

LAB SAFETY GUIDELINES

SPECIAL CENTERFOLD

Dr. James A. Kaufman's *Laboratory Safety Guidelines* for schools and colleges is the most widely circulated laboratory safety booklet in the world. Its 40 suggestions constitute a broad and comprehensive overview of the subject. Dr. Kaufman is a Professor Emeritus of Chemistry at Curry College and is an internationally acclaimed laboratory safety consultant.

The editors of *Tech to Tech* are furnishing a centerfold of all 40 points. It is intended to be conspicuously displayed for convenient and frequent reference.

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Laboratory Safety Guidelines

40 Steps for a Safer Laboratory

by James A. Kaufman, Ph.D., Ezra Seltzer and Randy Smith

1. Organize a departmental safety and health committee of faculty members, support staff, and students.
2. Have the departmental safety and health committee meet regularly to discuss safety problems and seek solutions to them.
3. Develop a safety and health orientation program for all students and new staff members.
4. Encourage students and staff members to develop a concern for their own safety and that of others.
5. Involve every staff member in some aspect of the safety program and give each specific responsibilities.
6. Provide the incentives to students and staff for safety performance.
7. Require all staff members to read the appropriate safety manual. Require students to read the school's laboratory safety rules. Have both groups sign a statement that they have done so and understand the contents. Keep these statements on file in the departmental office.
8. Conduct periodic, unannounced laboratory inspections to identify and correct hazardous conditions and unsafe practices. Involve students in a simulated OSHA inspection.
9. Schedule regular departmental safety meetings for students and staff to discuss the results of inspections and aspects of laboratory safety.
10. **Make learning how to be safe an integral and important part of the science education process.**
11. Require every pre-lab discussion to include considerations of safety and health.
12. Forbid working alone in any laboratory as well as working without prior knowledge of a staff member.
13. Don't allow experiments to run unattended unless they are failsafe.
14. 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?"Consider reducing the scale of the experiment, substituting less hazardous chemicals, or eliminating the experiment.
15. Require all accidents (incidents) to be reported, evaluated by the departmental safety committee, and discussed at departmental safety meetings.
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 such dangers as fire, explosion, poisoning, chemical spill or vapor release, and personal contamination.
21. Display the phone numbers of the fire department, police department, and local ambulance service immediately next to every departmental phone.
22. Store acids and bases separately. Store fuels and oxidizers separately.
23. Maintain a chemical inventory to avoid purchasing unnecessary quantities of chemicals.
24. Use warning signs to designate particular hazards.
25. Require good housekeeping practices in all working areas.
26. Develop specific work practices for individual experiments, such as those that should be conducted only in a ventilated hood or involve especially hazardous chemicals.
27. Allocate a portion of the departmental budget to safety.
28. Require the use of goggles in all laboratories.
29. Provide adequate supplies of personal protective equipment—goggles, face shields, gloves, lab coats, and bench top shields. When possible, most hazardous experiments should be done in a hood.
30. Provide fire extinguishers, safety showers, eye-wash facilities and ventilated hoods in each laboratory and test or check monthly.
31. Maintain a centrally located department safety library.
32. Provide guards on all vacuum pumps and secure all compressed gas cylinders.
33. Provide an appropriate supply of first aid equipment and instruction on its proper use.
34. Remove all electrical connections from inside chemical refrigerators and require magnetic closures.
35. Require ground plugs on all electrical equipment.
36. Label all chemicals to show nature and degree of hazard.
37. Develop a program for dating stored chemicals and for discarding them after predetermined maximum periods of storage.
38. Develop a system for the safe and ecologically acceptable disposal of chemical wastes.
39. Provide fireproof cabinets for storage of flammable chemicals.
40. Provide well ventilated storage for odoriferous chemicals.

“An understanding of inherent lab hazards is an important part of science education”
