Chapter 1
Introduction
Purpose
The information in this publication is provided as technical assistance to Illinois public school districts in developing district policies regarding secondary school science laboratories. The information has been compiled by the Illinois State Board of Education as representative of appropriate practices for secondary school science laboratories. Except for the provisions of federal or Illinois laws or rules quotes, the content of this publication does not create requirements applicable to public school districts, nor is it presented as encompassing all appropriate practices. Districts should consider existing conditions, curricula and requirements, as well as other sources of guidance (some of which are referenced in this publication) in developing district policies.
Introduction
Everyone wants to have a pleasant and safe environment in which to work and learn. Safety is a very important concern in science courses because students are learning new skills, working with unfamiliar equipment in close quarters, and using materials that can pose some degree of hazard. This manual is intended to help teachers maintain a safe classroom environment for the teaching of science.

The initial version of this manual focuses on the handling of chemicals and standards for the chemistry laboratory. Later supplements are planned to include biology, physics, other natural science laboratories, and K-12 activities.

A version of this safety manual will be available on disk so that sections can be used and modified to fit local needs. The student safety rules, safety contract, safety audit, and chemical hygiene plan are sections that might be adapted for your school.

Top Ten Checklist for Teachers and School Administrators
I. Do you understand your professional responsibilities with regard to safety issues?

Current standards of the chemical and safety professions for the safe handling of chemicals and scientific equipment in laboratories are designed to protect teachers and students from harm (chapters 3,4,6,7,8,9). Accidents will occur during the course of laboratory work, but their frequency and the possibility of resulting injury can be minimized by knowledge and common sense. Following recommended practices is an important way of defending against any charges of negligence that might result from an accident (section 5.1).

II. Does your school have a written comprehensive safety plan?

A school needs to develop a comprehensive safety plan that addresses safety issues in all places where hazardous materials are used, such as science laboratories, art and shop classes, as well as building maintenance. Public schools in Illinois fall under the jurisdiction of the Illinois Department of Labor and work areas are covered either under the Worker Right-to-Know Law or the Laboratory Standard, but not by both. The chemical hygiene plan, required by Illinois law under the Laboratory Standard is an excellent step in developing this comprehensive safety (section 5.3.3 and chapter 12). Private and parochial schools fall under federal Occupational Safety and Health Administration (OSHA). A successful safety program requires participation by administration, teachers, other school employees, students, and the community.

III. Does your school have a functioning safety committee that has power to make

recommendations?
The administration should organize a safety committee to develop the safety plan and ensure that it is carried out. A high priority of the safety committee is to conduct and document regular safety inspections of all laboratories (sections 3.1 and 9.2) and to conduct regular safety audits to ensure that the necessary safety equipment is available and in working order (section 3.1).

IV. Do you have a set of safety rules that students, teachers, substitute teachers, parents, and administrators understand and practice?
The special activities in science classes require that students follow strict codes of behavior. A set of safety rules must be adopted by the science teacher and strictly enforced (section 4.2.1). A safety contract signed by both the student and a parent is recommended to document the training of the student and to enlist cooperation of parents in the safety program (section 4.2.2).
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V. Do you regularly train students and staff in proper handling of equipment, chemicals, and emergency equipment?
Staff and students must be trained in the proper use of safety equipment (chapter 3) and in interpreting hazards of chemicals from the material safety data sheet (MSDS) (section 7.2). In addition to safety rules, students must be trained in the proper handling of laboratory equipment and chemicals (chapter 9). This training requires continual reinforcement and appropriate supervision.

VI. Do you know what to do when an emergency arises?
ecause accidents can happen even in the safest school, emergency procedures and training are essential components of the safety plan (chapter 4). An accident report form (section
4.1.5) that provides a written record of an accident is essential in case of later legal action. All incidents should be investigated and action taken to prevent similar incidents. Evacuation routes need to be planned and practiced (section 3.2.10). Procedures must be developed and practiced to handle fires and chemical spills (sections 3.2.4, 3.2.5). All incidents should be reported to the proper administrators.

VII. Do you have a strategy for minimizing exposure and disposal of hazardous materials?
Schools should look at strategies to minimize the amount of hazardous materials used in the laboratory (chapter 8). Switching to safer chemicals, adopting microscale techniques, and using multimedia technology are ways to reduce exposure to hazardous chemicals and minimize disposal problems.

VIII. Are hazardous materials stored properly?
Laboratory chemicals must be properly stored and labeled (section 7.5). A written inventory of the chemical storeroom(s) must be made (section 8.1.2). The list of material safety data sheets (MSDSs) maintained under the Worker Right-to-Know Law needs to be provided to the fire department, but the inventory of laboratory chemicals under the Laboratory Standard does not.

IX. Do you keep accurate records?
In case legal action results from an incident, it is important to document that students knew safety rules, were trained in correct safety procedures, and that safety equipment was available and in proper working order (chapters 3,4).

X. Do you follow consistent standards of practice in all classes?
Safety should be a school policy, not the policy of an individual teacher. Teachers, administrators, students, and parents should form the safety committee and develop uniform rules for conduct in science laboratories. Remember that many of these safety issues apply to fine arts and industrial arts classes and to custodians. Include representatives from these groups in the safety committee (chapters 6,7,8,9).

Acknowledgments:
The Illinois Science Safety Manual is a product of the Center on Scientific Literacy of the Illinois State Board of Education. This manual is intended to be a reference guide for the most common safety concerns encountered during secondary school science activities and is not meant to be an all-encompassing document.
This project was initiated by Gwen Pollock, Center on Scientific Literacy, Illinois State Board of Education. This manual was prepared by Gary Trammell, University of Illinois at Springfield; John E. Pingel, University of Illinois at Urbana-Champaign; John Fisher, Rend Lake Community College; Clarence Josefson, Millikin University; Mary Jackson, Springfield High School; Steven Vaughn, Belleville East High School; Susan Matthews, MacArthur High School, Decatur; and Elizabeth Ziebarth, Centennial High School, Champaign. Illustrations of laboratory techniques were prepared by Curt Neitzke, University of Illinois at Springfield.
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