

Environmental Guidance Manual for Science Centers

Presented by the Environmental Compliance Group

Office of Environmental Health & Safety Los Angeles Unified School District

Presentation Outline

- Waste Handled at LAUSD
 - Recycling
 - Universal Waste
 - Hazardous Waste
- Transportation
- Chemical Storage and Handling
- Chemical Inventory
- Material Safety Data Sheet (MSDS)

Goals of LAUSD/City of LA Recycling Program

- Reduce the amount of waste the District disposes in landfills by 70 percent during the period 1990 to 2020
- Implement a District-wide joint recycling program with the City of Los Angeles
- Reduce disposal and recycling costs

Responsibilities

OEHS

- Provide training to students and staff
- Provide individual boxes for classrooms and small plastic (12gallon) recycling containers for each site

City of Los Angeles

- Provide outreach to students and staff
- Provide large (60-gallon) recycling containers for each site
- Provide pick-up services

Responsibilities

M&O (Plant Managers)

- Transfer recyclable materials from small recycling containers to large recycling containers
- Record volume of recyclable materials per week
- Place large recycling containers by the curbside once per week and return emptied recycling containers to collection stations

Teachers and Students

- Collect paper in individual boxes inside the classrooms and transfer to large (60-gallon) recycling containers
- Collect bottles and cans in small (12-gallon) recycling containers

Recyclable Materials in Joint LAUSD / City of Los Angeles Program

- Homework paper
- Notebook paper
- Computer paper
- Construction paper
- White and colored paper
- Phone books
- Copier paper
- Sticky notes
- Ads and junk mail
- Envelopes
- Letters
- Newspaper
- Cereal boxes

- Plastic containers (water bottles and milk cartons)
- Glass bottles
- Aluminum, metal, steel and tin cans
- Cardboard
- Magazines
- Catalogs
- NCR paper
- Flyers
- Paper bags
- Aluminum trays

RECYCLING CONTAINER

To request recycling containers contact Douglas Santos of OEHS at (213) 241-3199



Recycling Bin

To request recycling bins contact Douglas Santos of OEHS at (213) 241-3199



BEVERAGE CONTAINERS RECYCLING BIN

Contact Robert Skillman of LOS ANGELES CONSERVATION CORPS (LACC) at 213-749-3601 (rskillman@lacorps.org) or OEHS at 213-241-3199

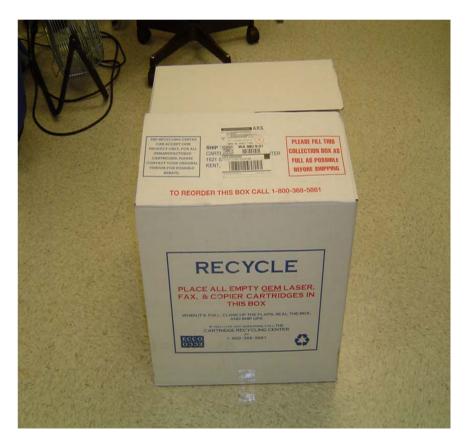


Toner & Inkjet Cartridges Recycling

Contact ECCO at (800) 368-5881







Universal Waste

- Fluorescent light bulbs
- Lamps with mercury
- Computers
- Televisions
- Mercury thermostats
- Mercury switches
- Batteries (nickel-cadmium batteries, small sealed lead acid batteries, alkaline batteries)

NOTE: Automotive-type lead acid batteries are not universal waste.

Disposal of Universal Waste

Complete hazardous waste pick-up request form & fax to OEHS at (213) 241-6816 to dispose fluorescent light bulbs and lamps with mercury





Recycling of Electronic Devices Do not dispose of in trash!





Contact Truck Operations at

<u>(562) 654-9000</u>

to arrange for collection of <u>Computer Monitors, Televisions</u> and Other Electronic Devices

HAZARDOUS WASTE

Highly regulated waste that may harm people or the environment.

Hazardous Waste at School Sites Examples of some hazardous wastes include:

- Duplicating fluid (flammable, non flammable)
- Laboratory chemicals (organics, acids/bases)
- Flammable solvents
- Used motor oil
- Car batteries
- Solvent based paint

Hazardous Waste at School Sites

- Contaminated gasoline or Diesel
- Asbestos containing materials
- Lead containing materials
- PCBs ballasts
- Old cleaning products
- Old maintenance and repair compounds

Chice of Environmental Health and Safety 33 South Beaudry Avenue os Angeles, California 90017 Phone: (213) 241-6816 ax: (213) 241-6816				A CONTROL OF LEUVENIN
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School/Site:		Date:		
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Contact Name.				
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Number of Replacement Containers	s Needed:			
	**** To be completed by	OEHS ****		
		DATELA	B PACKED:	
CONTRACTOR:		DATELA		
CONTRACTOR: DATE REQUESTED:			PICK-UP:	

Fill-out this form and fax to <u>OEHS</u> at (213) 241-6816

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Hazardous Waste Manifest

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Transportation

- 5 gallons or 50 lbs. of hazardous materials can be transported in your **own vehicle**; however shipping papers are required
- > 5 gallons or 50 lbs. but < 1,000 lbs. or 135 gallons must be transported in a **District** vehicle, with a shipping paper
- Proper labeling

Shipping Paper for Transporting Science Chemicals



LOS ANGELES UNIFIED SCHOOL DISTRICT SHIPPING PAPAR

Date:	
From: School/Site Address:	
Transporter:	

Title: _____

Line	Chemicals	Physical	Container	Quantity	Total
Item #		State	Туре		Volume
# 1					
2					
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Name of person receiving chemicals _____

_ Title: ____

Signature: ____

Physical State Code:

L = Liquid S = Solid P = Paste or Semi-Solid G = Gas **Container Type Code:**

F= Fiberboard G = Glass M = Metal P = Plastic

Chemical Storage and Handling

- LAUSD Approved Chemicals List
- Suggested Chemical Storage Pattern
- Chemical Storage Compatibility Categories
- Proper labeling

LAUSD Approved Chemicals List

Can be obtained from

- 1. <u>www.lausd-oehs.org/chemical-hygiene.asp</u>
- 2. Click on "View Approved Laboratory Chemicals"

Suggested Chemical Storage Pattern

Can be obtained from

www.lausd-oehs.org/chemical-hygiene_handout.asp

Your Safer Source for Science Supplies" Suggested Chemical Storage Pattern SUGGESTED CHEMICAL STORAGE PATTERN Storage of laboratory chemicals presents an ongoing safety hazard for school science departments. There are many chemicals that are incompatible with each other. The common method of storing these products in alphabetical order sometimes results in incompatible neighbors. For example, storing strong oxidizing materials next to organic chemicals can present a hazard. A possible solution is to separate chemicals into their organic and inorganic families and then to further divide the materials into related and compatible families. Below is a list of compatible families. On the next page you will find this family arrangement pictured as shelf areas in your chemical stores area. The pictured shelf arrangement will easily enable you to rearrange your inventory into a safer and more compatible environment. Inorganic Organic 1. Metals, Hydrides 1. Acids, Amino Acids, Anhydrides, Peracids 2. Acetates, Halides, Iodides, Sulfates, Sulfites, 2. Alcohols, Glycols, Sugars, Amines, Amides, Imines, Thiosulfates, Phosphates, Halogens Imides 3. Amides, Nitrates (except Ammonium Nitrate), 3. Hydrocarbons, Esters, Aldehydes, Oils Nitrites Azides 4. Ethers, Ketones, Ketenes, Halogenated 4. Hydroxides, Oxides, Silicates, Carbonates, Carbon Hydrocarbons, Ethylene Oxide 5. Sulfides, Selenides, Phosphides, Carbides, Nitrides 5. Epoxy Compounds, Isocyanates 6. Chlorates, Bromates, Iodates, Chlorites, 6. Peroxides, Hydroperoxides, Azides Hypochlorites, Perchlorates, Perchloric Acid, 7. Sulfides, Polysulfides, Sulfoxides, Nitriles Peroxides, Hydrogen Peroxide 8. Phenols, Cresols 7. Arsenates, Cyanides, Cyanates 9. Dyes, Stains, Indicators 8. Borates, Chromates, Manganates, Permanganates 10. Organic miscellancous 9. Acids (except Nitric) (Nitric Acid is isolated and stored by itself.) 10. Sulfur, Phosphorus, Arsenic, Phosphorus Pentoxide 11. Inorganic miscellaneous 1005 **NOTE:** If you store volatile materials (ether, hydrocarbons, etc.) in a refrigerator, the refrigerator must be explosion-proof. The thermostat switch or light switch in Chemical Inventory & Storage a standard refrigerator may spark and set off the volatile fumes inside and thus cause an explosion. Surely this list is not complete and is intended only to cover the materials possibly found in an average school situation. This is not the only method of arranging these materials and is only offered as a suggestion. See the next three pages for detailed inventory and storage steps you might follow to vastly improve the safety profile of your chemical storage.

Chemical Storage Compatibility Categories

Can be obtained from

www.lausd-oehs.org/chemical-hygiene_handout.asp

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Chemical Storage Compatibility Categories

- Metals. All metals except mercury (see item 8). Phosphorus (red only; white or yellow phosphorus not recommended for school usage) should also be stored here. Flammable solids should be stored in the flammables cabinet. *Location:* Keep separate from oxidizers (including ammonium nitrate), halogens, organic compounds, and moisture.
- 2. Oxidizers. All except ammonium nitrate. Includes nitrates, nitrites, permanganates, chlorates, perchlorates, peroxides, and hydrogen peroxide 30 percent or greater. *Location:* Keep separate from metals, acids, organic materials, and ammonium nitrate. Preferably, isolate oxidizers from the flammable liquids storage cabinet by a minimum of eight meters (25 feet) or by a one-hour free wall.
- Ammonium nitrate. Store in isolation from all other chemicals, especially acids, powdered metals, flammable liquids, chlorates, nitrites, sulfur, and finely divided organic combustible materials.
- 4. Bases. Strong bases—sodium hydroxide, potassium hydroxide, and other regulated bases—and ammonium hydroxide. Store in a dedicated corrosive chemicals storage cabinet that has an interior constructed entirely of corrosion-resistant materials.
- Acids. Inorganic (except nitric acid) and regulated organic acids. Store in a dedicated corrosive chemicals storage cabinet that has an interior

constructed entirely of corrosion-resistant materials.

- 6. Nitric acid. Must be stored separately from acetic acid. Store either in an isolated compartment in the acids cabinet or in special Styrofoam containers available for that purpose from vendors of chemicals. Furning nitric acid should never be used.
- Flammables. Store in a dedicated flammables storage cabinet painted with heat/flame-resistant paint. Preferably, isolate flammables from all oxidizers by a minimum of eight meters (25 feet) or by a one-hour fire wall.
- Poisons. Cyanides (no longer recommended for school programs), mercury and mercury compounds, nicotine, and other poisons. *Location:* Use a lockable drawer remote from the acids storage cabinet.
- Compressed gases. Cylinders must be chained or strapped to the wall, with caps on tight. Location: (a) Keep oxidizing gases remote from flammable liquids, metals, and flammable gases;
 (b) keep flammable gases remote from oxidizers and oxidizing gases by a distance of eight meters (25 feet) or by a one-hour fire wall.
- 10. Low-hazard chemicals. Many of the salts not otherwise specified (of course, not the nitrates), weak bases, oxides, carbonates, sulfides, dyes, indicators, stains, noncorrosive organic acids, amino acids, sugars, and so forth. Store on open shelves that have earthquake barriers.
- 9. Bottled gas cylinders should be secured to a wall or counter to prevent upsetting the cylinders. The rupture or unintentional opening of the release valve may cause serious personal injury and destruction of laboratory facilities, especially if the cylinder is not secured and becomes a projectile.
- 10. Larger gas cylinders must be kept in the cart provided for their transport. Valves should be in perfect working order. When not in use, each cylinder must be secured against movement; that is, each must be held by a sturdy chain or strap connected to ring bolts that will not pull free. The cylinders must be located within an approved storage area. Move large gas cylinders only when

regulator valves have been removed and safety covers have been installed.

A relatively safe and practical pattern for storage of chemicals is one that has separate storage provisions for different categories of chemicals (see diagram on page 44).

Labeling of Chemical Reagents

Whenever feasible, store chemicals in the containers in which they were received and retain the vendors' labels. Labels on prepared chemical reagent bottles or

Checklist for Safe Handling and Storage of Chemicals

LOS ANGELES UNIFIED SCHOOL DISTRICT

MONTHLY CHECK LIST FOR SAFE HANDLING AND STORAGE OF CHEMICALS

(To be completed by CSC)

	ACTIVITY	Yes	No
1.	All chemicals are correctly and clearly labeled.		
2.	Unlabeled containers and chemical wastes have been inventoried and a disposal request submitted to OEHS		
З.	Only chemicals that are being used are continually being stored.		
4.	Only the amount of chemicals which can be consumed within a year are being stored.		
5.	CSC is aware of and has trained others on the hazards and precautions for protection prior to using any chemical, and has reviewed the precautionary labels and contents before using any chemical product.		
6.	All chemicals are stored by compatibility (see CHSP Appendix IV, Table 1: Chemical Shelf Storage Identification Chart and Table 2: Storage for Compatibility Categories).		
7.	Chemicals are stored on shelves below eye level.		
8.	Chemicals are not stored on the floor.		
9.	Chemicals are being stored in approved storage cabinets.		
10.	Neutralizing chemicals, absorbent and other spill control materials are readily available.		
11.	Compressed gas cylinders are upright and secured to the wall with caps in place.		
12.	Storage cabinets for corrosive chemicals (separated for acids and for bases) are appropriately labeled.		
13.	Flammable materials are stored in approved storage cabinets.		
14.	Shelving is equipped with lips to prevent products from rolling off shelves and secured to walls/floor to prevent tipping of entire sections.		
15.	Storage areas/cabinets are labeled to identify the hazardous nature of the products stored within.		
16.	Class ABC fire extinguishers are available in chemical storage areas and are in working order.		
17.	There are no sources of ignition in the chemical storage area.		
18.	Chemicals storage area have two exits and egress (exiting) area is clear.		
19.	Used and contaminated reagents are stored and labeled property.		
20.	Current and dated inventory lists are posted clearly in each storage room throughout the science department.		
21.	Chemical storage cabinets are locked when laboratory classes are not in session.		

Certification: I hereby certify that I have completed all of the above activities in fulfillment of my responsibilities as the Chemical Safety Coordinator (CSC) for my school.

Date

Appendix F

School

CSC Signature

CSC Name (print)

Site Administrator

Date Completed

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Chemical Inventory

Chemical Inventory Form can be obtained from

- 1. <u>www.lausd-oehs.org/chemical-hygiene_handout.asp</u>
- 2. Click on "LAUSD Approved Chemical Inventory List"

Chemical Inventory Form

LAUSD APPROVED CHEMICALS LIST (INVENTORY LIST)

School/Site: Name: Signature: Room No.:_____ Time Spent:_____ Date:_____

CHEMICAL NAME	MANUFACTURER	MATERIAL RAFETY DATA SHEET YESJ ND	COMPATIBLE STORAGE	HAZARO HEALTH	H.R.	TOTAL NUMBER OF CONTAINERS	TOTAL DUANTITY SM-ORAMS, RO-RELOGIAMS, US-POLNOS, D2-DUNDS, 22, LITER	SHELF LIFE (Monthe)	Expired Chamical YES,NO
Carbon Diseide C.O. (PEL 10,000 ppm)			Chain Or Cabinet For Gas Container	Experimental tentogenio dela, Experimental reproductive effecta	1			12 - 50	
Nitroen N			Chain Or Cabinet for Gas Container	See Hezerd Reting (-F)	1			12 - 50	
Oxygen O Tenis			Chain Or cabinet for Gas Container	Human mutation data reported, Human teralogonic data,	з			12 - 50	
Properte CoMo			Chain Or Gabinet for Gas Container	See Hazard Flating ()-F3	з			12 - 50	
Holison He			Chain Or Cabinet For Gas Container	See Hazard Rating (HR)	1			12 - 50	
Aluminum Al (Powder, PEL 15 mg/m ³)			1-1	See Hazord Roting (HR)	3			12 - 50	
Biemuth El Netal (pellets)			1-1	Paiser	3			12-50	
				See Hazand Rating (HR)	-			@ 6 · 30	
Calcium Ca			1-1		3			@	
Copper Ou Netal (wire, sitips, pieces) (fer dusti PEL 1 eggim ¹ 6.			14	Experimental teratogenic data, reproductive effects, Questionable cardinogen sub-active activity terrorigenic data,	2			12 - 69	
Iron Fe Metall (powder, strips.wire, pieses)			ы	Poison, Questiensble carcinogen with experimental tamorigenic claim	3			12 - 50	
ror Demonstration cody (area) (powder, PCL d.05 mg/m²) (powder, PCL d.05 mg/m²)			(Strips ONLY) I-1	Peleon, Constenuité estraingen, Exponéncetat bordigen reproductivo offecto, Harnan mutation data respondo, Hallucinalises and datastad percapteras. (Ne powder, No aborts)	3			12 - 60 @	
Lithium Motel Li			I-1 Under Mineral Oil	Poison, Reacts Vigorously With Water,	з			12 - 50	
Magnosium Mg Netel (ribbos)			14	See Hezard Raling (HR)	з			12 - 60	
Manganese Min Metal (powdori PEL 1 mg/m ³)			14	Poison, Questionable cardinopen with experimental temorigenia offesta.	з			12 - 50	
Por Demonstration Only Prop. 66			(Strips Only) I-1	Confirmed continogen with experimental servinogenic, Neoplastigenic, Temolgenic and Tembogenic Data, Nutation date reported.	3			12 - 50	
(powder, PEL 0.01 mg/m ³)			(Strips Only) I-1	(when heated) Posion (No Powder)	з			12 - 50	
Silcon Si			1.1	See Hozard Raling (HR)	3			12 - 50	

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Material Safety Data Sheet (MSDS)

Can be obtained from

- 1. <u>www.lausd-oehs.org</u>
- 2. Select "Product Review"
- 3. Click on "download Material Safety Data Sheets"

Sample Material Safety Data Sheet

Flinn Scientific, Inc. FLINN SCIENTIFIC, INC – P.O. BOX 219 – BATAVIA, ILLINOIS 60510 – (312) 879-8900 MATERIAL SAFETY DATA SHEET

C	Consult your copy of the Fli	inn Chemical Cat	alog/Refere	ence Manual
External: Wash affect Internal: Wash moun Eyes: Wash cont	CANCE DANGEROUS): eted parts with copious quantitie rh. See a physician. tinously for 15 minutes. See a prt to greshen air; administer ox	physician.	an.	
SPECIAL PRECAUTI Wear chemical glove Prudent lab practices	s and goggles. Use and dispser	ase in a hood. If no	hood, then pre	ovide good ventilation.
	a immediately. Absorb on sand niner. Use the disposal method		DISPOSAL See Flinn Cl	METHOD 26b hemical Catalog/Reference Manua
FIRE HAZARDS (IF A Use triclass, dry cher	NY): mical fire extinguisher. Combu	stible liquid. Serio	us fire hazard.	-
Fatigue, nausea and h	and mucous membranes. Var			RESHOLD LIMIT VALUE V) IF ESTABLISHED 750 ppm in air
CONDITIONS TO AV Avoid any sour	OID (IF ANY): ree of ignition. Avoid breathin	g vapor.		
See Flinn Chemical Ca	talog/Reference Manual	Flammable Liquid		Stable
COMPATIBLE CHEM Organic	IICAL FAMILY	DOT CLASS		REACTIVITY
APPEARANCE AND Clear liquid, sweetish				
Specific Gravity: 0.7 Melting Point: -94C	ENSITY, SOLUBILITY, ETC 85 Flash and most organic solvents	.) Point: -18C		
FORMULA CH3OCH3	FORMULA OR ATOMIC	WEIGHT 8.08		S NUMBER 64-1
CHEMICAL NAME & ACETONE	SYNONYMS	I	FLINN CATALOG NUMBER A0009, A0010, A0081	

Additional Handouts

The following handouts are available at:

- <u>www.lausd-oehs.org/chemical-hygiene_handout.asp</u>
 - 1. Hazard Communication Presentation (PowerPoint)
 - 2. Chemical Hygiene Plan
- www.lausd-oehs.org/chemical-hygiene.asp
 - 1. Science Safety Handbook for California Public Schools

Conclusion

Thanks for your time, if you have any further questions, please contact the environmental compliance group of OEHS at 213-241-3199

Appendix I

Shipping Paper for Science Centers



LOS ANGELES UNIFIED SCHOOL DISTRICT SHIPPING PAPAR

Date:	
From:	
School/Site	
Address:	
Transporter:	
Title:	

То:	
School/Site:	
Address:	

Line	Chemicals	Physical	Container	Quantity	Total
Item		State	Туре		Volume
#					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

Name of person receiving chemicals ______ Title: _____

Signature: _____

Physical State Code:

L = Liquid S = Solid**P** = **Paste or Semi-Solid** G = Gas

Container Type Code:

F= Fiberboard **G** = **Gl**ass M = Metal **P** = **Plastic**