LOS MEDANOS COLLEGE

PHYSICAL SCIENCES DEPARTMENT

CHEMICAL HYGIENE PLAN

JANUARY 2021 FINAL

Preface

This Chemical Hygiene Plan (CHP) serves the Los Medanos College (LMC) Physical Sciences Department as a working document of existing practices and policies for safe use of chemical substances in and outside of the instructional laboratory classrooms. This CHP is intended to comply with the Occupational Health and Safety Administration (OSHA) requirement specified in 29 CFR 1910.1450. This CHP is a living document and should be reviewed and updated periodically or when warranted by a change in conditions or regulations. This CHP serves as a communication vehicle for internal and external audits and inspections, the LMC Department of Public Safety, insurers, and accrediting authorities.

This CHP is a revision and update to the document titled, "LOS MEDANOS COLLEGE PHYSICAL SCIENCES DEPARTMENT CHEMICAL HYGIENE PLAN FALL 2017". This CHP derives from several sources, including but not limited to Federal and State regulations; recommendations from the American Chemical Society and the National Research Council; and policies and recommendations from other educational campuses. The present and future effectiveness of this CHP depends on the awareness of and commitment to follow the policies and best practices described in this CHP.

General principles of safe chemical use are discussed. Institutional and departmental responsibilities and LMC campus facility information are described. A description of the CHP requirement and implementation as per 29 CFR 1910.1450 is presented. Selected best-practices in the California regulations are included. Finally, appendices are included as background for pertinent regulatory and safety topics.

The authors wish to acknowledge Mitch Schweickert (ret.) who prepared and contributed to the foundation documents upon which this document is built.

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A. Purpose and Scope of this Chemical Hygiene Plan

It is the Contra Costa Community College District (CCCCD)'s policy to provide its employees with a safe place and safe conditions in which to work (Board Policy 2023, Rev. 07/21/99). In support of this policy, the procedures and work practices described in this Chemical Hygiene Plan (CHP) ensure that operations with chemicals are performed as safely as possible. Many materials require appropriate precautions for safe use and storage. Safe chemical use largely depends on communication and education among all laboratory workers and a mindset for working safely. One-time, initial safety instruction for faculty, students and staff is not enough to support the policy. Ongoing reviews of safety procedures, periodic safety inspections of work areas, good laboratory housekeeping practices, and constant alertness are integral components of safe work practices. Common definitions used throughout this plan are included as Appendix A.

All faculty and staff who use chemicals in a laboratory setting must be familiar with this CHP. This document describes procedures intended to protect employees who use chemical substances at the laboratory scale from adverse exposure and subsequent health effects. This document applies to all CCCCD personnel working with chemicals in the classroom laboratories at Los Medanos College, whether in paid or unpaid status (including full-time and part-time employees, student assistants, student workers, and volunteers). Los Medanos College (LMC) students enrolled in classes are not required to be familiar with this CHP because they are directly supervised within the classroom by an instructor. However, all LMC students are encouraged to be familiar with this CHP and may receive a copy upon request. Visitors and guests must be accompanied by LMC personnel if chemicals are being used to ensure compliance with this CHP (e.g., for demonstrations or tours).

This CHP is intended to comply with Federal requirements specified in the Code of Federal Regulations (CFR) §1910.1450; and implements non-mandatory recommendations found in Appendix A of CFR §1910.1450 "National Research Council Recommendations Concerning Chemical Hygiene in Laboratories". This CHP should comply with Title 8, California Code of Regulations (CCR), Section 5191 California Division of Occupational Safety and Health, Department of Industrial Relations (CAL/OSHA). If a procedure or direction is discovered to be inconsistent with Federal or State regulations, this CHP will be amended or revised as appropriate. Complete references are available via online retrieval.

According to 29 CFR 1910.1450, laboratory use of hazardous chemicals means handling or use of such chemicals in which all the following conditions are met:

(i) Chemical manipulations are carried out on a "laboratory scale;"

(ii) Multiple chemical procedures or chemicals are used;

(iii) The procedures involved are not part of a production process, nor in any way simulate a production process; and

(iv) "Protective laboratory practices and equipment" are available and in common use to minimize the potential for employee exposure to hazardous chemicals.

Hazardous chemicals may be used in a manner that does not meet the definition of laboratory use. In such cases, the employer shall comply with the relevant standard in 29 CFR part 1910, subpart Z, even if such use occurs in a laboratory. Currently, the LMC Physical Sciences Department does not use chemicals in anything other than laboratory use.

This CHP primarily focuses on operations for the LMC Physical Sciences Department Chemistry and Biology operations in the Science buildings on the Pittsburg and Brentwood Campuses. The engineering and physics sections have limited use of chemicals in their programs and should comply with these procedures. Other Departments at LMC may amend this plan for their use.

B. Individual Responsibilities [CFR §1910.1450 Appendix A and California Title 8 §5191 (E)(3)(G)]

The overall responsibility for health and safety rests with the CCCCD Chancellor and the LMC President and is delegated to the Divisional Dean and the Physical Sciences Department Faculty. The immediate responsibility for laboratory health and safety belongs to each employee working with chemicals. All employees are responsible for knowing how to handle the chemicals that they work with in a safe manner. Anyone unsure of the hazard, or proper procedure, should seek qualified assistance prior to proceeding with the operation.

Daily implementation of the CHP is done by faculty and laboratory supervisors.

Chemical Hygiene Officer

The Chemical Hygiene Officer (CHO) is a designated employee of LMC who is responsible for reviewing, updating and implementing the CHP. The CHO is the Dean of Mathematics and Science at LMC.

LMC Administration and CCCCD Chancellor's Office

Everyone at the institutional level must recognize the safe use of chemical substances and laboratory apparatus requires comprehensive commitment that includes administrators, faculty, staff, and students. Resources may be requested from the administration to ensure that the requirements of the plan are met.

Such responsibilities include but may not be limited to:

Providing active support on issues of hazard identification and evaluation.

Assisting with procedures for correcting unsafe conditions.

Maintaining centralized environmental monitoring records, allowing employee access as required.

Serving as the principal point of contact with regulatory agencies on matters of chemical hygiene at LMC.

If needed, arrange for general safety inspections and safety equipment testing and repair.

Chemistry Program Faculty

The LMC Chemistry Program faculty works with colleagues to ensure that affected employees are trained on the provisions of the CHP and comply with its requirements. Responsibilities include:

Identifying all laboratories and chemical handling areas in the department.

Assisting with compliance with the CHP by collaborating with the Lab Coordinator/ Supervisor for each laboratory/chemical handling area as appropriate.

Assuring that training matrices/tracks appropriately reflect employee training needs.

Ensuring enrolled students receive and review the laboratory safety rules.

Ensuring enrolled students complete laboratory safety training (currently the American Chemical Society Safety Videos and Safety Quiz) prior to preforming experiments in the classroom laboratory areas.

Providing appropriate supervision and instruction to enrolled students working the classroom laboratory.

Laboratory Coordinators and Supervisors

Laboratory coordinators and supervisors are staff or faculty who supervise others on how to use and handle chemical substances. Laboratory coordinators and supervisors take measures that protect the health and safety of the workers under their supervision.

Areas of responsibility include but are not limited to:

Ensuring that protective equipment is available, working and used as appropriate.

Ensuring that periodic (typically monthly) testing of such items as eyewashes, emergency showers, and emergency lighting is completed (this task is presently done by the LMC Buildings and Grounds Department). Fume hoods are continuously monitored and alarmed to ensure minimum ventilation standards are maintained.

Ensuring that employees have been trained and understand the content of the CHP at the time of initial hire.

Provide training of employees whenever a significant new hazard is introduced as appropriate.

Identifying materials considered particularly hazardous and communicating warnings to personnel as appropriate.

The Science Laboratory Coordinator should conduct complete inspections, at least once per semester of the teaching laboratory rooms, stockroom/sample preparation room and waste storage area.

The Science Laboratory Coordinator must maintain chemical inventories and ensure SDSs are available for all chemicals used or stored in the laboratory space. A full inventory is done annually.

SDSs are to be maintained in a location (currently room SC-237) readily accessible to all users of the chemistry facilities, including both staff and students. Alternatively, current SDSs are available and may be obtained online.

Review SDSs as needed to assure an understanding of the chemical hazards and protective measures of the chemicals in the laboratory.

Correcting improper work practices and conditions that may result in an exposure to chemicals.

Laboratory Workers

Laboratory workers include all personnel who work with chemical substances on a laboratory scale. Laboratory workers can include regular college faculty, staff, and student assistants. No worker is to do any potentially hazardous operation unless a second competent person is also present in the facility. Student workers are not to work with chemicals or apparatus in the absence of a qualified faculty or staff supervisor.

Laboratory workers are further required to:

Understand and act in accordance with the CHP and any laboratory-specific standard operating procedures.

Participate in training programs as appropriate.

Practice good personal chemical hygiene.

Report all accidents and incidents to the supervisor on a timely basis.

Review SDSs as needed to ensure an understanding of the chemical hazards in the laboratory.

Enrolled Students

Students in instructional laboratories are required to follow the laboratory safety rules that are distributed and explained in the first laboratory meeting of each course. Students must follow any additional safety procedures and warnings will be distributed by the instructor if appropriate.

These safety rules specify work practices including but not limited to:

Wear adequate eye protection.

Do not eat or drink in lab.

Do not generally work alone or unsupervised in lab.

Dispose of waste in appropriate containers.

Do not engage in horseplay.

Students are required to follow the instructions of the faculty and/or of the Science Laboratory Coordinator.

For individual course laboratory experiments, pre-lab lectures include discussion of possible hazards and how to minimize them. Students in introductory courses (e.g. Chemistry 06 or 07) require closer supervision than those in the advanced courses (e.g. Chemistry 28 or 29). Instructors must recognize that students may have incomplete knowledge of possible hazards. Instructors must therefore provide appropriate supervision.

Students who repeatedly fail to follow required safety rules and guidelines and put themselves or their classmates at risk will be asked to leave. They will be reported to the Office of the Dean of Student Success for a Student Conduct review.

If a student believes that they have a need for reasonable accommodation due to potential chemical exposure, they should contact the LMC Disabled Students Programs & Services (DSPS). DSPS will work collaboratively with the instructor and student to implement the accommodation or negotiate implementation of an equally effective alternative. Note that no alternative may be possible.

C. General Work Practices

The objective for all general work practices may be summarized as the following:

Minimize direct exposure (either direct contact or inhalation) between the worker and the chemical substance.

Basic Rules

Know and have access to the location of the nearest landline telephone, for use in case of emergency. For emergencies, the LMC Department of Public Safety can be reached by dialing 3-7333 from a landline on campus.

Know how to activate the LMC Department of Public Safety using the emergency notification button.

Know how to access and interpret SDSs for all chemical substances.

Be aware of chemical hazards as determined from the SDS, labels and other appropriate references.

Know the location and proper use of emergency equipment (e.g., fire extinguishers, emergency eyewash stations and emergency showers).

Understand appropriate procedures for emergencies, including evacuation routes, and spill cleanup procedures.

Wear appropriate personal protective equipment (PPE), including but not necessarily limited to safety glasses or goggles.

Use proper personal hygiene practices including washing hands after handling chemicals and before leaving the laboratory. NOTE: The use of gloves does not preclude the need to wash hands.

If chemicals have been spilled in the eyes or on the body, flush in the eyewash/safety shower for at least fifteen (15) minutes. Be prepared to help others to get to the eyewash or shower safely if needed. Seek medical attention as appropriate.

Be alert to unsafe conditions and if identified, correct or report the condition.

If working with flammable chemicals, be certain there are no sources of ignition nearby in the event of a vapor release or liquid spill.

Know where to properly store chemicals when not in use.

Consider using a less-hazardous chemical in the process when there is a practical choice.

Do not bring food, beverages, or tobacco in chemical use or storage areas.

Do not apply cosmetics where chemical contamination is possible.

Do not use glassware which is damaged and unsafe.

Never use mouth suction to pipet anything. Use pipet bulbs.

Working alone may be unsafe and is generally discouraged.

Work of a clearly hazardous nature (e.g., tasks involving high energy, toxic, flammable, cryogenic, or high-pressure materials) must not be conducted alone.

Any work of an acutely hazardous nature must be scheduled during hours when another worker capable of helping in an emergency is present (within earshot) an aware of the hazardous nature.

Do not leave potentially hazardous processes unattended.

Standard Operating Procedures, Work Instructions and Laboratory Experiment Procedures

Specific Standard Operating Procedures (SOPs) or work instructions (WIs) are available for routine operations within the chemistry stockroom. Laboratory experiment procedures are provided within the educational context.

SOPs are written, documented procedures with enough detail for a worker with a general knowledge of chemical manipulations to safely prepare the reagent or perform the procedure. Examples include but are not limited to reagent preparation, labeling of materials, glassware cleaning procedures, disposing of hazardous waste, deionized water system monitoring, and calibrating balances and pH meters. SOPs are intended for new employees who are unfamiliar with a procedure, or for procedures that are done infrequently. SOPs are created and revised as needed.

WIs are abbreviated procedures with minimal detail enough for quick reference to accomplish the task. These procedures are typically preparation recipes for chemical reagents used in the classroom laboratory experiments. WIs are created and revised as needed.

Laboratory experiment procedures are either included in the laboratory manual or distributed within the class as part of the instruction from the faculty.

If a procedure uses a chemical that requires special handling or special precautions that are different from the normal work practices outlined above, the procedure shall contain a written warning and direction for such use. This requirement applies to SOPs, WIs and laboratory experiment procedures.

If a material has a listed permissible exposure limit (PEL), then monitoring may be required to ensure that exposure above the PEL is not met. For hazardous substances when no PEL has been established, general guidance is to minimize exposure as much as possible.

D. Personal Protective Equipment, Apparel and Engineering Controls

Personal Protective Equipment

Appropriate personal protective equipment (PPE) should be worn for the operation being performed. When any chemical manipulation is being done, minimum PPE should include eye protection, closed-toed shoes, and long pants. This is enough PPE for most students within the teaching laboratories.

Eye protection appropriate to the operation is required for all lab work and when working in areas where other persons are using chemicals or chemical apparatus. With some procedures, gloves may also be required. Students are asked to obtain appropriate safety glasses or goggles for their own personal use, either at the campus store or at a supplier such as a hardware store or a welding supply store. A stock of safety glasses is available for loan in Room SC-234 and SC-235. Disinfecting spray is available for loaner eye ware and should be used. Disposable gloves of various sizes and materials are also kept in stock for routine use.

Disposable nitrile gloves are available in the stockroom and are provided if necessary, for chemical manipulations. Appropriate to the specific procedure being done in the teaching laboratory, disposable nitrile gloves will be provided upon request.

Reusable latex rubber gloves are also available for stockroom personnel and are provided for non-chemical operations such as glassware cleaning.

Apparel

Loose-fitting clothing, shorts and open-toed shoes are not allowed in the laboratory. If a person is not appropriately attired for the intended activity, he/she will be asked to leave. For students, generally no credit will be provided for that day's class. The instructor has the final decision for students within their classroom. For employees (such as student workers), the supervisor has the final decision on whether the employees may continue that day.

A laboratory coat or smock is recommended for all personnel. Disposable laboratory coats are provided as needed for operations within the chemistry stockroom.

The LMC Bookstore has protective eyewear available for purchase. Several local businesses have protective eyewear available. LMC student clubs may sell protective eyewear and hair ties for nominal profit for fundraising.

Engineering Controls

Gas, air, water, and vacuum services are available on most laboratory benches and in the fume hoods. Several fume hoods are dedicated for hazardous waste collection. Fire extinguishers are available in classrooms and in hallways. Manual fire alarm activators are located in all corridors outside of the classrooms.

The Biology Department is on the ground floor of the science building. The Physical Sciences Department is on the second floor of the science building. The Brentwood Center has a dedicated wing for science classes. These rooms have fixed safety equipment:

Room #	Room Description	Number of hoods	Number of eyewashes/showers
SC-125	Pre-Health Preparatory Lab	0	1
SC-126	Biology Lab for Non-Majors	1	1
SC-127	Microbiology and Physiology Lab	1	1
SC-128	Preparatory lab room for majors/nonmajors	1	1
SC-130	Biology laboratory classroom	1	1
SC-133	Anatomy lab	0	1
SC-139	Anteroom	0	1 (portable)
SC-234	General Chemistry Laboratory	5	1
SC-235	Organic Chemistry Laboratory	17	1
SC-233	Instrument Room	0	1
SC-237	Chemistry stockroom	2	1
BRT-209	Chemistry Lab	17	1
BRT-213	Physical Science Prep room/stock room	1	1
BRT-217	Physics Lab	0	0
BRT-218	Health Sciences Lab	1	1
BRT-219	Dissection room	0	1
BRT-220	Biology prep room	0	1
BRT-225	Biology Lab	1	1

Updated floor plans and evacuation routes from the science building are available from the LMC website. They are included in Appendix B for convenience. Updated floor plans for the Brentwood center will be posted throughout the Brentwood center when available.

Air flow in fume hoods is integrated with the main air handling system in both science buildings. Safety showers and eyewash stations are checked monthly for operation. Access to the safety showers and eyewash stations must always be left clear. The window for the chemistry stockroom, SC237 is a roll-up type. It is connected to the fire alarm system and automatically closes in the event of an alarm activation. Integrated fire and smoke sensors for the building are in all rooms and the main corridor. Room SC237 is the chemical storeroom and preparation area.

Room SC237 has 2 corrosive storage cabinets, 5 flammable storage cabinets, and 2 flammable/explosion rated refrigerators. Many fume hoods have additional flammable and corrosive designated storage cabinets under them.

Room SC141 is the waste storage area. It is used exclusively to store chemical waste for disposal. It is accessed via a dedicated freight elevator that runs between SC237 and the ground floor.

Maintenance of engineering controls for is handled as necessary by the LMC Buildings and Grounds Department.

E. Laboratory Equipment

Laboratory equipment includes but is not limited to: balances, centrifuges, pH meters, UV-Vis spectrometers (Spec 20's, Spec 200's), ovens, standard equipment in lockers, organic chemistry glassware kits, a gas chromatograph/mass spectrometer, a nuclear magnetic resonance spectrometer, and an infrared spectrometer.

Safety procedures for all equipment is beyond the scope of this CHP. Manufacturer safety instructions shall be followed for all equipment that is in service. Note that some equipment uses services with specific hazards (e.g., electrical supplies, compressed gas cylinders etc.).

F. Portable Safety Equipment

Portable safety equipment includes first aid kits in rooms SC234, SC235 and SC237. Fire blankets are in rooms SC234 and SC235 (the teaching labs). Portable fire extinguishers are in Rooms SC-234 (2 extinguishers); SC-235 (4 extinguishers); SC-237 (1 extinguisher), and SC-141 (1 extinguisher). Two additional fire extinguishers in recessed wall cabinets are in the corridor outside room SC237. Additional portable fire extinguishers are located throughout the buildings. Extinguishers are inspected monthly by the LMC Buildings and Ground Department and marked on an inspection tag. Extinguishers are serviced annually, or as needed by outside contractors.

Fire extinguishers in Rooms SC234, SC235, SC237 and SC-241 are also inspected by the Science Laboratory Coordinator prior to the beginning of Fall, Spring and Summer sessions. These rooms have the highest likelihood of classroom experiments with fire potential. Inspection records shall be maintained for the duration of the semester.

G. Chemical Management

Procurement and Inventory

Chemical procurement is coordinated with the Science Laboratory Coordinator, who is usually the person who places orders. Received items are stored and added to the chemical inventory. Chemicals are shelved in the chemistry stockroom, corrosive storage cabinets, flammable storage cabinets or the flammable storage refrigerator, as appropriate. Quantities of materials for teaching laboratory instruction are minimized by using smaller bottles and containers to transfer sufficient and minimal amounts of materials to the teaching laboratory. When not in use, these smaller containers are co-located with the larger containers in the appropriate storage area.

A full update to the quantities and identities of the chemical storage inventory is done approximately once a year. The most up-to-date copy of the inventory is maintained by the Science Laboratory Coordinator. A hardcopy of the most recent annual update is also stored next to the stockroom window.

Chemical Storage

Storage areas are marked with appropriate signs. The door to the chemistry stockroom is marked as having chemicals within. The door to the hazardous waste room is marked as containing hazardous waste.

Internal to the stockroom, flammable storage cabinets, corrosive storage cabinets and explosion proof refrigerators are marked for storage of appropriate chemicals.

General Principles

Segregate incompatible chemicals.
Corrosive, flammable and toxic liquids should be stored and used below eye level.
Properly dispose of unneeded or outdated chemicals.
Maintain minimal quantities of chemicals.
Do not exceed the capacity of refrigerators or storage cabinets recommended by the manufacturer.

Flammable Liquids

Flammable liquid storage cabinets are identified and labeled.
Flammable liquid cabinets should be used if more than 5 gallons of flammable liquids are stored in the laboratory.
Chemicals with a flash point less than 140 ˚F should be stored in a flammable liquid storage cabinet or designated flammable storage location.
Flammable liquid storage cabinets must be placed away from sources of ignition.
Compatible materials may be stored inside a particular cabinet.
Paper or other combustible solid material should not be stored in a flammable liquid storage cabinet.

Corrosive Materials (acids and bases) and Oxidizers

Concentrated acid storage should be separated from concentrated base storage.
Concentrated nitric acid should not be stored near other easily oxidized materials.

Solid oxidizers are stored on a separate shelf in the stockroom.
Concentrated (30%) hydrogen peroxide is stored on a separate shelf from other materials.
Concentrated hydrogen peroxide may be stored under refrigeration away from incompatible materials.

Labeling

Chemicals shall be stored in their original container from the manufacturer with the original label. If chemicals are placed in smaller containers for dispensing to classrooms, the labels on the smaller containers must accurately convey the same information as on the original label. Chemicals should be dated when received and when opened.

When solutions are prepared in the stockroom for classroom use, the following is the minimum to be included on the label:

Concentration (if appropriate)
Chemical formula
Name (in English)
Global Harmonized System (GHS) hazard symbols that accurately reflect the hazard of the contents
Class and Experiment

The GHS hazard symbol of a manufactured chemical may not accurately reflect the hazard of a diluted solution. Additional references may need to be consulted to determine the most appropriate GHS symbols for the material. If GHS hazard symbols are not required, a label stating 'No GHS Label required' should be included.

A full SOP for labeling is included as "DCN-2019-006 Labeling of Chemical Reagents in the Stockroom and Teaching Experiments" as Appendix C.

H. Housekeeping

Good housekeeping is necessary to avoid inadvertent creation of hazardous situations.

Access to emergency equipment, showers, eyewashes, aisles and exits shall never be blocked by anything.
Keep all work areas, especially laboratory benches, clean and free of clutter.
Chemical containers must be labeled with the identity of the contents and any known hazards of the material.
All hazardous chemicals shall be closed and stored properly when not in use.
Wastes shall be properly labeled, and containers should be closed and kept in the appropriate storage location.
Clean up spilled chemicals promptly. Contact with dried residue of some chemicals can cause irritation or burns to the skin.

The laboratory floors are cleaned regularly by the College custodial staff, who are also responsible for emptying wastepaper baskets. LMC faculty, staff and students are responsible for keeping their work areas (counters, hoods, etc.) clean and tidy. LMC personnel monitor the condition of the labs and support areas on a day-to-day basis. Paper and Tyvek have been placed underneath balances in room SC233 and SC236 to facilitate easier cleanup of spills and are changed as needed.

Dedicated broken-glass waste containers are available in Rooms SC234, SC235 and SC237. Dispose of all broken glass in these containers. Do not dispose of regular waste or hazardous waste in these containers. Notify the Science Laboratory Coordinator when the broken glass container is approximately 1/2 full for a replacement (the broken glass containers are too heavy for the custodial staff if they are completely full).

Eyewash fountains, safety showers, and emergency lights are checked approximately monthly by the LMC Building and Grounds department. Dates of inspection are noted on tags attached to the appropriate equipment. Annual inspections of fire extinguishers are arranged for by LMC Buildings and Grounds staff. Any problems or issues with the operation of fume hoods, ventilation, plumbing etc. are reported promptly to LMC Buildings and Grounds staff for checking by either phone or the online work order system.

Doorways, corridors, and hallways are always kept free of obstructions, except for necessary maintenance and repair at times when students are not present. Access to exits, emergency equipment (e.g. fire extinguishers) and utility controls (e.g. gas shutoff, electrical panels, etc.) are also to be kept clear. Fire regulations dictate that laboratory doors are not to be propped open.

I. Emergency Procedures for Accidents and Spills

Emergency Procedures

Emergency procedures should be followed if a condition exists that poses an immediate threat to life or a risk of great injury. Many events may require emergency response procedures. These can include but are not limited to chemical spills, accidents involving injuries, fire alarms, earthquakes and power outages that cause safety equipment to be non-operational (e.g., fume hoods).

Faculty and staff who are present are expected to take charge as appropriate to resolve the condition. After any significant event, faculty and staff should assist with the incident report prepared by campus police if needed. Refer to the Contra Costa Community College District Emergency Operations plan for additional guidance. The current plan is located here:

http://www.4cd.edu/hr/risk/eg/Emergency%20Operations%20Plan.pdf

In case of a medical emergency, contact campus police (extension 3-7333, 9-911 from any campus phone, or the emergency call button) and describe the incident. **From cell phones, use the direct number of 925-473-7333**. Campus police will arrange for additional resources to respond as appropriate. Follow the directions of the campus police.

In case of a non-emergency injury, notification procedures should be followed in accordance with the most current revision of stockroom procedure "DCN-2021-003, Accident Reporting", included as Appendix D.

Chemical spill cleanup procedures

Unreactive solids may be cleaned up with a dustpan and brush, and the material then placed in appropriate waste containers.

Minor drips of organic liquids may be cleaned up with wipes. The wipes can either be air-dried in the back of a ventilated fume hood or captured and double-bagged as hazardous waste. Large spills of

organic materials should be treated with spill-absorbent solid, then swept up and placed in a waste container for appropriate disposal.

Minor drips of acid spills may be treated with baking soda (sodium bicarbonate), wiped up with towels and placed in the solid waste containers in each laboratory. Baking soda is available from the stockroom main hood in room SC-237. Large spills of acids and bases may be treated with absorbent solid material, collected and placed in an appropriate solid waste container. Absorbent solid material for spill cleanup is located under the main hood in SC-237. Contact the Science Laboratory Coordinator for proper disposal. Minor spills do not generally require formal documentation if they are addressed quickly.

If a major spill occurs (generally, a major spill would require a building evacuation), police services should be notified, and documentation of the spill should be done through their office. Note: the LMC Physical Sciences department does not have the equipment or training to respond to a major spill, generally this would require respiratory protection. The Fire Department or the County Hazardous Materials Response Team have major spill response capabilities.

It is not possible to define the difference between a major spill and a minor spill. This threshold depends on the hazard of the material that has been spilt, and the size of the spill. For example, a spill of a gallon of concentrated aqueous ammonia may require room or building evacuation due to the respiratory hazard the material presents. A similar spill of very dilute acid may require only a little sodium bicarbonate to neutralize it and a mop. The instructor and Science Laboratory Coordinator should be consulted to determine the necessary response to a spill.

In case of power outage, evacuation may or may not be necessary. However, due to the potential interruption of engineering controls within the building, laboratory operations should be shut down safely meaning that electrical apparatus and gas lines should be shut off.

If a building evacuation is necessary, laboratory operations should be shut down safely. Electrical apparatus and gas lines should be shut off. Faculty and staff should direct all students to leave the building and assemble at the appropriate gather location. Gather locations are identified on the evacuation map in each classroom and laboratory on the wall near one of the exit doors. Gather locations are also identified in the LMC website at the following link:

https://www.losmedanos.edu/safety/comresources.aspx

Broken glass should not be picked up with unprotected fingers, to avoid cuts and embedding of fragments in the skin. Broken glassware should be cleaned up carefully using a dustpan and brush. A limited number of leather/canvas gloves are also available in the stockroom and can be loaned upon request. Broken glass should not be disposed of in the regular trash containers to avoid injury to the custodial staff. Dispose of broken glass in the dedicated broken glass waste containers located in each laboratory and stockroom. Notify the Science Laboratory Coordinator when the broken glass container is approximately 1/2 full for a replacement (the broken glass containers are too heavy for the custodial staff if they are completely full).

J. Chemical Waste

Four identified waste streams have been established for LMC:

Aqueous/Inorganic Waste

This waste stream is made of aqueous liquids from teaching experiments, and it is primarily water (> 90%). It may be acidic, neutral or basic; the local discharge standards prohibit introduction of wastewater less than pH 6.0 or greater than pH 10.0. Various soluble metals in this stream include but are not limited to silver (Ag), lead (Pb), chromium (Cr), barium (Ba), copper (Cu). The material may be classified as an oxidizing liquid. Some solid material may also form at the bottom of the container as some waste streams interact. This waste stream is collected in 5-gallon DOT plastic carboy containers and is labeled "Inorganic Waste".

Non-aqueous/Organic Waste

This waste stream is made of non-aqueous liquids. It may include non-halogenated organic liquids such as hexane, cyclohexane, alcohol and halogenated organic liquids such as dichloromethane. As waste is added to the container, some aqueous solutions may collect and separate so there may be two phases of liquids present. This waste stream is collected in 5-gallon DOT plastic carboy containers and is labeled "Organic Waste".

Hazardous Solid Waste

This waste stream is primarily made of filter papers with solids, wipes used for spill cleanup, absorbent materials used for spill cleanups, and any other non-liquid hazardous materials. This waste stream is collected in plastic, double-bagged and labeled as hazardous waste.

Other Specific Waste

Certain waste from specific experiments may be collected and isolated separately from the general waste streams already described. Examples include: Mercury thermometers that are being phased out and have been collected as a separate waste stream. Expired or obsolete sampling kits that have small amounts of reagents. Other specific waste is generally not expected to be generated on a continuous basis. This waste stream is collected in small containers/boxes/bags as appropriate, identified and collected for subsequent disposal.

Laboratory waste disposal is arranged periodically through Buildings and Grounds. The Science Laboratory Coordinator manages the collection of waste from instructional laboratories. Room SC-141 of the Science building is dedicated for waste storage. A waste disposal contractor collects, characterizes and subsequently disposes of the hazardous waste. The waste disposal contractor is funded through the Contra Costa Community College District procurement process. Contact the Science Laboratory Coordinator or the Building and Grounds Manager if a waste pickup needs to be scheduled.

Waste is collected in designated hood in rooms SC-234, SC-235 and SC-237. Los Medanos College Waste Stream Signs used to designate hoods are included as Appendix H.

K. Training

All faculty, staff and students are informed about laboratory safety procedures from the first day of employment or of laboratory instruction. An orientation for all workers including but not limited to staff, faculty and student stockroom workers should be provided. The following topics should be included in the orientation:

Global Harmonized System (GHS) labeling
Personal Protective Equipment (PPE)
Safety equipment
Hazardous Waste Disposal
Accident Reporting Procedures
Identification of symptoms of exposure
Evacuation procedures
Shelter in place procedures for external hazardous material incidents

PowerPoint slides for the 2020 version of the safety training presentation for student stockroom workers is included as Appendix E. This presentation is annually updated or if major changes occur. The Science Laboratory Coordinator and the Department Chair have the most current version of this presentation.

The instructional laboratory safety rules are provided to each student on the first day of class and to student stockroom workers before working within the stockroom. It is included as Appendix F for the Physical Sciences Department, and Appendix G for the Biological Sciences Department. Specific safety information is included for each experiment for instructional laboratory exercises.

A database of Safety Data Sheets (SDSs) has been established by the District and is accessible through any open internet connection. If an employee needs or wants to refer to a SDS for a material, one will be made available if request. Many other laboratory safety references are available at LMC, both online and in print. Use of additional references is encouraged.

For employees, training shall be documented on a roster. An example roster is included as Appendix I. Rosters will be retained for the duration of employment plus one year. Training concludes with an orientation and checklist which is includes as Appendix K. Migration to paperless documentation is planned and will meet the documentation requirement.

For students, training shall be documented by signing the safety agreement on the first day of class. Safety agreements and emergency contact information shall be retained for one year following the completion of the class.

L. Safety Rules and Regulations

The LMC Laboratory operations fall under the following regulations:

Federal

Chemical Hygiene Standard, 29 CFR 1910.1450, Occupational Safety and Health Administration (OSHA)

Hazardous Communication Standard, 29 CFR 1910.1200, Occupational Safety and Health Administration. Note: The Chemical Hygiene Standard has precedence over the Hazardous Communication standard where applicable (per interpretation letter dated May 28, 1999 to Baker Hughes, et. al. from OSHA.

Resource Conservation and Recovery Act (RCRA), 40 CFR 260-273, Environmental Protection Agency

State of California

Occupational Exposure to Hazardous Chemicals in Laboratories, 22 California Code of Regulations (CCR), Title 8, Sub 7, Group 17, Article 109.5191. Note: This regulation also specifies Chemical Hygiene Plan requirements.

Standards Applicable to Generators of Hazardous Waste, 26 CCR, Title 22, Division 4.5, 66262.10 to 66262.89.

Local

Delta Diablo Sanitation District Code, 2011; Delta Diablo Sanitation District, Contra Costa County, California.

When multiple regulations apply, this CHP will comply with the most restrictive regulation.

M. Laboratory Design and Ventilation

The Science building ventilation system has enough capacity to provide comfort to occupants. The Science building ventilation system is not designed to protect from airborne chemical hazards. Chemical processes that generate hazardous vapors, gases, aerosols or particulates must be performed in a fume hood.

Fume hoods are inspected annually or when there has been an engineering change or repair to the system. Fume hoods should be operated as following:

> Fume hood sashes should be closed except when necessary to adjust the apparatus inside the hood or to conduct a chemical procedure.
>
> Fume hoods must provide an average linear face velocity of 100 feet per minute with a minimum of 70 feet per minute at any one location.
>
> If the hood is unable to attain the required face velocity, the sash will be lowered until a satisfactory velocity is achieved.

The hood shall be marked indicating the maximum sash height.

Any fume hood lacking a sash should be used only for materials presenting low levels of potential hazards.

The hood fan shall be kept in operation whenever a chemical is inside the hood, whether or not any work is being performed in the hood.

Objects near the front of the fume hood can affect airflow and reduce the effectiveness of the fume hood. As much as is practical, fume hoods should not be used as storage areas for chemicals, apparatus, or other materials. Exceptions are for satellite hazardous waste collection containers and reservoirs for reagents for current experiments.

Ensure the fume hood has an inspection tag indicating the maximum sash height. If the tag is not present, contact Buildings and Grounds to have the fume hoods inspected.

The hazardous waste storage area of Room 141 has a ventilation shaft in continuous operation. This is to prevent buildup of gasses in the hazardous waste storage area. If the ventilation system in Room 141 is not functioning, notify Buildings and Grounds.

N. Exposure Monitoring

If an employee is showing active signs or symptoms of chemical exposure, follow the emergency procedures outline in Section I, Emergency Procedures for Accidents and Spills.

An opportunity to receive medical consultation at the employer's expense shall be provided to workers under the following circumstances:

An employee develops any signs or symptoms thought to arise from chemical exposure.

A major chemical release, accident, or incident occurred which may have resulted in an employee being exposed to a hazardous chemical.

Other information has been identified that a worker has been exposed to a chemical in excess of the permissible exposure limit (PEL).

For workers who are in a paid status (including faculty, staff, and student workers), notification of the exposure and/or signs or symptoms of exposure shall be through the LMC Workplace Injury provider. As of 2020, this is Company Nurse, Inc. and can be reached at 888-375-9779. Medical monitoring records shall be maintained allowing employee access as required by law.

For students and volunteers who are in a non-paid status, notification of the exposure and/or signs or symptoms shall be made to the LMC Police department during normal business hours at 925-473-3332. An incident report will be filed in accordance with the LMC Police Department's internal reporting procedure. If needed, subsequent medical monitoring will be arranged through the LMC insurance carrier.

O. Compressed Gasses and Cryogenic Materials

Compressed gasses

Compressed gasses present a special set of chemical and mechanical hazards, depending on the gas and on the cylinder size. Compressed gas cylinders are generally stored and used in Room SC233. The following are specific practices for compressed gas cylinders:

Compressed gas cylinders must be securely fastened at all times using chains or straps to fixed points to prevent them from tipping, falling or rolling. A fixed laboratory bench is acceptable.

Regulators are specific for gasses. The regulator must match the type of gas for which it is intended. The Compressed Gas Association (CGA) specifies regulator connectors to match regulators to gas cylinders. (e.g., male/female and clockwise/counterclockwise threads). This is to prevent accidental mixing of incompatible gases (e.g., fuels and oxidizers). Adapters would defeat this safety purpose and therefore may NEVER be used to fit a regulator onto a cylinder.

Cylinder caps must be replaced prior to safely dislodging any cylinder.

Full and empty cylinders should be stored separately.

Empty cylinders must be labeled.

The movement of cylinders must be done using properly designed carts with straps or chains.

Cylinders must not be stored on cylinder carts. Cylinder carts are for transport.

Compressed gases must only be used with adequate ventilation. Some hazards are subtle. Flammability hazards are obvious for gases such as hydrogen or acetylene. However, elevated levels of oxygen can enormously increase fire hazard. Inert gases such as nitrogen or carbon dioxide in confined spaces can cause asphyxiation. Users of compressed gases are expected to research and educate themselves of such potential hazards before use.

Cryogenic Materials

Cryogenic materials are used at LMC rarely and in limited quantities.

Cryogenic fluids (e.g. liquid nitrogen) or solids (e.g. dry ice, solid carbon dioxide) shall be stored or handled only in containers designed for such use.

Liquid oxygen, in addition to being a cryogen, is a very powerful oxidizing agent and requires special precautions to avoid contact with other reactive material (e.g., organic materials).

If contact with a cryogenic fluid is possible, additional protection such as an apron and full-face shield should be considered along with full goggle-splash protection.

Cryogenic materials must be stored and used in containers that allow for evaporation without pressure buildup. Cryogenic materials should not be stored in enclosed spaces to avoid asphyxiation.

Metal items are highly thermally conductive and may quickly cool below safe levels. Watches, rings, boots, or other items that may trap or conduct/remove heat when in contact with cryogenic material should not be worn.

When insulated gloves are worn while handling cryogenic materials, they should be dry, impervious and loose enough to be removed quickly.

P. Medical Consultation and Examination

The College does not have a specific medical program. College employees are generally covered by the District health insurance plan or equivalent. Students are encouraged to sign up with either the District's student health insurance plan, or to obtain similar coverage elsewhere. Emergency procedures have been specified in Section I. Exposure monitoring has been discussed in Section N.

Q. Changes to the Chemical Hygiene Plan

Faculty, administrators, staff or students can initiate and propose changes to this CHP. Proposed changes are submitted in writing or by email to the Science Laboratory Coordinator.

Proposed changes will be assigned a priority of high or low. High priority changes will be addressed as soon as reasonably possible. Low priority changes will be collected and evaluated during the periodic review of the CHP.

The Science Laboratory Coordinator and Physical Science Department Chair will jointly approve or disapprove of changes to the CHP. The resolution of the proposed change will be communicated back to the initiator along with the reason for the approval or disapproval.

Approved changes are forwarded to the college administration for review. In the absence of administrative objections, the changes are incorporated into the document.

Appendix A: Definitions and Abbreviations

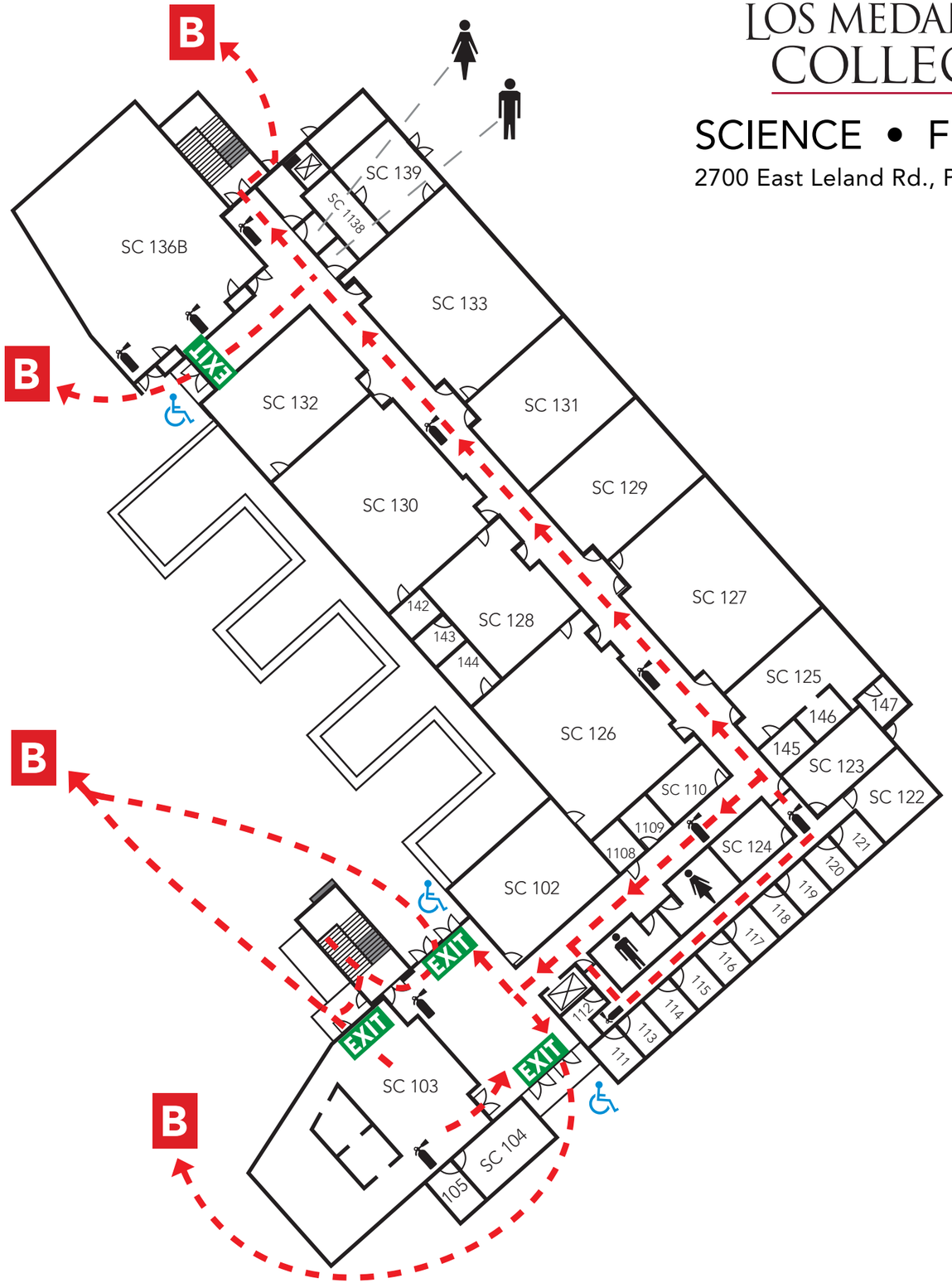
Aqueous	Pertaining to water
CCCCD	Contra Costa Community College District
CFR	Code of Federal Regulations
CGA	Compressed Gas Association
CHP	Chemical Hygiene Plan
DCN	Document control number. Number that is assigned within the LMC stockroom to a procedure or written instruction
DOT	Department of Transportation
GHS	Globally Harmonized System
LMC	Los Medanos College
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PPE	Personal Protective Equipment
SDS	Safety Data Sheet (formerly Material Safety Data Sheet, or MSDS)
SOP	Standard Operating Procedure
WI	Work Instruction

Appendix B: **Facility Floor Plans and Evacuation Map:**
Science Building, 1st Floor
Science Building, 2nd Floor
Brentwood Science Building (pending)

LOS MEDANOS COLLEGE

SCIENCE • FLOOR 1

2700 East Leland Rd., Pittsburg CA



Evacuation Assembly Sites

A – Marquee on East Leland Road

B – **Walkway at Lot A on East Leland Road**

C – Walkway between baseball and softball fields at Los Medanos Drive

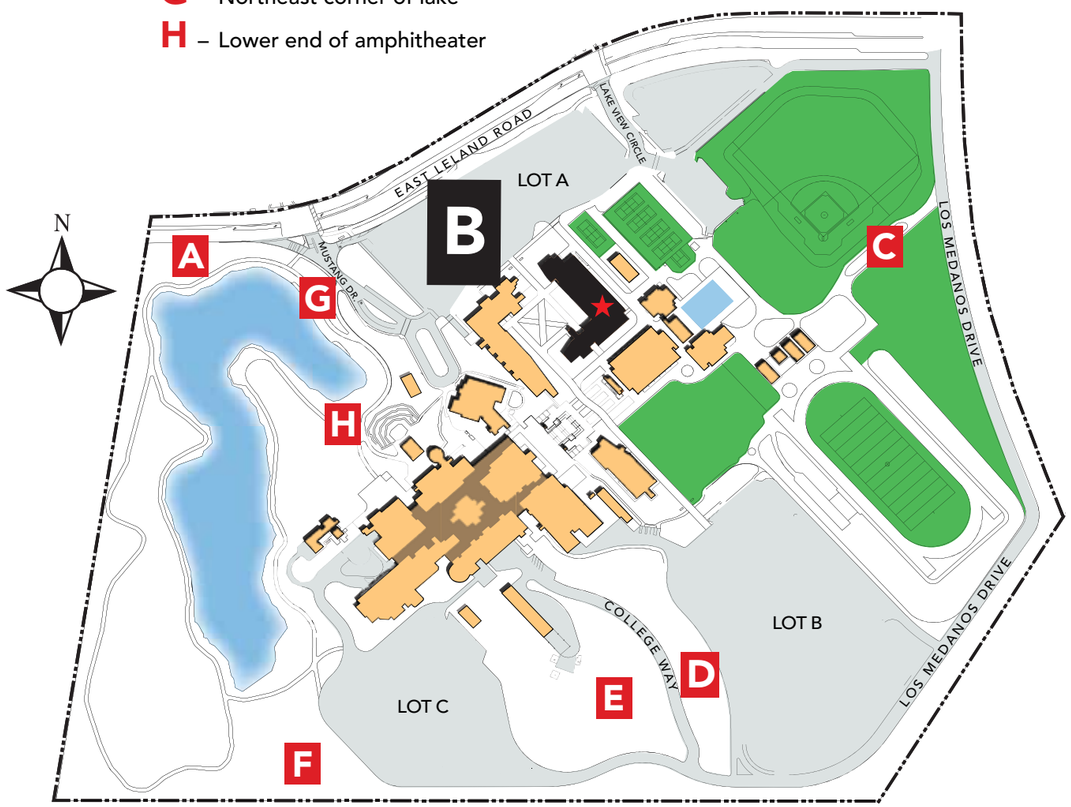
D – Sloped area west of Lot B

E – Sloped area west of College Way

F – Area west of Lot C

G – Northeast corner of lake

H – Lower end of amphitheater



KEY

- = Maintenance Closet
- = Restroom
- = Elevator
- = Handicap Accessible
- = Fire Extinguisher

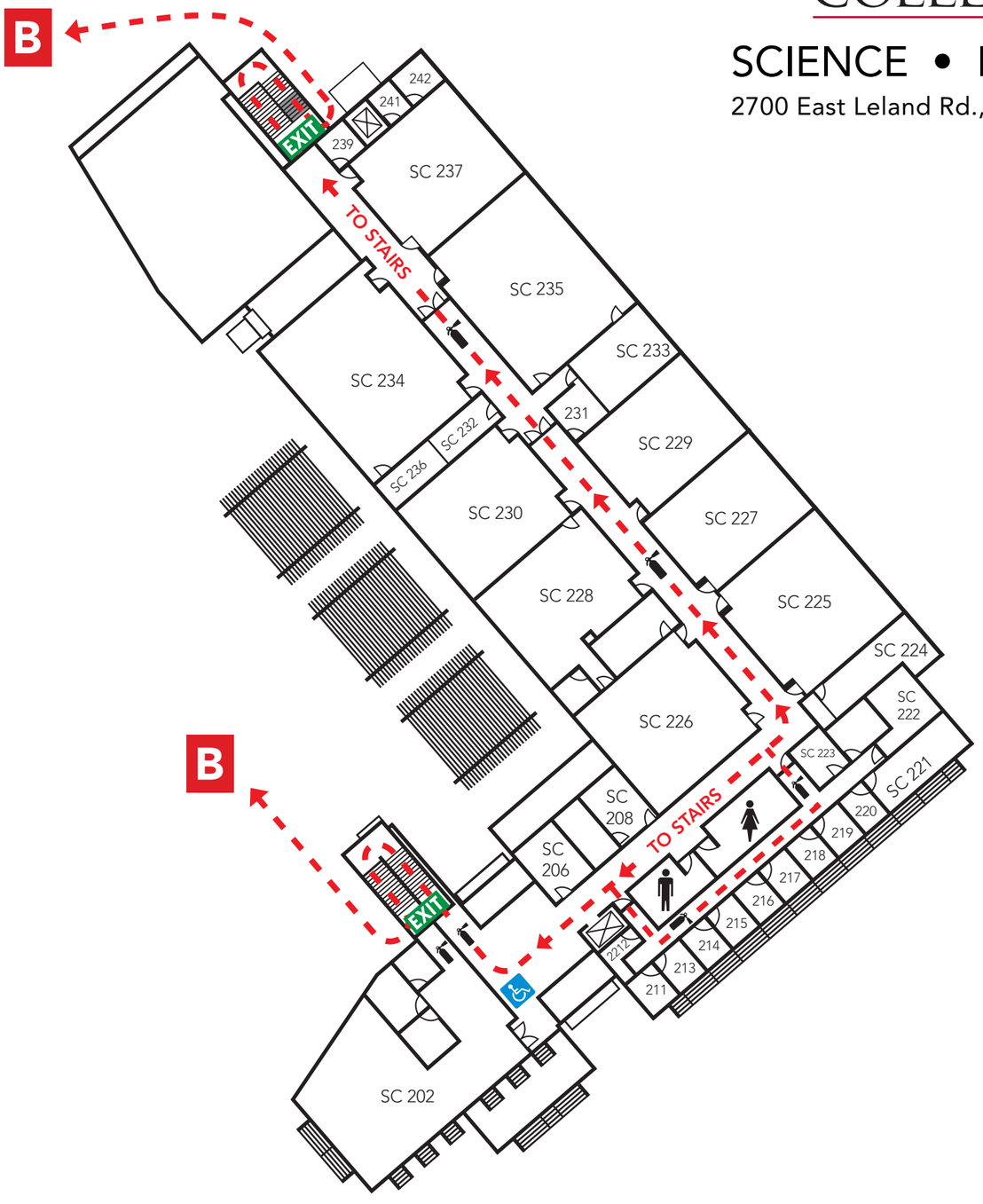
Emergency Phone: 9-1-1 (9-9-1-1 from most campus phones)

925-646-2441 (from cell phone)

LOS MEDANOS COLLEGE

SCIENCE • FLOOR 2

2700 East Leland Rd., Pittsburg CA



Evacuation Assembly Sites

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E – Sloped area west of College Way

F – Area west of Lot C

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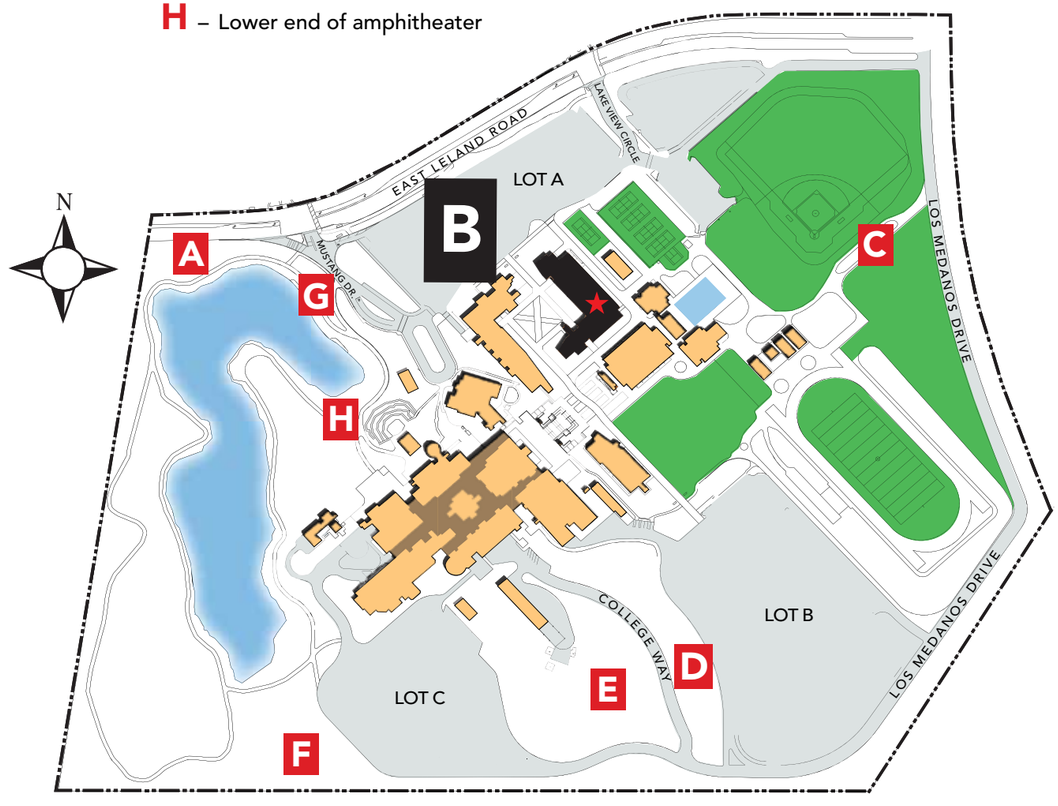
H – Lower end of amphitheater



KEY

= Maintenance Closet

= Restroom

= Elevator

= Rescue Area

= Fire Extinguisher

Emergency Phone: 9-1-1 (9-9-1-1 from most campus phones)

925-646-2441 (from cell phone)

Appendix C: DCN-2019-006 Labeling of Chemical Reagents in the Stockroom and Teaching Experiments

Labeling of Chemical Reagents in the Stockroom and Teaching Experiments

Proper labeling of chemical reagents is necessary to provide a safe work environment within the chemistry stockroom and teaching laboratories. As much as possible, label materials in accordance with the Global Harmonized System (GHS) of Classification and Labeling of Chemicals, an international standard hazard warning labeling system.

Unless there is a compelling reason to use a non-standard name, use the standard name for the chemical as determined by the International Union of Pure and Applied Chemistry (IUPAC).

All containers should be properly labeled in accordance with this procedure. If a container is identified as being deficient in its labeling the deficiency should be remedied at the time of discovery.

Original labels

Retain the original labels provided by the manufacturer on original containers until all of the chemical has been used.

Chemicals procured after 2015 should be labeled in accordance with the GHS formatted labels.

Chemicals procured prior to 2015 will be brought into compliance by adding the appropriate GHS warning sticker to the original bottle. Determine which GHS warning labels that need to be added by using a manufacturer's SDS for the identical or similar products (for example, 20-40 mesh size zinc is similar to 60 mesh size zinc). If no GHS warning label is required, add a label 'NO GHS WARNING REQ.' to indicate that the material has been evaluated.

Standard GHS symbols are included at the end of this procedure.

Secondary containers of original manufactured material

In some instances, materials are dispensed in smaller containers for use in the teaching laboratories. Use the following format to label the smaller containers for distribution:

Formula: Chemical Formula

Name: Name spelled out in English

GHS Warning Symbol(s), or 'NO GHS WARNING REQ."

Course/Experiment: The course and experiment the material for which the material is used.

Example:

CoCl2 . 6 H2O

Cobalt Chloride, hexahydrate

GHS symbols: Health hazard, Warning, Marine/Environmental Hazard

CHEM 025 C-1

Secondary containers of diluted reagents

Label diluted reagents in the same manner as manufactured materials with two changes. First, include the concentration with the chemical formula. Second, confirm that the GHS hazard labels appropriately describe the hazards. Often, when a material is diluted or dissolved in a solution, a hazard is reduced and the hazard labels from the concentrated stock material do not accurately describe the dilute material. Try to find a SDS from a reputable supplier for a reagent with the same or similar concentration for reference.

Formula: Concentration and Chemical Formula

Name: Name spelled out in English

GHS Warning Symbol(s), or 'NO GHS WARNING REQ."

Course/Experiment: The course and experiment for which the material is used.

Example:

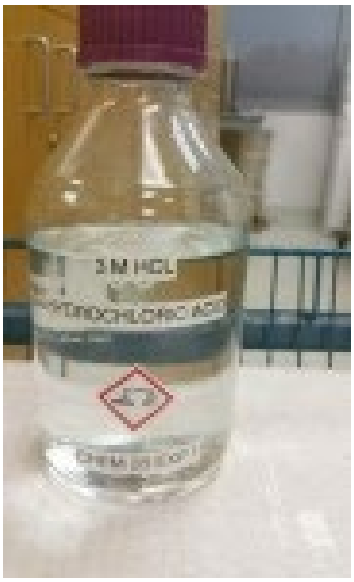
3 M HCl

Hydrochloric Acid

GHS symbols: Corrosive

CHEM 25 Iodine Clock

The photo below shows approximately where the labels should be placed:



Preparation Tags

Some reagents can degrade with time. It is important to know when the container was last filled with a prepared reagent. Reagent preparation tags have been printed and should be used.

Preparation tags have the following information:

Quantity: Amount of material

Name: Name of preparer

Prep Date: Date of preparation

Fill out the preparation tag. Curl one corner of the tag over so that it is easier to remove in the future and affix it to the container. Do not cover the permanent container labels, GHS warning labels and other information with the preparation tags.

Globally Harmonized System Pictograms

Health Hazard
- Carcinogen
- Mutagenicity
- Reproductive Toxicity
- Respiratory Sensitizer
- Target Organ Toxicity
- Aspiration Toxicity

Exclamation Mark
- Irritant (skin and eye)
- Skin Sensitizer
- Acute Toxicity
- Narcotic Effects
- Respiratory Tract Irritant
- Hazardous to Ozone Layer (non-mandatory)

Flame
- Flammables
- Pyrophorics
- Self-Heating
- Emits Flammable Gas
- Self-Reactives
- Organic Peroxides

Exploding Bomb
- Explosives
- Self-Reactives
- Organic Peroxides

Corrosion
- Skin Corrosion/Burns
- Eye Damage
- Corrosive to Metals

Environment
(non-mandatory)
- Aquatic Toxicity

Gas Cylinder
- Gases Under Pressure

Flame Over Circle
- Oxidizers

Skull and Crossbones
- Acute Toxicity (fatal or toxic)

Version Control

Revision	Date Issued	Major Change(s)
09/2016	09/01/2016	New
02/2019	02/08/2019	Added that labeling problems should be addressed at time of discovery.

Appendix D: DCN-2021-003, Accident Reporting Procedures

Accident Reporting Procedures in Stockroom and Teaching Laboratories

Although all operations within the stockroom and academic laboratories are designed to be safe, accidents do happen. This document describes the reporting procedures in the event of an accident.

Initial response/immediate treatment for major medical event/emergency:

If a major medical or emergency response is required, contact police services by using the Public Assistance Call button located in rooms SC-234 and SC-235 under the digital clock. Alternatively, dial **925-473-7333** from either a landline or cell phone. If using one of the internal campus phones (located within the chemistry stockroom and offices), **3-7333** will connect you directly to the police services emergency line. All of these communication techniques are equivalent to calling 911.

Note: dialing 911 from a cell phone will generally connect you with a different local law enforcement agency (either the California Highway Patrol or another agency). It will be necessary to identify your location, nature of the call and the Los Medanos Police department as the local agency before the call is properly transferred.

As soon as reasonably possible an Accident Investigation Form (for Managers/Supervisors) should be filled out and submitted per Contra Costa Community College District Procedures. This form is attached. Contact the Science Laboratory Coordinator for an editable version.

Contra Costa County Schools Insurance Group
550 Ellinwood Way - Pleasant Hill, CA - 94523 -1-866-922-2744 - www.cccsig.org

Accident Investigation Form (for Managers/Supervisors)

Purpose of this form: To assist managers/supervisors in determining root cause of employee incidents, as well as identifying and correcting any hazards that may exist to prevent similar incidents from occurring. Accident/incident investigation and documentation is a Cal OSHA requirement and is stated in the District's Injury and Illness Prevention Program.

Employee Name:		**Position Title:**	
District Name:		**Campus:**	
Date of Accident:		**Location of Incident** (e.g. parking lot)	

Incident Description:

Injury Sustained/Body Part(s) Affected:

Possible Causes of Incident (i.e. cleaning, rain, unsafe practice, uneven sidewalk, needlestick, etc.

Corrective Action(s) Taken (i.e. standard or emergency work order, review of safety practices, CCCSIG ergonomic evaluation or safety training, site inspection, etc.

Date Corrective Action(s) Completed/Scheduled:

Name/Title of Supervisor Completing Form:

If you have concerns regarding this injury, please contact Reed Rawlinson, Benefits Analyst at 925-229-6853.

Supervisor Signature: **Date:**

What to Do with this Form after Completion:
Click 'Email Form' (in upper right hand corner of form), then click 'Send';
OR, print, SCAN and email form to hflanagan@cccsig.org;
OR, print and FAX form to1-925-692-1176, ATTN: Heidi Flanagan

Minor injury not requiring medical response:

For minor injuries that require treatment but no medical response (e.g. small cuts), a first aid kit is located in Rooms 234, 235 and 237. The first aid kits are inspected before the start of each semester and restocked as needed. First aid supplies are provided to the injured person for self-treatment.

For students:

Campus police should be notified at the earliest opportunity regarding the injury on the police services business line at (925) 473-7332 during the normal business hours. The injury should be reported (no matter how minor) so that there is a record of it with police services. This is necessary in the event that subsequent treatment is needed (e.g., infection control) at a future time.

For staff/faculty:

The staff/faculty injury hotline should be contacted. It is presently supported by Company Nurse, Inc. and can be reached at 888-375-9979 or at www.CompanyNurse.com. Use the code "CSIG" in order to report the injury. Follow the reporting procedures as directed by the hotline.

Version Control

Revision	Date Issued	Major Change(s)
04/2016		New
11/2018		Annual Chemical Hygiene Plan update review Added text regarding Public Assistance Call Buttons
01/2019		Added code 'CSIG' in instructions for Company nurse and minor edits.
01/2021		Added CCCD Accident Reporting Form for Major incidents

Appendix E: Student Stockroom Worker Safety Training Presentation

Safety Training 2020

Welcome!

Today's Objectives:

Comply with Federal and State (OSHA and Cal OSHA) requirements and LMC Policies

Identify safety equipment in SC 234, SC 235, SC 233 and SC 237

Identify methods to detect presence or release of a hazardous chemical

Describe physical and health hazards of chemicals in the work area and how to protect employees

Describe accident reporting, evacuation, lockdown and shelter-in-place procedures

LOS MEDANOS COLLEGE

Safety Training

Where does all this safety stuff come from?

History of injuries which developed a culture of prevention:

https://en.wikipedia.org/wiki/List_of_industrial_disasters

Establishment of Federal agencies:

1966 - Department of Transportation (DOT, 49CFR)
1970 - Occupational Safety and Health Administration (OSHA, 29CFR)
1970 - Environmental Protection Agency (EPA, 40CFR)

CFR= Code of Federal Regulations, 50 volumes that collect Federal Laws

State Regulations also were established, and may be more restrictive

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Safety Training

State (CalOSHA) vs. Federal (OSHA)

2014 Operational Status Agreement (Effective June 2, 2017)

Federal OSHA will not initiate efforts under State Plan except for:

- Federal Facilities
- USPS Facilities (incl. contactor operated facilitites)
- Private sector employers operating on Federal properties

Takeaway: In California, pay attention to Cal OSHA requirements.

Note: Globally Harmonized System (GHS) required for chemical hazard labels and SDS effective 2016.

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Safety Training

Where does all this safety stuff come from?

Recognition within Academia:

Prudent Practices for Handling Hazardous Chemicals in Laboratories (1981)
Prudent Practices for Disposal of Chemicals from Laboratories (1983)

Published by the National Research Council. Latest editions 2011.

Injuries and accidents:

https://en.wikipedia.org/wiki/Karen_Wetterhahn (dimethyl mercury, 1997)

http://cen.acs.org/articles/89/i43/Academic-Lab-Safety-Under-Exam.html (2011)

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Safety Training

What does this mean to us?

1. Safety Data Sheets (SDSs) must be available.
2. Employees need to be trained how to read a SDSs.
3. Employees must know how chemicals can be physical or health hazards.
4. Employees must know how to identify a release or exposure.
5. Chemical Hygiene Plan should be in place and followed.
6. Hazardous waste must be disposed of properly.

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Safety Training

Where does all this safety stuff come from?

A very brief and small set of (incomplete) milestones:

1983: Hazardous Communication Standard, 29 CFR 1910.1200 issued (MSDSs required)

1990: Chemical Hygiene Plan requirement established, 29 CFR 1910.1450

2003: First edition of Globally Harmonized System (GHS) issued (international agreement)

June 1, 2015: Chemical manufacturers must update to GHS labeling for shipment (49 CFR requirement)

June 1, 2016: Employers must update to GHS Hazard Communication Standard (HCS) requirements for internal labeling and SDS

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Safety Training

Safety Data Sheets (SDS)s—There are 16 parts

1. Name
2. Hazard(s)
3. Compositions
4. First Aid
5. Firefighting Measures
6. Accidental Release Measures
7. Handling and Storage
8. Exposure Controls/Personal Protection
9. Physical and Chemical Properties
10. Stability and Reactivity
11. Toxicological information
12. Ecological Information
13. Disposal Considerations
14. Transport information
15. Regulatory Information
16. Other information

See Handout of Example for Sulfuric Acid

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Safety Training

Safety Data Sheets (SDS)s

SDSs provide basic safety information for use. Most important parts for us are:

2. Hazard Identification (GHS identifiers are here)
4. First Aid Measures
7. Handling and Storage
8. Exposure Controls/Personal Protection
13. Disposal Considerations

SDSs are available to all employees for materials on site. Online system is being worked out. If you need a SDS, ask and it will be provided.

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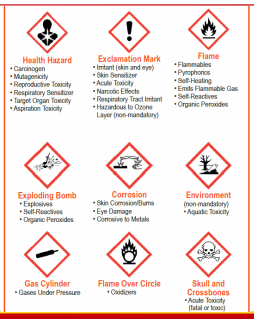
Safety Training

GHS hazard Symbols



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Safety Training

Importance of proper storage

Video: Ethanol and oxidizer

http://www.periodicvideos.com/videos/mv_chromium_trioxide.htm

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Safety Training

Physical and Health Hazard Characteristics

A chemical is a physical hazard if it:

is likely to burn or support fire;
may explode or release high pressures that can inflict bodily injury; or
can spontaneously react on its own, or when exposed to water.

A combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.

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Safety Training

Physical and Health Hazard Characteristics

A chemical is a health hazard if it is a:

Carcinogen (causes cancer)

Toxin (including reproductive toxins, hepatotoxin, nephrotoxin, neurotoxin, etc.)

Irritant (e.g. ammonia, concentrated acetic acid)

Corrosive (nitric acid, sulfuric acid, sodium hydroxide, etc.)

Sensitizer (Allergens -- poison oak, isocyanates (super glue vapor).)

Remember! Some materials fall into both categories.

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Safety Training

Exposure Identification

Unusual odors

Sensations on skin contact.
- Burning
- Itching
- Tingling sensations

Dust, vapors (possible generation of aerosols)

Colors (e.g. Metal salts, indicator powders from solids)

Any of these can indicate possible exposure.

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Safety Training

Chemical Hygiene Plan

Required by OSHA (29 CFR 1910.1450)

Required elements:

- Standard Operating Procedures
- Criteria for control measure implementation
- Fume hood and other engineering controls operational criteria
- Information to be provided to personnel
- Training requirements for personnel
- Medical monitoring criteria and procedures

LOS MEDANOS COLLEGE

Safety Training

Chemical Hygiene Plan

Required by OSHA (29 CFR 1910.1450)

Required elements (continued):

- Hazard identification
- Personal protective equipment requirements
- How to identify an exposure or a release

Note: A hardcopy of the 2017 version of the LMC CHP is in the Stockroom.

LOS MEDANOS COLLEGE

Safety Training

Laboratory Safety Rules (Handout)

The Laboratory Safety Rules are applicable to <u>all students, staff and faculty</u>.

Derive from Chemical Hygiene Plan. Following them reduces accidents and exposures.

Accident prevention:

- Think about what can go wrong and work to prevent that from happening

Laboratory Attire:

- Eye protection—chemical safety splash goggles at all times
- No open-toed shoes (like sandals)
- No shorts or loose clothing.
- Keep long hair and beards tied down.

LOS MEDANOS COLLEGE

Safety Training

Laboratory Safety Rules (Handout)

Chemical Hygiene:

- Wash hands with soap and water prior to leaving lab, even after gloves.
- Use gloves if needed.
- No food or drink in laboratory.
- Do not store chemicals outside of their containers.

Laboratory Behavior:

- No horseplay.
- Laboratory is not an area to socialize. It is an area to work.
- Never pipet by mouth.
- Plan movements and anticipate movements by others.

LOS MEDANOS COLLEGE

Safety Training

Disposal

Identified hazardous waste streams:

Inorganic Metals Waste

Contains acids (hydrochloric, sulfuric, nitric, acetic), and metals (lead, mercury, copper). Corrosive (pH < 2) and possibly oxidizing

Organic Materials Waste

Contains hydrocarbons (hexane, toluene), alcohols (ethanol, methanol), chlorine/bromine containing compounds (dichloromethane, bromobenzene)

Waste streams are captured in 5 gallon DOT approved shipping containers. Moved weekly or as needed to the waste storage on the 1st floor.

Additional small-quantity of unique or unusual combinations are treated separately

LOS MEDANOS COLLEGE

Safety Training

Disposal

Sanitary Municipal Drain disposal

Limits given in District Code starting page 61 (handout included)

If there is an experiment using one or more of the excluded materials, it needs to be captured in the existing waste streams.

NOTE: Dilution of materials to bring below concentration limits is prohibited.

NOTE: Some experiments _may_ have materials that can be disposed of in the municipal system.

Penalties for violations are both civil ($) and criminal (misdemeanor=jail time)

LOS MEDANOS COLLEGE

Safety Training

Safety Equipment

Eyewash stations

Fume hoods

Safety Showers

Fire Extinguishers

Refrigerators





LOS MEDANOS COLLEGE

Safety Training

Accident response and reporting

Call 911 (or 9-911 from campus landline) for emergency event.

For non-emergency, treat first.

First aid kits are available in SC234; SC235; and SC237. Will be restocked as needed. Notify laboratory coordinator for restocking.

Follow stockroom procedure DCN-2016-003 for accident reporting.

Call Police Services 925-473-7332 for students; call Company Nurse 1-888-375-9779 for employees (faculty, student workers and staff).

Copy of DCN-2016-003 is provided and posted in the display cabinet and all rooms.

LOS MEDANOS COLLEGE

Safety Training

Emergency Response Guidebook

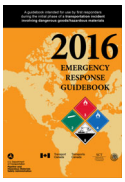
Issued by Department of Transportation

Good resource to have (especially synonyms)

Free and downloadable here:

http://www.phmsa.dot.gov/hazmat/outreach-training/erg

(and I believe there is an app for it too…)



LOS MEDANOS COLLEGE

Safety Training

Evacuation Procedures

Evacuation routes are posted in each room.

Main route is north staircase. Alternative is the main staircase at the south of the building.

DO NOT USE ELEVATORS

Stair-chair is available next to the main staircase to assist wheelchair users or mobility-impaired persons.

Stair-chair training is provided via Police Services. 1 hour optional training but will be paid on timecard.

Assembly site is location B, just north in the parking lot.

LOS MEDANOS COLLEGE

Safety Training

Shelter-in-place/Lockdown procedures

If a Shelter-in-place or lockdown directive has been issued for the building, campus, or surrounding area:

- Safely stop all laboratory operations
- Lower all fume hood sashes
- Turn off all laboratory equipment

Classes may continue in session depending on the severity of the shelter-in-place.

Lockdown procedures may consider barricading/securing classroom doors.

LOS MEDANOS COLLEGE

Safety Training

Chemical inventory and waste inventory

Chemical inventory updated May 2018.
- Electronic copy available and stored on the student computer desktop.
- This one is not the master copy. Master copy in coordinator's office.
- Updated as items are received.
- Annually reviewed.

Inorganic shelves are identified from S1 through S12.
Refrigerator #1 and Refrigerator #2.
Flammable Storage Cabinets #1 through #5.
Corrosive Storage Cabinets #1 and #2.

If you aren't sure where things should be stored, ask

LOS MEDANOS COLLEGE

Safety Training

Chemical inventory and waste inventory

Waste will be checked weekly, or as needed.

- Fill line is the bottom of the embossed pattern on 5 gallon containers
- Cap and bring to waste storage area
- Add to the clipboard in the waste storage area
- Waste disposal scheduled at end of each semester.

For solid waste (filter papers, solids, etc.), double bag and label as solid waste using the hazardous waste symbols.

All waste should be stored with secondary containers to capture any spills or leaks

LOS MEDANOS COLLEGE

Safety Training

Chemical inventory and waste inventory

The maximum fill line is visible just above the label in the picture→

LOS MEDANOS COLLEGE

Safety Training

Local discharge disposal limits

If all the materials used in an experiment are not prohibited for disposal, expended materials MAY be disposed of in the municipal sanitary system.

Example: Titration of vinegar with sodium hydroxide.

If any of the materials are prohibited, then all waste from the experiment needs to go in one of the waste streams.

Violators are subject to either civil penalties ($), or criminal penalties ($+ time), or both.

The local sanitary district code is available online.

LOS MEDANOS COLLEGE

Safety Training

Summary:

We've increased safety awareness

Described OSHA and Cal OSHA compliance requirements

Identified safety equipment in SC 234, SC 235, SC 233 and SC 237

Discussed accident reporting, evacuation and shelter-in-place procedures

Reviewed inventory and hazardous waste management procedures.

LOS MEDANOS COLLEGE

Appendix F: Instructional Laboratory Safety Rules, Physical Sciences Department

Laboratory Safety Rules

Adapted from *Safety in Academic Chemistry Laboratories*, 7th ed.; American Chemical Society: Washington, DC, 2003.

Our goal in the laboratory is to learn techniques and procedures, preform experiments emphasizing the topics covered in class, and learn proper laboratory hygiene, etiquette, and safety. For us to meet this goal, chemical and laboratory safety is everyone's responsibility.

Accident Prevention

- Before beginning an experiment, become familiar with the hazards of the chemicals, apparatus, and equipment being used. Consult the Safety Data Sheet (SDS) for chemical hazards. Be sure you know and follow the precautions that protect you and other from these hazards.
- Before beginning an experiment, clear the bench and surrounding area of any nonessential items such as backpacks, books, and phones.
- Keep aisles free of obstructions such as chairs, boxes, backpacks, and trashcans.
- Keep drawers and cabinets closed while working and before leaving the laboratory.
- Inspect all glassware for flaws such as cracks or chips before beginning an experiment.
- When heating, do not place hot containers on the bench to cool, instead use a wire gauze or wooded test tube rack.

Laboratory Attire

- Everyone in the laboratory must wear chemical safety splash goggles (not safety glasses) whenever any experiment is being preformed, even when not preforming an experiment.
- Clothing must be worn in the laboratory to protect against possible splashes and spills. A laboratory jacket or coat offers the best protection. Do not wear: short skirts or shorts, shirts without sleeves, low cut shirts, shirts that expose the midriff, shoes with high heels, shoes with open toes, excessively baggy clothes, or loose fitting jewelry.
- Constrain long hair and beards.

Chemical Hygiene

- Always wash your hands and arms with soap and water before leaving the lab, even if you were wearing gloves.
- Clean your work area (bench top, hood, equipment room, sink) after completing an experiment. Even if you do did not spill anything, chemical residues not visible can be harmful.
- Do not prepare, store, or consume food or beverages in the laboratory.
- Do not chew gum or tobacco, smoke, or apply cosmetics in the laboratory.
- Never remove chemicals from the laboratory.
- Never store chemicals on the floor or in your drawer. If a reaction or solution must be stored until the next lab period, cover the container with a lid, stopper, or parafilm, label the container with your name, the name of any and all substances in the container (you may have excess reagent present), the name of your instructor, the experiment name or number, your class, and the date. Your instructor will indicate where to store the chemicals.
- Keep the laboratory free of broken glassware, leftover chemicals, pipets, filters, and scraps of paper.
- All chemicals should be disposed of in the appropriate hazardous waste container. NEVER dispose of any chemical in the sink unless specifically instructed to do so by your instructor.

- When dispensing chemicals from the stock container, NEVER put anything directly into the container. Pour a small volume into a labeled beaker and return to your work area to properly measure the substance.
- Do not remove any stock solutions from the cart.
- If you have excess reagent do not put it back into the stock container, instead share with others around you. Any remaining reagent should be disposed of in the appropriate hazardous waste container.
- Clean used glassware in the laboratory sink with environmentally acceptable cleaning agents (soap, detergents). Do not use strong cleaning agents such as nitric acid, sulfuric acid, or acetone unless specifically instructed to do so by your instructor.
- Many chemicals that may or may not have an odor are harmful if their vapors or dust are inhaled. Such chemicals will carry a warning about inhalation on the Safety Data Sheet (SDS) and should be stored and handled in a hood.
- A hood's airflow can be disrupted by drafts from open doors and movement of individuals around the hood. When you use a hood only open the sash as much as necessary.
- Keep your face outside of the hood.

Laboratory Behavior

- Never work without the supervision of an instructor or staff.
- Never play tricks or indulge in horseplay in the laboratory.
- Never pipet by mouth, use a pipet bulb or suction aid.
- When moving around the laboratory, anticipate sudden movement by others.
- Keep chemicals and apparatus away from the edge of the bench top or hood.

Emergency Procedures

- Know the location of and how to use all safety equipment such as safety shower and eye wash fountain.
- For small spills on the skin, immediately flush the area with flowing water for 15 minutes. Remove any jewelry to remove any residual chemical. Consult the SDS for any special treatment or delayed effects.
- Large spills can have serious consequences. Get to the shower, immediately! Remove all clothing, flush for at least 15 minutes and consult a medical professional.
- Know a main and secondary evacuation route leading outside of the building.
- For splashes into the eye, immediately flush the eye in the eye-wash fountain. Use your thumb and forefinger to hold your eyelids open and move your eyes continually. Flush for at least 15 minutes and consult a medical professional.
- If an emergency occurs, report the nature and location of the emergency to your instructor, and if necessary the laboratory staff and/or emergency responders.
- Inform others in the area of the nature of the emergency.
- Fires contained in a small vessel can often be suffocated by covering with a watch glass or beaker. If the fire is over a larger area or too large to be suffocated, everyone should evacuate the area. Do not attempt to use a fire extinguisher unless you have been trained to do so and are confident it will extinguish the fire.

Laboratory Safety Quiz Name: _____

Instructor: _____ Course: _____

1. Whom should you call in case of an emergency in the lab?
   a) Instructor b) Nobody c) A friend d) Anybody

2. What would immediately be used if your clothing caught fire or if a large chemical spill had occured on your clothing?
   a) Fire extinguisher
   b) Safety shower
   c) Laboratory sinks
   d) Eye-wash fountain

3. What should be worn in a laboratory at all times to decrease the likelihood of eye injury?
   a) Corrective lenses
   b) Safety Glasses
   c) A mask
   d) Safety Goggles

4. What should be done if a chemical gets in the eye?
   a) Notify the Instructor; then use the eye-wash fountain
   b) Use the eye-wash fountain; then return to the experiment
   c) Use the eye-wash fountain; then notify the instructor
   d) Nothing, unless the chemical causes discomfort

5. How can a small contained fire be extinguished most easily?
   a) Use a fire extinguisher
   b) Use water
   c) Call the instructor
   d) Smother the fire with a small container (i.e., a beaker)

6. What precautions are needed with long hair and beards?
   a) Keep long hair tied back/keep hair away from flames
   b) Must be shampooed
   c) No long hair and/or beards allowed in the lab
   d) No precautions are necessary

7. What type of footwear is required in the lab?
   a) Shoes are optional
   b) Hard-soled, covered shoes
   c) Sandals
   d) Something in a low heel

8. Eating and drinking is not permitted in the lab because:
   a) There would not be enough time to finish the experiment
   b) The storeroom serves terrible appetizers
   c) You could be poisoned
   d) The lab would become quite messy with this type of activity

9. Why are no unauthorized experiments permitted in the lab?
   a) The student lacks experience in the lab
   b) Most professors love to see only their selected experiments performed
   c) The stockroom may not have the reagents that you need
   d) It may take more time to perform than expected

10. What should be the very last function performed in the lab before you leave?
    a) Bid the instructor farewell
    b) Make sure that your locker is secure
    c) Wash your hands
    d) Arrange a time with your lab partner for lunch

11. Describe the procedure for smelling a chemical.
    a) Stick your nose close to the vessel and breath deeply
    b) Point vessel away from face while gently fanning vapors toward nose
    c) Never smell a chemical
    d) Smell chemical as you would anything else

12. If you wear contact lenses in the school laboratory,
    a) take them out before starting the lab.
    b) you do not have to wear protective goggles.
    c) advise your instructor that you wear contact lenses.
    d) keep the information to yourself.

13. After completing an experiment, all chemical wastes should be
    a) left in your drawer for the next lab period.
    b) disposed of according to your instructor's directions.
    c) dumped in the sink.
    d) taken home.

14. Identify at least six safety violations in the figure below.

15. On a separate sheet of paper complete and turn-in the laboratory scavenger hunt.

a. shower	b. eye-wash fountain	c. fire blanket
d. first aid kit	e. stockroom window	f. dionized water facet (2)
g. fume hoods	h. gas shut off	i. broken glass deposit box

    j. fire extinguisher (2 inside & 2 outside of the lab)
    k. fire alarm (the switch to ACTIVATE the alarm)

Student Lab Safety Agreement

I _____**(Student name printed)** have watched the laboratory safety video and will follow safety protocol and regulation whenever present in the laboratory. It is my responsibilities to wear proper laboratory attire, behave safely and responsibly, and will appropriately clean after all spills and breakage of glassware or equipment.

Also prior to leaving the laboratory, I am responsible to clean my workstation and dispose of all hazard waste in the correct waste bins. By violating this agreement, I allow my professor to deduct points from my laboratory grade. It can also lead to being removed from the laboratory for the day, due to unsafe conditions.

Chemistry Course: _____

Student ID: _____

Professor name: _____

Date: _____

Student signature: _____

Appendix G: Instructional Laboratory Safety Rules, Biological Sciences Department

Laboratory Safety Rules—Biology Department

Adapted from *Safety in Academic Chemistry Laboratories*, 7th ed.; American Chemical Society:

Washington, DC, 2003.

Our goal in the laboratory is to learn techniques and procedures, preform experiments emphasizing the topics covered in class, and learn proper laboratory hygiene, etiquette, and safety. For us to meet this goal, chemical and laboratory safety is everyone's responsibility.

Accident Prevention

- Read and understand the laboratory safety rules in your laboratory notebook, which outline general rules plus hazards unique to the particular lab.
- Before beginning an experiment, become familiar with the hazards of the chemicals, apparatus, and equipment being used. Consult the Safety Data Sheet (SDS) for chemical hazards. Be sure you know and follow the precautions that protect you and other from these hazards.
- Before beginning an experiment, clear the bench and surrounding area of any nonessential items such as backpacks, books, and phones.
- Keep aisles free of obstructions such as chairs, boxes, backpacks, and trashcans.
- Keep drawers and cabinets closed while working and before leaving the laboratory.
- Inspect all glassware for flaws such as cracks or chips before beginning an experiment.

Laboratory Attire

- Students will be advised when safety glasses are needed for a particular experiment. Students who wear contact lenses are advised to wear safety glasses at all times during lab.
- It is advisable to wear clothing that covers the skin as much as possible. Excessively baggy or draping clothing or jewelry can drag or catch on things and is not advised. A laboratory jacket or coat offers the best protection. Shoes must be closed-toe and cover the top of the foot.
- Constrain long hair and beards.

Chemical and Biological Hygiene

- Always wash your hands and arms with soap and water before leaving the lab, even if you were wearing gloves.
- Clean and disinfect your work area (bench top, hood, equipment room, sink) after completing an experiment. Even if you do did not spill anything, residues not visible can be harmful.
- Do not prepare, store, or consume food or beverages in the laboratory.
- Do not chew gum or tobacco, smoke, or apply cosmetics in the laboratory.
- Never remove any substance or specimen from the laboratory.
- Keep the laboratory free of broken glassware, leftover chemicals, pipets, filters, and scraps of paper.
- All chemicals and specimens should be disposed of in the appropriate waste container. NEVER dispose of any chemical in the sink unless specifically instructed to do so by your instructor.
- Clean used glassware in the laboratory sink with environmentally acceptable cleaning agents (soap, detergents).

- A hood's airflow can be disrupted by drafts from open doors and movement of individuals around the hood. When you use a hood only open the sash as much as necessary.
- Keep your face outside of the hood.

Laboratory Behavior

- Never work without the supervision of an instructor or staff.
- Never play tricks or indulge in horseplay in the laboratory.
- Never pipet by mouth, use a pipet bulb or suction aid.
- When moving around the laboratory, anticipate sudden movement by others.
- Keep chemicals and apparatus away from the edge of the bench top or hood.

Emergency Procedures

- Know the location of and how to use all safety equipment such as safety shower and eye wash fountain.
- For small spills on the skin, immediately flush the area with flowing water for 15 minutes. Remove any jewelry to remove any residual chemical. Consult the SDS for any special treatment or delayed effects.
- Know a main and secondary evacuation route leading outside of the building.
- For splashes into the eye, immediately flush the eye in the eye-wash fountain. Use your thumb and forefinger to hold your eyelids open and move your eyes continually. Flush for at least 15 minutes and consult a medical professional.
- If an emergency occurs, report the nature and location of the emergency to your instructor, and if necessary the laboratory staff and/or emergency responders.
- Inform others in the area of the nature of the emergency. Fires contained in a small vessel can often be suffocated by covering with a watch glass or beaker. If the fire is over a larger area or too large to be suffocated, everyone should evacuate the area. Do not attempt to use a fire extinguisher unless you have been trained to do so and are confident it will extinguish the fire.

Appendix H: Los Medanos College Hazardous Waste Collection Area Signs

LOS MEDANOS COLLEGE WASTE STREAMS

INORGANIC/AQUEOUS WASTE	ORGANIC WASTE
Contents: Water: H_2O Nitric acid: HNO_3 Sulfuric acid: H_2SO_4 Hydrochloric acid: HCl Sodium hydroxide: NaOH Dissolved metals including arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver and zinc ammonia/ammonium salts Oxidizing materials such as sodium/potassium bromate, hydrogen peroxide, sodium persulfate, etc.	Contents: Halogenated and non-halogenated solvents like dichloromethane, toluene, cyclohexane, acetone, ethyl acetate, diethyl ether. 2-butanone Concentrated alcohols like 2-propanol, methanol and ethanol
SOLID WASTE	**SPECIAL WASTE**
Used filter paper Unreacted metals (zinc, aluminum, iron, etc.) Other solids NO LIQUIDS	Certain experiments generate waste that needs to be segregated and will be captured on a case-by-case basis. Labeling will be specific to that experiment. Example: F-2 experiment waste from halogens including chlorine, iodine, bromine and organic solvents.

THE FOLLOWING MATERIALS CAN BE DISPOSED OF DOWN THE SANITARY SEWER:

Rinse water from cleaning glassware.

Sodium hydroxide/acetic acid titration waste

Sodium hydroxide/hydrochloric acid titration waste

Reacted potassium permanganate and oxalic acid solutions

Dilute potassium iodide solutions

Dilute sodium thiosulfate solutions

Appendix I: Training Roster Form

Training Topic _____

Instructor/Presenter _____

Date _____

Name	Signature	Email

Appendix J: Semester Safety Inspection Checklist

Semester Safety Inspection Checklist

Room (Circle One): SC-233 SC-234 SC-235 SC-237

Item	Inspected	Notes
Lighting/Electrical: Light switches function Light bulbs work Electrical outlets are powered Electrical outlets are in good condition		
Ovens turn on Maintain temperature of 100 degrees C +/- 2 degrees Hot plate/Stirrer cords are intact and in good condition Barometers have power and are intact.		
Eyewash is operational and have been inspected. Safety shower has been tested. Fire extinguisher inspection. First Aid Kit is stocked.		
Water faucets turn on and off properly (no leaks). Fume hoods are working properly		
Document/Binders are present (SC-237 only): Chemical Hygiene Plan SDS binder Work Instruction binders Special projects notebook Chemical inventory hardcopy		
Chemical container inspection (SC-237 only): Inorganic shelves 1-12 Flammable storage cabinets (FSC) 1-5 Corrosive storage cabinets (CSC) 1-2 Refrigerators 1-2 pH Indicators cabinet		

As needed, submit work orders.

Inspected by: _____ Signature: _____

Inspection date: _____

This form shall remain on file for (5) years. Electronic filing is acceptable.

Appendix K: DCN-2016-016, Stockroom Orientation Checklist

Name _____Student/Staff ID Number _____

Please review the items below with the new worker. Check off as done and sign the bottom of the form. This is in addition to other required training.

This form shall remain on file for 1 year after the worker leaves employment.

Item	**Reviewed (check off)**
Explanation of electronic time card procedures. (These should be updated daily!)	_____
Locations of the following items: Storage area for personal property Disposable lab coats Disposable and reusable gloves Safety glasses Phone and computer ID badges (student workers) Chemical Hygiene Plan SDS binder Work Instruction binders Special projects notebook Chemical inventory hardcopy Fire extinguisher in stockroom Deionized water tap	 _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____
Stockroom window opening and closing operations, and the emergency operation in the event of a fire alarm activation.	_____
Location of eyewash and demonstrate how to use it. Location of safety shower (there is no drain, so only use in emergency).	_____
Tour of chemical reagent storage areas including: Inorganic shelves 1-12 Flammable storage cabinets (FSC) 1-5 Corrosive storage cabinets (CSC) 1-2 Refrigerators 1-2 Indicators cabinet	 _____ _____ _____ _____ _____
Explanation of bin system and bin tags. Location of refill containers.	_____ _____
Location of hazardous waste labels and containers.	_____
Tour of hazardous waste storage room.	_____
Location of emergency activation buttons in SC-234 and SC- 235	_____

Signatures:

Trainee:_____Trainer:_____

Date:_____

Version Control

Revision	Date Issued	Major Change(s)
03/2017	Draft	New
05/2018	05/2018	Updated to include model kits, timekeeping changes and emergency button locations.
07/2018	07/2018	Minor edits for clarity.
06/2019	06/2019	Added Student ID number at top of form. Changed “pH Indicators” to “Indicators”
01/2021	01/2021	Changed ‘Student Name’ to ‘Name’ and ‘Student ID’ to ‘Student/Staff ID’

Signature: Jenifer Fay
Jenifer Fay (Jan 25, 2021 10:42 PST)
Email: jfay@losmedanos.edu

Signature: Jill Bouchard
Jill Bouchard (Jan 25, 2021 11:07 PST)
Email: jbouchard@losmedanos.edu

Signature:
Email: khanks@losmedanos.edu

Signature: Mindy Capes
Mindy Capes (Jan 25, 2021 12:35 PST)
Email: mcapes@losmedanos.edu

Signature: Ryan Pedersen
Email: rpedersen520@email.4cd.edu

LMC ChemicalHygienePlan_2021_Final_Signature

Final Audit Report 2021-01-26

Created:	2021-01-21
By:	Paul West (pwest644@email.4cd.edu)
Status:	Signed
Transaction ID:	CBJCHBCAABAA6Ws5VebSsdplZNSvfu5tf7LqDYGMsR-4

"LMC ChemicalHygienePlan_2021_Final_Signature" History

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