

POLLUTION PREVENTION FOR SCHOOL SCIENCE LABS

Introduction

Storage, management, and disposal of laboratory chemicals present an on-going health and safety hazard for school science departments. Many schools hold stockpiles of unused and unwanted hazardous chemicals, some of which have degraded over time to become highly hazardous.

There are many actions a school can take to prevent accumulation of unneeded, older chemicals and prevent chemicals from impacting the environment.

Pollution prevention

Pollution prevention is any activity that reduces the amount of waste generated. Pollution prevention can be applied to any business, even a school. Pollution prevention practices for school science labs include:

- Purchasing less hazardous chemicals and buying smaller amounts
- Buying only what you need and keeping accurate inventory of all chemicals on-site to prevent expiration or loss of product and accumulation of chemical stockpiles
- Storing chemicals in ways that prevent spills
- Ensuring disposal practices are environmentally sound

Following these pollution prevention practices can help your school:

- Save money — Good management practices create efficiencies and reduce disposal costs.
- Reduce liability — Even after a waste has left your facility, you are still legally responsible for it.
- Protect health by reducing the amount and toxicity of chemicals, you protect students and staff

Purchasing and accounting

Many chemical stockpiles and chemical wastes can be avoided if care is taken during the purchasing stage.

- Centralize chemical purchasing to reduce buying duplicate product
- Purchase only what you need — many chemical suppliers offer a discount for bulk purchases. Before choosing this option, consider how much you will actually use each year. Can you use the product before its expiration date? Disposal of unneeded left-over chemicals can cost 10 times the purchase price.
- Do not accept chemical donations unless they meet a specific need. Free chemicals may require costly disposal if never used and there is no guarantee the labels on the containers are accurate.
- Include costs for chemical disposal in yearly budgets.

Inventory

Schools are required to maintain inventories of their chemicals. In this time of heightened security concerns, inventory systems can help prevent the theft of chemicals and lab glassware from school labs for synthetic drug manufacture. An inventory system with periodic monitoring can help secure chemicals and ensure the safety and security of your community.

- Develop an inventory system for all science chemicals in the school and review it prior to purchases
- Use up old chemicals before opening a new container of the same compound
- Share chemicals among departments
- Update the inventory annually
- Ensure each chemical onsite has a Material Safety Data Sheet (MSDS), available for review by all staff

Minimize chemical use

Eliminate unnecessary use of chemicals. Consider alternatives including probes, computer simulations, analytical equipment, or small scale chemistry lesson plans that use less chemical per experiment.

Storage

Schools should take extra precautions to ensure that chemicals are stored safely and securely. Proper storage can help prevent spills. Chemical spills can be costly and dangerous to clean up. Best management practices include:

- Limit access to chemicals to appropriate teachers and staff
- Monitor the integrity of the chemical storage area — Are locks working? Are shelving units sturdy? Are shelving unit holders in good condition? Check routinely for signs of wear.
- Store chemicals according to chemical compatibility — Just because two chemicals have similar names or share common elements does not mean they are the same. Storing chemicals in alphabetical order may result in incompatible chemicals next to each other, which may present a hazard. Schools should evaluate the chemicals on-site, their properties and potential hazards, and use the information to develop an appropriate and functional storage method.
- Use secondary containment around containers to limit impacts from spills
- Plug any drains in the storage area to ensure that spills do not enter the wastewater system
- Monitor volumes of chemicals as part of the inventory process — Loss of chemical could be an indicator of theft or evaporation and should be closely evaluated.
- Monitor the condition of containers for deterioration. Lids should close tightly, labels should be clear, and containers should be in good condition. Note: crystal build-up on containers with ether, disulfides, peroxides, dioxins, dioxanes, or reactive metals may be particularly dangerous

and require special handling. If such a container is discovered, do not disturb it and State and Local authorities for assistance.

Disposal

Evaluate disposal options carefully to ensure chemical wastes are disposed of carefully and legally.

- Talk with suppliers to see if they offer a “chemical take” back program to dispose of unused chemicals at the end of each year
- Consider recycling or disposal through a hazardous waste management company
- Contact your wastewater treatment authority to determine what can go down the drain. Ask what may be safely disposed of and any pretreatment requirements. Disposal of chemicals and wastes down a drain can interfere with the operation of the wastewater treatment plant and may be prohibited.
- Call your landfill for restrictions or requirements prior to disposing of chemical wastes or lab specimens in the trash.

For additional information

Chemical Cleanout Toolkit for EPA Region 8 States (CO, MT, ND, SD, UT, WY)

http://peakstoprairies.org/library/healthy_schools/chemcleanout/index.cfm?page=p2#head

Flinn Scientific, Inc., Teacher Resources <http://www.flinnsci.com/teacher-resources/teacher-resource-videos/laboratory-safety-videos/chemical-storage-area-clean-up-plan/>