

## Introduction

### Providing a Stimulating and Safe Environment for Science Studies

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**B**y its very nature, experimental science encourages teachers and students to create new techniques and apparatus to investigate both old and new ideas. In the stimulating science classroom, it is impossible to anticipate all of the specific hazards that might arise. It is not necessary to eliminate creativity in the interest of safety. It is important, however, that teachers temper their creativity with a constant alertness to potential dangers. Common sense can go a long way toward maintaining a safe environment.

The ultimate responsibility for safety in the science classroom lies with the school administration in general and the school principal in particular.

Administrators should be familiar with the general provisions of this Manual and insist on the implementation of its requirements. Teachers and students, however, bear the day-to-day

responsibility for safety. For this reason, the details of the safety program enumerated in this Manual are directed primarily to the teacher. Yet, a safety program can only be effective if all parties carry out their responsibilities. It is essential that the safety program have the full support of all school and central office administrators as well as parents.

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To teach science effectively, the teacher must teach it safely. The first step is to establish an effective, continuous safety program. Many of the materials and procedures used in teaching science are *potentially* dangerous. It is the purpose of a safety program to prevent that potentiality from becoming reality. This means not just one lecture or a handout pertaining to safety, but a continuous effort to think and practice safety both in laboratory operations and in everyday activities. The teacher should “sell” safety procedures to the students, require student competency, and enforce the practice of safety at all times. The aim is to make safety a part of students’ basic approach to the laboratory every day and in all their future scientific and other educational endeavors.

This Manual provides both general and specific guidelines for activities frequently performed in the science classroom. Even though some chapters bear the names of specific subject areas in science, each chapter represents a topical grouping that may have information for all science teachers. Teachers of all science classes will want to refer to several sections to acquire the necessary information across the full range of activities that take place in the science classroom and laboratory. Cross-reference notes guide the reader to sections that provide additional information on a particular safety measure.

This Manual is the work of the Science Safety Project Committee of the Maryland Science Supervisors Association. The committee has attempted to produce a Manual that communicates clearly the best that is currently known about safety practices in the science classroom and laboratory. While the committee assumes full responsibility for the contents

of the Manual, it also wishes to acknowledge with gratitude four principal resources used in producing the Manual:

- The Illinois State Board of Education, Center for Educational Innovation and Reform, Division of Intermediate and Secondary Level Support, which published the *Guidebook for Science Safety in Illinois*, 1995.
- The Virginia Department of Education, Division of Sciences, which published *Safety and Science Teaching*, 1997.
- The Maryland State Department of Education, Maryland School Science Safety Project, which published the *Science Safety Manual K-12* in 1985.
- Flinn Scientific, Inc., publisher of the annual *Chemical and Biological Catalog Reference Manual*.

In addition, the committee gratefully acknowledges two consultants and their organizations for their expert guidance throughout the process of developing the Manual: Robert Smoot, TekEd Associates, and Dr. James Kaufman, The Laboratory Safety Workshop. Mr. Smoot's and Dr. Kaufman's assistance was invaluable in helping to craft the comprehensive set of classroom safety guidelines presented in this Manual.

Some users of the Manual may be governed by regulations established at the school or school system level. Such regulations may supersede the guidelines in this Manual. Whatever the primary guiding authority, the essential imperative remains: *all who teach and learn in science classrooms and laboratories, as well as those who support these activities, must constantly strive to maintain a safe and a stimulating learning environment.*