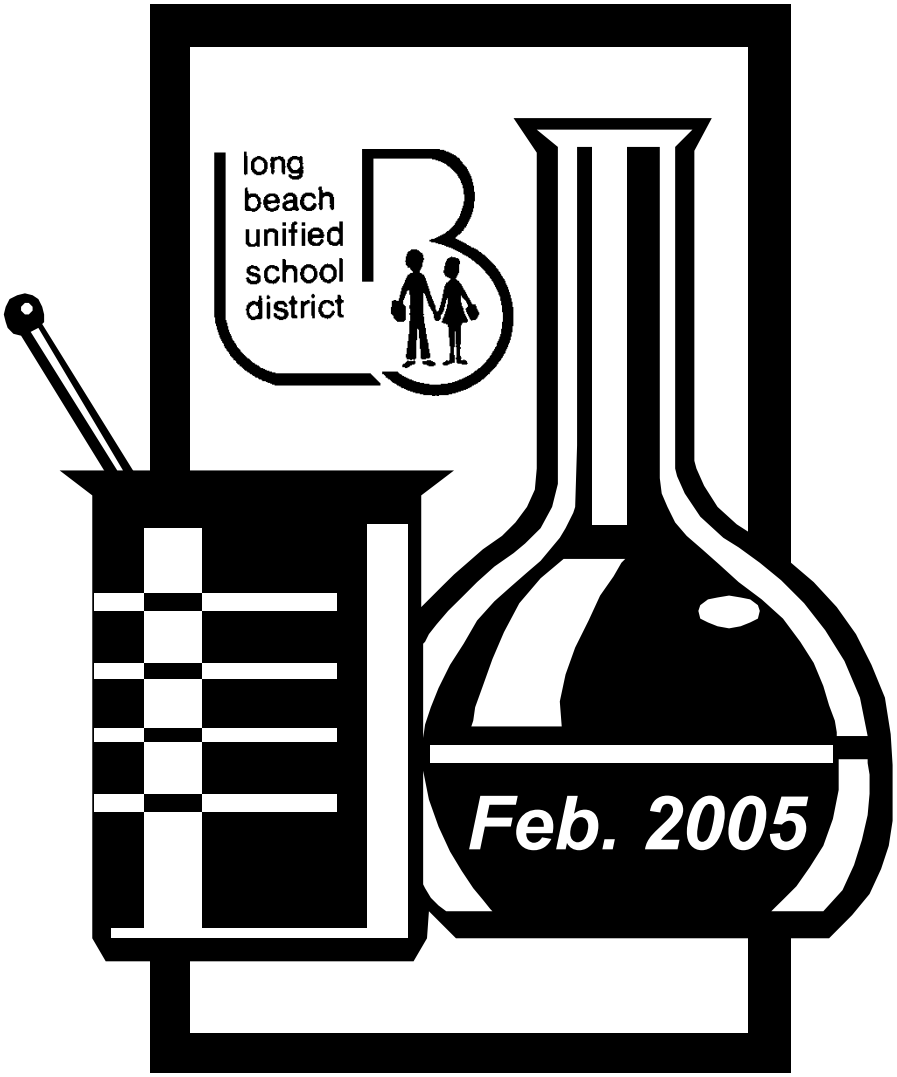
CHEMICAL HYGIENE PLAN



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A Collaborative Product of LBUSD
Environmental Health & Safety and Science Curriculum Offices

Chemical Hygiene Plan

for Long Beach Unified School District

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1.0 SCOPE

1.1 District Policy on Chemical Hygiene in Laboratories

The Long Beach Unified School District is committed to providing a safe working environment for its employees and students, and believes that they need to know about health hazards associated with their work.

The school district has the responsibility to adopt policies and procedures that minimize exposure of employees to hazardous chemicals present in school laboratories. Furthermore, it has the responsibility to provide information and appropriate training to make employees aware of potential hazards and safe working practices. This Chemical Hygiene Plan is the document that specifies how these responsibilities will be discharged.

Employees have both the right and responsibility to participate actively in training programs, to know and follow the policies and procedures contained in the Chemical Hygiene Plan, and to conduct their work activities in a manner which minimizes their risk of exposure. Employees working in laboratory settings are encouraged to discuss any concerns with their principal or supervisor, and to communicate to the Environmental Health & Safety Office at (562) 997-7510 or the Science Office at (562) 997-2963.

This policy statement and the Chemical Hygiene Plan are adopted by the Long Beach Unified School District as of October 2003, and are effective as of this date.

1.2 Scope and Application of the Chemical Hygiene Plan

On January 31, 1990, The Occupational Safety and Health Administration (OSHA) promulgated the final rule for occupational exposures to hazardous chemicals in laboratories. The basis for this standard is the determination that laboratories typically differ from industrial operations in their use and handling of hazardous chemicals and that a different approach than that found in OSHA's substance specific health standards is warranted to protect workers.

The final standard, called the Laboratory Standard (see Appendix A), applies to all laboratories that use hazardous chemicals in accordance with the definitions of "laboratory use" and "laboratory scale" provided in the standard (see Appendix B). Laboratories covered by this standard have the obligation to maintain employee exposures at or below permissible exposure limits (PELs) specified by OSHA.

However, the manner in which this obligation is achieved will be determined by each employer through the formulation and implementation of a Chemical Hygiene Plan (CHP).

Because schools contain facilities and programs that meet the "laboratory use" and laboratory scale" criteria in the final standard, they must be covered under an appropriate Chemical Hygiene Plan. Moreover, school employees whose assignments include working in a laboratory area must receive appropriate training and information about the CHP and the practices it prescribes.

This document serves as the written guide for Long Beach Unified School District compliance with the Laboratory Standard and the Chemical Hygiene Plan (CHP) requirements contained therein. The Chemical Hygiene Plan of Long Beach Unified School District affirms the district's commitment to a safe working environment for all employees / students working in laboratories. The plan details the district's standards of acceptable operation regarding laboratory procedures; chemical procurement, labeling and storage; availability, inspection and maintenance of laboratory facilities and protective equipment; employee information and training programs; and finally the disposal of chemicals and other laboratory waste. The plan also describes roles and responsibilities for implementing the standards. All science laboratories of the Long Beach Unified School District engaged in the laboratory use (as defined by this document) of hazardous chemicals are required to comply with this document.

1.3 Relation to the Hazard Communication Plan and Other OSHA Standards

The OSHA Laboratory Standard (29 CFR 1910.1450) is connected to the OSHA Hazard Communication Standard (29 CFR 1910.1200) since both address limiting employee's exposure to hazardous chemicals in the workplace. Therefore, the Chemical Hygiene Plan must be consistent with the district's Hazard Communication Plan, particularly as regards the availability of Material Safety Data Sheets (MSDS), procedures for chemical storage and labeling, and the provision of employee training. The Chemical Hygiene Plan will supersede the Hazard Communication Plan where the specific differences are necessary to address unique conditions of school laboratories.

The following OSHA standards are particularly pertinent to laboratories, in addition to the Laboratory Standard. Their provisions apply, except where the Chemical Hygiene Plan specifies a higher standard of operation:

29 CFR 1910.132	-	General Requirements – Personal Protective Equipment
29 CFR 1910.133	-	Eye and Face Protection
29 CFR 1910.147	-	The Controls of Hazardous Energy (lockout / tag out)
29 CFR 1910.151	-	Medical Services and First Aid
29 CFR 1910.157	-	Portable Fire Extinguishers
29 CFR 1910.1020	-	Access to Employee Exposure and Medical Records
29 CFR 1910.1030	-	Blood-borne Pathogens

1.4 Availability

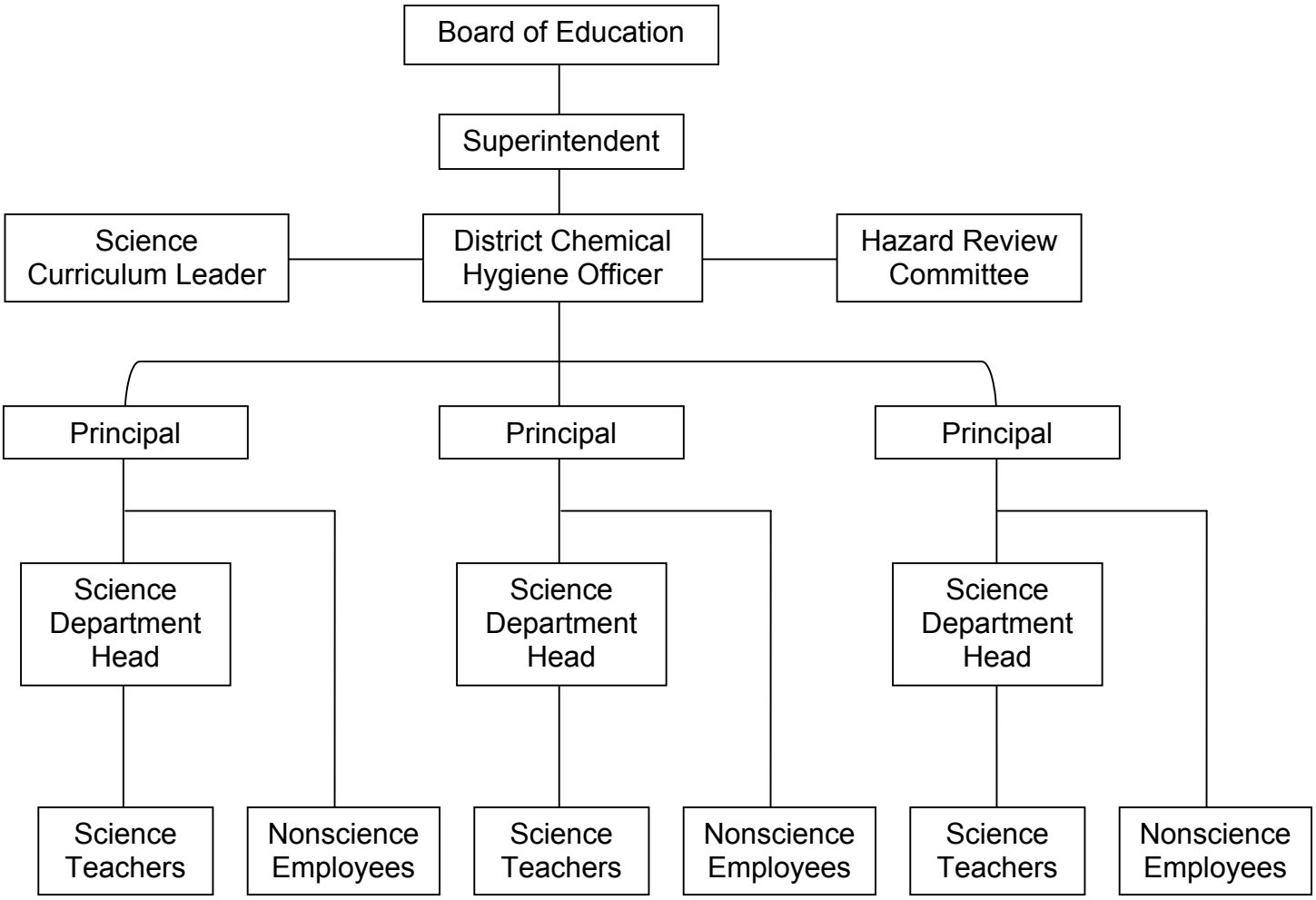
The Chemical Hygiene Plan must be readily available to employees and employee representatives. Copies will be kept by the District Chemical Hygiene Officer, Science Curriculum leader, Environmental Health and Safety, Risk Management, the Principal of each school containing a science laboratory, and the Science Department Head of these schools. In addition, each school will place a copy in an area readily accessible by all employees during normal working hours. Teachers may also request copies from Textbook Services.

1.5 Annual Review

The Chemical Hygiene Plan (CHP) will be reviewed annually from its effective date by the District Chemical Hygiene Officer (DCHO) and the Hazard Review Committee, with suggested revisions submitted to the Superintendent for consideration by the Board of Education.

2.0 Responsibilities for Chemical Hygiene

2.1 Chemical Hygiene Administrative Organization Chart



2.2 Board of Education and Superintendent

The Board of Education, as the legal employer, and the Superintendent, as the district's Chief Executive Officer, have the ultimate responsibility for providing safe working conditions within the school district, including implementation of the district Chemical Hygiene Plan.

2.3 District Chemical Hygiene Officer

The District Chemical Hygiene Officer (DCHO) is a position appointed by the Environmental Health and Safety Office and responsible for overseeing implementation of the Chemical Hygiene Plan. The person designated as the DCHO will have the following minimum qualifications:

a. Substantial academic background in chemistry, preferably a BS degree or higher;

b. Familiarity with state and federal occupational safety and health standards and regulations;

c. At least three years experience planning and implementing laboratory safety and/or chemical hygiene programs; and

d. Familiarity with school laboratories and the safety issues underlying school science programs.

The responsibilities of the DCHO are to:

a. work with administrators and teachers to develop and implement appropriate chemical hygiene policies and practices, including chairing the district Hazard Review Committee;

b. work with Science Department Heads at the schools to coordinate and monitor implementation of the Chemical Hygiene Plan;

c. see that required inspections are performed and appropriate records are maintained;

d. provide technical assistance to schools and employees on the Chemical Hygiene Plan;

e. know the most current legal requirements concerning regulated substances and justify that the Chemical Hygiene Plan is in accord with those requirements;

f. make recommendations to the Hazard Review Committee regarding request to use chemicals not on the standard district inventory because they have been identified by the district as explosive, carcinogenic, mutagenic, highly toxic, or otherwise unsuitable for general school laboratories;

g. determine need for personal protective equipment beyond that specified for general laboratory use;

h. contract for appropriate chemical hygiene training for all district employees whose normal work locations include laboratory areas; and

i. conduct an annual review of the Chemical Hygiene Plan and recommend revisions when appropriate.

2.4 District Science Curriculum Leader

The District Science Curriculum Leader oversees the curricular and instructional aspects of the district's science program. As such, the Science Curriculum Leader is responsible for insuring that implementation of the science program does not conflict with the standards set forth in the Chemical Hygiene Plan. In particular, the responsibilities of the Science Curriculum Leader are to:

a. facilitate and schedule appropriate chemical hygiene training for all district employees whose normal work locations include laboratory areas in conjunction with the District Chemical Hygiene Officer;

b. advise the District Chemical Hygiene Officer when changes in the adopted science curriculum materials or expected instructional practices have implications for maintaining district compliance with the Chemical Hygiene Plan;

c. serve as a member of the Hazard Review Committee to review requests to use hazardous chemicals in the science instructional program; and

d. work with principals and science department heads to identify laboratory safety issues to bring to the attention of the DCHO.

2.5 Hazard Review Committee

The Hazard Review Committee represents the various stakeholder groups impacted by the Chemical Hygiene Plan and advises the District Chemical Hygiene Officer on issues relative to the plan. The Committee has the following composition:

a. District Chemical Hygiene Officer (Committee Chair)

b. District Science Curriculum Leader

c. Representative from district maintenance division responsible for facility issues

d. One science teacher from each high school, selected by the Science Department Head

e. One science teacher from each middle or K-8 school containing science laboratory areas selected by the Principal and Science Department Head.

The Committee has a scheduled meeting once per school year. Additional meetings may be called by the DCHO to review chemical request or to address other issues of chemical hygiene or laboratory safety. The responsibilities of the Committee are to:

a. Review and rule on request to purchase and use chemicals not on the district's standard inventory lists;

b. Perform and annual review of the Chemical Hygiene Plan and propose needed updates and revisions; and

c. Advise the DCHO on issues of chemical hygiene and laboratory safety at the district and school levels.

2.6 Principal

The Principal is responsible for chemical hygiene in the school, and monitors school employees' compliance with the Chemical Hygiene Plan. The principal maintains required records of incidents, employee exposures, and chemical hygiene training of employees outside the science department.

2.7 Science Department Head

The Science Department Head is the building's contact person for the chemical hygiene program, including responsibility to:

a. Ensure that employees have received appropriate training and have access to the Chemical Hygiene Plan, material safety data sheets (MSDS), and other reference materials:

b. Coordinate a regular process for conducting chemical hygiene and housekeeping inspections, including routine inspections of emergency equipment;

c. Coordinate request to the Hazard Review Committee for acquisition and use of chemicals not on the standard district inventory list, due to explosive, carcinogenic, mutagenic, highly toxic, or other characteristics that make them unsuitable for general school laboratories;

d. Oversee purchase, storage, and disposal of chemicals in accordance with the Chemical Hygiene Plan; and

e. Maintain required records of science teacher training, current inventory, and inspections and maintenance of facilities and equipment.

In buildings lacking a "Science Department Head" position, the Principal will appoint a qualified teacher to act as "School Chemical Hygiene Officer" with the responsibilities listed above.

2.8 School Employee

Individual employees are responsible for their own safety. All employees performing work with hazardous substances must accept a shared responsibility for operating in a safe manner once they have been informed about the extent of risk and safe procedures for their activities. All school employees whose normal work locations include a laboratory area have the specific responsibility to:

a. maintain awareness of health and safety hazards through participating in required training programs and updating knowledge through optional training and consulting reference materials;

b. plan and conduct daily activities in accordance with the district chemical hygiene standards and procedures, including chemical preparation, handling, and disposal;

c. use good personal chemical hygiene habits in their own work, as well as modeling and enforcing these habits for students;

d. inform supervisors of accidents and work practices or working conditions they believe hazardous to their health or to the health of others; and

e. keep records of all safety instructions given, and written proof of student understanding of the class safety rules and procedures.

2.9 Students

While students are not covered under the provisions of the Laboratory Standard, students should be made aware of chemical health and safety hazard in classroom situations and should be provided with information and equipment to protect themselves from those hazards. Teachers should provide student training at the beginning of each course in which hazardous chemicals are used, and specific safety instructions should be provided at the beginning of each laboratory period.

3.0 Access to Hazard Information

Identifying the specific hazards associated with a chemical greatly reduces chances of misuse by regular laboratory employees, new users, or visitors to the laboratory. The goal of the district's chemical hygiene program is to assure that all individuals at risk are adequately informed about: the hazards associated with hazardous chemicals present in the laboratory; the proper procedures to minimize risk of exposure; and the proper response to workplace accidents. This goal is achieved through two means: 1) formal training and 2) readily available hazard information on signs, labels, and material safety data sheets (MSDS).

3.1 Employee Training

All school employees whose normal work assignment includes working in a laboratory area shall participate in an ongoing chemical hygiene-training program. This includes custodial and maintenance personnel, as well as appropriate teaching staff (including substitute teachers whose assignments are likely to include a laboratory area). Employees new to the district who possess records certifying their participation in chemical hygiene training with a previous employer will be excused from the general introductory training, but must participate in training that covers the specifics of the district Chemical Hygiene Plan.

The precise nature of the training that a particular employee receives is determined by the nature of his/her work assignment in the laboratory. For example, the training for science teachers would include safe handling of chemicals during experimental procedures; training for custodians would include procedures for performing necessary cleaning operations in the possible presence of hazardous chemicals. The training approach will be directed to categories or groups of hazardous chemicals, rather than to the specific characteristics of many individual chemicals.
Training may take the form of individual instruction, group workshops, audiovisual presentations, handout material, or any combination of these.

The general content of the training and information program will include:

1. the federal and state chemical hygiene standards, including the contents of 29 CFR Part 1910.1450;

2. the contents of the district's Chemical Hygiene Plan and where copies of the plan are located in each school building;

3. safe practices for handling hazardous chemicals and transporting them within the facility;

4. hazards of chemicals on the school site, including PELs or other exposure limits;

5. procedures for requesting authorization to obtain and use chemicals considered too hazardous for general school laboratories;

6. labeling and storage practices, and information to interpret labels, as outlined in the district's Hazard Communications Plan;

7. information on concepts necessary to understand reference materials, such as PEL, TLV, LD50, and routes of entry;

8. content of MSDS, and the location in each school building of the MSDS for chemicals in that building, as well as the location and content of other reference materials on the properties, safe handling, storage, and disposal of hazardous chemicals;

9. proper use, available protective apparel and equipment;

10. signs and symptoms associated with exposures to hazardous chemicals used in the laboratory;

11. methods and observations to detect the presence or release of hazardous chemicals; and

12. appropriate procedures for responding to and reporting accidents involving chemical exposures. Selected employees will also receive training in the use of specialized emergency response equipment (i.e., spill kits, fire extinguishers, fire blankets, etc.). At least one employee per building will be trained in first aid techniques.

The training program will be a regular, continuing activity, not simply a one-time initial orientation for new employees. The Science Department Head will maintain records documenting the ongoing training received by science teachers; the principal will maintain training records for other employees in the building.

All principals and associated principals in buildings containing laboratories will attend a Chemical Hygiene Plan orientation session addressing the following topics:

1. basic components of the Chemical Hygiene Plan;

2. principles of laboratory safety and safety issues in the science instructional program; and

3. administrative responsibilities for overseeing implementation of the Chemical Hygiene Plan at the school level.

3.2 Material Safety Data Sheets

Material Safety Data Sheets (MSDS) were created with worker safety in mind. They give details about chemicals and their hazards. A typical Material Safety Data Sheet is divided into the categories: Identification, Toxic Hazards, Health Hazard Data, Physical Data, Fire and Explosion Data, Reactivity Data, Spill or Leak Procedures and Addition Precautions and Comments. While there is no required standard format, all MSDSs supply the following information:

Identity

- Name of the chemical
- Name, address and phone number of the supplier
- Chemical formula and EPA number

Physical Characteristics

- Boiling point (special fire hazard for flammables)
- Vapor pressure (high values mean easy inhalation)
- Vapor density (accumulates in low areas)
- Water solubility
- Appearance and odor
- Specific gravity
- Water reactivity (important for cleanup operations)

Special hazard

- Flashpoint (lowest temperature at which vapor will ignite with a spark)
- Auto-igniting information – extinguishing material to use (dry chemical, CO_2, etc.)
- Explosive limits (maximum concentrations of vapors allowed)

Reactivity Data

- Stability and reaction paths of dangerous decomposition

Health Hazard Data

- Routes of exposure (inhalation, absorption through skin, etc.)
- Health symptoms (irritant, corrosive, carcinogen, etc.)
- Emergency first aid

Personal Protective Equipment

- Respiration, goggles, gloves
- Types of ventilation required
- Hygiene procedure – washing hands after use, etc.

Hazardous Waste Disposal

- Protective equipment to use
- Spill cleanup
- Method of disposal

Each school must maintain the most current MSDS received for all chemicals stored and/or used in the science department. MSDSs will be kept in a location readily accessible to employees working in school laboratories. The system a school uses to store MSDS varies from keeping them in a notebook or file cabinet to a computerized data file. However, the system adopted must provide easy and immediate access in an emergency situation. The District Chemical Hygiene Officer will maintain a master set of MSDS's for all chemicals in the district.

All chemical orders must include a request for the most recent MSDS from the supplier.

3.3 Laboratory Signs

Warning signs should allow both employees and those unfamiliar with the laboratory surroundings to identify hazardous chemical use and storage areas, safety facilities, emergency information, protective equipment and exit routes. Signs will be clearly posted in all laboratory, preparation, and chemical storage areas. The school district will provide standard signage, including:

a. telephone numbers of emergency response personnel (fire, medical, chemical spill, and poison control). These signs are also posted in the main school office and in areas containing telephones accessible to laboratory personnel;

b. standard laboratory procedures, safety precautions, and emergency medical procedures;

c. location signs for exits, evacuation routes, safety showers, eyewash stations, fire extinguishers, fire blankets, first aid kits, used chemical containers, and other safety equipment;

d. warnings at areas or equipment where special or unusual hazards exist, such as lasers, vacuum, or biohazards; and

e. signs indicating “designated areas” for restricted use of specially authorized chemicals.

3.4 Labels

Identifying labels will be placed on all containers used for stock preparations, reagents for laboratory procedures, and used chemical receptacles. Labels will include the following minimum information:

a. chemical name (chemical formula alone is not permitted);

b. concentration, where applicable;

c. hazard information; and

d. date prepared, name/initials of the preparer.

Labels on stock bottles will not be removed or altered. Additional information labels may be affixed, if they do not obscure the original labels.

The labels described above are not required for “secondary use” containers that are prepared and will be used and emptied within the school day, and are only handled by the employee preparing them. Secondary use containers are only required to be labeled with the identity of the chemical and its concentration, where applicable.

A special, district-supplied label will be affixed to all containers of chemicals not on the standard district inventory. These labels will list the date that use of the chemical was approved and the designated areas, if any, to which its use is restricted.

The chemical storeroom index will show the location and storage pattern for all chemicals contained in the storeroom.

3.5 Other Sources of Hazard Information

Each school must maintain a laboratory safety information file accessible to all employees. The file should contain reference materials pertinent to chemical hazard information, safe laboratory practices, chemical storage, and chemical disposal, e.g. “Standard Operating Procedures (SOP).

4.0 Standard Operating Procedures

4.1 General Principles Guiding Handling and Use of Chemicals

Understanding the hazards before using any chemicals.
The Permissible Exposure Limits (PELs), and Threshold Limit Values (TLVs), of chemicals approved for use in school laboratories of the Long Beach Unified School District are available to employees in the Material Safety Data Sheets (MSDS) for each chemical, and in publications such as OSHA 3112, "Air Contaminants-Permissible Exposure Limits", NIOSH *Pocket Guide to Chemical Hazards,* or the *Manual of Safety and Health Hazards in the School Science Laboratory.* The school district will train employees in how to find and use this information. Employees, in return, will make use of this information to familiarize themselves with the hazards associated with chemicals.

Minimize all chemical exposures.
It is prudent to minimize all chemical exposures because few laboratory chemicals are without hazards. Employees will follow the standard general precautions listed in this plan for handling all laboratory chemicals. Other specific procedures must also be followed for chemicals with particular hazardous properties, such as corrosiveness, flammability, toxicity and strength.

Do not underestimate risk.
Employees must not underestimate the risk involved in any given laboratory procedure. Exposures to substances of unknown risk should be minimized. The decision to use a particular substance in the school laboratory must be based on the best available knowledge of the chemical's particular hazards, and the availability of proper facilities and equipment to store, handle, use, and dispose of the chemical. Substitutions, either of chemicals or procedures, can often be made to reduce hazards without sacrificing instructional objectives. When the risk outweighs the instructional benefit and no safer substitutes are available, then the experiment or procedure MUST NOT be performed.

Adequate ventilation is essential.
The best way to prevent exposure to airborne substances is to prevent their accumulation in the working atmosphere. General laboratory ventilation will be maintained at specified levels and additional devices such as hoods and auxiliary ventilation will be used when necessary to keep airborne concentrations below the PEL or TLV for the chemicals in use.

Follow the Chemical Hygiene Plan.
The chemical hygiene program specifies laboratory practices designed to minimize employee exposure to hazardous chemicals. Because of the large number of chemicals that may be stored and used in school laboratories, employees must follow the practices specified in the Chemical Hygiene Plan in order to minimize their health and safety risks. When employees are in doubt about particular procedures and safeguards in the Plan, they must consult with their Science Department Head or the District Chemical Hygiene Officer before proceeding.

4.2 General Laboratory Procedures

1. Planning

   a. Consult Material Safety Data Sheets *before* undertaking any activity. Texbooks, laboratory manuals and other instructional materials often designate safety precautions needed for a particular activity. However, employees should not rely on such publications to provide complete and accurate information. The MSDS specifies handling precautions, spill cleanup, and storage guidelines.

   b. Do not perform a laboratory procedure unless the following criteria have been met:

      1. All persons involved in the procedure are knowledgeable about the hazards of the procedure and can perform the manipulations required.

      2. All necessary facilities and protective equipment and apparel are available and in good operating condition for use during the procedure.

      3. The instructional benefits to be gained from the procedure clearly outweigh the risks involved in the procedure.

      4. Where appropriate, the scale of procedures is adjusted (to microscale) to minimize risk of exposure and reduce generation of used or waste chemicals.

2. Conduct for students and employees

   a. Do not eat, drink, smoke, chew gum, apply cosmetics, manipulate contact lenses, or other such activities in the laboratory.

   b. Do not perform procedures using unauthorized chemicals.

   c. Avoid working alone in the laboratory whenever possible. Otherwise, inform another person where you will be and what you will be doing.

   d. Do not engage in horseplay, practical jokes, or other behavior, which might confuse, startle, or distract another person in the laboratory.

   e. Do not leave the laboratory unattended while operations are ongoing.

   f. Use laboratory equipment only for its designed purpose.

3. Handling Chemicals

   a. Read the label on a chemical container at least twice-once when you get the container, and again before you dispense the chemical.

   b. Work in the fume hood whenever the PEL for a chemical is 50 ppm or less. Hood sash should remain closed, except when placing or removing apparatus. The hood fan should be kept on whenever chemicals are present in the hood. Chemicals and solutions should not be stored in the fume hood.

   c. Always use the proper method of transporting chemicals within the facility. Use acid/base carriers when moving corrosive materials. Use cylinder carts when transporting cylinders. Make sure that any carts used to transport chemicals are sturdy and tight, without loose connections.

d. Avoid inhalation of chemicals; do not “sniff” to test chemicals. Do not taste chemicals. Avoid ingestion of chemicals. Do not mouth pipette anything; use suction bulbs.

e. When mixing solutions, always pour the more concentrated solutions into water or into the less concentrated solutions. Pour slowly, while stirring to dissipate heat.

f. Do not mix chemicals known to have incompatible properties. Check the MSDS for both chemicals (Appendix C).

g. Know the symptoms of exposure for the chemicals being used, and the precautions necessary to prevent exposure.

4. Apparel

a. Wear appropriate chemical splash eye protection whenever manipulating chemicals (impact goggles do not provide sufficient protection and MUST NOT be worn for chemical work).

b. Wear a chemical-resistant lab apron or coat to protect exposed body parts and clothing.

c. Wear shoes at all times, but do not wear sandals, open-toed or perforated shoes.

d. Wear nonpermeable latex or nitrile gloves whenever there is potential for contact with corrosive or toxic material. Check gloves for pinholes.

e. Confine long hair and loose clothing. Remove jewelry from fingers, wrists, and neck.

f. Contact lenses normally should not be worn in the laboratory when fumes are present that could adhere to the lenses. If contact lenses are worn for other laboratory procedures, appropriate chemical splash goggles MUST be worn at all times.

5. Inspections and Maintenance

a. Perform a visual inspection of safety equipment prior to beginning a chemical procedure in the laboratory. The purpose of such visual inspections is to check for obvious problems with equipment. It is not intended to substitute for thorough periodic inspections. Any safety equipment not operating to the general standards must be taken out of service and reported to the District Chemical Hygiene Officer.

b. Know how to use the protective equipment – eyewash, shower or drench hose, fire extinguisher, and fire blanket. If you are uncertain ask the Science Department Head for assistance. DO NOT PERFORM LABORATORY WORK UNTIL YOU CAN USE PROTECTIVE EQUIPMENT TO RESPOND TO AN EMERGENCY.

c. Be alert to unsafe conditions and see that they are corrected. Ensure that aisleways, exits, and paths to safety equipment are unblocked.

d. Know the location of safety devices wherever you are working – in the stockroom, preparation areas, and laboratories.

e. Check that equipment is in good operating condition, and that glassware is free of chips and cracks.

6. Housekeeping and Personal Hygiene

a. Keep chemical containers out of the laboratory except when in active use; return to the storage area at the end of each day.

b. Keep rooms clean and in orderly condition. Keep floors, shelves, and tables clear of chemicals not in use. Clean up the work area on completion of an operation or at the end of the day.

c. Wash areas of exposed skin well before leaving the laboratory.

d. Never use the same refrigerator to store both chemicals and food.

e. Place excess reagents and reaction products in proper used chemical containers; do not return reagents to the stock containers.

f. Promptly clean-up spills, using appropriate protective apparel and proper procedures.

g. Keep aisles and passageways to all exits and safety equipment clear. Do not store materials near doorways.

h. Before leaving the laboratory, turn off all services (gas, water, and electricity). Lower the fume hood sash. Lock the laboratory door.

i. Clean chemical storage rooms prior to the opening of school and at the close of the school year, under supervision of a trained and qualified employee.

j. At the end of each workday, treat the contents of all containers of used chemicals in accordance with district-approved procedures for used and waste chemicals.

4.3 Use/Handling/Storage of Certain Chemicals is Specifically Forbidden

Certain chemicals have severe hazards that far outweigh any instructional benefits that might result from their use in school laboratories.

Chemicals in the following categories may not be stored, handled, or used in any laboratory in the Long Beach Unified School District without specific approval (see Section 5.3) and only under tightly controlled conditions:

a. Select carcinogens, listed by the National Toxicology Program (NTP) as “known to be carcinogens” or “reasonably anticipated to be carcinogens” or by the International Agency for Research on Cancer (IARC) as Group 1,2A, or 2B carcinogens.

b. Reproductive toxicants

c. Chemicals with high degree of acute and chronic toxicity (LD = 50 mg/kg)

d. Unstable, shock-sensitive, or highly-reactive chemicals

Chemicals Not Permitted

In California School Science Laboratories

Source: Science Safety Handbook for California Public Schools, 1999 Edition

2-aectylaminofluorine
4-aminodiphenyl
acrylamide
aniline
antimony
arsenic compound (any)
arsenic powder
arsenic trioxide
asbestos
benzene
benzidine (and salts)
benzoyl peroxide
beryllium
beryllium compounds
bromine
cadmium powder
cadmium salts
calcium carbide
carbon disulfide
carbon tetrachloride
chloroform
chromium (VI) oxide
all hexavalent chromium compunds
cobalt
p-dichlrobenzene
3,3-dichlorobenzidene (and salts)
diisopropyl ether (more than a year old)
dimethyl amine
4-dimethylaminoazobenzene
ethidium bromide
ethyl ether / diethyl ether (more that a year old)
ethylene dichloride
ethylene oxide
ethyleneimine
formaldehyde
hydrazine (anhydrous)
hydrofluoric acid
hydrogen peroxide (35%)
lead (powder)
lead acetate
lead arsenate
lead carbonate
lead chloride
lead nitrate
lead oxide
lead peroxide (dioxide)
lead sulfate
lead sulfide
mercurous/ mercuric nitrate mercury metal
mercury compounds
methylchloromethyl ether
4,4-methylene bis (2-chloroanaline)
methylene chloride
alpha-naphthylamine
beta-naphthylamine
nickel compounds
nickel powder
4-nitrobiphenyl
nicotine
nitrogen triiodide
phenol (carbolic acid)
phosphorus (red)
phosphorus (yellow/white)
picric acid
potassium chlorate
potassium metal
Beta-propiolactone
sodium arsenate
sodium arsenite
sodium azide
toluene
vinyl chloride

In addition, other chemicals may be designated by the Hazard Review Committee as unsuitable for school laboratories.

4.4 Procedures for Specific Chemical Hazards

Materials which present physical and/or health hazards can be used safely if the specific hazards are understood, appropriate equipment and facilities are available and proper procedures are followed. If appropriate precautions are not taken, personal injury or property damage may occur. See the glossary in Appendix B for definitions of the hazard classes discussed below.

Additionally, certain chemicals cannot be safely mixed or stored with chemicals because of the danger of severe reaction or toxic products. See Appendix C for a table of incompatible chemicals.

1. Toxic Chemicals

   a. Use nonpermeable gloves when handling containers of toxic chemicals. Wash affected areas immediately if the chemicals come in contact with skin.

   b. If the PEL or TLV for a substance is less than 50 ppm or its LC50 is less than 200 ppm, the substance should only be handled in a properly functioning fume hood.

   c. Know the signs and symptoms of exposure to toxic substances. Review emergency response procedures.

2. Flammable Chemicals

   a. Store flammable liquids in approved flammable storage cabinets. Ground safety cans and other metal containers of flammable liquids used near electrical equipment or other sources of electrostatic fields.

   b. When working with flammable chemicals, be certain that there are no open flames, hot surfaces, sparks, or other sources of ignition near enough to cause a fire or explosion in the event of a vapor release or liquid spill.

   c. Assure that appropriate fire extinguishers are in the area. Always have vermiculite, absorbent pillows, or some other chemical absorbent available in the event of a spill.

3. Corrosive Chemicals

   a. Eye protection and appropriate apron and gloves should always be used when handling corrosive materials. An eyewash and safety shower or drench hose must be readily accessible (See Section 7.1 a) to areas where corrosives are used and stored.

   b. Carry bottles of acids or bases in protective carriers to reduce possibility of breakage or spills.

   c. Acid or base exposure demands immediate attention! Exposure can occur through direct skin contact, ingestion, inhalation of vapors or skin exposure to mists in the air. Symptoms of exposure include:

      -irritation of skin, eyes, nose, throat or lungs
      -dermatitis
      -skin and eye burns
      -difficulty breathing

      Splashes should be washed off immediately with plenty of water for 15 minutes. Remove all affected clothing and seek medical help.

   d. Mineral acids (e.g. sulfuric, nitric, hydrochloric) are quite reactive with metals, generating flammable hydrogen gas.

   e. When performing dilutions, always pour acid into water, never the reverse.

   f. Completely neutralize a spill (with baking soda acid spills, vinegar for base spills) before cleaning up the area with plenty of water.

4. Reactive Chemicals

a. Oxidizers: Know the reactivity of the materials involved in the reaction. Ensure that there are no extraneous materials in the area, which could become involved in a reaction. Use shields or other methods for isolating the process if the reaction is expected to be violent.

b. Water Reactive (react with water to produce a flammable or toxic gas): Safe handling of water reactive materials depends on the specific materials and the conditions of use and storage. See MSDS for specific instructions.

c. Pyrophoric (ignite spontaneously upon contact with air): Pyrophoric chemicals should be used and stored in inert environments. Often the flame is invisible.

d. Peroxidizable (materials, which react with air to form explosive peroxides): Peroxides can explode with impact, heat, or friction. Peroxides can form even when the container has not been opened. Date all peroxidizables upon receipt and upon opening. Dispose of after three months. Do not open any container, which has obvious solid formation around the lid.

e. Light Sensitive (degrade in the presence of light): Light sensitive materials can form new compounds that may be hazardous, or may cause pressure build-up in containers. Store in a cool, dark place in amber colored bottles.

5. Allergens and Sensitizers

A variety of allergens may be encountered in the laboratory. Exposure of skin or the respiratory tract to these agents may elicit dermatitis, asthma, or other responses. The special problem with allergic responses is one of sensitization and difficulties arise because the cause of the allergic response may not be readily identifiable. Usually there is no physical reaction at the time of initial exposure, but this is the point where sensitization occurs. The reaction takes place upon a subsequent exposure to the allergen.

Because of the variety of chemicals that may produce allergic responses or adverse reactions in sensitive individuals, and because of the varying response of individuals to such substance, it is essential to minimize exposure of eyes, hands and forearms, and lungs by working with adequate ventilation and appropriate protective apparel, resistant to permeation by the chemicals.

4.5 Procedures for Specific Physical Hazards

Materials and equipment, which present physical hazards, can be used safely if the specific hazards are understood, appropriate equipment and facilities are available and proper procedures are followed. If appropriate precautions are not taken, personal injury or property damage may occur.

1. Electrical Safety

a. Water can turn anything into an electrical conductor, so do not stand in water or have water on your hands when using electrical equipment.

b. Electrical shocks are caused from electrical current flowing into your body as an easy path to ground is formed, not only from high voltage. Be very cautious when dealing with voltages high enough to generate this current. Current as little as fifty milliamperes can kill.

c. Use only one hand when probing for voltage readings, as two hands allows a path through the heart. The best procedure is to rest your elbow on a grounded surface so that, if a circuit is accidentally completed, the current will flow in your hand and out your elbow, avoiding your heart.

d. All electrical outlets should carry a grounding connection requiring a three-prong plug. All electrical equipment should be wired with a three-prong plug, unless the equipment is double-shielded. Never remove the ground post from a three-prong plug.

e. The condition of wiring plugs. And cords should be checked regularly. Confirm that the insulation on electrical cords and cables is intact and not frayed or cracked. Breaks in the insulation can cause shocks.

f. All laboratories should have circuit breakers readily accessible. Employees should know how to cut off electrical service to the laboratory in case of emergency. Laboratory lighting should be on separate circuits from electrical outlets, in case electric service must be cut off in an emergency.

g. If electrical equipment shows evidence of undue heating, unplug it immediately.

h. When unplugging electrical equipment, grasp the plug instead of pulling on the cord.

i. In case of an electrical fire, do not touch the burning object or douse it with water. If possible, turn off the current. For a small fire, extinguish it with a CO_2 or multipurpose ABC extinguisher, or with baking soda.

2. Glassware

a. Adequate hand protection (heavy gloves) should be used when inserting glass tubing into rubber stoppers or corks or when placing rubber tubing onto glass tubing. Tubing must be fire polished and lubricated and hands should be used close together to minimize the possibility of fracturing the glass.

b. Use leather gloves when picking up broken glass, or use tools such as brooms, dustpans, forceps, etc.

c. Glassware should be stored on well-lighted stockroom shelves built with a barrier to prevent the pieces from falling off.

d. Select glassware that is designated for the type of work planned. In particular, be sure that glassware to be used in vacuum apparatus is constructed for that purpose.

e. When cutting glass tubing or rod, place a towel over the strike mark and break away from the body. Fire polish all glass before use. After heating glassware, allow ample time for cooling to occur. Hot glass looks the same as cool glass.

f. Glass containers of acids, alkalis, or flammable chemicals should be transported in carriers to protect from breakage and to contain leaks.

g. Each laboratory should have a container specifically designated and labeled for broken glass. Do not place broken glass in the general trash container.

3. Laser Safety

a. It is imperative that personnel do not look down the barrel of any laser while it is in operation. (Wavelengths of 200-315 nm are absorbed by the cornea of the eye, causing “welders flash”. Wavelengths of 315-400 nm are absorbed by the lens and iris of the eye. Wavelengths of 400-1400 nm pass through the ocular media of the eye and burn the retina). Even low energy output He-Ne lasers can cause eye damage.

b. Protection for the eyes requires goggles that have sufficient protective material and so fitted that stray light cannot come in from any angle.

c. Be particularly careful about reflections of the laser beam. Specular reflections (from polished, flat surfaces) are the most seriously damaging to the eye, due to the collimated nature of the laser beam. No protection is offered by distance from the source.

d. Working conditions must be in compliance with ANSI Z136.1-1993, the American National Standard for Safe Use of Lasers. In the lab area, warning signs are required.

4. Vacuum Safety

a. All reduced-pressure or vacuum conditions present serious hazards. Do not assume that 10-3 Torr is less dangerous than 10-11 Torr.

b. One of the biggest dangers associated with working under vacuum is the danger of implosion. When the vacuum vessel is constructed of glass or other shatterable materials, this danger can be extreme. Even stainless steel vacuum systems will occasionally have some components made of glass. Take the necessary precautions like taping the vessel in a criss-cross pattern if it does not have to be heated, or work behind a mechanical shield with safety glasses.

c. Achieving and measuring vacuum often involves dangerous mechanical motions (e.g. rotary pumps). Cover belts and wheels with guards, and exercise caution so as not to get body parts and clothing caught in these devices; cover exposed high voltage sources.

5. Compressed gases

a. Laboratories using compressed gases comply with Compressed Gas Association guidelines contained in CGA P-1 (1965), “Safe Handling of Compressed Gases”.

b. Always use the minimum-sized cylinder adequate to perform the desired laboratory activity.

c. Cylinders of compressed or liquid gases must not be stored in the laboratory. They should be kept in a storage area, securely restrained by straps or a suitable stand. Do not expose cylinders to temperatures above 50^{o}C. Always store cylinders upright, secured, with the cap threaded on.

d. Never transport a cylinder without the safety cap in place. Use a cylinder cart for transporting.

e. Never force threaded connections.

f. Teflon tape should not be used on a new Swagelok fitting, as it will tend to deform the threads prematurely.

g. When a cylinder is empty or before moving, replace the protective cap. Do not bleed a cylinder completely empty. Leave a slight pressure to keep contaminants out.

h. Do not interchange gauges, regulators, or fittings, especially with oxygen cylinders. Use only the appropriate gauges fittings and materials compatible with the particular gas being handled.

i. Do not use a cylinder that cannot be positively identified.

j. Always wear safety goggles when handling or using compressed gases.

k. Note specific handling requirements for cylinders of toxic, corrosive, or reactive gases, especially requirements for ventilation (i.e., using in a fume hood).

6. Cryogens

a. Liquefied gases that condense oxygen from the air create an oxygen rich atmosphere and increase potential for fire if flammable or combustible materials and a source of ignition are present. Mixture of gases or fluids should be strictly controlled to prevent formation of flammable or explosive mixtures.

b. Pressure is a hazard due to the large expansion ratio from liquid to gas, causing pressure build up in containers. Containers and systems containing cryogens should have pressure relief mechanisms.

c. Many materials become brittle at extremely low temperatures. Containers and systems should be capable of withstanding extreme cold without becoming brittle.

d. Always wear safety glasses with side shields or goggles when handling. If there is a chance of a splash or spray, a full-face protection shield, an impervious apron or coat, cuffless trousers, and high-topped shoes should be worn. Watches, rings and other jewelry should not be worn. Brief contact with materials at extremely low temperatures can cause burns similar to thermal burns. Gloves should be impervious and sufficiently large to be readily thrown off should a cryogen spill. Potholders could also be used.

7. Other Hazards

   a. When using a centrifuge, be sure the arms are balanced, and that is securely anchored.

   b. Reactions should never be carried out in, nor heat applied to, an apparatus that is a closed system (stoppered or fitted with a septum). A pressurized apparatus should have an appropriate relief device. An inert gas purge or bubbler system is usually appropriate.

5.0 Chemical Procurement and Storage

5.1 Ordering and Receiving Chemicals

Prior to ordering any chemical, the need should be verified, based on the desired use of the chemical. Amounts ordered should not exceed what is expected to be used within a reasonable time period, recognizing that some chemicals are unstable and should not be stored more that one year. All chemical orders will request the latest MSDS from the vendor.

Before new chemicals are ordered or used, employees will be trained in their hazards, storage and handling.

5.2 Standard District Chemical Inventory List (Approved Chemical List)

Several chemicals have hazards that outweigh their educational usefulness. In general, explosive, carcinogenic, mutagenic, and highly toxic chemicals are considered too hazardous for use in school laboratories. The District Chemical Hygiene Officer and Science Curriculum Leader will oversee development of a standard district chemical inventory, which specifies which chemicals are acceptable for use at the elementary, middle school and high school levels. Other chemicals may not be ordered, stored, or used in school laboratories without specific, written authorization from the Hazard Review Committee and the District Chemical Hygiene Officer (see section 5.3).

5.3 Requests to Use Chemicals not on Standard District Inventory

Employees wishing to obtain and use chemicals not on the standard district inventory must submit a request, through the School Science Department Head, to the District Chemical Hygiene Officer, using the specified form (see appendix D.9). The request will include the following information:

a. Name of person submitting the request;

b. Chemical name, common name(s) (if any), and Chemical Abstract Service (CAS) Registry Number of the desired chemical;

c. Name and address of the supplier and quantity of the chemical desired;

d. Name of course and copy of the specified laboratory activity for which the chemical is needed, together with rationale for performing the activity;

e. Justification that adequate facilities, equipment, and apparel are present at the school laboratory to provide a safe working environment in which exposures will not exceed PEL or TLV for the chemical;

f. Description of specific handling guidelines (such as National Cancer Institute or NIOSH)

g. Documentation that the employee has appropriate certification, as well as sufficient knowledge and skills to handle the chemical in the prescribed manner;

h. Estimate of the length of time the chemical will be stored in the school building and justification that school storage facilities are appropriate for housing the chemical;

i. Plan for proper disposal of used chemical products and reagents; and

j. Date that use of the chemical is desired.

Upon receiving the request, the District Chemical Hygiene Officer and Science Curriculum Leader will determine whether or not to approve the chemical purchase, and will provide guidelines for its use. A copy of the determination and its rationale will be sent to the employee(s) making the request, the department chair, and the principal.

If the request is approved, the Hazard Review Committee will determine whether the chemical should be added to the district's Approved Chemicals List. The DCHO will authorize the marking of any necessary designated areas as the only areas where work with chemical will be conducted. Appropriate signs will be placed to identify the designated area and to indicate the hazards of the chemical to be used there. Special labels will be affixed to all containers of the chemical indicating the date of its approval for use and designated areas to which its use is restricted.

5.4 Chemical Storage Facilities

All middle and high schools will have a designated chemical storage room with suitable shelf space, arrangement, and ventilation for the nature of the chemicals housed. Laboratory rooms shall not be used for storage of chemicals. Chemical storage rooms will have the following features:

a. Lockable door to restrict access by unauthorized persons. Deadbolt locks or hasp locks are not permitted, since they may inadvertently trap someone inside.

b. Ventilation sufficient to prevent buildup of vapors above recommended levels. OSHA 1910.106 specifies six room changes per hour (calculated), exhausted to the outside air.

c. Temperature controlled to remain in a moderate range, not to exceed the flash point of stored flammable substance, at all time during the year (including summer months)

d. Shelves or cabinets are firmly secured to the wall, with maximum shelf height of six feet. Shelf clips (if present) are corrosion-resistant.

e. ABC fire extinguisher and fire blanket near storeroom exit or within 25 feet of storage areas. If reactive metals (sodium, magnesium, etc.) are stored, a Class D extinguisher will be available within 5 ft. of the storage area.

f. Eyewash and either a shower or drench hose, within 25 feet of storage area. All will conform to ANSI Z358.1-1991: continuous stream of ambient-temperature water for a minimum of 15 minutes; water pressure 30 psi; flow rate of 0.4 gal/min (eyewash), 3 gal/min (drench hose), 30 gal/min (shower). Drench hose must not be used as a replacement for eyewash.

g. Ceiling-mounted smoke or fire detector with outside alarm

h. Dedicated cabinets for flammables and acids

i. Spill control kit, with chemical splash goggles, chemical-resistant gloves, appropriate neutralizing materials and absorbent material, plastic bags, and scooper

j. Separate, lockable storage to restrict access to highly toxic chemicals or hazardous chemicals not on standard inventory list (if present)

k. Dedicated explosion-proof refrigerator for storage of volatile flammable materials or biological specimens (if present)

5.5 Chemical Storage Procedures (General)

a. Chemicals are arranged in chemically compatible families, not in alphabetical order.

b. Amounts of unstable chemicals stored should correspond to no more than one year's projected supply.

c. The Uniform Fire Code UFC 79.202A(2) states that when more than 10 gallons of flammable or combustible liquids (total) are present in a building, they must be stored in a dedicated cabinet meeting NFPA specifications. If the cabinet is vented, the ductwork will not be less fire resistant than the cabinet. The amount of material stored in the cabinet will not exceed its specified rating.

d. Chemical storerooms are not to be used as prep rooms for repackaging chemicals or preparing solutions.

e. When opening newly received chemicals, immediately read the warning label to be aware of any special storage precautions like refrigeration or segregation from other chemicals.

f. No chemicals are to be stored in aisles or stairwells, on desks or laboratory benches, on floors or in hallways, in fume hoods, or in cabinets in rooms other than the specified chemical storage room.

g. Maintain a complete inventory in the room where chemicals are stored, and update the inventory annually.

h. Mark the acquisition dates on all containers; dispose of peroxide-forming chemicals after six months.

i. Do not store chemicals on shelves above eye level or directly at floor level.

j. Do not crowd bottles on shelves so that some containers must be moved in order to remove the desired container.

k. Inspect bottles at least annually and dispose of those that show signs of corrosion or leakage.

l. Gas cylinders must be secured in place, with protective caps to prevent valve damage in case the cylinder falls. Store away from heat and direct sunlight.

m. All chemical storage shelves must have Earthquake Proof "Lip" or wire.

5.6 Guidelines for Storing Chemicals from Specific Hazard Classes

Flammable Liquids

Conditions for storage:

- ☑ Store in a cool place away from heat, sun or sources of ignition.
- ☑ Automatic fire detection equipment and spray devices should be used.
- ☑ Adequate ventilation should be provided to prevent vapor buildup.
- ☑ Use approved storage cabinets or safety cans for flammable liquids.
- ☑ Ground metal containers.

Store away from:

- ⦸ Oxidizers.
- ⦸ Chemicals capable of spontaneous heating.
- ⦸ Explosives.
- ⦸ Materials that react with air or moisture to liberate heat,
- ⦸ Ignition sources.

Corrosive Chemicals

Conditions for storage:

- ☑ Separate acids from bases.
- ☑ Separate oxidizing acids (e.g. nitric acid) from other acids.
- ☑ Cabinets should be non-corroding or covered with fume resistant paint.
- ☑ Corrosives should not be stored at or above eye level.
- ☑ Use bottle carriers for transporting containers of corrosives.
- ☑ Inorganic acids should be stored separate from organic acids.
- ☑ Have spill control pillows and neutralizing materials readily available.

Store away from:

- ⦸ Toxic materials.
- ⦸ Active metals (Group IA and IIA, like sodium, magnesium, etc.)
- ⦸ Substance that release corrosive, toxic or flammable fumes on reaction
- ⦸ Organic materials.
- ⦸ Flammable substances.
- ⦸ Uncoated structural material.

Toxic Chemicals

Conditions for storage:

- ☑ Store away from heat, moisture and fire hazards areas.
- ☑ Protect from contamination with acids and fumes.

Store away from:

- ⦸ Acids and other corrosives.
- ⦸ Reactive chemicals.
- ⦸ Fire hazards.
- ⦸ Heat.
- ⦸ Moisture.

Reactive chemicals:

Conditions for storage:

- ☑ A fire sprinkler, except where water sensitive chemicals are stored.
- ☑ Protect from extremes of temperature and rapid changes in temperature.
- ☑ Store oxidizers away from flammable or combustible materials, and away from reducing agents such as zinc and alkaline earth metals.
- ☑ Store peroxide-forming chemicals in airtight containers and label with receiving and disposal dates (these chemicals can form explosive peroxides which can be detonated by shock or heat)
- ☑ Store light sensitive chemicals in amber bottles

Store away from:

- ⦸ Organic materials.
- ⦸ Flammable materials.
- ⦸ Corrosives.
- ⦸ Toxic materials.

Water and air sensitive chemicals

Conditions for storage:

- ☑ Store in waterproof, fire-resistant cabinet or room.
- ☑ Smoke and/or heat detector should be provided in storage area.
- ☑ Eliminate all ignition sources.

Store away from:

- ⦸ Water and moist air.
- ⦸ Solutions of aqueous acids and bases.
- ⦸ Flammable storage area.
- ⦸ Reactive chemicals.

6.0 Laboratory Facilities

6.1 Laboratory Design

The design of the laboratory facility will provide sufficient space for safe work by the number of persons assigned to be in the laboratory. Exit doors will be clearly marked and free of obstructions to permit quick, safe escape in an emergency. Furniture will be arranged for maximum use of available space while maintaining safe conditions. Desks will be separated from lab benches and aisles will be unobstructed.

Laboratory facilities will be used only by persons with proper qualifications and training. Any employee assigned to work in a classroom or other area in which laboratory procedures are performed must receive appropriate training as specified in the Chemical Hygiene Plan (Section 3.1), even if that employee's assigned work does not entail laboratory procedures.

Classroom areas will be assigned for use for science laboratory activities only if they meet the standards for facilities and safety equipment specified in the Chemical Hygiene Plan. The use of laboratory facilities for purposes such as teaching classes outside the subject area, monitoring study halls, or other non-laboratory-based school functions should be avoided (such uses have implications for employee training and risk management procedures).

The design of new laboratories and renovation of existing laboratories will incorporate safety features as specified in the Chemical Hygiene Plan. Deficiencies in existing facilities identified during inspections will be addressed in a written action plan developed by the DCHO, approved by the Superintendent, and kept on file by the DCHO. Non-critical facility deficiencies requiring major structural work will typically be addressed in the normal schedule of renovation.

6.2 Laboratory Ventilation

The movement of air in the general ventilation system for a building will be from nonlaboratory areas and corridors into the laboratories. Air from laboratories will be exhausted outdoors and not recycled. General laboratory ventilation will be adequate to exchange room air no less than 6 nor more than 12 times per hour (calculated) when chemicals are in the laboratory. This may be achieved through use of a switchable auxiliary exhaust system.

Any change in the laboratory facility, particularly in the ventilation system, will be instituted only if a thorough analysis by the DCHO of its effects demonstrates that employees will continue to have adequate protection from hazardous concentration of toxic substance.

6.3 Fume Hoods

Laboratories in which the airborne concentration of approved chemicals has the potential to exceed listed PELs or TLVs will be equipped with a fume hood or other mechanism for exhaust to the outside air, away from air intake ports. Fume hoods will be inspected at least annually by DCHO for performance capabilities and proper usage.

Although fume hoods are local ventilation devices to be used to prevent toxic, offensive, or flammable vapors from entering the laboratory atmosphere, hoods also offer other significant protection. Placing a reacting chemical system within a hood, especially with a hood sash closed also places physical barrier between the workers in the lab and the chemical reaction. This barrier can afford workers significant protection from chemical splashes, fires and minor explosions.

To determine whether a fume hood is needed for handling a particular chemical, assess the MSDS. Some MSDS terminology may indicate a need for special ventilation, such as*: use with adequate ventilation; avoid vapor inhalation; use in a fume hood; or provide local exhaust ventilation*.

For use of hazardous chemical warranting local ventilation controls, the following guidelines should be observed:

1. Conduct all operations, which may generate air contaminants at or above the appropriate PEL or TLV inside a fume hood.
2. Equipment and chemicals kept in the hood will interrupt the even airflow. *Fume hoods are not intended for the primary storage of chemicals.* Minimize chemicals and apparatus present in the hood to include only those items being used for the current procedure. Keep all apparatus at least 6 inches back from the face of the hood and keep the slots in the hood baffle free of obstruction by apparatus or containers. Large equipment should be elevated at least two inches off the base of the fume hood, to allow for the passage of air underneath the apparatus.
3. Do not use the hood as a waste disposal mechanism except for very small quantities of volatile materials.
4. Keep the hood sash closed at all times except when the hood is in use.
5. Do not have sources of ignition inside the hood when flammable liquids or gases are present.
6. Use sash as a safety shield when boiling liquids or conducting an experiment with reactive chemicals.
7. Periodically check the airflow in the hood using a continuous monitoring device or another source of visible airflow indicator (Manometer). If airflow has changed, notify the Science Department Chair who will contact the EHS office (extension 7510) for an inspection or repair.

Fume hood sashes will be marked in the position at which they are calibrated to deliver ~100 feet per minute (fpm). *The hood will only operate efficiently when the sash is in this position.* The sash should not be left in the fully open or fully closed position for an extended period or the efficiency of the fume hood is diminished. Fume hoods will be equipped with a manometer, pressure differential meter, velometer, or similar device to verify adequate airflow before each use. *The system must be checked prior to each use to assure it is operating. Never work with hazardous chemicals if the hood is not working properly.*

6.4 Designated Areas

Some chemicals may have suspected hazards (toxicity, volatility, carcinogenic/mutagenic, etc.) for which the facilities and protective equipment of standard laboratories provide inadequate protection. Such chemicals are not permitted in the general school laboratories. However, the chemical may be approved for use in a “designated area” equipped to handle and use the chemical with minimal risk. A designated area may be an entire laboratory, a specified area of a laboratory, or a device such as a specified fume hood.

Designated areas will be clearly marked with signs indicating the chemicals for which they are designated. In addition, containers of the chemicals will be marked with a special label indicating that their use is restricted to the designated areas.

7.0 Protective Equipment

Maintaining a safe laboratory environment is the responsibility of both the school district and its employees. Personal protective devices and safety equipment must be provided to all employees under the appropriate circumstances and employees have the responsibility of properly using such equipment and apparel.

The MSDS will provide some information on the personal protective equipment and safety procedures recommended for a given chemical, though the MSDS may not provide sufficient information concerning the specific type of safety equipment required (for example, it may say "use glove" but not list the best glove to use).

In accordance with OSHA General Requirements (29CFR 1910.132), the DCHO will oversee and document a hazard assessment (walk-through survey; see Appendix D.2) of each laboratory, considering the following types of hazard:

Impact
Penetration
Compression (roll-over)
Chemicals
Heat
Harmful dust
Light (optical) radiation

After the survey has been complete, the DCHO shall identify protective equipment and apparel to suit the hazards. Employees who purchase their own equipment and apparel must follow the same criteria the school district uses. Employee training will specifically address use and maintenance of protective equipment and apparel.

The following standards (Section 7.1 and 7.2) shall apply to all laboratory areas, except where the hazard assessment results in more stringent requirements for specific laboratories or designated areas.

7.1 Protective Equipment in Laboratories

Each laboratory will contain the following protective equipment:

a. At least one eyewash fountain with double nozzle, conforming to the standards of ANSI Z358.1-1990: cable of delivering a continuous stream of ambient-temperature water for at least fifteen minutes at no less than 0.4 gallons per minute; the supply line pressure will be 30 psi. Eyewash(es) will be located within 40 feet or 10 seconds travel from any point in the laboratory under normal working conditions. An eyewash must be within 25 feet of areas where chemicals with pH ≤2.0 or ≥12.5 are used. (Note: A drench hose may supplement eyewash units, but <u>does not</u> replace them).

b. At least one fire extinguisher, type ABC (up to ten pound charge), mounted in accordance with NFPA Standard 10, and available within 50 feet from any point in the laboratory under normal working conditions. One fire extinguisher will be located near the exit from the laboratory area. In laboratories with risk of metal fire (magnesium, sodium, etc.), a Class D fire extinguisher will also be available within 75 feet from any point in the laboratory.

c. Non-asbestos fire blanket within 50 feet from any point in the laboratory.

d. Laboratories using chemicals with pH ≤4.0 or ≥9.0 will have a safety shower or drench hose within 100 feet from any point in the laboratory under normal working conditions. The shower or drench hose will conform to the standards of ANSI Z358.1-1990; capable of delivering a continuous stream of ambient-temperature water for a minimum of ten minutes at no less than 30 gallons per minute (shower) or 3 gallons per minute (drench hose); the supply line pressure will 30 psi.

e. Ceiling-mounted smoke or fire detector

f. Chemical spill kit, containing: chemical splash goggles, chemical-resistant gloves, appropriate neutralizing materials for the chemicals to be used in the laboratory, plastic bags, and scooper.

The following items will be immediately accessible to each laboratory area (but not necessarily located within the laboratory):

a. Master cut-offs for gas and electricity

b. First aid kit, containing only items approved by the DCHO as appropriate for first aid administered by employees

c. Fire alarm actuator

d. Telephone or other communication means for use in emergencies.

e. Means to sterilize goggles and other protective eyewear

7.2 Personal Protective Equipment and Apparel

The following personal protective items are considered standard for school laboratory programs, and will be readily available to all persons involved in using the laboratory area:

a. Laboratory aprons made of chemically inert material. Lab coats made of ordinary non-chemically-resistant material are not acceptable.

b. Safety goggles, specifically conforming to ANSI Standard Z87.1-1989 as acceptable protection against chemical splash. Where other hazards exist (e.g., lasers, flying particles) appropriate protective eyewear approved under ANSI Z87.1-1989 will be available. Impact goggles must be worn when danger of a splash exists.

c. Nonpermeable gloves for employee use while handling hazardous chemicals. Disposable gloves will also be available for laboratory occupants as needed by specific procedures.

Other personal protective equipment, e.g., respirators, should be present, if designated by the District Chemical Hygiene Officer. Training and use of such additional equipment will be in accordance with the relevant standards.

8.0 Inspections and Maintenance

One of the most important sections of the OSHA Laboratory Standards states that all safety equipment in the laboratory must always be in good operating condition, whether the equipment is required or optional under the Chemical Hygiene Plan. Employees are expected to check operation of safety equipment prior to engaging in any laboratory procedure. The inspection process in this section describes formal procedures for insuring that equipment is performing to standards.

8.1 Responsibility for Inspections and Reporting

The Science Department Head is responsible for working with the District Chemical Hygiene Officer to coordinate, oversee and document inspections of all laboratory areas in the school at least three times during the school year:

- ☑ Before the end of the first month of the school calendar;
- ☑ At the end of the first semester; and
- ☑ At the close of the school year.

The district will provide standard forms with which to carry out all required inspections. Inspection records will be kept by the Science Department Head, with a copy sent to the District Chemical Hygiene Officer. Equipment will be tagged following the inspection, showing the date and results.

8.2 School-Level Inspection Responsibilities and Standards

Personnel at the school, under the direction of the Science Department Head, will inspect laboratory facilities, preparation areas, and storage rooms for compliance with the following standards:

a. Number of laboratory occupants does not exceed available working area.

b. Area is free of clutter; aisles and evacuation routes are unobstructed.

c. Appropriate signage is readily viewable.

d. Chemicals are labeled appropriately and stored in the proper arrangement.

e. All required protective equipment and apparel are present.

Personnel at the school, under the direction of the Science Department Head, will inspect and document the operating condition of the following protective equipment and apparel for compliance with listed standards:

a. Eyewash – continuous flow of ambient-temperature water at no less than 0.4 gallons per minute; eyewash stations will be flushed for at least one minute on a monthly basis.

b. Safety shower or drench hose – continuous flow of ambient-temperature water at no less than one gallon per minute; showers and drench hoses will be flushed for at least one minute on a quarterly basis.

c. Fire extinguisher – ABC class, fully charged (Class D if reactive metals present)

d. Goggle sanitizer (if present) – UV bulb and timer operating properly

e. Master cutoff switches for gas and electricity and auxiliary exhaust– operating properly

f. Safety apparel (laboratory aprons, goggles, gloves) – Usable condition, without holes or other damage that would permit exposure of eyes or skin.

g. Chemical spill kit – all components present and in usable condition

8.3 District-Level Inspection Responsibilities and Standards

District-assigned or contracted personnel, under the direction of the DCHO, will inspect and document the operating condition of the following protective equipment for compliance with listed standards:

a. Fume hoods – face velocity 80-100 linear feet per minute (average from measurements across opening) and with minimum turbulence (smoke test)

b. Laboratory ventilation – 6-8 room changes per hour (calculated)

c. Laboratory smoke or fire detectors – sensitivity within rated specifications

d. Fire alarm – proper operation when actuated

e. Evidence of up to date site inspection and chemical inventory records, etc. (see section 9)

8.4 Maintenance and Repair of Protective Equipment

The Science Department Head will note all deficiencies revealed in an inspection in a written report to the Principal and District Chemical Hygiene Officer. The Department Head, Principal, and DCHO will jointly prioritize the deficiencies and submit the prioritized list to the Superintendent, who will authorize an action plan for correcting the deficiencies. The DCHO will monitor the progress of correcting the deficiencies.

Maintenance and repair of protective equipment will be provided by qualified district personnel or by other qualified persons contracted by the district for that purpose. In particular, maintenance of fume hoods will be performed only by persons specifically trained to do so.

Equipment that has been identified as inoperative or operating below standards will be clearly tagged and removed from use. Such equipment must not be used under any circumstances until proper repairs have been carried out and the equipment is certified as operating within standards.

9.0 Record Keeping

9.1 Chemical Inventory

The district will develop and utilize a standard inventory list of chemicals approved for use in elementary, middle school, and high school science laboratories. The Science Department Head at each school will oversee an annual inventory of all chemicals stored in the school building. Inventory information shall include the following:

Chemical name
Quantity on hand
Hazard information
Storage location

The school inventory will make special note of any chemical not on the standard inventory list, and the Science Department Head will verify that approval has been granted to store and use such chemicals.

Inventory and order records will be maintained by the Science Department Head, with a copy sent to the District Chemical Hygiene Officer. The DCHO will maintain a combined inventory of all chemicals in the district and will ensure that updated inventories are made available to local agencies (fire, chemical response, etc.) in compliance with pertinent regulations. Inventory records will be kept on file for at least five years.

9.2 Maintenance and Inspection Records

Records of required inspections will be completed and retained by the Science Department Head, with copies sent to the Principal and District Chemical Hygiene Officer. Equipment will be tagged to indicate the date and the results of the last inspection.

When deficiencies are noted in equipment or facilities, the Science Department Head will note all deficiencies in a written report to the Principal and District Chemical Hygiene Officer. The Department Head, Principal and the DCHO will jointly prioritize the deficiencies and submit the prioritized list to the Superintendent, who will authorize an action plan for correcting the deficiencies. The DCHO will monitor the progress of correcting the deficiencies. The Principal and DCHO will maintain records documenting maintenance performed to bring equipment or facilities up to standards. Maintenance and inspection records will be kept at least five years.

9.3 Training Records

Records documenting the dates and content of chemical hygiene training sessions for each employee will be completed and retained by the District Chemical Hygiene Officer, with copies maintained by the Science Department Head (Science teachers) and the Principal (other school employees). Training records will be kept for at least one year after an employee leaves a position.

9.4 Incident/Accident Reports

Incident and accidents reports are retained in the Principal's office, with a copy sent to the District Chemical Hygiene Officer, Nursing Services, and Risk Management. Reports are kept for at least ten years.

9.5 Medical and Exposure Records

OSHA regulations in 20 CFR Part 1910.20 require that records of air concentration monitoring, exposure assessments, medical consultations, and medical examinations be maintained for at least 30 years after the employee leaves school district employment. These records are kept by your site and the Office of Environmental Health and Safety.

9.6 Requests to Use Chemicals not on the Standard District Inventory

The District Chemical Hygiene Officer will maintain records of requests of non-standard chemicals and the determination of the Hazard Review Committee. Records will be kept at least five years. A copy will be sent to the Science Department Head.

10.0 Responding to Incidents and Exposures

10.1 General Accident Procedures

While the practices and procedures specified in the Chemical Hygiene Plan will help to minimize risk of exposure to hazardous chemicals, employees must be knowledgeable about what to do should an accident occur. Types of emergencies that should be anticipated are:

Thermal and chemical burns
Chemicals in the eye
Skin contact and irritation by chemicals
Inhalation, ingestion, or skin absorption of chemicals
Cuts and puncture wounds

Laboratory employees must be familiar with their work area and know the location and procedures for using the following safety items:

- ☑ Fire extinguisher and fire blanket
- ☑ Eyewash and shower/drench hose
- ☑ Chemical spill clean-up kits
- ☑ First aid kits
- ☑ Master utility cut-offs for the laboratory
- ☑ Emergency telephone and emergency phone numbers

In the event of a laboratory accident:

a. Follow the appropriate steps to contain and/or isolate the hazards, if the nature and scope of the accident allow individual employee action. When helping another person, remember to evaluate the potential danger to yourself before taking action. Otherwise, evacuate the area immediately.

b. Report the nature and location of the emergency to the appropriate fire or medical facility. Give your name, telephone number, building, and room number. If individuals are involved, report how many, whether they are unconscious, burned or trapped, whether an explosion has occurred, and whether there has been a chemical or electrical fire. Do not make any other phone calls unless they directly relate to the control of the emergency.

c. Notify the school administration and others in the immediate area about the nature of the emergency.

d. Meet the emergency personnel at the indicated location, or send someone to meet them.

e. Do not move any injured person unless they are in further danger. Use general first aid techniques, if appropriate (see Section 10.6)

10.2 Chemical Accidents Involving Persons

If a chemical spills on any part of a person, treatment must begin immediately. Often the volume spilled is not as important as the toxicity or corrosive properties of the chemical. When the situation has stabilized, check the MSDS to see if any delayed effects should be expected.

a. If chemicals are in the eyes, lead the victim to the eyewash station, help them hold both eyes open, and irrigate with plenty of water for at least 15 minutes. Check for and remove contact lenses.

b. For a chemical splash to other parts of the body, do not attempt to wipe the clothes. Remove all contaminated clothing, shoes, and jewelry immediately and wash the skin with soap and water. Flush the skin for at least five minutes. For splashes covering major portions of the body, use the shower or drench hose to flood the affected area before removing contaminated clothing. Use caution when removing pullover garments to prevent contamination of the eyes. It is advisable to seek medical attention even for minor chemical burns. Do not use creams or lotions.

c. If chemicals are ingested, encourage the victim to drink large amounts of water en route to medical assistance. Contact the medical staff and poison control center for further instructions. Be sure to note which chemical is believed to have been ingested.

National Capital Poison Center: 1 (800) 222-1222 or http://www.poison.org/actFast/

10.3 Dealing with Chemical Spills

a. If there is no hazard and the material is not particularly volatile or toxic, confine the spill, cover the liquid with absorbent from the spill kit, scoop into plastic disposal bag, and follow disposal instructions listed on the Material Safety Data Sheet (MSDS). Wear appropriate gloves and other personal protective equipment. Clean the contaminated area with soap and water after removing the spill.

b. If a corrosive material is spilled, confine the spill and neutralize with appropriate agent (baking soda for acids, vinegar for bases). Cover the liquid with absorbent from the spill kit, scoop into a plastic disposal bag, and follow disposal instructions listed on the Material Safety Data Sheets (MSDS). Wear appropriate gloves and other personal protective equipment. Clean the contaminated area with soap and water after removing the spill.

c. If a volatile, flammable material is spilled, immediately extinguish flames and turn off electrical apparatus. Evacuate the area by established routes. Cover the liquid with absorbent from the spill kit, scoop into a plastic disposal bag, and follow disposal instructions listed on the Material Safety Data Sheet (MSDS). Wear appropriate personal protective equipment. If the quantity exceeds the employee's ability or training to handle, seal the area until appropriately trained personnel arrive.

d. If a volatile, toxic material is spilled outside the hood, evacuate the area by established routes and seal until personnel trained to use appropriate breathing apparatus arrive.

e. If a nonvolatile, toxic material is spilled, isolate the area of the spill. Consult the MSDS for appropriate clean-up procedures and wear appropriate personal protective equipment. If the quantity or toxicity of the chemical exceeds the employee's ability or training to handle, evacuate the area until appropriately trained personnel arrive.

f. Use care in cleaning spills involving multiple chemicals, so that reactive combinations do not occur in used chemical receptacles. Treat absorbing material as chemical waste and dispose accordingly; do not dispose in ordinary trashcans.

10.4 Fire Accidents Involving Persons

a. If a person's clothing is on fire, douse the individual with water or wrap the person in a coat, blanket, or whatever is immediately available and roll the victim on the floor to smother the flames. *Use fire blankets with caution, because wrapping the body can force flames toward the face and neck.*

b. Quickly remove any clothing contaminated with chemicals. Use caution removing pullover garments to prevent contamination of the eyes.

c. Douse the burned areas with water to remove heat and place clean, wet, cold cloths on burned areas. Wrap the inured person to avoid shock and exposure.

d. Get medical attention promptly.

10.5 Dealing With Fires

a. A fire contained in a small vessel or container can often be suffocated by covering the vessel with an inverted container. Do not use dry towels or cloths. Remove nearby flammable materials.

b. In fires that appear controllable, direct the discharge from a fire extinguisher at the base of the flames. Use the proper fire extinguisher for the type of fire:

Class A

Water extinguishers are effective against burning paper and trash. Do not use water for extinguishing electrical, liquid or metal fires.

Class B and C

Carbon dioxide and dry powder extinguishers are effective against burning liquids and electrical fires. They are less effective against burning paper or metal fires. Avoid using dry powder extinguishers in areas with delicate instruments and computers, due to the clean-up efforts required afterward.

Class D

Met-L-X and certain dry chemical extinguishers have special formulations for use against burning metals, such as magnesium or sodium.

Do not discharge a fire extinguisher at an uncontained pool of burning liquid. Avoid breathing gases and smoke from the fire. Always fight the fire from a position of escape.

c. If the fire is too large to be suffocated quickly and simply or if it is believed to produce toxic fumes, vacate the area following established evacuation routes, sound the fire alarm, and notify the fire department. On arrival, inform fire fighters of what chemicals are involved, or may become involved.

d. In case of a fire involving an electrical device (like a hotplate), shut off the electricity to the affected outlet.

e. Immediately after the fire, all extinguishers used must be recharged or replaced with full ones.

10.6 Power Outages

If emergency lighting and are alarms <u>are not</u> operable, evacuate the building after the following steps have been taken:

a. Place lids on all open containers of volatile chemicals

b. Lower the sash on chemical fume hoods

c. Shut down all equipment (leave cooling water and purge gases on as necessary)

d. Turn off ignition sources

e. Secure or isolate reactions that are underway (i.e., boiling liquid on a hot plate, distillations)

f. Close fire doors

g. Take your books, coats, purse/wallet, keys, etc.

h. Lock outside door to lab

10.7 Personal Injury and First Aid

When an employee or student is injured in a life-threatening manner, call the appropriate emergency response personnel immediately. If the victim requires immediate attention, consider the following priorities.

a. First, make sure you are not endangering yourself by entering the scene. Watch for unstable structures, electrical wires, toxic fumes, chemical spill, fires, etc.

b. <u>Pulse</u>: Check the pulse at the side of the throat under the jaw. If there is no pulse; CPR should be started, but only by a trained individual. *Do not attempt CPR if you are not trained.*

c. <u>Bleeding</u>: Stop bleeding by applying either a bandage or your hand firmly over the wound. If no fractures are suspected, wrap the wound with a firm bandage and elevate the injury. Never use a tourniquet. Do not apply any ointments or creams.

d. <u>Shock</u>: When victims look pale and say they are cool, elevate the legs 10 to 12 inches and cover them with something. Do not move victims unless there is a life and death situation (fire, etc.), otherwise keep them still and as comfortable as possible.

e. <u>Burns</u>: Stop burning by cooling if necessary. Cover the area with a dry clean dressing. Chemical burns in the eyes or on other parts of the body should be flushed with large amounts of water. Do not put any ointments or creams on burns.

10.8 Incident/Accident Reporting

All incidents and accidents must be reported on the approved form (see Appendix D), even if no injuries occurred. Attach report from eyewitness. Copies of incident/accident reports will be kept by the Principal, District Chemical Hygiene Officer and Risk Management. These reports will be carefully evaluated to determine if district safety policies and training were adequate for the circumstances. Any recommendations that a policy or practice needs to be changed, or simply reinforced, will be distributed to all who might benefit. A periodic review of incident reports by the Hazard Review Committee will look for problem areas that need special attention.

10.9 Exposure Assessment

It is the policy of the Long Beach Unified School District to investigate in a prompt manner all employee-reported incidents in which there is a possibility of overexposure to a toxic substance. Events or circumstances that might reasonably constitute overexposure include:

a. A hazardous chemical spilled or leaked or was otherwise rapidly released in an uncontrolled manner.

b. A laboratory worker (teachers or students) had direct skin or eye contact with a hazardous chemical.

c. A laboratory worker manifested symptoms, such as headaches, rash, nausea, coughing, tearing, irritation or redness of eyes, irritation of nose or throat, dizziness, loss of motor dexterity or judgment, etc., and
   - some or all of the symptoms disappear when the person is taken out of the exposure area and breaths fresh air, and
   - the symptoms reappear after the person returns to the workplace.

If evidence is sufficient, investigation of an incident may result in the decision to conduct a formal exposure assessment. It is not the purpose of an exposure assessment to place blame for the incident on any person or source. It is to gather facts regarding the possible exposure and the chemical(s) involved. The exposure assessment will include: interviews with the involved persons; environmental monitoring results; and determinations regarding chemicals involved and control measures in use at the time of the incident.

10.10 Monitoring

Highly toxic substances are not commonly used in the school laboratory program, and regular instrumental monitoring of airborne concentrations is not justified or practical. Initial monitoring may be necessary for laboratories under renovation, modernization or hood installation.

Monitoring for specific airborne substances shall be performed in cases of suspected or known employee exposure. If the measured concentration exceeds the PEL, TLV, or other specified action level, then steps will be taken immediately to reduce the level to permissible limits. All laboratory employees will be notified of the results of the measurement within fifteen days, and further monitoring will be undertaken in compliance with 29 CFR 1910.1000 through 1910.1199 to verify that the steps to reduce the exposure have been effective. Monitoring will be discontinued after levels are shown to be consistently below the action level for the specific material.

10.11 Medical Consultations

School laboratory workers do not regularly handle significant quantities of materials that are acutely or chronically toxic. Therefore, regular medical surveillance is not justified.

The school district will provide all employees who work with hazardous chemicals an opportunity to receive medical attention, including any follow-up examinations which the examining physician determines to be necessary, under the following circumstances:

1. When an employee develops signs or symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory, the employee must be provided an opportunity to receive an appropriate examination.
2. Where exposure monitoring reveals an exposure level routinely above the action level (or in the absence of an action level, the Permissible Exposure Limit) for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements, medical surveillance shall be established for the affected employee as prescribed by the particular standard.
3. Whenever an event takes place in the work area, such as a spill, leak, explosion or other occurrence resulting in the likelihood of a hazardous exposure, the affected employee shall be provided an opportunity for a medical consultation. Such consultation shall be for the purpose of determining the need for a medical examination.

All medical consultations and examinations must be performed by or under the direct supervision of a licensed physician and must be provided without cost to the employee, without loss of pay and at a reasonable time and place.

The school district shall provide the following information to the physician:

1. The identity of the hazardous chemicals(s) to which the employee may have been exposed.
2. A description of the conditions surrounding the exposure, including available quantitative exposure data.
3. A description of the signs and symptoms of exposure that the employee is experiencing, if any.

The school district shall obtain a written opinion from the examining physician, which shall include the following:

1. Any recommendation for further medical follow-up.
2. The results of the medical examination and any associated tests.
3. Any medical condition, which may be revealed in the course of the examination, which may place the employee at increased risk as a result of exposure to a hazardous chemical, found in the workplace.
4. A statement that the employee has been informed by the physician of the results of the consultation or medical examination and any medical condition that may require further examination or treatment. The written opinion of the physician shall not reveal specific findings of diagnoses unrelated to occupational exposure.

A record of the results of the consultation, including tests performed and conclusions reached will be maintained by the district personnel office. Other employees working under the same conditions will be notified of the results of the consultation.

11.0 Used and Waste Chemicals

The Long Beach Unified School District has eleven high schools and twenty-four K-8 / middle schools (subject to change) containing laboratories covered under this plan. Each one of the above-mentioned sites is considered a small quantity generator of waste, as per the Environmental Protection Agency criteria, unless notified otherwise. Appropriate documentation is kept on file with the District Chemical Hygiene Officer and the Office of Environmental Health and Safety.

Chemicals in school laboratory programs are used in relatively small quantities (micro). The used and waste chemical program for the school district is tailored to the volume and variety of chemicals involved, in accordance with all local, state, and federal regulations.

a. The aim of the used and waste chemical program is to assure that minimal harm to people, other organisms and the environment will result from the disposal of unwanted laboratory chemicals from the district. The first priority in the program is

b. Reducing (micro) the scale of experiments to limit the amounts of products generated;

c. Purchase of chemicals only in the amounts needed; and

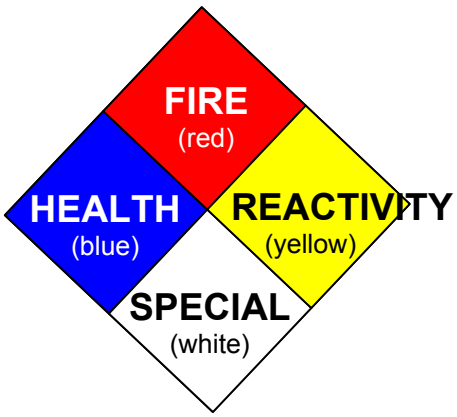
d. Recovery of chemicals from reaction products.

11.1 Used Chemicals

Each laboratory will have specially marked containers to dispose of used chemicals. Leftover reagents and reaction products will be placed in marked containers at the end of each laboratory session. Broken glass/ceramics need to have a marked container for "toxic waste" disposal with the same pickup procedure as other chemicals.

Used chemicals shall be classified and segregated into the following categories:

a. Flammable
b. Reactive
c. Water reactive
d. Air reactive
e. Inorganic acid
f. Organic acid
g. Base
h. Toxic (POISON)
i. Oxidizer
j. Other (SPECIFY)



It is becoming increasingly difficult to dispose properly of used chemicals once they are reclassified as hazardous waste. Faced with the threat of potential fines, all laboratories generating unwanted chemicals must accurately identify all components in used chemical containers. Containers shall be labeled with the following information:

a. used-chemical category;

b. name of chemical(s) in the container

c. approximately percentage of each chemical (if mixed);

d. date produced; and

e. name of teacher.

Used chemicals will be maintained in their containers in a secure storage area until such time that they are used in a laboratory procedure or classified as waste for disposal. Used chemicals stored in each building shall be inventoried at least annually. A record of the inventory will be kept by the Science Department Head, with a copy to the DCHO.

11.2 Waste Chemicals

Reduction of waste by recycling, reclamation, or chemical decontamination of used chemicals will be performed when possible. Indiscriminate disposal of waste chemicals by pouring down the drain, adding them to mixed refuse for landfill burial, or evaporating volatiles in the hood is not tolerated or legal.

Certain unwanted chemicals are permissible for drain disposal, but only when the school's drain system connects to a sanitary sewer system that ultimately flows to a wastewater treatment facility. The local sanitary sewer district allows specified types and amounts of chemicals to be flushed with copious amounts of water. The DCHO will compile a list of such chemicals and distribute the list to each Science Department Head on an annual basis. <u>At no time is a septic tank system to be used for chemical disposal.</u>

If used chemicals become reclassified as hazardous waste; their containers will be relabeled as such and segregated into the following EPA classes for disposal:

a. <u>Ignitable</u>. Materials capable of causing fire.

b. <u>Oxidizer.</u> Substances that readily yield oxygen, such as permanganates, nitrates, etc.

c. <u>Corrosive.</u> Aqueous solutions with pH = 2 or 12.5

d. <u>Reactive.</u> Substances that are unstable, explosive, water reactive or generated toxic gases.

e. <u>Poison.</u> Substances containing arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver or any specified chlorinated organic substances.

f. Other wastes not falling into one of the above classes.

Segregated waste will be stored in approved containers, labeled clearly as “Hazardous Waste” with the waste’s physical state, hazard properties, percentage composition, and full product names. No more than 50 gallons of hazardous waste will be stored in any given school location.

Once a container is classified as containing chemical waste, laboratory employees may not handle or transport the containers without specified authorization from the DCHO. Chemical waste will be transported only by district employees or contractors specifically certified and authorized to do so.

Following a request from the Science Department Head, pickup and disposal of waste will be arranged by the DCHO at regular intervals in accordance with local, state, and federal regulations. The DCHO will maintain appropriate records for waste storage and disposal.

11.3 Other Issues

Unknown Chemicals. On occasion there are chemical bottles that have lost a label or the label is stained or otherwise unreadable. Unknown chemicals cannot be evaluated for their hazards. Furthermore, they cannot be packed for disposal until they are assayed. The Science Department Head should make every effort to identify the chemical(s) in the container, using tests such as those in the “Mystery Substances Identification Guide” in the Flinn Science Company catalog. The Department Head will notify the DCHO of the presence of containers and the necessary procedures to identify the contents.

Biohazards. A biohazard includes only those infectious agents presenting a risk or potential risk to the well being of persons. Orange biohazard identity tags will be used to identify containers of these materials. Specimens labeled in this manner require special disposal, separate from chemical disposal. The Science Department Head will notify the DCHO when biohazard materials are present. The DCHO will arrange for qualified persons to pick up, transport, and dispose of the materials.

APPENDIX A

OSHA Laboratory Standard

U.S. Department of Labor: Final rule part II"29CFR Part 1910. Occupational Exposure to Hazardous Chemicals in Laboratories". Federal Register, Volume 55, Number 21, Wednesday, January 31, 1990.

The United States Department of Labor
Occupational Safety and Health Administration

1910.1450 – Occupational exposure to hazardous chemicals in laboratories.

Standard Number: 1910.1450
Standard Title: Occupational exposure to hazardous chemicals in laboratories.
SubPart Number: Z
SubPart Title: Toxic and Hazardous Substances

(a) Scope and Application.

(a)(1) This section shall apply to all employees engaged in the laboratory use of hazardous chemicals as defined below.

(a)(2) Where this section applies, it shall supersede, for laboratories, the requirements of all other OSHA health standards in 29 CFR 1910, subpart Z, except as follows:

(a)(2)(i) For any OSHA health standard, only the requirement to limit employee exposure to the specific permissible exposure limit shall apply for laboratories, unless that particular standard states otherwise or unless the conditions of paragraph (a)(2)(iii) of this section apply.

(a)(2)(ii) Prohibition of eye and skin contact where specified by any OSHA health standard shall be observed.

(a)(2)(iii) Where the action level (or in the absence of an action level, the permissible exposure limit) is routinely exceeded for an OSHA regulated substance with exposure monitoring and medical surveillance requirements paragraphs (d) and (g)(1)(ii) of this section shall apply.

(a)(3) This section shall not apply to:

(a)(3)(i) Uses of hazardous chemicals which do not meet the definition of laboratory use, and in such cases, the employer shall comply with the relevant standard in 29 CFR part 1910, subpart 2, even if such use occurs in a laboratory.

(a)(3)(ii) Laboratory uses of hazardous chemicals which provide no potential for employee exposure. Examples of such conditions might include:

(a)(3)(ii)(A) Procedures using chemically-impregnated test media such as Dip-and-Read tests where a reagent strip is dipped into the specimen to be tested and the results are interpreted by comparing the color reaction to a color chart supplied by the manufacturer of the test strip; and

(a)(3)(ii)(B) Commercially prepared kits such as those used in performing pregnancy test in which all of the reagents needed to conduct the test are contained in the kit.

(b) Definitions (see glossary in Appendix B)

(c) Permissible Exposure Limits.

For laboratory uses of OSHA regulated substances, the employer shall assure that laboratory employee's exposures to such substances do not exceed the permissible exposure limits specified in 29 CFR 1910, subpart Z.

(d) Employee Exposure Determination

(d)(1) Initial monitoring. The employer shall measure the employee's exposure to any substance regulated by a standard which required monitoring if there is reason to believe that exposure levels for that substance routinely exceed the action level (or in the absence of an action level, the PEL).

(d)(2) Periodic monitoring. If the initial monitoring prescribed by paragraph (d) (1) of this section disclosed employees exposure over the action level (or in the absence of an action level, the PEL), the employer shall immediately comply with the exposure monitoring provisions of the relevant standard.

(d)(3) Termination of monitoring. Monitoring may be terminated in accordance with the relevant standard.

(d)(4) Employee notification of monitoring results. The employer shall, within 15 working days after the receipt of any monitoring results, notify the employee of these results in writing either individually or by posting results in an appropriate location that is accessible to employees.

(e) Chemical Hygiene Plan – General. (Appendix A of this section is non-mandatory but provides guidance to assist employers in the development of the Chemical Hygiene Plan).

(e)(1) Where hazardous chemicals as defined by this standard are used in the workplace, the employer shall develop and carry out the provisions of a written Chemical Hygiene Plan which is:

(e)(1)(i) Capable of protecting employees from health hazards associated with hazardous chemicals in that laboratory and

(e)(1)(ii) Capable of keeping exposures below the limits specified in paragraph (C) of this section.

(e)(2) The Chemical Hygiene Plan shall be readily available to employees, employee representatives and, upon request, any city, State and Federal Agencies requesting it. E.g. OSHA, Health Department, DTSC, etc.

(e)(3) The Chemical Hygiene Plan shall include each of the following elements and shall indicate specific measures that the employer will take to ensure laboratory employee protection;

(e)(3)(i) Standard operating procedures relevant to safety and health considerations to be followed when laboratory work involves the use of hazardous chemicals;

(e)(3)(ii) Criteria that the employer will use to determine and implement control measures to reduce employee exposure to hazardous chemicals including engineering controls. The use of personal protective equipment and hygiene practices; particular attention shall be given to the selection of control measure for chemicals that are known to be extremely hazardous;

(e)(3)(iii) A requirement that fume hoods and other protective equipment are functioning properly and specific measures that shall be taken to ensure proper and adequate performance of such equipment;

(e)(3)(iv) Provisions for employee information and training as prescribed in paragraph (f) of this section;

(e)(3)(v) The circumstances under which a particular laboratory operation, procedure or activity shall require prior approval from the employer or the employer's designee before implementation;

(e)(3)(vi) Provisions for medical consultation and medical examinations in accordance with paragraph (g) of this section;

(e)(3)(vii) Designation of personnel responsible for implementation of the Chemical Hygiene Plan including the assignment of a Chemical Hygiene Officer, and, if appropriate, establishment of a Chemical Hygiene Committee; and

(e)(3)(viii) Provisions for additional employee protection for work with particularly hazardous substances. These include "select carcinogens," reproductive toxins and substances that have a high degree of acute toxicity. Specific consideration shall be given to the following provisions that shall be included where appropriate:

(e)(3)(viii)(A) Establishment of a designated area;

(e)(3)(viii)(B) Use of containment devices such as fume hoods or glove boxes;

(e)(3)(viii)(C) Procedures for safe removal of contaminated waste; and

(e)(3)(viii)(D) Decontamination procedures.

(e)(4) The employer shall review and evaluate the effectiveness of the Chemical Hygiene Plan at least annually and update it as necessary.

(f) Employee Information and Training.

(f)(1) The employer shall provide employees with information and training to ensure that they are apprised of the hazards of chemicals present in their work area.

(f)(2) Such information shall be provided at the time of an employee's initial assignment to a work area where hazardous chemicals are present and prior to assignments involving new exposure situations. The frequency of refresher information and training shall be determined by the employer.

(f)(3) Information. Employees shall be informed of:

(f)(3)(i) The contents of this standard and its appendices which shall be made available to employees;

(f)(3)(ii) The location and availability of the employer's Chemical Hygiene Plan;

(f)(3)(iii) The permissible exposure limits for OSHA regulated substances or recommended exposure limits for other hazardous chemicals where there is no applicable OSHA standard;

(f)(3)(iv) Signs and symptoms associated with exposures to hazardous chemicals used in the laboratory; and

(f)(3)(v) The location and availability of known references material on the hazards, safe handling, storage and disposal of hazardous chemicals found in the laboratory including, but not limited to, Material Safety Data Sheets received from the chemical supplier.

(f)(4) Training.

(f)(4)(i) Employee training shall include:

(f)(4)(i)(A) Methods and observations that may be used to detect the presence or release of a hazardous chemical (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.);

(f)(4)(i)(B) The physical and health hazards of chemicals in the work area; and

(f)(4)(i)(C) The measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used.

(f)(4)(ii) The employee shall be trained on the applicable details of the employer's written Chemical Hygiene Plan.

(g) Medical Consultation and Medical Examinations.

(g)(1) The employer shall provide all employees who work with hazardous chemicals an opportunity to receive medical attention, including any follow-up examinations which the examining physician determines to be necessary, under the following circumstances:

(g)(1)(i) Whenever an employee develops signs or symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory, the employee shall be provided an opportunity to receive an appropriate medical examination.

(g)(1)(ii) Where exposure monitoring reveals and exposure level routinely above the action level (or in the absence of an action level, the PEL) for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements. Medical surveillance shall be established for the affected employee as prescribed by the particular standard.

(g)(1)(iii) Whenever an event takes place in the work area such as a spill, leak, explosion or other occurrence resulting in the likelihood of a hazardous exposure, the affected employee shall be provided an opportunity for a medical consultation. Such consultation shall be for the purpose of determining the need for a medical examination.

(g)(2) All medical examinations and consultations shall be performed by or under the direct supervision of a licensed physician and shall be provided without cost to the employee, without loss of pay and at a reasonable time and place.

(g)(3) Information provided to the physician. The employer shall provide the following information to the physician:

(g)(3)(i) The identity of the hazardous chemical(s) to which the employee may have been exposed;

(g)(3)(ii) A description of the conditions under which the exposure occurred including quantitative exposure data, if available; and

(g)(3)(iii) A description of the signs and symptoms of exposure that the employee is experiencing, if any.

(g)(4) Physician's written opinion.

(g)(4)(i) For examination or consultation required under this standard, the employer shall obtain a written opinion from the examining physician which shall include the following:

(g)(4)(i)(A) any recommendation for further medical follow-up;

(g)(4)(i)(B) the results of the medical examination and any associated tests;

(g)(4)(i)(C) any medical condition which may be revealed in the course of the examination which may place the employee at increased risk as a result of exposure to a hazardous workplace; and

(g)(4)(i)(D) a statement that the employee has been informed by the physician of the results of the consultation or medical examination and any medical condition that may require further examination or treatment.

(g)(4)(ii) The written opinion shall not reveal specific findings of diagnoses unrelated to occupational exposure

(h) Hazard Identification

(h)(1) With respect to labels and material safety data sheets:

(h)(1)(i) Employees shall ensure that labels on incoming containers of hazardous chemicals are not removed or defaced.

(h)(1)(ii) Employers shall maintain any material safety data sheets that are received with incoming shipments of hazardous chemicals, and ensure that they are readily accessible to laboratory employees.

(h)(2) The following provisions shall apply to chemical substances developed in the laboratory:

(h)(2)(i) If the composition of the chemical substance, which is produced exclusively for the laboratory's use, is known, the employer shall determine if it is a hazardous chemical as defined in paragraph (b) of this section. If the chemical is determined to be hazardous, the employer shall provide appropriate training as required under paragraph (f) of this section.

(h)(2)(ii) If the chemical produced is a byproduct whose composition is not known, the employer shall assume that the substance is hazardous and shall implement paragraph (e) of this section.

(h)(2)(iii) If the chemical substance is produced for another user outside of the laboratory, the employer shall comply with the Hazard Communication Standard (29 CFR 1910.1200) including the requirements for preparation of material safety data sheets and labeling.

(i) Use of Respirators.

Where the use of respirators is necessary to maintain exposure below permissible exposure limits, the employer shall provide, at no cost to the employees, the proper respiratory equipment. Respirators shall be selected and used in accordance with the requirements of 29 CFR 1910.134.

(j) Record Keeping

(j)(1) The employer shall establish and maintain for each employee an accurate record of any measurements taken to monitor employee exposures and any medical consultation and examinations including tests or written opinions required by this standard.

(j)(2) The employer shall assure that such records are kept, transferred and be available in accordance with 20CFR 1910.1020.

(k) Dates

(k)(1) Effective date. This section shall become effective May 1, 1990.

(k)(2) Start-up dates.

(k)(2)(i) Employers shall have developed and implemented a written Chemical Hygiene Plan no later that January 31, 1991.

(k)(2)(ii) Paragraph (a)(2) of this section shall not take effect until employer has developed and implemented a written Chemical Hygiene Plan.

(l) Appendices.

The information contained in the appendices is not intended, by itself, to create any additional obligations not otherwise imposed or to detract from any existing obligation.

APPENDIX B

Glossary of Terms

ACGIH
The American Conference of Governmental Industrial Hygienist is a voluntary membership organization of professional industrial hygiene personnel in governmental or educational institutions. The ACGIH develops and publishes recommended occupational exposure limits each year called Threshold Limit Values (TLV's) for hundreds of chemicals, physical agents, and includes Biological Exposure Indices (BEI).

Action Level
A concentration designated in 29 CFR part 1910 for a specific substance, calculated as an eight-hour time-weighted average, which initiates certain required activities such as exposure monitoring and medical surveillance.

Acute
Severe, often dangerous exposure conditions in which relatively rapid changes occur.

Acute Exposure
An intense exposure over a relatively short period of time.

Allergen
An agent capable of producing an immunologic reaction.

ANSI
The American National Standards Institute is a voluntary membership organization (run with private funding) that develops national consensus standards for a wide variety of devices and procedures.

Asphyxiant
A chemical (gas or vapor) that can cause death or unconsciousness by suffocation. Simple asphyxiants such as nitrogen either use or displace oxygen in the air. They become especially dangerous in confined or closed spaces. Chemical asphyxiants, such as carbon monoxide and hydrogen sulfide, interfere with the body's ability to absorb or transport oxygen to the tissues.

Autoclave
A device to expose items to steam at a high pressure in order to decontaminate the materials or render them sterile.

Biohazard
Infectious agents that present a risk or potential risk to the health of humans or other animals, either directly through infection or indirectly through damage to the environment.

Boiling Point
The temperature at which the vapor pressure of a liquid equals atmospheric pressure or at which the liquid changes to a vapor. The boiling point is usually expressed in degrees Fahrenheit. If a flammable material has a low boiling point, it indicates a special fire hazard.

“C” or Ceiling
A description usually seen in connection with a published exposure limit. It refers to the concentration that should not be exceeded, even for an instant. It may be written as TLV-C or Threshold Limit Value—Ceiling (see also THRESHOLD LIMIT VALUE).

Carcinogen
A substance that may cause cancer in animals or humans.

C.A.S. Number
Identifies a particular chemical by the Chemical Abstracts Service, a service of the American Chemical Society that indexes and compiles abstracts of worldwide chemical literature called “Chemical Abstracts”

Chemical Hygiene Officer
An employee who is designated by the employer and who is qualified by training and experience, to provide guidance in the development and implementation of the provisions of the Chemical Hygiene Plan. This definition is not intended to place limitations on the position description or job classification that the designated individual shall hold within the employer’s organizational structure.

Chemical Hygiene Plan
A written program developed and implemented by the department which sets forth procedures, equipment, personal protective equipment and work practices that are capable of protecting students, instructors and other personnel from the health hazards presented by the hazardous chemicals used in that particular workplace.

Chronic
An adverse effect with symptoms that develop slowly over a long period of time or that frequently reoccur.

Chronic exposure
A prolonged exposure occurring over a period of days, weeks, or years.

Combustible
According to the DOT and NFPA, COMBUSTIBLE liquids are those having a flash point at or above 100 deg. F (37.8 deg. C), or liquids that will burn. They do not ignite as easily as flammable liquids. However, combustible liquids can be ignited under certain circumstance, and must be handled with caution. Substances such as wood, paper, etc., are termed “Ordinary Combustibles”

Compressed Gas
A gas mixture of gases that, in a container, will have an absolute pressure exceeding 40 psi at 70 deg. F or 21.1 deg. C. A gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130 deg. F or 54.4 deg. C, regardless of the pressure at 70 deg. F. A liquid having a vapor pressure exceeding 40 psi at 100 deg. F or 37.8 deg. C.

Concentration
The relative amount of a material in combination with another material. For example, 5 parts (of acetone) per million (parts of air).

Corrosive
A substance that, according to the DOT, causes visible destruction or permanent changes in human skin tissue at the site of contact or is highly corrosive to steel.

Cutaneous/Dermal
Pertaining to or affecting the skin.

Cytotoxin
A substance toxic to cells in culture, or to cells in an organism.

Decomposition
The breakdown of a chemical or substance into different parts or simpler compounds. Decomposition can occur due to heat, chemical reaction, decay, etc.

Designated Area
An area which may be used for work with "selected carcinogens", reproductive toxins or substances which have a high degree of acute toxicity. This area may be the entire laboratory or an area under a device such as a laboratory hood.

Dermatitis
An inflammation of the skin.

Dilution Ventilation
See GENERAL VENTILATION

DOT
The United States Department of Transportation is the Federal agency that regulates the labeling and transportation of hazardous materials.

Dyspnea
Shortness of breath, difficult or labored breathing.

Employee
An individual employed in a laboratory workplace who may be exposed to hazardous chemicals in the course of his or her assignment.

EPA
The Environmental Protection Agency is the governmental agency responsible for administration of laws to control and/or reduce pollution of air, water, and land systems.

EPA Number
The number assigned to chemicals regulated by the Environmental Protection Agency (EPA).

Epidemiology
The study of disease in human populations.

Erythema
A reddening of the skin.

Evaporation Rate
The rate at which a material is converted to vapor (evaporates) at a given temperature and pressure when compared to the evaporation rate of a given substance. Health and fire hazard evaluations of materials involve consideration of evaporation rates as one aspect of the evaluation.

Explosive
A chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure or high temperature.

Flammable Gas
A gas that, at an ambient temperature and pressure, form a flammable mixture with air at a concentration of 13 percent by volume or less; or, a gas that, at an ambient temperature and pressure forms a range of flammable mixtures with air wider than 12 percent by volume, regardless of the lower limit.

Flammable Liquid
According to the DOT and NFPA a flammable liquid is one that has a flash point below 100 deg. F (See FLASH POINT).

Flammable Solid
A solid, other than a blasting agent or explosive, that is liable to cause fire through friction, absorption of moisture, spontaneous chemical change or retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently it creates a serious hazard.

Flash Point
The lowest temperature at which a liquid gives off enough vapor to form an ignitable mixture and burn when a source of ignition (sparks, open flames, etc.) is present. Two tests are used to determine the flash point: open cup and closed cup. The test method is indicated on the MSDS after the flash point.

Fume
A solid particle that has condensed from the vapor state.

Gas
Chemical substances that exists in the gaseous state at room temperature.

General Ventilation
Also known as general exhaust ventilation, this is a system of ventilation consisting of either natural or mechanically induced fresh air movements to mix with and dilute contaminants in the workroom air. This is not the recommended type of ventilation to control contaminants that are highly toxic, when there may be corrosion problems from the contaminant, when the worker is close to where the contaminants are being generated, and where fire or explosion hazards are generated close to sources of ignition (See LOCAL EXHAUST VENTILATION).

Grams per Kilogram (g/kg)
This indicates the dose of substances given to test animals in toxicity studies. For example, a dose may be 2 grams (of substance) per kilogram of body weight (of the experimental animal).

Health Hazard
A chemical for which there is scientifically valid evidence that acute or chronic health effects may occur in exposed persons. Included are: allergens, embryotoxicants, carcinogens, toxic or highly toxic agents, reproductive toxicants, irritants, corrosives, sensitizers, hepatoxins (liver), nephrotoxins (kidneys), neurotoxins (nervous system), hematopoietic systems agents (blood), and agents which damage the lungs, skin, eyes, or mucous membranes.

Hazardous Chemicals
Any chemical for which there is significant evidence that acute or chronic health effects may occur in exposed personnel. The term “health hazard” includes chemicals that are carcinogens, toxins, irritants, corrosives, sensitizers or other agents that can damage the lungs, skin, eyes or mucous membranes.

Ignitable
A solid, liquid or compressed gas waste that has a flashpoint of less than 140 deg. F. Ignitable with the other without the possibility of a dangerous reaction.

Incompatible
The term applied to two substances to indicate that one material cannot be mixed with the other without the possibility of a dangerous reaction.

Ingestion
Taking a substance into the body through the mouth as food, drink, medicine, or unknowingly as on contaminated hands or cigarettes, etc.

Inhalation
The breathing in of an airborne substance that may be in the form of gas, fumes, mist, vapors, dusts, or aerosols.

Inhibitor
A substance that is added to another to prevent or slow downs an unwanted reaction or change.

Irritant
A substance that produces an irritation effect when it contacts skin, eyes, nose, or respiratory system.

Laboratory
A facility where relatively small quantities of hazardous materials are used on a non-production basis.

Laboratory Scale
Work with substances in which the containers used for reactions, transfers, and other handling of substances are designed to be easily and safely manipulated by one person.

Laboratory-type Hood
A device constructed and maintained to draw air from the laboratory and to prevent or minimize the escape of air contaminants into the laboratory.

Laboratory Use of Hazardous Materials
The handling or use of chemicals in which the following conditions are met:

(1) Chemical manipulations are carried out on a laboratory scale.
(2) Multiple chemical procedures or chemicals are used.
(3) The procedures involved are not part of a production process.
(4) Protective laboratory practices and equipment are available and in common use to minimize the potential for personnel exposure to hazardous chemicals.

Laminar Air Flow
Airflow in which the entire mass of air within a designated space move with uniform velocity in a single direction along parallel flow lines with a minimum of mixing.

Lethal Concentration 50 (LC_{50})
The concentration of an air contaminant that will kill 50 percent of the test animals in a group during a single exposure.

Lethal Dose 50 (LD_{50})
The dose of a substance or chemical that will kill 50 percent of the test animals in a group within the first 30 days following exposure.

Local Exhaust Ventilation (Also known as exhaust ventilation)
A ventilation system that captures and removes air contaminants at the point they are being produced before they escape into the workroom air. The system consists of hoods, ductwork, a fan and possibly an air-cleaning device. Advantages of local exhaust ventilation over general ventilation include; removing the contaminant rather than diluting it; less airflow making it a more economical system over the long run; and conservation or reclamation of valuable materials. However, the system must be properly designed with the correctly shaped and placed hoods correctly sized fans and correctly connected ductwork.

Lower Explosive Limit (LEL) (also known as Lower Flammable Limit-LFL)
The lowest concentration of a substance that will produce a fire or flash when an ignition source (flame, spark, etc.) is present. It is expressed in percent of vapor or gas in the air by volume. Below the LEL or LFL, the air/contaminant mixture is theoretically too “lean” to burn (see also UEL).

Medical Consultation
A consultation which takes place between an employee and a licensed physician for the purpose of determining what medical examinations or procedures, if any, are needed in cases where a significant exposure to a hazardous chemical may have taken place.

Melting Point
The temperature at which a solid changes to a liquid. A melting range any can be given for mixtures.

MSDS
Material Safety Data Sheet.

MSHA
The Mine Safety and Health Administration; a Federal agency that regulates the mining industry in the safety and health area.

Mutagen
Anything that can cause a change (or mutation) in the genetic material of a living cell.

Narcosis
Stupor or unconsciousness caused by exposure to a chemical.

Neoplastigen
Chemical capable of causing non-cancerous tumors.

NFPA
The National Fire Protection Association is a voluntary membership organization whose aims are to promote and improve fire protection and prevention. NFPA has published 16 volumes of codes known as the National Fire Codes. Within these codes is Standard No. 704, “Identification of the Fire Hazards of Materials” This is a system that rates the hazard of a material during a fire. These hazards are divided into health, flammability, and reactivity hazards and appear in a well-known diamond system using from zero through four to indicate severity of the hazard. Zero indicates no special and four indicates severe hazard.

NIOSH
The National Institute for Occupational Safety and Health is a Federal agency that among its various responsibilities trains occupational health and safety professionals, conducts research on health and safety concerns, and test and certifies respirators for workplace use.

Occupational Safety and Health Administration (OSHA)
A Federal agency under the Department of Labor that publishes and enforces safety and health regulations for most business and industries in the United States.

Odor Threshold
The minimum concentration of a substance at which a majority of test subjects can detect and identify the substance'' characteristic odor.

Oxidation
The process of combining oxygen with some other substance or a chemical change in which an atom loses electrons.

Oxidizer
Is a substance that gives up oxygen easily to stimulate combustion of organic material.

Oxygen Deficiency
An atmosphere having less than the normal percentage of oxygen found in normal air. Normal air contains 21% oxygen at sea level.

Permissible Exposure Limit (PEL)
An exposure limit that is published and enforced by OSHA as a legal standard. PEL may be either a time-weighted-average (TWA) exposure limit (8Hours), a 15-minute short-term exposure limit (STEL), or a ceiling (C). The PELs are found in Tables Z-1, Z-2, or Z-3 of OSHA regulations 1910.1000. (See also TLV).

Personal Protective Equipment
Any devices or clothing worn by the worker to protect against hazards in the environment. Examples are respirators, gloves, and chemical splash goggles.

Physical Hazard
A chemical that has scientifically valid evidence providing it to be a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.

Polymerization
A chemical reaction in which two or more small molecules combine to form larger molecules that contain repeating structural units of the original molecules. A hazardous polymerization is the above reaction with an uncontrolled release of energy.

Protective Laboratory Procedures, Practices, and Equipment
Those laboratory procedures, practices, and equipment accepted by laboratory health and safety experts as effective, or that the employer can show to be effective, in minimizing the potential for employee exposure to hazardous chemicals.

RAD
The unit of absorbed dose equal to 100 ergs per gram or 0.01 joules per kilogram of absorbing material.

Reactivity
A substance's susceptibility to undergoing a chemical reaction or change that may result in dangerous side effects, such as explosion, burning, and corrosive or toxic emissions. The conditions that cause the reaction, such as heat, other chemicals, and dropping, will usually be specified as "Conditions to Avoid" when a chemical's reactivity is discussed on a MSDS.

Reproductive Toxins
Chemicals which affect the reproductive capabilities including chromosomal damage (mutations) and effects on fetuses.

Respirator
A device which is designed to protect the wearer from inhaling harmful contaminants.

Respirator Hazard
A particular concentration of an airborne contaminant that, when it enters the body by was of the respiratory system or by being breathed into the lungs, results in some bodily function impairment.

Select Carcinogen
Any substance which is regulated by OSHA as a carcinogen, or is recognized as a carcinogen by the National Toxicology Program or the International Agency for Research on Cancer Monographs.

Sensitizer
A substance that may cause no reaction in a person during initial exposures, but afterwards, further exposures will cause an allergic response to the substance.

Short Term Exposure Limit
Represented as STEL or TLV-STEL, this is the maximum concentration to which workers can be exposed for a short period of time (15 minutes) for only four times throughout the day with at least one hour between exposures. Also, the daily TLV-TWA must not be exceeded.

"Skin"
This designation sometimes appears alongside a TLV or PEL. It refers to the possibility of absorption of the particular chemical through the skin and eyes. Thus, protection of large surface areas of skin should be considered to prevent skin absorption so that the TLV is not invalidated.

Systemic
Spread throughout the body; affecting many or all body systems or organs; not localized in one spot or area.

Teratogen
An agent or substance that may cause physical defects in the developing embryo or fetus when a pregnant female is exposed to that substance.

Threshold Limit Value
Airborne concentrations of substances devised by the ACGIH that represents conditions under which it is believed that nearly all workers may be exposed day after day with no adverse effect. TLVs are advisory exposure guidelines, not legal standards, that are based on evidence from industrial experience, animal studies, or human studies when they exist. There are three different types of TLVs: Time Weighted Average (TLV-TWA), Short Term Exposure Limit (TLV-STEL) and Ceiling (TLV-C). (See also PEL).

Time Weighted Average
The average time, over a given work period (e.g. 8-hour workday) of a person's exposure to a chemical or an agent. The average is determined by sampling for the contaminant throughout the time period. Represented as TLV-TWA.

Toxicity
The potential of a substance to exert a harmful effect on humans or animals and a description of the effects and conditions or concentration under which the effect takes place.

Trade Name
The commercial name or trademark by which a chemical is known. One chemical may have a variety of trade names depending on the manufacturers or distributors involved.

Unstable (Reactive)
A chemical that, in its pure state or as commercially produced, will react vigorously in some hazardous way under shock conditions (i.e., dropping), certain temperatures, or pressures.

Upper Explosive Limit
Also known as Upper Flammable Limit, is the highest concentration (expressed in percent of vapor or gas in the air by volume) of a substance that will burn or explode when an ignition source is present. Theoretically, above this limit the mixture is said to be to "rich" to support combustion. The difference between the LEL and the UEL constitutes the flammable range or explosive range of a substance. That is, if the LEL is 1 ppm and the UEL is 5 ppm, then the explosive range of the chemical is 1 ppm to 5ppm. (See also LEL).

Vapor
The gaseous state substances which are normally in the liquid or solid state (at normal room temperature and pressure). Vapors evaporate into the air from liquids such as solvents. Solvents with low boiling points will evaporate.

Vapor Pressure
The pressure that a solid or liquid exerts when it is in equilibrium with its vapor at a given temperature.

Water-reactive
A chemical that reacts with water to release a gas that is either flammable or presents a health hazard.

APPENDIX C

Incompatibility of Common Laboratory Chemicals

When certain hazardous chemicals are stored or mixed together, violent reactions may occur because the chemicals are incompatible. The list below contains information on incompatibilities. Before mixing any chemicals, refer to the chemicals' MSDSs for additional information.

Chemical	**… is incompatible & should not be mixed or stored with**
Acetic Acid	Chromic acid, nitric acid, hydroxyl compounds, ethylene glycol, perchloric acid, peroxides, permanganates
Acetylene	Chlorine, bromine, copper, fluorine, silver, mercury
Acetone	Concentrated nitric and sulfuric acid mixtures
Alkali and alkaline earth Metals (such as Mg, Ca, Li, Na, K, or powdered Al)	Water, carbon tetrachloride or other chlorinated hydrocarbons, carbon dioxide, halogens
Ammonia (anhydrous)	Mercury, chlorine, calcium hypochlorite, iodine, bromine, hydrofluoric acid (anhydrous)
Aniline	Nitric acid, hydrogen peroxide
Arsenical materials	Any reducing agent
Azides	Acids
Bromine, Chlorine	Ammonia, acetylene, butadiene, butane, methane, propane (or other petroleum gases), hydrogen, sodium carbide, benzene, finely divided metals, turpentine
Calcium oxide	Water
Carbon (activated)	Calcium hypochlorite, all oxidizing agents
Carbon tetrachloride	Sodium
Chlorates and perchlorates	Ammonium salts, acids, powdered metals, sulfur, finely divided organic or combustible materials
Chromic acid and chromium trioxide	Acetic acid, naphthalene, camphor, glycerol, alcohol, flammable liquids in general

Chemical	**… is incompatible & should not be mixed or stored with**
Chlorine dioxide	Ammonia, methane, phosphine, hydrogen sulfide
Copper	Acetylene, hydrogen peroxide
Cumene hydroperoxide	Acids (organic or inorganic)
Cyanides	Acids
Flammable liquids	Ammonium nitrate, chromic acid, hydrogen peroxide, nitric acid, sodium peroxide, halogens
Fluorine	Everything
Hydrocarbons (such as Butane, propane, benzene)	Fluorine, chlorine, bromine, chromic acid, sodium peroxide
Hydrocyanic acid	Nitric acid, alkali
Hydrofluoric acid (anhydrous)	Ammonia (aqueous or anhydrous)
Hydrogen peroxide	Copper, chromium, iron, most metals or their salts, alcohols, acetone, organic materials, aniline, nitromethane, combustible materials
Hydrogen sulfide	Fuming nitric acid, oxidizing gases
Hypochlorites	Acids, activated carbon
Iodine	Acetylene, ammonia (aqueous or anhydrous), hydrogen
Mercury	Acetylene, fulminic acid, ammonia
Nitrates	Sulfuric acid
Nitric acid (concentrated)	Acetic acid, aniline, chromic acid, hydrocyanic acid, hydrogen sulfide, flammable liquids, flammable gases, copper, brass, any heavy metals
Nitrites	Acids
Nitroparaffins	Inorganic bases, amines
Oxalic acid	Silver, mercury
Oxygen	Oils, grease, hydrogen, flammable liquids, solids, or gases
Perchloric acid	Acetic anhydride, bismuth and its alloys, alcohol, paper, wood, grease, oils
Peroxide, organic	Acids (organic or mineral) avoid friction, store cold
Phosphorus (white)	Air, oxygen, alkalis, reducing agents

Chemical	**… is incompatible & should not be mixed or stored with**
Potassium (metal)	Carbon tetrachloride, carbon dioxide, water
Potassium permanganate	Glycerol, ethylene glycol, benzaldehyde, sulfuric acid
Selenides	Reducing agents
Silver	Acetylene, oxalic acid, tartartic acid, ammonium compounds
Sodium (metal)	Carbon tetrachloride, carbon dioxide, water
Sodium nitrate	Ammonium nitrate and other ammonium salts
Sodium peroxide	Ethyl or methyl alcohol, glacial acetic acid, acetic anhydrite, benzaldehyde, carbon disulfide, glycerin, ethylene glycol, ethyl acetate, methyl acetate, furfural
Sulfides	Acids
Sulfuric acid	Potassium chlorite, potassium perchlorate, potassium permanganate (similar compounds of light metals, such as sodium, lithium)
Tellurides	Reducing agent

APPENDIX D

Forms to Implement the Chemical Hygiene Plan

Laboratory Inspection Report

(complete and submit to the Science Department Head)

School _____ Room # _____

Inspected by _____ Position _____ Date _____

Courses taught in this laboratory _____ Grade Levels _____

Item	Standard	Meets Standard	Below Standard	Not Applicable	Comments
Room Appearance	general cleanliness aisle ways clear	_____	_____	_____	_____
Ventilation	general ventilation operative; auxiliary ventilation to outside	_____	_____	_____	_____
Fume Hood	annual certification, not used for storage, cleanliness	_____	_____	_____	_____
Fire extinguisher(s)	type ABC available within 50 ft. Type D available	_____	_____	_____	_____
Fire blanket	available within 50 ft from any point in lab	_____	_____	_____	_____
Eyewash(es)	double nozzle; delivers continuous stream of water at minimum 0.4 gal/min. for 15 min; available within 40 ft from any point in lab	_____	_____	_____	_____
Shower	required in chemistry lab only	_____	_____	_____	_____
Drench hose	labs using chemicals With pH between 4-9	_____	_____	_____	_____
Smoke or fire Detector	mounted in ceiling in center part of lab	_____	_____	_____	_____
Master cut-offs	readily accessible cutoffs For gas, water, electricity	_____	_____	_____	_____
Chemical spill kit	contains splash goggles, chemical resistant gloves, neutralizing and absorbent materials, disposal container	_____	_____	_____	_____

D.H. initials _____

Principal initials _____

Laboratory Inspection Report (cont'd)

Date _____

School _____ Room # _____

Item	Standard	Meets Standard	Below Standard	Not Applicable	Comments
First aid kit	readily accessible to lab				
Goggle sterilization (u.v. cabinet)					
Safety goggles	Z87.1 chemical splash goggles (with indirect vents); one per person in lab				
Lab aprons	chemically resistant material; one per person in lab				
Gloves	non-permeable gloves for preparation and handling; disposable gloves for lab work				
Used chemical Container (s)	present for substances in use; appropriately Labeled				
Containers of Chemicals in lab	not permanently stored in lab; labeled with Required information				

Posted information and locator signs	Clearly visible	Not Clearly visible	Not present	Not Applicable	Comments
School safety policy					
Emergency phone numbers					
Exit signs					
Evacuation routes					
Designated area(s)					
Good lab practices and Safety procedures					
Equipment:					
Eyewash					
Shower/drench hose					
Fire extinguisher					
Fire Blanket					
First aid kit					
Utility cut-offs					

DH initials _____

Principal initials _____

Laboratory Inspection Report (cont'd)

Date _____

School _____ Room # _____

Other inspector comments and concerns

_____

_____

_____

_____

_____

_____

_____ _____

Inspector signature Date

_____ _____

Science Department Head signature Date

_____ _____

Principal signature Date

Chemical Storeroom Inspection Report

(complete and submit to the Science Department Head)

School _____ Room # _____

Inspected by _____ Position _____ Date _____

Item	Standard	Meets Standard	Below Standard	Not Applicable	Comments
Room Appearance	general cleanliness aisle ways clear shelves not crowded; all chemicals stored properly	_____	_____	_____	_____
Organization	chemicals stored in compatible groups; organization posted	_____	_____	_____	_____
Shelving	shelf "lips"	_____	_____	_____	_____
Containers	all containers labeled correctly	_____	_____	_____	_____
Ventilation	continuous, to outside air	_____	_____	_____	_____
Fire extinguisher & fire blanket	near exit or within 25 ft of storeroom; Class ABC & D	_____	_____	_____	_____
Eyewash and shower/drench hose	available within 25 ft	_____	_____	_____	_____
Smoke/heat detector	ceiling mounted	_____	_____	_____	_____
Flammable storage	dedicated, approved cabinet	_____	_____	_____	_____
Corrosive storage	separate, approved cabinet, acids/bases separate, as well as Nitric	_____	_____	_____	_____
Compressed Cylinders	secured, caps on valve	_____	_____	_____	_____
Refrigerators	marked "food only" And "chemical only" Contents agree with Markings	_____	_____	_____	_____
Spill kit	near storeroom	_____	_____	_____	_____

DH Initials _____

Principal initials _____

Chemical Storeroom Inspection Report (cont'd)

Date _____

School _____ Room # _____

Other inspector comments and concerns

_____

_____

_____

_____

_____

_____

_____ _____

Inspector signature Date

_____ _____

Science Department Head signature Date

_____ _____

Principal signature Date

long beach unified school district

School Employee
Science Safety Training Record

(to be retained by Science Department Head and the DCHO)

Employee Name _____ Social Security # _____

Job Assignment _____ Job Location _____

Training Location _____ Training Date _____

Trainer Name (s) _____ Organization _____

Training Method (workshop, video, individual orientation, etc.) _____

Training is geared for ☐ Admin./Secretarial ☐ Custodial ☐ Secondary Sci. ☐ Physics ☐ Chem

The above named employee has received training, as specified in the school district's Chemical Hygiene Plan, in the following areas:

- ❑ Federal and state chemical hygiene standards, including the OSHA Laboratory Standard (29 CFR 1910.1450).
- ❑ Location and content of the district's Chemical Hygiene Plan (CHP), and roles and responsibilities under the CHP.
- ❑ Safe practices for handling hazardous chemicals in general; specific practices for designated areas; dealing with used, surplus and waste chemicals.
- ❑ Information on concepts necessary to understand reference materials, such as PEL, TLV, LD_{50} and routes of entry; information on hazard of chemicals on the school site, including PELs or other exposure limits.
- ❑ Proper procedures for requesting authorization to obtain and use chemicals considered too hazardous for general school laboratories.
- ❑ Labeling and storage practices, and information to interpret labels.
- ❑ Location and content of MSDS and other reference materials on the properties.
- ❑ Safe handling, storage and disposal of hazardous chemicals in the building.
- ❑ Location and proper use of available protective apparel and equipment.
- ❑ Signs and symptoms associated with exposures to hazardous chemicals used in the laboratory.
- ❑ Methods and observations to detect the presence or release of hazardous chemicals used in the laboratory.
- ❑ Appropriate procedures for responding to and reporting accidents involving chemical exposures.
- ❑ Appropriate first aid techniques (at least one employee per building)

Verified by _____

Request to purchase Chemical ***NOT* Listed on LBUSD** Approved Chemicals List

Date of Request: _____

Department Head Approval:

Signature _____ *Date* _____

Principal Approval:

Signature _____ *Date* _____

WHO

Teacher	School	Safety Certification (attach verification)	
		Date of Last Chemical Safety Training	Presenter / Sponsor of Last Chemical Safety Training

WHAT

Chemical Name	Alternate or Common Name *(if any)*	CAS Number

Chemical Formula	Supplier	Catalog Ordering Information	Quantity Desired

WHY

Class / Grade Level for which chemical is intended		SCL Approval:
Brief Description of Lab Activity (Attach copy of the lab. if available)		
Content Being Taught		

HOW

Safety Requirements: (per Nat. Cancer Inst., NIOSH, ACGIH, etc.)	Apparel			DCHO Approval:
	Equipment			
	Ventilation			
Storage Category			Hazard Class	
Shelf Life			PEL / TLV *	
			Potential Hazardous Interactions:	
Disposal Requirements for Wastes and Excess Reagent				

* PEL, Permissible Exposure Level TLV, Threshold Limit Value

FOR OFFICE USE ONLY:

Initials

☐ Approved as Submitted _____

☐ Approved as Edited _____

☐ Not Approved _____

☐ Recommend Adding to District Approved Chemicals List

COMMENTS:

_____

_____

_____

_____

Name _____ Position _____

Laboratory Accident / Incident Report

Staff member completing this report		Position	

Accident / Incident Date: _____ Time: _____

Location: _____

Supervising Employee

Name		Position	
Address			

Other People Involved in Accident / Incident *(reports attached)*

Name		Address	
Name		Address	
Name		Address	
Name		Address	

Witnesses to Accident / Incident *(reports attached)*

Staff	Students
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Total Number of Witnesses: _____

Accident / Incident Date: _____ Time: _____

Location: _____

Description of Accident / Incident: _____

Immediate Action Taken (including first aid given): _____

Actions taken or recommended to avoid similar occurrences in the future: _____

_____ _____
Signature of Person Completing This Report Date

_____ _____
Signature of Principal Date

_____ _____
Signature of Person Receiving This Report Date

Presented to Hazard Review Committee: _____
Date

Laboratory Accident / Incident
Staff Witness Report

Staff member completing this report		Position	

Accident / Incident Date: _____ Time: _____

Location: _____

Your eyewitness description of the accident / incident: _____

_____

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(Continue on the back of this form if you need more space.)

_____ _____

Signature of Witness Date

Laboratory Accident / Incident
Student Witness Report

Student completing this report

Name		Grade Level		Age	

Accident / Incident Date: _____ Time: _____

Location: _____

Your eyewitness description of the accident / incident: _____

(Continue on the back of this form if you need more space.)

_____ _____

Signature of Witness Date

Used Chemical Inventory Form

Note: All used chemicals must be stored in approved, labeled containers and housed in a designated, approved location.

School		Date	
Contact Person		Phone / Extension	

☑ List each used chemical container as a separate item.
☑ Be sure that the labels coincide with the item numbers.

Item #:	Location:	
Form: *(circle one)*	*Solid* *Liquid* *Solution* *Gas*	Quantity: *(volume or mass)*
Contents:	Chemical Name(s):	
	Approximate Percentage: *(if mixture)*	

Item #:	Location:	
Form: *(circle one)*	*Solid* *Liquid* *Solution* *Gas*	Quantity: *(volume or mass)*
Contents:	Chemical Name(s):	
	Approximate Percentage: *(if mixture)*	

Item #:	Location:	
Form: *(circle one)*	*Solid* *Liquid* *Solution* *Gas*	Quantity: *(volume or mass)*
Contents:	Chemical Name(s):	
	Approximate Percentage: *(if mixture)*	

Item #:	Location:	
Form: *(circle one)*	*Solid* *Liquid* *Solution* *Gas*	Quantity: *(volume or mass)*
Contents:	Chemical Name(s):	
	Approximate Percentage: *(if mixture)*	

Item #:	Location:	
Form: *(circle one)*	*Solid* *Liquid* *Solution* *Gas*	Quantity: *(volume or mass)*
Contents:	Chemical Name(s):	
	Approximate Percentage: *(if mixture)*	

Item #:	Location:	
Form: *(circle one)*	*Solid* *Liquid* *Solution* *Gas*	Quantity: *(volume or mass)*
Contents:	Chemical Name(s):	
	Approximate Percentage: *(if mixture)*	

Item #:	Location:	
Form: *(circle one)*	*Solid* *Liquid* *Solution* *Gas*	Quantity: *(volume or mass)*
Contents:	Chemical Name(s):	
	Approximate Percentage: *(if mixture)*	

Item #:	Location:	
Form: *(circle one)*	*Solid* *Liquid* *Solution* *Gas*	Quantity: *(volume or mass)*
Contents:	Chemical Name(s):	
	Approximate Percentage: *(if mixture)*	

Item #:	Location:	
Form: *(circle one)*	*Solid* *Liquid* *Solution* *Gas*	Quantity: *(volume or mass)*
Contents:	Chemical Name(s):	
	Approximate Percentage: *(if mixture)*	

long beach unified school district

Request to Remove Used /Waste Chemicals

1. The District will provide, upon request, the containers that waste must be placed in. The only exception is a chemical in its original container.

2. Section 11.0 of the District Chemical Hygiene Plan indicates the criteria that must be met to package, inventory, label, and etc. waste chemicals.

3. At no time will waste chemicals be inventoried without the FULL NAME of the chemical indicated on inventory sheets. A variety of people have to handle the waste, including instructors, fire department personnel etc., who do not have extensive chemistry backgrounds.
CHEMICAL FORMULATIONS MUST BE COMPLETELY WRITTEN OUT.

4. Contact the District's Environmental Health & Safety office at (562) 997-7510 when used/waste chemicals are ready for pick-up. Keep in mind that once you place any amount of used/waste chemical in the disposal container that a ninety (90) day clock has begun and limits the containers time frame to be on-site.

5. If you are unsure about or have any questions regarding disposal/collection of waste and or chemicals, contact the DCHO or the office of Environmental Health & Safety.

APPENDIX E

LBUSD Approved Chemicals List

APPENDIX F

STANDARD OPERATING PROCEDURES (SOP) FOR SCIENCE BUILDINGS

1. CHEMICAL STORAGE ROOMS

Chemicals shall be stored on shelves, in lockable chemical storage rooms, as per hazard class at all times, except when an instructor is giving a demonstration or when students are performing experiments.

A. Chemical storage shelves shall have safety lips, preferably transparent plexiglass with a minimum height of three inches above each shelf. This is to prevent bottles of chemicals from sliding off during an earthquake.

B. An inventory of chemicals stored in the Chemical Storage Room shall be posted on the exterior of each storage room. As new chemicals are brought in they shall be added to the inventory list and dated. As chemicals are removed, they shall be deleted from the inventory list. As chemicals are received to the District, they shall also be dated. Chemicals shall have their dates checked on a regular basis. In this manner, chemicals will not be beyond their shelf life, when they may decay to a less useful or even dangerous state.

C. Chemicals shall be stored in a safe manner, with the proper lid on the appropriate container, with the container intact, labeled, dated, and stored properly.

D. Any one chemical should not be overstocked. There should be no more of any one chemical than is reasonably needed or as stated on the approved chemical list. Excessively dangerous chemicals should not be stocked. Examples might include oxidizers, reactive metals etc.

E. Access to any chemical storage room shall be limited to personnel familiar with this SOP and authorized by the Science Department Head. At all times, unless an authorized person is present, the chemical storage room shall remain locked.

2. MATERIAL SAFETY DATA SHEETS (MSDS)

A. Material Safety Data Sheets (MSDS), for all the chemicals in the chemical storage room, shall be compiled in a binder to be kept in an easily accessible area near the chemical storage room. A copy of this binder should also be added to the school's/facility's master MSDS binder which should be kept in the main office of the site. Each MSDS will advise the teacher/instructor what exactly they are dealing with. In the event of an emergency, it will tell the Fire Department/Emergency personnel how to deal with the situation. If a student or teacher is exposed or splashed or splashed with a chemical, it will allow medical personnel to render proper treatment.

3. EMERGENCY EQUIPMENT

A. All emergency eyewash/showers are to remain in good working order.

This includes a monthly inspection ensuring that:

1. Dust caps are always in place over the ports of the eyewash deluge station, when not in use.

2. Eyewash/showers are run approximately five minutes a month to ensure the proper unobstructed flow, and cleanliness of the water. (TITLE 8 CCR, SECTION 5162).

B. Each emergency eyewash/shower shall have an inspection tag on it with the date, and the initials of the person inspecting it. If the emergency eyewash/shower is not in proper working order at the time of the inspection, then the problem shall be rectified immediately, or as soon as is feasibly possible.

C. A three-foot perimeter around each emergency eyewash/shower shall be demarcated by green painted stripes. This is to keep the area around each eyewash/shower unobstructed at all times.

D. Fire extinguishers shall have marked locations and be inspected on a monthly basis. These also shall have an inspection tag on them, which must be signed and dated monthly by a qualified inspector.

E. If flammable metals are being stored, then the facility should have a fire extinguisher specifically classified for flammable metals. There is no one fire extinguisher available that is capable of extinguishing all four classes of fires (A, B, C and D). Class D fire extinguishers are designated for flammable metals.

4. GOOD HOUSEKEEPING

A. Refrigerators in the science buildings shall be marked "FOOD ONLY" or 'SPECIMENS/CHEMICALS ONLY" as appropriate. These shall be used for their marked designation only. NO EXCEPTIONS.

B. Whenever a science/chemistry project is completed it shall be disassembled, disengaged, stored and/or disposed of properly. Science/chemistry projects shall not be stored in an unsafe manner. Chemicals should be returned to their proper storage area promptly upon being finished with their use.

C. There should never be an unknown chemical mixture generated by District personnel. If chemicals are commingled, an inventory of each chemical being commingled shall be posted on the container containing the mixture. THIS CONTAINER MUST BE CLEARLY LABELED AND SAFELY STORED AWAY FOR HAZARDOUS WASTE PICKUP. MONTHLY PICKUPS ARE STRONGLY RECOMMENDED. CONTAINERS ARE BEING PROVIDED BY EH&S at extension 7547. NO PERSONAL CONTAINERS MAY BE USED.

D. Always use any and all safety equipment guidelines for all science/chemistry projects.

5. EMERGENCY EVACUTION

A. Evacuation in the event of an emergency shall be followed such as that of a fire evacuation. The evacuation routes shall be clearly delineated and displayed prominently in each science lab.

6. LAB SAFETY

A. All laboratory safety rules shall be strictly adhered to by all personnel authorized to be in the lab. Under no circumstances should "horseplay" be allowed.

B. Rules of safety should be prominently displayed in each lab. Custodial staff should receive proper awareness training. This is meant to prevent injury to the custodians, other school employees and, or students.

C. College Aid student aides are not qualified to handle or dispose of hazardous chemicals. Only qualified certificated or classified employees should do so.

SOP Q&A FOR SCIENCE BUILDINGS

1. Who is responsible?

You, the Employer, or anyone in a supervisory capacity is responsible for compliance.

2. What are the relevant regulations?

Titles 8, 13, 19, 22 and 23 of the California Administrative Code; Division 20 of the California Health and Safety Code; the California Vehicle Code.

3. Who enforces the regulations?

The California Department of Health Services, The City of Long Beach Department of Health Services, Department of Toxic Substance Control (DTSC), CAL/OSHA, CAL/EPA, the California Agricultural Department, the California Highway Patrol, and other local/state agencies.

4. What is a hazardous waste?

A waste that is ignitable, corrosive, reactive, poses a biological hazard or is listed as such in Title 22 of the California Administrative Code.

5. How can I determine if my waste is hazardous?
Read the label of the chemicals used, read the MSDS. Check with your Environmental Health and Safety Department (562) 997-7510.

6. Where can I get more information about my chemicals?
From manufacturers' Material Safety Data Sheets (MSDS)

7. What is a Material Safety Data Sheet (MSDS)?
It is a form which is required to be supplied by the chemical manufacturer, and/or distributor, that states what the chemical is made of, its hazards, proper handling and storage instructions, what protective equipment should be used, and emergency procedures in the event of a fire, spill, or accidental over exposure and disposal guidelines.

8. May I store my hazardous waste at my facility and for low long?
Yes, you may store it for ninety days without a special permit. This material must be properly and accurately labeled. The material must also be dated as to when storage was begun.

9. How do I get rid of my hazardous material/waste?
Notify the Science Department Head, or contact Environmental Health and Safety at 997-7510. It is highly recommended that you schedule a hazardous waste pickup at least once a month to avoid stockpiling of chemicals. DO NOT transport hazardous materials or hazardous waste either to or from your site. DO NOT dispose of hazardous material/waste yourself. NEVER dispose of hazardous waste by pouring it down a water drain or by flushing it down the toilet. There are very strict laws governing the transport and disposal of hazardous and/or toxic waste. Non-compliance with these laws may result in rather substantial penalties.

10. How do I remain in compliance, there are so many rules and regulations?
Follow your Standard Operating Procedure (SOP); contact your Environmental Health and Safety Department at 997-7510, or extension x1469 or the Science Curriculum Leader if you have any questions.

APPENDIX G

References

A N S I , American National Standards Institute – Various sections.

Brynes, J.K. “Eyewear Meets the Challenge”, *Safety and Health*, Vol. 134, No 3 (March 1989), 64,67-69.

Code of Federal Regulations (CFR) 29, **OSHA**, Various Sections.

Code of Federal Regulations (CFR) 40, **Environmental Protection Agency (EPA)**, Various Sections.

Code of regulations (CRF) 49, Department of Transportation (DOT) various sections.

Compressed Gas Association, (1965)

Cronin-Jones, L. “Is Your School A Dumping Ground?” *The Science Teacher*, Vol. 59 (October 1992), 26-31.

Fiske, J.R. “The Chemical Hygiene Officer: Piecing Together the Liability Puzzle”, *Chemical Health and Safety*, Vol. 1 (June/July, 1994), 12-16.

Generic Chemical Hygiene Plan for High School Laboratories, Flinn Scientific, Inc. (1992 Edition).

Gerlovich, J., and T. Gerard. “Don’t Let Your Hands-On Science Program Blow Up in your Face”, *American School Board Journal*, Vol. 176 (May 1989), 40-41.

Guidelines for Self-Assessment of High School Science Programs (Revised Edition). Arlington, VA: National Science Teachers Association, 1989.

Guidelines for Self-Assessment of Middle / Junior High School Science Programs (Revised Edition). Arlington, CA; National Science Teachers Association, 1989.

Hall, S.K. *Chemical Safety in the Laboratory.* Boca Raton, FL; CRC Press, 1993.

Handbook of Chemical and Environmental Safety in Schools and Colleges. The Forum for Scientific Excellence. Philadelphia, PA: J.P. Lippincott, 1991.

Improving Safety in the Chemical Laboratory: *A Practical Guide* (Second Edition). Edited by J. A. Young. New York: John Wiley & Sons, Inc. 1991.

Model Chemical Hygiene Plan for Kentucky School Districts, Kentucky Science and Technology Council, Inc., Kentucky Department of Education and the Fayette County Public School District, Lexington, KY (1991 Edition).

Science Framework for California Public Schools, K-12, Sacramento, CA: California Department of Education, 1990.

Science Safety –No Game of Chance: *A School Science Safety Manual,*
Tallahassee, FL: Florida Department of Education, 1992.

Science Safety Handbook for California Public Schools, Sacramento, CA: Science and Environmental Education Unit, California Department of Education.
(1999 Edition).

Steel, M.; P. Conroy; and J. Kaufman. *"How to Say '**NO**' to Overcrowded, Unsafe Science Labs",* NSTA Reports (April 1993).

Thompson, S. *Chemtrek: Small Scale Experiments for General Chemistry.* Englewood Cliffs, NJ: Prentice Hall, 1990.

Uniform Fire Code.

Utah Division of Epidemiology and Laboratory Services, Larry Scanlan, Salt Lake City, UT.

Working Conditions for Secondary Science Teachers. Washington, D.C.: National Science Teachers Association, 1986.

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