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Chemical Management Resource Guide for School Administrators

References and Appendix

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Appendix

Chemical Hygiene and Management Plans

Responsible chemical management and hazard communication procedures help to minimize the risk of accidental exposures in schools. **Chemical hygiene or management plans** provide guidelines for handling chemicals in schools using tools such as inventory lists (see example below, extracted from an existing inventory list²⁴).

LAUSD APPROVED CHEMICALS LIST (INVENTORY LIST)

School/Site: _____
 Name: _____
 Signature: _____

Room No.: _____
 Time Spent: _____
 Date: _____

Chemical Name	Manufacturer	Material Safety Data Sheet Yes/No	Compatible Storage	Hazard Health Effects	HR	Total Number of Containers	Total Quantity GM=grams, KG=kilograms, LB=pounds, OZ=ounce, CC, liter	Shelf Life (Months)	Expired Chemical Yes/No
Gram's Iodine Stain= Iodine Solution, Gram			I-2	Poison, Human mutation data reported, Experimental reproductive effects.	3			1 – 10	
Gypsum CaSO ₄ .xH ₂ O			I-2	See Hazard Rating (HR)	1			1 – 10	
Iodeosin C ₂₀ H ₁₄ O ₅			I-2	Poison, Human mutation data reported, Experimental reproductive effects.	3			1 – 10	
**** Iodine (crystals) (PEL 0.1 ppm)			I-2	Poison, Human mutation data reported, Experimental reproductive effects.	3			1 – 10	
Iodine Solution			I-2	Poison, Human mutation data reported, Experimental reproductive effects.	3			1 – 10	
Lithium Chloride LiCl			I-2	Poison, Human mutation data reported, Questionable carcinogen, Experimental neoplastigenic, teratogenic and reproductive effects.	3			1 – 10	



Check It Out

Examples of school chemical hygiene/management plans and associated resources include:

- Maine Department of Labor, Sample Chemical Hygiene Plan for Maine Schools, http://www.safetyworksmaine.com/safe_workplace/sample_programs/school_chemical_hygiene_plan.htm
- Maine Department of Environmental Protection, Scientific Lab Chemical Inventory spreadsheet, http://www.maine.gov/dep/mercury/chemical_inventory_list.xls
- Colorado Department of Public Health and Environment, Guidance on Chemical Management in Schools, <http://www.cdphe.state.co.us/cp/Institutions/Schools/Chems%20In%20Schools/ChemMgmt.html>
- Massachusetts Department of Environmental Protection, Massachusetts School Chemical Management Program, <http://www.mass.gov/dep/service/schlchem.pdf>
- Illinois State Board of Education, Chapter 12 of the Guidebook for Science Safety in Illinois, http://www.isbe.net/ils/science/pdf/science_safety.pdf
- EPA, Chemical Management and Usage, http://www.epa.gov/Region7/education_resources/teachers/ehsstudy/ehs1.htm

Hazard Communication Programs also have been implemented in various school districts:

- Putnam City Schools (Oklahoma) – Hazard Communication Standard, <http://www.putnamcityschools.org/pageid333.html>
- Penasco Independent School District (New Mexico) – Hazard Communication Program, http://www.penasco.k12.nm.us/policies/10_12.htm

Sample Guidelines

In addition to preparing comprehensive management plans, many school districts throughout the U.S. have implemented **other types of guidelines**, such as integrated pest management (IPM) policies, to minimize the use of toxic chemicals. An excerpt adapted from a **sample policy** developed for use by California schools is shown below:²⁵

Model School IPM Policy

A. Policy Statement

The {insert name} School District recognizes that the maintenance of a safe, clean, and healthy environment for students and staff is essential to learning. It is the goal of the District to provide the safest and lowest risk approach to control pest problems, while protecting students, staff, the environment, and district property.

The District hereby adopts a Least-Toxic Integrated Pest Management (IPM) policy. This policy shall focus on long-term pest prevention and give non-chemical methods first consideration when selecting appropriate control techniques. The full range of alternatives, including taking no action, will be considered first, with chemical controls used as a last resort. Preference will be given to chemicals and methods of application that pose the least hazards to people and the environment. The District's long-term goal is the elimination of all chemical pest control methods.

B. Role of the IPM Coordinator

The IPM coordinator shall be named to coordinate the district's efforts to adopt IPM techniques, and shall be provided with training on least toxic pest management practices. Specific responsibilities include:

- Overall program management and providing proposed regulations or procedures and products for use in managing pest populations
- Education and training for IPM personnel
- Formal annual notification to parents, staff, and students of any potential chemical pesticide application
- Posting of warning signs for all pesticide applications
- Establishment and maintenance of a registry of parents, staff, and students who have indicated a desire for prior notification of each pesticide application
- Advance notification for individual pesticide applications
- Recordkeeping for any chemical pesticide application

C. Pesticide Product Selection and Use Approval

Selection of pesticide products will be based on the IPM coordinator's review of the product's contents, precautions, and adverse health effects. The IPM Coordinator will prioritize the use of the following nontoxic products:

1. Approved Products

Mechanical or Biological Products

- Caulking agents and crack sealants
- Physical barriers
- Electronic products, heat, and lights

Chemical Products

- Soap-based products
- Borates, silicates, and diatomaceous earth
- Insecticide or rodenticide self-contained baits and traps



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For more information on IPM in schools, visit:

- EPA, Integrated Pest Management (IPM) in Schools, <http://www.epa.gov/pesticides/ipm/>
- EPA, Pesticides: Controlling Pests, Storing Pesticides, <http://www.epa.gov/pesticides/ipm/brochure/steps6-7.htm>
- California Department of Pesticide Regulation, Model Program Guidebook, 2nd Edition, http://www.cdpr.ca.gov/cfdocs/apps/schoolipm/managing_pests/guidebook.cfm
- University of Florida/EPA, National School IPM Information Source, <http://schoolipm.ifas.ufl.edu/>
- Texas A&M University/EPA, IPM Resource Center for Schools and Childcare Facilities, <http://schoolipm.tamu.edu/>
- Massachusetts Natural Resources Collaboration, IPM Tools & Resources, <http://massnrc.org/ipm/schools-daycare/ipm-tools-resources.html>
- Minnesota Department of Agriculture, Management of Pesticides, www.mda.state.mn.us/ipm/fspesticides.pdf
- National Pesticide Information Center, <http://npic.orst.edu/>

Checklists

Checklists are often used to clearly identify chemical management actions and to verify that they have been completed (see basic example below, an excerpt adapted from the Los Angeles Unified School District “School Laboratory Chemical Hygiene & Safety Plan”²⁶).

LOS ANGELES UNIFIED SCHOOL DISTRICT MONTHLY CHECKLIST FOR SAFE HANDLING AND STORAGE OF CHEMICALS

To be completed by C.S.C.

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.		
3. 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 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 being 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. Chemical storage area has two exits and egress (exiting) area is clear.		
19. Used and contaminated reagents are stored and labeled properly.		
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

School

CSC Signature

CSC Name (print)



Check It Out

Additional checklists are available at:

- EPA, HealthySeat Assessment Checklist, http://www.epa.gov/schools/healthyseat/AssessmentChecklist_Blank.pdf
- National Institute for Occupational Safety and Health, NIOSH Safety Checklist Program for Schools, <http://www.cdc.gov/niosh/docs/2004-101/default.html>
- Massachusetts Healthy Schools Council, Checklist Concerning Environmental Health & Safety in Schools, http://mass.gov/Eeohhs2/docs/dph/environmental/iaq/schools_checklist.pdf
- Washington Department of Health and Office of Superintendent of Office of Public Instruction, Health and Safety Guide for K-12 Schools in Washington (Part II), <http://www.k12.wa.us/SchFacilities/HealthSafetyGuide.aspx>

Chemical Purchasing, Storage, and Design Guidelines

Chemical purchasing, storage, and design guidelines have been developed by many school districts and state agencies in an effort to eliminate unnecessary purchases of hazardous substances and avoid dangerous storage scenarios. General chemical storage principles are illustrated in the following example, adapted from the U.S. Centers for Disease Control and Prevention, Office of Health and Safety's Chemical Storage Guidelines:²⁷

Class of Chemical	Recommended Storage Method	Examples	Incompatibilities
Compressed gases – Flammable	Store in a cool, dry area, away from oxidizing gases. Securely strap or chain cylinders to a wall or bench.	Methane, Hydrogen, Acetylene, Propane	Oxidizing and toxic compressed gases, oxidizing solids
Compressed gases – Oxidizing	Store in a cool, dry area, away from flammable gases and liquids. Securely strap or chain cylinders to a wall or bench.	Oxygen, Chlorine, Bromine	Flammable gases
Compressed gases – Poisonous	Store in a cool, dry area, away from flammable gases and liquids. Securely strap or chain cylinders to a wall or bench.	Carbon monoxide, Hydrogen sulfide, Nitrogen dioxide	Flammable and/or oxidizing gases
Corrosives – Acids	Store separately in acid storage cabinet. Segregate oxidizing acids (i.e., Chromic, nitric, sulfuric, and perchloric acids) from organic acids.	Acetic acid, Phenol, Sulfuric acid, Chromerge, Nitric acid, Perchloric acid, Chromic acid, Hydrochloric acid	Flammable liquids, flammable solids, bases, oxidizers
Corrosives – Bases	Store in separate corrosive storage cabinet. Store solutions of inorganic hydroxides in labeled polyethylene containers.	Ammonium hydroxide, Sodium hydroxide, Calcium hydroxide	Flammable liquids, oxidizers, poisons, acids
Flammable Liquids	Store in flammable storage cabinet and away from sources of ignition. Store highly volatile flammable liquids in an explosion-proof refrigerator.	Acetone, Benzene, Diethyl ether, Methanol, Ethanol, Toluene, Glacial acetic acid	Acids, bases, oxidizers, poisons



Check It Out

Consult the following resources for more information on chemical storage, purchasing, and design:

- Californian Department of Environmental Health Hazard Assessment, Art Hazards, <http://www.oehha.ca.gov/education/art/index.html>
- King County, Washington, Rehab the Lab, <http://www.govlink.org/hazwaste/schoolyouth/rehab/index.htm> and <http://www.epa.gov/epaoswer/osw/conserves/2004news/03-labs.htm>
- Iowa Metro Waste Authority, Rehab the Lab (Hazardous Materials), http://www.metro-waste.com/sch_reh.html
- EPA, Healthy School Environment Resources: Chemical Purchasing, http://cfpub.epa.gov/schools/top_sub.cfm?t_id=361&s_id=363
- Massachusetts Department of Environmental Protection, Massachusetts School Chemical Management Program, <http://www.mass.gov/dep/service/schlchem.pdf>
- Commonwealth of Massachusetts, Environmentally Preferable Purchasing Program, Product & Service Information, <http://www.mass.gov/epp/products.htm>
- Illinois EPA and Waste Management Resource Center, Greening Schools homepage, <http://www.greeningschools.org/>
- Maryland State Department of Education, Science Facilities Guidelines, Chapter 5: Design Considerations, http://www.mdk12.org/instruction/curriculum/hsa/science_facility/chapter5.html

Use of Chemicals in Schools

Some states have taken **regulatory actions** to limit the use of chemicals in schools. For example, Rhode Island²⁸ prohibits the use of listed chemicals in schools (see excerpts from Rhode Island’s list below). The State of Washington’s Department of Health and Office of Superintendent of Public Instruction also have published a tiered list of chemicals: (1) unsuitable for use (see Appendix D, Table 1 of their guide) in K-12 schools due to excessive risk that exceeds their educational utility, and (2) appropriate only for advanced-level high school science classes due to high risk and limited to small- or micro-scale quantities (see Appendix D, Table 2 of their guide).²⁹ Furthermore, chemicals that are allowed in schools may vary across districts for different reasons (e.g., staff experience, training).

Full Chemical Name	CAS #	Reference
1-(2-tert-Butylperoxy isopropyl)-3-isopropenylbenzene	96319-55-0	49CFR173.225
1-(o-Chlorophenyl)thiourea	5344-82-1	EPA Acutely Toxic (P Listed)
1,1-Di-(tert-amylperoxy)cyclohexane	15667-10-4	49CFR173.225
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	6731-36-8	49CFR173.225
1,1-Di-(tert-butylperoxy)cyclohexane	3006-86-8	49CFR173.225
1,1'-Diazoaminonaphthalene		DOT Forbidden
1,1-Dimethyl-3-hydroxybutylperoxyneohexanoate		49CFR173.225
1,2,3-Propanetriol, trinitrate (R)	55-63-0	EPA Acutely Toxic (P Listed)
1,2,4-butanetriol trinitrate		DOT Forbidden
Benzene	71-43-2	Reproductive Toxic, Select Carcinogen
benzene diazonim chloride		DOT Forbidden
Benzene sulphohydrazide	80-17-1	49CFR 173.224
benzene triozone		DOT Forbidden
Benzene, (chloromethyl)-	100-44-7	EPA Acutely Toxic (P Listed)
carbazole	86-74-8	IARC List of Known and Suspected Human Carcinogens
Carbonic dichloride	75-15-0	EPA Acutely Toxic (P Listed)
carrageenan	9000-07-1	IARC List of Known and Suspected Human Carcinogens
chlordane	57-74-9	IARC List of Known and Suspected Human Carcinogens
dichloromethane	75-09-2	IARC List of Known and Suspected Human Carcinogens
Dieldrin	60-57-1	EPA Acutely Toxic (P Listed)
guanyl nitrosaminoguanilydene hydrazine		DOT Explosive
hexanitrodiphenylamine	131-73-7	DOT Explosive
Isopropyl Ether	108-20-3	Peroxidizable
Lead and lead compounds	7439-92-1	Reproductive Toxic
Methyl chloromethyl ether	107-30-2	OSHA Listed Chemicals
Methyl ethyl ketone peroxide	1338-23-4	49CFR173.225



Check It Out

Other states that have passed regulations related to chemicals in schools:

- Colorado Department of Public Health and Environment, Rules and Regulations Governing Schools in the State of Colorado, http://www.csmate.colostate.edu/cltw/Colorado_Rules.pdf