

Funding Safety Activities in Secondary Schools

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ABSTRACT

In order to teach chemistry thoroughly, safety should be taught as an integral portion of the curriculum. However, acquiring the funding to incorporate safety related material can be difficult. We present some innovative ways to gain the necessary funding, and suggest some appropriate resource material for secondary school chemistry departments.

Today, laboratory safety and accident prevention must be a part of a proactive philosophy, policy and practice that is modeled on a daily basis. For those readers who acquired their basic science education 40 or 50 years ago,

science safety may have been equated with not breaking glassware, not burning holes in ones clothing and keeping the occasional fire or explosion to a small scale. To some, safety may have meant wearing an apron or protective eyewear. Currently, as a result of industrial and governmental initiatives such as Hazard Communication (HazCom) and Right-to-Know (1), the Less is Better philosophy of chemical management, the recognition of hazardous materials (hazmats) and the Laboratory Standard (2), science safety has taken on a more technical bent. Science safety now demands not just personal protective equipment (PPE), but the literature of safety as well.

Funding problems and budget constraints are always with us; consequently, acquiring quality safety reference material and the necessary hardware for laboratory safety can be difficult. All too often, the public education system is viewed by the voters as a tax liability rather than an asset to the community. (3) Of course, funding daily needs is important, but we point out that neglecting to supply the necessary funds for safety in the classroom can be dangerous. The fact, An accident has never happened here, is an incomplete and misleading statement. The complete, and correct, statement is An accident has never happened here *yet*.

Administrators, especially of schools with limited funds, are removed from the classroom and some need help to understand that safety is not only worth it but necessary. The teacher is left with few options to obtain the necessary materials required to both teach and conduct science safely.

To win the budget battle, safety awareness must be raised and the importance of safety in the classroom and laboratory must be consistently emphasized to your colleagues and especially to those who make the ultimate financial decisions. All staff involved in science education should be convinced that Safety is Job #1 and speak with a single voice when it comes time to seek a portion of the operating funds. Promotion of both the monetary and ethical value of safety is an absolute must.

The monetary value of laboratory safety and accident prevention may be difficult to explain to a school board strapped for funds. The school board may point out that it only has finite funds available and cannot pay some paltry amount for, say, science safety reference materials. In todays litigious world, one might better ask if the school board *could* afford the cost of a preventable accident or hazardous materials incident?

From the ethical, and often a more persuasive perspective, we must remember that schools act *in loco parentis*, that is, the school board (and the science staff) have an obligation to protect the children in their charge. Finally, there is also an obligation to protect the investment of the taxpayers.

Promoting awareness of the Laboratory Standard, HazCom and hazardous materials management, as well as

applicable PPE standards and prudent laboratory practice is vital, not only for the students own education, but also for your colleagues and the school board. In order to promote safety awareness to your colleagues, we suggest the use of in-house training time or in-service hours to host laboratory safety seminars. The seminars should cover fundamental topics such as the Lab Standard, PPE, chemical disposal, and laboratory chemical hood use. Presentations to the local school board with the purpose of increasing safety awareness can include video presentations of Whats wrong with this picture or better, Whats right with this picture?

In communities with local radio or cable access stations that broadcast school board meetings, presentations to the school board also become presentations to the community at large. Innovative and creative presentations not only increase community chemical safety awareness, but also the awareness of your need for safety related reference material and equipment.

A complete set of safety references is not inexpensive (4), but the essentials for a school are listed in Table 1. The total cost is less than \$500. Even so, there are ways to overcome the problem of cost. Here are a few suggestions:

1. Consider cooperative purchasing and sharing with local school districts. While larger districts may have the resources to acquire copies of selected references, smaller districts could split the cost and rotate copies from school to school throughout the year.
2. Acquire resources through a local education consortium or joint/cooperative educational agency. If such an option is available, the materials could be centrally located. The cost is shared by a large number of schools.
3. Seek financial assistance from the local fire department and local/county emergency management agency. Science professionals are a valuable adjunct to emergency services, and your ability to interpret technical references for these agencies can be a selling point for this option.
4. Try a science-related fund-raiser. Sponsor a chemical demonstration performance and charge a nominal admission to purchase safety related materials. The promise of flash, bang and boom usually brings out a crowd.
5. Investigate the use of state and federal curriculum improvement or school improvement funds or grants.
6. Seek assistance from area industries that are stakeholders in chemical safety. For example, petroleum

and natural gas pipeline companies, agricultural chemical suppliers, and insurance companies all have an interest in chemical safety. A corporate outreach could be a valuable activity for both parties.

7. Seek assistance from the state-level emergency management agency. If an instructional unit involves the equivalent of hazardous materials awareness level training or hazmat incident education, the state agency could be a source for slides, video/films, and other instructional materials. If the science department and the driver education department could develop a joint safety program, the state Department of Transportation could be another source of material support.
8. There are also a number of free or inexpensive resources that are available from the American Chemical Society and other sources, as shown in Table 2. Your local ACS section is also a valuable resource that is often overlooked. Local ACS sections can be found via the ACS web site, www.chemistry.org and performing a search on local sections, or <http://center.acs.org/applications/lookup/locate.cfm>. The local section membership may have a first-class knowledge from a variety of, and often practical, perspectives. Many of these local sections have people knowledgeable in laboratory safety. They may be willing to donate some time to local school districts. Note: Chemical safety references available through internet sources are not included in the listing as it is often difficult to ascertain if a safety resource has been reviewed for accuracy. It is best to stay with reviewed material. Additionally, paper resources do not require net access and are often the quickest resource to use in an emergency.

Monetary restrictions can make the acquisition of important safety references and material difficult. But with imagination and salesmanship the monies can be found. Good references and top-notch programs help to make sure that safety is no accident.

References

1. Hazard communication. 29 CFR 1910.1200
2. Occupational Exposure to Hazardous Chemicals in Laboratories. 29 CFR 1910.1450.
3. As an example, a Google search on the words failed school referendum gave over 55,000 results.
4. Elston, H.J., Young, J.A. *et al.* *Chem. Health Safe.* **2001**, 8(1) 6-7.

Table 1: The cost of selected references.

Title Publisher Approximate Cost

Chemical Safety for Teachers and American Free to schools
Their Supervisors, Grades 7-12 Chemical Society upon request
or, Read On-line at
http://membership.acs.org/c/ccs/pub_1.htm

Prudent Practices in the National Research \$ 70.00
Laboratory Council
or, Read On-line at
<http://books.nap.edu/books/0309052297/html/index.html>

Merck Index Merck \$ 60.00

Safe Storage of Laboratory Chemicals Wiley \$145.00

First Aid Manual for Chemical Wiley \$ 90.00
Accidents

CRC Handbook of Laboratory CRC Press \$150.00
Safety

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Table 2: References available for little or no cost from the American Chemical Society (www.acs.org or 1-800-227-5558) and other sources.

Title

Less is Better*

Chemical Safety for Teachers and Their Supervisors, Grades 7-12*

Safety and Audit Inspection Manual*

Safety in Academic Chemistry Laboratories

Developing a Chemical Hygiene Plan

Flynn Scientific Catalog

Fisher Scientific Chemical Catalog (available from Fisher Scientific, www.fishersci.com)

* Available in PDF format at <http://membership.acs.org/ccs/publications>
