

# Laboratory Safety Guidelines

## 40 Suggestions for a Safer Lab



### Steps Requiring Minimal Expense

1. Have a written health, safety and environmental affairs (HS&E) policy statement.
2. Organize a departmental HS&E committee of employees, management, faculty, staff and students that will meet regularly to discuss HS&E issues.
3. Develop an HS&E orientation for all new employees and students.
4. Encourage employees and students to care about their health and safety and that of others.
5. Involve every employee and student in some aspect of the safety program and give each specific responsibility.
6. Provide incentives to employees and students for safety performance.
7. Require all employees to read the appropriate safety manual. Require students to read the institution's laboratory safety rules. Have both groups sign a statement that they have done so, understand the contents, and agree to follow the procedures and practices. Keep these statements on file in the department office.
8. Conduct periodic, unannounced laboratory inspections to identify and correct hazardous conditions and unsafe practices. Involve students and employees in simulated OSHA inspections.
9. Make learning how to be safe an integral and important part of science education, your work, and your life.
10. Schedule regular departmental safety meetings for all students and employees to discuss the results of inspections and aspects of laboratory safety.
11. When conducting experiments with hazards or potential hazards, ask yourself these questions:  
*What are the hazards?*  
*What are the worst possible things that could go wrong?*  
*How will I deal with them?*  
*What are the prudent practices, protective facilities and equipment necessary to minimize the risk of exposure to the hazards?*
12. Require that all accidents (incidents) be reported, evaluated by the departmental safety committee, and discussed at departmental safety meetings.

13. Require every pre-lab/pre-experiment discussion to include consideration of the health and safety aspects.
14. Don't allow experiments to run unattended unless they are failsafe.
15. Forbid working alone in any laboratory and working without prior knowledge of a staff member.
16. Extend the safety program beyond the laboratory to the automobile and the home.
17. Allow only minimum amounts of flammable liquids in each laboratory.
18. Forbid smoking, eating and drinking in the laboratory.
19. Do not allow food to be stored in chemical refrigerators.
20. Develop plans and conduct drills for dealing with emergencies such as fire, explosion, poisoning, chemical spill or vapor release, electric shock, bleeding and personal contamination.
21. Require good housekeeping practices in all work areas.
22. Display the phone numbers of the fire department, police department, and local ambulance either on or immediately next to every phone.
23. Store acids and bases separately; Store fuels and oxidizers separately.
24. Maintain a chemical inventory to avoid purchasing unnecessary quantities of chemicals.
25. Use warning signs to designate particular hazards.
26. Develop specific work practices for individual experiments, such as those that should be conducted only in a ventilated hood or involve particularly hazardous. When possible most hazardous experiments should be done in a hood.

### Steps Requiring Moderate Expense

27. Allocate a portion of the departmental budget to safety.
28. Require the use of appropriate eye protection at all times in laboratories and areas where chemicals are transported.
29. Provide adequate supplies of personal protective equipment - safety glasses, goggles, face shields, gloves, lab coats, and bench top shields.
30. Provide fire extinguishers, safety showers, eye wash fountains, first aid kits, fire blankets and fume hoods in each laboratory and test or check monthly.

31. Provide guards on all vacuum pumps and secure all compressed gas cylinders.
32. Provide an appropriate supply of first aid equipment and instruction on its proper use.
33. Provide fireproof cabinets for storage of flammable chemicals.
34. Maintain a centrally located departmental safety library:
  - \* Mercier, P. (2005) *Laboratory Safety Pocket Handbook*. Amsterdam, NY: Genium Group, Inc.
  - \* ACS Committee on Chemical Safety. (2003) *Safety in Academic Chemistry Laboratories 7<sup>th</sup> Edition: Volume 1 & 2*. Washington, DC: ACS
  - \* Furr, A. K. (2000) *CRC Handbook of Laboratory Safety, 5<sup>th</sup> Edition*. Boca Raton, FL: CRC Press
  - \* National Fire Protection Association (2010) *Fire Protection Guide on Hazardous Materials, 10<sup>th</sup> Edition*. Quincy, MA: NFPA
  - \* National Research Council (2011) *Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards, Updated Edition*. Washington, DC: The National Academies Press
  - \* U.S. Dept. of Health and Human Services (2009) *Biosafety in Microbiological and Biomedical Laboratories, 5<sup>th</sup> Edition*. Lexington, KY: Createspace
  - \* Department of Health and Human Services (2007) *Niosh Pocket Guide to Chemical Hazards*. Cincinnati, OH: NIOSH Publications
  - \* The Laboratory Safety Institute (2005) *Learning By Accident, Three Volume Series*. Natick, MA: The Laboratory Safety Institute(The publications above are all available from The Laboratory Safety Institute.)
35. Remove all electrical connections from inside chemical refrigerators and require magnetic closures.
36. Require grounded plugs on all electrical equipment and install ground fault interrupters (GFI's) where appropriate.
37. Label all chemicals to show the name of the material, the nature and degree of hazard, the appropriate precautions, and the name of the person responsible for the container.
38. Develop a program for dating stored chemicals and for recertifying or discarding them after predetermined maximum periods of storage.
39. Develop a system for the legal, safe and ecologically acceptable disposal of chemical wastes.
40. Provide secure, adequately spaced, well ventilated storage of chemicals.



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LSI has grown to become a "National Center for Science Safety." The Institute offers a variety of programs and services to assist both academia, at all education levels, as well as, medical, governmental, and industrial laboratories.

About The Laboratory Safety Institute (LSI)

Dr. James A. Kaufman founded LSI in 1978 as The Laboratory Safety Workshop, with a mission to provide safety training for secondary school science teachers. Since then, more than 35,000 science educators and scientists have attended LSI's programs at locations throughout the world.

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40 Suggestions for a Safer Lab



Teach, Learn, and Practice Science Safely

An expanded version of "Lab Safety Guide- lines" with a 200-500 word discussion of each of the guidelines is available for purchase from The Laboratory Safety Institute.

The Laboratory Safety Institute offers these suggestions for improving laboratory safety of inherent hazards and learning how to be safe should be an integral and important part of science education, work, and life.

Last year, we revised the guidelines for Fisher Science Education to make a new, 4-color "Laboratory Safety Guidelines" poster. Twenty thousand copies are being distributed. Other versions have been produced with the assistance of Carolina Biological Supply and Fisher Science Education.

In 1986, Dr. Kaufman assisted Dow with a revision of the guidelines. Dow sent this version to 10,000 high schools. Since then, over three million copies in several languages have been distributed and reprinted.

"Laboratory Safety Guidelines" were written while James worked for the Dow Chemical Company in an attempt to share with schools, colleges, and universities what he was learning about lab safety. In 1976, Dow sent copies to 2,000 colleges and university chemistry departments and received requests for 250,000 reprints!

A Little History...



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An International Center for Science Safety

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- Webinars
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For more information about science safety, contact your science safety network...

The Laboratory Safety Institute  
192 Worcester Street, Natick, MA 01760  
P: 508-647-1900 Fax: 508-647-0062  
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Email: [info@labsafetyinstitute.org](mailto:info@labsafetyinstitute.org)

<p>For more information and products, please visit: <a href="http://www.labsafetyinstitute.org/shop/catalog/">http://www.labsafetyinstitute.org/shop/catalog/</a></p>	<p>PPITLHDC</p> 	<p>This revised edition of the standard for chemical laboratory safety practice, includes an expanded chapter on chemical management and delves into new areas, such as nanotechnology, laboratory security, &amp; emergency planning.</p>
<p>Model Chemical Hygiene Plan</p> <p>The OSHA Lab Standard (29CFR1910.1450) and related state regulations require almost all labs to have a chemical hygiene officer and a chemical hygiene plan. Our MCHP provides an excellent starting point for developing your documents. Includes CD and notebook.</p>	<p>MCHP</p> 	<p>The Laboratory Safety Institute offers these suggestions for improving laboratory safety of inherent hazards and learning how to be safe should be an integral and important part of science education, work, and life.</p>
<p>Safety Is Elementary [Second Edition]</p> <p>The New Standard for Safety and resource manual for Elementary Science classrooms. This guide offers suggestions and guidelines for safe and proper usage of science materials for grades K-6.</p>	<p>SIE</p> 	<p>An expanded version of "Lab Safety Guide- lines" with a 200-500 word discussion of each of the guidelines is available for purchase from The Laboratory Safety Institute.</p>
<p>Teaching Science Lab Safety: A Guide for K-12 Science Educators</p> <p>This guide, written by teachers for teachers, will stimulate safety thinking and safety awareness among students at all levels. Includes lesson plans, presentations, forms, checklists, and contracts!</p>	<p>TSLs</p> 	<p>The Laboratory Safety Institute offers these suggestions for improving laboratory safety of inherent hazards and learning how to be safe should be an integral and important part of science education, work, and life.</p>

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