Texas Safety Standards

Kindergarten Through Grade 12 Science

4th edition

2010

A Guide to Laws, Rules, Regulations, and Safety Procedures for Classroom, Laboratory, and Field Investigations

A publication of the
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The University of Texas at Austin

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About the Charles A. Dana Center at The University of Texas at Austin

The Dana Center works to raise student achievement in K–16 mathematics and science, especially for historically underserved populations. We do so by providing direct service to school districts and institutions of higher education; to local, state, and national education leaders; and to agencies, nonprofits, and professional organizations concerned with strengthening American mathematics and science education.

The Center was founded in 1991 in the College of Natural Sciences at The University of Texas at Austin. Our original purpose—which continues in our work today—was to increase the diversity of students who successfully pursue careers in science, technology, engineering, and mathematics (STEM) fields. We carry out our work by supporting high standards and building system capacity; collaborating with key state and national organizations to address emerging issues; creating and delivering professional supports for educators and education leaders; and writing and publishing education resources, including student supports.

Our staff of more than 60 researchers and education professionals has worked intensively with dozens of school systems in nearly 20 states and with 90 percent of Texas's more than 1,000 school districts. As one of the College's largest research units, the Dana Center works to further the university's mission of achieving excellence in education, research, and public service. We are committed to ensuring that the accident of where a child attends school does not limit the academic opportunities he or she can pursue.

For more information about the Dana Center and our programs and resources, see our homepage at **www.utdanacenter.org**. To access our resources (many of them free), please see our products index at **www.utdanacenter.org/products**. Our science toolkit is available at **www.sciencetekstoolkit.org**, and you can sign up for professional development around this Texas Safety Standards resource and other topics at **www.utdanacenter.org/pd**.

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What's New in This Book

The Dana Center is pleased to present the fourth edition of *Texas Safety Standards: Kindergarten Through Grade 12 Science*. The first three editions are widely used in Texas public schools as well as in other states as a tool for supporting students, teachers, and school administrators in understanding safety rules, regulations, and recommendations and establishing good safety procedures for science rooms.

In this fourth edition, we have rearranged content from the third edition to improve flow and usability and have added a number of new images to enhance clarity. In addition, we updated the legal citations and laws in Chapter 4 and Appendix A (both titled Laws, Rules, and Regulations), and we added a new section on poisonous and nonpoisonous plants in Chapter 5, Hazard Concerns. In what follows, we provide a brief chapter-by-chapter overview of significant changes in this fourth edition.

Additional research related to safety and the maximum number of students that should be allowed in a science class appears in **Chapter 1, Safe Working and Learning Environments**. New graphs show the reader the latest research data from a science safety survey the Dana Center conducted in Texas in 2009–2010.

Chapter 2, Laboratory and Field Activities, has been expanded to include safety requirements mandated in the science Texas Essential Knowledge and Skills revised in 2009 (these TEKS are available for purchase or free download here: www.utdanacenter.org/sciencetoolkit/teks). In particular, student expectation (1)(A) in the 2009 revised elementary and middle school science TEKS requires not only that students "demonstrate safe practices" during classroom and outdoor investigations, but that students are to do so as described or outlined "in the Texas Safety Standards," including wearing safety goggles, washing hands, and using materials appropriately.

Further, the 2009 science TEKS note that districts are "encouraged to facilitate classroom and outdoor investigations" for at least 80% of instructional time in Kindergarten and Grade 1, 60% in Grades 2 and 3, and 50% in Grades 4 and 5. In middle school and high school, Knowledge and Skills statement (1) notes that the student is to conduct laboratory and field investigations for at least 40% of instructional time.

Thus, in this edition of *Texas Safety Standards*, we have defined field experiences more broadly and have added new Student Science Safety Responsibilities and a Science Safety Student Responsibility Agreement as alternatives to the standard safety contracts that are used by many schools in Texas.

We have added more images of personal protective equipment and safety equipment to **Chapter 3, Safety Equipment and Supplies**, so that school personnel can more easily distinguish between different types of personal protective equipment, such as safety goggles and safety glasses. In this chapter, we have also included images (taken from Dana Center–ScholAR® Chemistry products) of safety posters that show the proper use of various types of safety equipment.

Users of the first three editions will find that the laws relating to safety in public schools have been updated in **Chapter 4, Laws, Rules, and Regulations**; full text of these laws appears in Appendix A.

(Note that the law is constantly changing; the legal overview in Chapter 4 and laws excerpted in Appendix A are meant to provide a snapshot of the laws as they existed in Spring 2010. To access the most current laws, please consult with your district's legal department.)

In **Chapter 5, Hazard Concerns**, we address proper hand-washing and include references to new position statements from science professional organizations. A new section in this chapter highlights poisonous plants and fungi and lists poisonous and nonpoisonous plants that could be encountered on field excursions or brought into the class environment. The chapter also discusses animals that could be encountered in the field and includes images of some of the more dangerous ones. Introducing live animals in the classroom is always a concern; therefore, we provide additional information to help students remain safe as they come into contact with animals in the classroom and laboratory environment.

Chapter 6, Chemical Safety, focuses on the Texas Hazard Communication Act and the need for Texas districts/schools to develop a chemical hygiene plan. In this section, we have expanded explanations about storing chemicals in compatible families and incorporated additional information about proper disposal of chemicals. This section also discusses spill-control materials that should be used in public schools (and includes some images of materials that can be used). Many questions arise concerning whether students should be allowed to wear contact lenses during laboratory investigations when chemicals are used. To address that question, we include a position statement by the American College of Occupational and Environmental Medicine that may help districts develop policies about the wearing of contact lenses in science rooms.

Chapter 7, Safety Training and Professional Development, includes a table to help school districts figure out who should receive professional development and training and on what topics. In this edition, this chapter provides a more complete list of topics for safety training and professional development.

Appendix A, Laws, Rules, and Regulations, contains up-to-date text of selected laws that govern science safety in Texas schools.

Appendix B, Professional Organization Position Statements, reflects changes made by science professional organizations to their positions on important issues in science education, such as the maximum number of students that a teacher should have in science classes.

Appendix C, Checklists, includes a checklist and safety calendar forms for teachers and administrators to use as examples in developing their own. In addition, readers will find the Dana Center's Safety and Equipment Checklist Calendar to help them with routine science safety checks at their schools.

Appendix D, Hazardous Chemical Lists, provides tables of hazardous chemicals that are not recommended for use in public schools. It is the same version that appeared in the 2006 edition of *Texas Safety Standards*.

A glossary of terms commonly found on a Material Safety Data Sheet appears in **Appendix E, Material Safety Data Sheet Glossary**. Each page contains a section of an MSDS with the definition of the terms used in the section appearing below it.

An updated listing of agencies that science teachers may find helpful appears in **Appendix F, State and Federal Agencies**. Current contact information is given with each listing.