stored in an approved flammable safety cabinet or flammable storage room. Do not store flammables in fume hoods
E. Do not store ether or any other flammable in refrigerators, unless the refrigerator is rated as explosion proof. (Such refrigerators will be clearly marked "Flammable".)
F. Flammable liquids should always be kept away from fire, reactive chemicals and sparks.
G. Flammable chemicals should be stored separately from oxidizers and out of direct sunlight in tightly closed containers.
H. Avoid heating flammable solvents with open flame.
I. Flammable liquids must never be dumped in a sink. Dispose of flammables as chemical waste in approved, properly labeled containers in accordance with the Kean University Hazardous Waste Policy.

27. CORROSIVE CHEMICALS

Corrosivity is sometimes given in manufacturers Material Safety Data Sheets and on labels. Also, guidelines on which chemicals are corrosive can be found in other OSHA standards and in regulation promulgated by DOT in 49 CFR and the EPA in 40 CFR.

A. A corrosive chemical is one that

i. Is injurious to body or corrosive to metal by direct chemical action,
ii. Fits the OSHA definition of corrosive in Appendix A of 29 CFR19190.1200,
iii. Fits the EPA definition of corrosive in 40 CFR 261.22 (has a pH greater than 12 or less than 2.5), or
iv. Is known or found to be corrosive to living tissues.

B. Store acids and bases separately.

C. Organic acids should be stored separately from strong oxidizing agents (e.g.,sulfuric, nitric or perchloric acid) to prevent corrosion of storage cabinets due to fume interaction).

D. Wear appropriate protective lab coat/apron, gloves and eye protection when handling corrosive chemicals.

E. Never pipet by mouth.

F. When diluting acids, always *add the acid to the water* slowly from the side of the mixing vessel. Mix by rotating slowly and avoid heating.

G. Check containers for any leaks.

H. All corrosive materials should be kept in cool, dry, well ventilated area away from direct sunlight and other reactive, flammable or toxic chemicals.

I. Dispose of corrosives as chemical waste in properly labeled containers in accordance with Kean University Hazardous Waste Policy.

28. REACTIVE CHEMICALS

Reactivity information is sometimes given in the manufacturers, MSDSs and on the labels.
Guidelines on which chemicals are reactive can be found in regulations promulgated by the Department of Transportation (DOT) in 49 CFR and by the Environmental Protection Agency (EPA) in 40 CFR.

A. A reactive chemical is one that:
   i. Is described as such in the MSDS,
   ii. Is identified by the DOT as:
      a. An oxidizer
      b. As organic peroxide
      c. An explosive, Class A, B or C
   iii. Fits the EPA definition of reactive chemical in 40 CFR 261.23
   iv. Fits the OSHA definition of unstable in CFR 1910.1450
   v. Is known or found to be reactive with other substances.

B. Handle reactive chemicals with all proper safety precautions, including segregation in storage and prohibition on mixing even small quantities with other chemicals without appropriate personal protection and precaution.
C. Reactive chemicals should be kept away from heat, sparks, fire and flammables.
D. Always work with reactive chemicals in well-ventilated areas, preferably under a chemical fume hood.
E. Take proper precautions while working with peroxides and other explosive chemicals:
   i. Work with minimum amounts of chemicals required.
   ii. Never use metal spatulas; use wooden or ceramic spatulas.
   iii. All spills should be cleaned immediately.
   iv. Never dispose of pure peroxides directly. Always dilute the peroxides into water or reducing reagents such as sodium bisulfite or ferrous sulfate before disposal as chemical waste.
F. Dispose of reactive chemicals in properly labeled containers in accordance with the Kean University Hazardous Waste Policy.

29. DECOMMISSIONING EQUIPMENT & LABORATORY SPACE

Unwanted equipment is to be turned over to the Research Facilities Manager for storage or disposal.

Equipment which has been contaminated by chemical or biological materials must be decontaminated prior to disposal or storage.

Spaces which have been used for hazardous chemicals should be cleaned completely, according to the MSDS of the chemicals which were used in the area.

Please contact x77227 for more information.

APPENDIX B: CHP/LABORATORY STANDARD TRAINING

Annual Chemical Hygiene Plan Training will address these topics on an on-going basis. Students and new employees will be oriented to and given a copy of the Laboratory Safety Procedures prior to performing work and when taking on additional new tasks.

I. Occupational exposure to hazardous chemicals in laboratories standard (29 CFR 1910.1450)

A. Content of the standard and appendices.
B. Location and explanation of the chemical hygiene plan.
C. Location of reference materials and material safety data sheets (MSDS).

II. Physical Hazards

A. Combustible liquid
B. Compressed gas
C. Explosive
D. Flammable
E. Organic peroxide
F. Pyrophoric
G. Unstable (reactive)
H. Water reactive

III. Health Hazards

A. Local
    1. Irritants
    2. Corrosives
B. Systemic
    1. Toxics
        a. Acute/Chronic
        b. Nervous System Effects
        c. Respiratory System Effects
        d. Reproductive System Effects
    2. Sensitizers

IV. Route of Exposure

A. Inhalation
B. Skin Absorption
C. Ingestion

V. Amount of Absorption

A. Gases/Vapors
B. Particulates
    1. Dust
    2. Mist
    3. Fume

VI. Dose

A. Work Practices
B. Personal Hygiene
C. Weight
D. Personal Protective Equipment
E. Environmental Controls

VII. Duration of Exposure

VIII. Exposure Limits Including PELs

A. Definition
B. Established by:
   1. Chemical similarity
   2. Animal studies
   3. Human studies

IX. Air Sampling

A. Required by PEOSH
B. Employee reports of illness
C. Confined space work
D. Other

X. Response

A. Age
B. Gender
C. Body size
D. Health status
E. Personal habits
F. Other exposures

XI. Employee Concerns

A. Symptoms limited/many cases
B. Documentation
C. Referral
D. Refusal to work

XII. STEM Standard Operating Procedures

APPENDIX C: TRAINING DOCUMENTATION

TOPIC: _____ DATE: _____
(Attach outline of material covered)

NAME OF INSTRUCTOR: _____ POSITION: _____

	NAME	**LABORATORY**
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____
6.	_____	_____
7.	_____	_____
8.	_____	_____
9.	_____	_____
10.	_____	_____
11.	_____	_____
12.	_____	_____

APPENDIX D: SAFETY PROCEDURES IN TEACHING LABORATORIES

The following form will be used in Teaching Labs during the first week of lab class as a means of orienting and training students in safe use of laboratory equipment and materials.

After the orientation, students will sign the signature form and return it to their instructor as indicative of their understanding of the rules and procedures.

Working copies of the Laboratory Safety Procedures document are available from the NJCSTM Safety Office, STEM 118, x77227

STEM Basic Laboratory Safety Procedures

General Lab Safety:

PROTECT YOUR HEALTH: Never eat, drink, smoke, chew gum, apply lip balm, or put anything in or on your eyes, nose, or mouth while in a laboratory. *This includes water bottles and coffee/tea; keep them out of the labs.* Chemicals and biologicals in a lab are not to be ingested in any way, nor should glassware or any other lab materials be used for food or drink.

CONTAIN YOURSELF. Tie back long hair, avoid wearing dangly sleeves, earrings, pendants, bracelets, or anything else that will interfere with your work or become contaminated or electrified. Do not engage in horseplay or roughhousing in any laboratory at any time. Put your backpack and personal items in a safe place out of the way of spills and traffic flow.

AVOID DISTRACTIONS. Laboratory work requires that you focus on what you are doing. Put away your cell phone and computer during lab unless it is serving a specific lab-related function. If you must make a call, wash up to leave the lab properly and use your phone in the lobby. Phones can become a medium for chemical or biological contamination and should be kept in a pocket or away from the workbench if being used as a timer or manual.

NO UNAUTHORIZED EXPERIMENTS. Make sure your supervisor knows what you are doing at all times; *there is no experimentation without prior discussion and authorization.*

Personal Protective Equipment (PPE) is to be used at all times when working with chemicals and biologicals, and are to be left in the lab to avoid spreading contamination.

COVER YOUR SKIN. You will be assigned a lab coat in class. ***Lab coats are to be worn at all times while you are in the lab***. In addition, clothing should cover any other exposed body parts; this includes wearing long pants and covered shoes (sandals, open mesh, and open-toed shoes are not protective) while in the lab. Remove your lab coat when you leave the lab.

PROTECT YOUR EYES. Goggles or safety glasses are to be brought to lab every day and worn whenever you are working with liquids or chemicals, or in physics when projectiles or other hazards are occurring. Contact lenses are not recommended to be used in a laboratory setting. If you decide to wear contact lenses, you should *always* wear your safety glasses in the lab. Many professors require that you wear your safety glasses during the entire time you are in the lab regardless of your activity.

PROTECT YOUR FACE: your instructor will let you know when you should also wear a face-shield or use a chemical fume hood for protection. This often occurs when working with hazards such as pouring hazardous liquids, working with heating chemicals, or other dangers. Your safety glasses should be worn with the face shield when needed.

PROTECT YOUR HANDS: WEAR GLOVES. Whenever you are working with chemicals or biologicals, it is imperative to wear protective gloves. Remove any rings, as they can tear gloves. For some chemicals, latex gloves are inadequate, as these chemicals will pass across latex and contact your skin; use nitrile or other appropriate gloves as directed. Some chemicals require two layers of gloves. If you get chemicals onto your gloves, replace them as soon as practicable. If you are working with hot materials, dry ice or liquid nitrogen, or will be retrieving materials from a freezer, wear insulated gloves for protection. REMOVE YOUR GLOVES BEFORE LEAVING THE LAB – don't spread contamination.

KNOW WHERE SAFETY EQUIPMENT CAN BE FOUND. All labs have eyewash stations, and most have emergency drench showers. Note where the nearest ones are to your lab bench. If you splash a chemical in your eyes or on your skin, *notify your instructor* and get help removing the chemical.

To use an eyewash station, hold open the affected eye(s) and flush with water for at least 10-15 minutes to remove all of the chemical; these can also be used to flush chemicals off the skin. Once you have flushed the area, seek medical attention for evaluation.

Emergency showers are for large-scale splashes or body fires that require a whole-body drenching; keep in mind that they are only for appropriate emergencies: at a 20-30 gallons per minute flow rate, the cleanup is a messy one.

Chemical Spill kits are available on each floor in the prep rooms. If you have a spill, notify your instructor immediately, and they will use the kit to contain and neutralize the spill. Even if you spill a small amount of a chemical, ask your Instructor's advice in cleaning it up: some chemicals cannot simply be wiped up and must be treated as a hazard.

Fire extinguishers are available in each lab, but are only to be used by trained personnel (your Instructor, for instance). If you notice a fire, notify your instructor immediately, and be prepared to evacuate the area should it become necessary. If the fire is large or spreading at all, evacuate the area and pull the fire alarm near the stairs or elevators for help.

Never block access to emergency equipment or emergency exits with chairs, carts, boxes, packs, or any other objects. Keep aisles and walkways free of tripping hazards and obstructions. Impeding access, even temporarily, is dangerous. Exit doors should never be blocked or locked in any way.

FIRE SAFETY: Know your exit routes! Have your personal belongings nearby at all times. In case of evacuation, use the stairs (not elevators) to exit the building. The STEM building evacuation assembly area is the grounds between STEM and Morris Avenue. *Please report there to your instructor or supervisor so we know everyone has left the building.*

ON FIRE? STOP, DROP AND ROLL! The goal is to extinguish the flames by smothering them. Running or panicking will provide the air to increase the flames. Drop to the floor and roll the flames out, get help from a colleague to smother the flames with a lab coat or other material. Do not use a fire blanket while standing up, as this creates a funnel effect and can result in facial burns. Use an emergency drench shower if the flames are out of control. If you are burned, seek medical attention.

INJURED? Seek medical attention ASAP. The student health center is an appropriate place for care of non-life-threatening injuries. After hours, go to Overlook Medical Center, 1000 Galloping Hill Road, Union. *If you or your colleague are seriously hurt, bleeding profusely, or cannot stand or walk to help, dial 911 for emergency assistance*. On campus, 911 will go to campus dispatch; on a cell phone, identify your location (Kean University, Union, NJ) so they can put you through to appropriate local emergency personnel.

USE THE BUDDY SYSTEM. Never work alone in a laboratory, especially when working with hazardous chemicals or biologicals or with heat sources such as flames. Make sure someone is nearby to help you in case of an emergency.

HANDLE CHEMICALS SAFELY:

Chemicals should be aliquoted to useable amounts to minimize waste and cross-contamination. Use caution with containers and make sure they are chemically compatible.

Chemicals MUST be properly stored. Do not store acids near bases, or organic chemicals near combustible agents. Flammable material must be stored in a Flammables Cabinet. Never store flammables in quantities greater than 500mL outside a Flammables Cabinet, and make sure they all fit into the cabinet in an upright and stable manner. Fluids should always be stored in a secondary containment system in case the original container fails.

Chemicals MUST be properly labeled for storage. If you make a solution or aliquot of a chemical, be sure to label with:

Name of chemical and its carrier/solvent. Concentration (if appropriate).
Date (mm/dd/yy)
Course number/name.
Name of person who made the chemical or is using it.
If storage is overnight or longer, the CAS* number should be included.
(*Chemical Abstract Service)

Chemicals MUST be properly disposed of. Follow your instructor's directions for where to put waste chemicals. DO NOT POUR CHEMICALS DOWN THE DRAIN AND DO NOT PUT CHEMICALS IN THE TRASH. There are few chemicals which can be handled this way; your instructor will let you know if that type of disposal is appropriate.

Never heat volatile chemicals over an open flame. Use a water bath and/or hot plate.
Never start a suction hose or pipet with your mouth.
Do not "sniff" to test chemicals or inhale chemical vapors.

Read the **Safety Data Sheets** (MSDS/SDS) on any chemical you question. Ask your lab instructor for directions and information. You can also obtain SDS information online at www.siri.org or www.hazard.com/msds *SDS contain important information about the hazards of chemicals you are working with so you can be aware of potential hazards.*

SHARP HAZARDS: sharp objects such as needles, syringes, scalpels/blades, capillary tubes, pipets, pipet tips, and broken glass must be disposed of in an appropriate Sharps Container, which is labeled specifically for the safe disposal of such hazards. *Do not simply toss these in the trash, as maintenance personnel can be injured.* Broken glassware should be picked up with a broom and dustbin or forceps, NOT with the hands, to avoid lacerations.

GET PROPERLY TRAINED ON EQUIPMENT: Many labs use specialized equipment which requires training to use properly. Be sure to be on time for class to receive instructions on equipment use. DO NOT USE ANY EQUIPMENT UNTIL YOU HAVE BEEN PROPERLY TRAINED – it can be dangerous and costly if something goes wrong. ASK if you have *any* questions or concerns or feel uncomfortable using lab equipment.

KEEP YOUR WORK STATION TIDY: this keeps your work area cleaner and safer, since you can more readily control possible spills, contamination, and other hazards. Dispose of debris in the proper containers and remove materials you are finished with as you work.

CLEAN UP AFTER YOURSELF. You wouldn't want to come to a lab bench covered in unknown chemicals and biologicals, so don't do it to someone else. Put away all equipment, close what is open, wipe down your work station or change the cover as needed, and *properly dispose of wastes*. See the waste chart to help you determine how particular items should be disposed of, or ask for guidance. Help clean up the common areas, as well. Thank you.

WASH YOUR HANDS. Wash them coming into the lab to keep the lab clean of contaminants, and wash them again after taking off gloves to keep contaminants from leaving the lab. While hand sterilizing agents have their place, the lab isn't one of them; washing hands removes materials you don't want to have accompany you elsewhere. Use warm running water and soap, and be sure to clean all hand surfaces thoroughly.

ELECTRICAL HAZARDS. Do not handle electrical devices or plugs with wet hands or while standing in water. Do not use any device which has frayed cords or exposed wiring. Notify your instructor if any of the equipment seems faulty. Do not use cell phone chargers in lab outlets.

REPRODUCTIVE HAZARDS: Reproductive hazards are substances or agents that may affect the reproductive health of women or men or the ability of couples to have healthy children. Efforts have been made to eliminate the use of known reproductive hazards in our labs. However, the vast majority of laboratory chemicals have never been tested by the manufacturer or by any governmental agency. As a result, their effect on a developing fetus is unknown; students must assume that each chemical used in this lab presents a hazard to an unborn child.

If you are pregnant, become pregnant or are planning to become pregnant during the semester, you are strongly encouraged to speak privately with your instructor, who will be able to provide written health and safety information about each chemical that will be used in the class (MSDS). You are asked to review and discuss this information with your healthcare provider.

After you have reviewed the information, you can choose to:
1. Continue your enrollment in the lab - You will be asked to sign a waiver and will be expected to follow a strict set of health and safety procedures while in the lab.
2. Withdraw from the lab - Your instructor will assist you in creating a plan to complete the course at a later date.

USE OF SPECIAL EQUIPMENT & MATERIALS

CHEMICAL (FUME) HOODS: Use chemical hoods whenever a volatile or hazardous chemical is involved. Keep the hood front sash at a level which allows work but minimizes exposure to splashes, spills, and possible explosions; the red marker should be highest level for the sash during under-hood work. Do not use lightweight materials such as paper or paper toweling in a hood where it can get sucked into the airstream. Keep your head and upper body out of the hood when using chemicals. Keep materials in the hood at least 6 inches from the front panel to ensure vapors do not enter the classroom. Do not store large quantities of materials under fume hoods, especially hoods where work is being performed. Do not block airflow - keep materials at least 6 inches from back of hood. Promptly wipe up any spills. Close the hood to storage level when done.

BIOLOGICAL SAFETY CABINETS: Use Biological Safety Cabinets for reducing contamination of biological materials and for containing biological materials within an area. BSCs allow easier chemical decontamination of surfaces and many use disinfecting UV lights when not in use to further reduce contamination. Do not use while UV lights are on. Keep your upper body and head out of the cabinet while in use. Use appropriate PPE (lab coat & gloves, at minimum). Make sure the BSC you use has passed inspection.

CENTRIFUGES: Centrifuges spin at a high rate of speed and, if not balanced, can cause a catastrophic failure, damaging equipment and harming individuals. You **must** be properly trained to use one. Do not run without a balanced load and work away from the machine while it is in motion. Be sure to wipe up any spills immediately, to avoid spread, solidification and/or corrosion of the machine/containers. Any corrosive, hazardous, or biological materials should only be centrifuged when appropriate secondary containment systems are in place.

LAB SAFETY AGREEMENT

I have read and understand the basic Laboratory Safety Procedures outlined above, have received a safety briefing, and will read the appropriate sections of the NJCSTM Laboratory Safety Manual in order to better understand the general safety procedures and fire safety practices here in the STEM building at Kean University.

I understand that any research I do in NJCSTM is subject to rules contained within the NJCSTM Laboratory Safety Manual as well as within the lab in which I work. I understand that there are to be NO UNAUTHORIZED EXPERIMENTS in any lab at any time, and that the supervising professor or staff member must be fully aware of any experiment I am doing and has approved of all my procedures.

I will contact the NJCSTM Safety Officer, Nan Perigo, in case of any questions regarding procedures or other concerns. (nperigo@kean.edu, 908-737-7227, or visit room 118)

I agree to abide by the STEM safety procedures, outlined above and in this Safety Packet, to keep myself and my colleagues safe in the laboratories in which I work.

Print Name *Signature*

Date *Course, Name of Lab Supervisor/Instructor*

This form is to be completed and signed, then given to the STEM Safety Officer to be put on file in the STEM Safety Office. The information packet attached should be retained for reference.