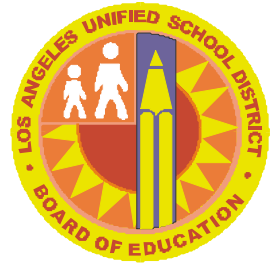


Office of Environmental Health & Safety
333 South Beaudry Avenue
Los Angeles, CA 90017
Phone: (213) 241-3199
Fax: (213) 241-6816
www.lausd-oehs.org



SCHOOL LABORATORY CHEMICAL HYGIENE & SAFETY PLAN

**LOS ANGELES UNIFIED SCHOOL DISTRICT
OFFICE OF ENVIRONMENTAL HEALTH AND SAFETY**

JANUARY 2005

TABLE OF CONTENTS

I.	EXECUTIVE SUMMARY	1
II.	RESPONSIBILITIES	2
A.	Chemical Hygiene & Safety Plan Organization Chart.....	2
B.	Principal/Site Administrator	2
C.	Chemical Safety Coordinator.....	2
D.	Science Teachers	3
E.	Office of Environmental Health and Safety.....	3
III.	EMPLOYEE INFORMATION AND TRAINING.....	4
A.	Chemical Hygiene & Safety Training Program	4
B.	Material Safety Data Sheets	5
C.	Signs/Drawings.....	5
IV.	LABORATORY HAZARD RECOGNITION AND CLASSIFICATION.....	6
A.	Physical (Safety) Hazards.....	6
B.	Chemical Health Hazards.....	8
C.	Chemical Classes and Their Effects.....	9
V.	STANDARD OPERATING PROCEDURES.....	10
A.	General Safe Work Practices.....	10
B.	Safe Equipment Use	12
C.	Safe Handling and Storage of Chemicals.....	13
D.	Working Safely With Flammability Hazards	14
E.	Working Safely With Cryogenic Hazards.....	15
F.	Reactive Chemicals and Explosives.....	15
G.	Warning Signs and Labels	16
VI.	HAZARD CONTROLS	16
A.	General Principles for Hazard Minimization	16
B.	Engineering Controls.....	17
C.	Personal Protective Equipment.....	19
D.	Administrative Controls.....	20

E.	Environmental Monitoring.....	21
F.	Fire Protection and Prevention	22
G.	Accident and Spill Responses	22
1.	General Accident Procedures.....	23
2.	Chemical Accidents	24
3.	Chemical Spill Clean-up.....	24
4.	Fire Accidents	25
VII. CHEMICAL CONTAINER LABELING AND DISPOSAL OF HAZARDOUS		
	MATERIALS AND WASTE	25
A.	Used Chemical Container Labeling.....	26
B.	Chemical Waste Disposal.....	26
VIII. RECORDKEEPING.....		
A.	Chemical Inventory Records	27
B.	Chemical Hygiene and Safety Training Records.....	27
C.	Medical Examination and Exposure Records	27
Appendix A.....		
		29
Appendix B.....		
		40
Appendix C.....		
		42
Appendix D.....		
		44
Appendix E.....		
		47
Appendix F		
		50
Appendix G		
		52
Appendix H.....		
		54

I. EXECUTIVE SUMMARY

The Chemical Hygiene & Safety Plan (CHSP) manual was developed for compliance with Title 8, CCR, Section 5191, "Occupational Exposure to Hazardous Chemicals in Laboratories," (Appendix A) which became effective October 1, 1991 and with the California Education Code Sections 49340-49341. The regulation outlines procedures to be followed to protect employees who work in laboratories from health hazards associated with hazardous chemicals. The CHSP is in addition to Title 8, CCR, Section 5194, "Hazard Communication Standard," which applies to all employees who may be exposed to hazardous substances.

The CHSP manual provides guidelines to ensure that all individuals covered by this policy and procedure are adequately informed and trained on requirements of Section 5191. Requirements include information on:

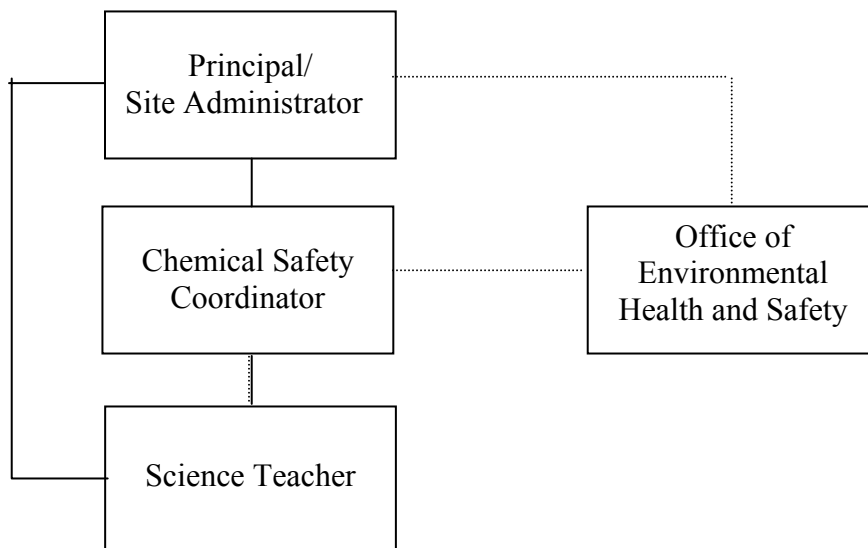
- recognition and classification of hazards, including potential effects of physical and health hazards associated with hazardous chemicals in laboratories;
- standard operating work procedures, including safe work practices, safe equipment use, safe handling and storage of chemicals and posting warning signs and labels;
- minimization and control of hazards by engineering and administrative controls, use of personal protective equipment, environmental monitoring and appropriate response to accidents;
- proper labeling and disposal of hazardous materials and wastes; and
- recordkeeping requirements of chemical inventories, employee safety training, monitoring results and medical examinations.

The CHSP manual also outlines responsibilities for the site administrator, Chemical Safety Coordinators, science teachers, other laboratory personnel and the Office of Environmental Health and Safety (OEHS). For secondary schools, the Chemical Safety Coordinator has been designated as the person responsible for implementing the CHSP at their site.

Since the primary objective of the CHSP is to reduce and control hazards associated with school laboratories, it is essential that all elements of the CHSP are implemented so that we can provide the safest learning environment for our students and staff.

II. RESPONSIBILITIES

A. Chemical Hygiene & Safety Plan Organization Chart



B. Principal/Site Administrator

The Principal/Site Administrator is responsible for ensuring implementation of the Chemical Hygiene & Safety Plan (CHSP) in school laboratories. The Principal/Site Administrator shall assign a person, such as a Chemical Safety Coordinator, to train affected staff on CHSP requirements. However, the Principal/Site Administrator has the ultimate responsibility to ensure that all affected staff are trained. Each school in with any affected laboratory should designate a Chemical Safety Coordinator.

C. Chemical Safety Coordinator

The Chemical Safety Coordinators at secondary schools, occupational/skills centers and facilities are assigned by the principal or site administrators, and are designated as the school's contact person for the CHSP. The Chemical Safety Coordinator has the responsibility to ensure the following:

1. Employees receive appropriate health and safety training upon initial assignment to a work area where chemicals/ hazardous materials are present and prior to assignments involving new or different exposure situations.
2. Employees have access to the CHSP and other reference materials (e.g. Material Safety and Data Sheets).

3. Employees adhere to safe work procedures which are prescribed in the CHSP.
4. Health and safety inspections are performed and appropriate records are maintained.
5. The school is in compliance with current legal requirements concerning chemicals/hazardous materials and ensure that the school CHSP is in accord with those requirements.

D. Science Teachers

School science teachers (whose normal work locations include a laboratory area), have the responsibility to:

1. Plan and conduct each laboratory operation/activity in accordance with the District's CHSP;
2. Maintain an annual inventory of laboratory chemicals and their Material Safety Data Sheets (MSDS);
3. Provide regular chemical hygiene, safety and housekeeping inspections, including routine inspections of emergency equipment, and maintenance of appropriate records; and
4. Observe proper chemical hygiene and safety work practices.
5. Instruct students in safe work practices and procedures.

E. Office of Environmental Health and Safety

The District's Office of Environmental Health and Safety (OEHS) has the responsibility for developing a program to implement the CHSP requirements.

These responsibilities require the OEHS to:

1. Work with school principals, Chemical Safety Coordinators and teachers to help implement school chemical hygiene & safety plans;
2. Maintain a list of Chemical Safety Coordinators in schools and work with these persons to monitor procurement, usage, and disposal of chemicals used in the school laboratory programs;
3. Provide technical assistance to schools and employees on the CHSP;

4. Regulate the use of chemicals for general school laboratories;
5. Determine the need for personal protective equipment beyond what is specified for general laboratory use;
6. Conduct annual review and revision of the CHSP; and
7. Provide training to staff as to the requirements listed in the Chemical Hygiene and Safety plan.

III. EMPLOYEE INFORMATION AND TRAINING

A. Chemical Hygiene & Safety Training Program

The goal of the District's chemical hygiene and safety training program is to ensure that all individuals at risk are adequately informed of the physical and health hazards associated with chemicals. Hazardous materials and wastes present/generated in the laboratory, the proper procedures to minimize risk of exposure and the proper response to spills.

All school employees whose normal work locations include a laboratory area shall participate in an ongoing chemical hygiene and safety training program. This includes custodial and maintenance personnel, as well as appropriate teaching staff.

The precise nature of training that a particular employee receives is determined by the nature of his/her work assignment in the laboratory. For example, 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 presence of laboratory chemicals. The training approach will be directed to classes or groups of hazardous chemicals, rather than to the specific characteristics of many individual chemicals.

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

1. The State Chemical Hygiene and Safety standards, including the contents of Section 5191 of the General Industry Safety Orders of Title 8, California Code of Regulations.
2. Location and contents of the District's Chemical Hygiene and Safety Plan.
3. Safe practices for handling hazardous materials and transporting them within the school.
4. Hazards of chemicals used in the school laboratory, including permissible exposure limits (PELs) or other exposure limits.

5. Labeling and storage practices and information to interpret labels, as outlined in the District's Hazard Communication Program.
6. Procedure for requesting chemical evaluation and authorization to obtain and use chemicals which are not previously approved for school laboratory use.
7. Information on concepts necessary to understand reference materials, such as PEL, threshold limit value (TLV), lethal dose (LD) 50, and routes of entry.
8. Location and content of Material Safety Data Sheets for chemicals in the school building and reference materials related to the chemical/physical properties, safe handling/storage, and disposal of hazardous materials/waste.
9. Location and proper use of available protective apparel and equipment.
10. Signs and symptoms associated with exposures to physical and chemical hazardous chemicals associated with the laboratory.
11. Methods and observations to detect the presence or release of hazardous contaminants (e.g., air monitoring).
12. Appropriate procedures for evacuation, response and reporting accidents involving chemical releases/spills.

The training program will be an ongoing process, not simply a one-time initial orientation for new employees. The Chemical Safety Coordinator will maintain records documenting the ongoing training received by employees (see Health and Safety Training Form in Appendix B).

B. Material Safety Data Sheets

The most current Material Safety Data Sheets (MSDS) received for all laboratory chemicals should be kept in the Science Chemical Material Safety Data Sheets binder which is readily accessible to employees. Appendix C contains a sample MSDS.

These MSDS's are available on the District on-line system located on the OEHS website accessible through the LAUSD.net website.

C. Signs/Drawings

Prominent signs/drawings must be clearly posted in all laboratories, as well as in chemical preparation and chemical storage areas. These signs/drawings have to clearly state the following:

1. Exits and evacuation routes.
2. Location of safety showers and eyewash stations.
3. Location of fire extinguishers/blankets and first aid kits.
4. Proper identification of used chemical/waste disposal containers and other safety equipment.
5. Floor plan drawings of the laboratory.
6. Location of equipment workbenches, and storage pattern for all chemicals contained in the storeroom.

IV. LABORATORY HAZARD RECOGNITION AND CLASSIFICATION

Laboratory operations are inherently hazardous and they can be classified as either physical or chemical in nature. Physical hazards include fire, explosion, skin cuts and abrasions, and extreme temperature. Laboratory chemical substances are hazardous to health when they enter the human body in sufficient quantity. Substance toxicity depends greatly on its phase (e.g., gas, liquid, or solid), route of entry, duration of exposure and the quantity which is absorbed into the body.

A substance can have acute or chronic health effects. Acute effects produce an immediate symptom, usually from a single dose at high concentration. Chronic effects do not cause any immediate adverse health effect, rather after long periods of exposure to the chemical(s).

There are three main routes by which chemical substances can enter the body:

- Inhalation by breathing dusts, fumes, mists or vapors.
- Ingestion by eating or drinking with contaminated hands or in a contaminated laboratory.
- Absorption through the skin or eye by contact with liquid, dusts, fumes, mists or vapors. Absorption by accidental puncture of the skin may occur with sharp objects or needles.

A. Physical (Safety) Hazards

1. **Combustible liquid:** Any pure liquid having a flash point at or above 100 degrees Fahrenheit (100 For 37.8 degrees Celsius), but below 200 F (93.3 C), except when a mixture has components with flashpoints of 200 F (93.3 C), or higher and the sum of the components makes up 99 percent or more of the total volume of the

mixture.

2. **Compressed Gas:** (a) A gas or mixture of gases, in a container having an absolute pressure exceeding 40 psi at 70 F (21.1 C); or (b) A gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130 F (54.4 C) regardless of the pressure at 70 F (21.1 C); or (c) A liquid having a vapor pressure exceeding 40 psi at 100 F (37.8 C).
3. **Explosive:** A chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature.
4. **Flammable:** A chemical that falls into one of the following categories:

"Aerosol, flammable" means an aerosol that yields a flame projection exceeding 18 inches at full valve opening, or a flashback (a flame extending back to the valve) at any degree of valve opening.

"Gas, flammable" means a gas at ambient temperature and pressure that forms a flammable mixture with air at a concentration of 13 percent by volume or less; or a gas at ambient temperature and pressure that forms a range of flammable mixtures with air greater than 12 percent by volume, regardless of the lower explosive limit.

"Liquid, flammable" means any liquid having a flashpoint below 100°F (37.8 C), except any mixture having components with flashpoints of 100°F (37.8 C) or higher, the total of which make up 99 percent or more of the total volume of the mixture.

"Liquid Combustible" are those with flash points at or above 100°F (37.8 C), but below 200°F (93.3C)

"Solid, flammable" means 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 as to create a serious hazard.

5. **Organic Peroxide:** An organic compound that contains the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms has been replaced by an organic radical. All organic peroxides are extremely flammable and sensitive to heat, friction, impact and light as well as to strong oxidizing and reducing agents.

6. **Oxidizer:** A chemical other than a blasting agent or explosive that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.
7. **Unstable (reactive):** A chemical which is in the pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shock, pressure or temperature.
8. **Water-reactive:** A chemical that reacts with water to release a gas that is either flammable or presents a health hazard.

B. Chemical Health Hazards

1. **Carcinogen:** A chemical is considered to be a carcinogen if it is capable of causing cancer. Carcinogens are listed by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), or the Occupational Safety and Health Administration (OSHA). Lists of carcinogens are updated and maintained by OEHS. Currently, the District does not use any chemicals identified in the above referenced lists.
2. **Corrosive:** A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact.
3. **Highly toxic:** A substance with the potential of injury by direct chemical action with body systems falling within any of the following categories:
 - A chemical that has a median lethal dose (LD50) of 50 milligrams or less per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.
 - A chemical that has a LD50 of 200 milligrams or less per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between two and three kilograms each.
 - A chemical that has a median lethal concentration (LC50) in air of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter or less of mist, fume, or dust, when administered by continuous inhalation for one hour (or less if death occurs within one hour) to albino rats weighing

