



NSTA Position Statement

Liability of Science Educators for Laboratory Safety

Introduction

Laboratory investigations are essential for the effective teaching and learning of science. A school laboratory investigation (“lab”) is an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC 2006, p. 3). Inherent in laboratory-based activities is the potential for injury. Studies show that safety in K–12 school science instruction needs immediate and significant attention. (Gerlovich et al. 2005)

As professionals, teachers of science have a duty of care to ensure the safety of students, teachers, and staff. Duty of care is defined as an obligation, recognized by law, requiring conformance to a certain standard of conduct to protect others against unreasonable risk (Prosser et al. 1984). “The breach of a particular duty owed to a student or others may lead to liability for both the teacher and the school district that employs that teacher” (Ryan 2001). As such, science educators must act as a reasonably prudent person would in providing and maintaining a safe learning environment for their students.

Educators’ duty to maintain a safe learning environment while providing science instruction also must be shared by school leaders, district administrators, school boards, parents, and students. It is vital that teachers and administrators communicate regularly and fully on the essentials of safe instruction for students.

Declarations

To ensure a safe and effective learning environment for students, teachers of science should:

- Integrate laboratory investigations into science instruction so that all students—including students with academic, remedial, or physical needs; gifted and talented students; and English language learners—have the opportunity to participate in laboratory investigations in a safe environment (NSTA 2007).
- Be proactive in seeking professional development opportunities to learn and implement practices and procedures necessary to conduct safe laboratory science investigations, including storage, use, and disposal of materials and chemicals; use of personal protective equipment; engineering controls; and proper administrative procedures (Roy 2006).

- Request and encourage school and district leadership to provide necessary professional development opportunities for staff and take personal professional responsibility to learn and implement these safe practices and procedures into teaching.
- Exercise reasonable judgment when conducting laboratory investigations.
- Accept the duty of care to provide all students and staff with a safe environment while performing hands-on science investigations or demonstrations in the laboratory, classroom, or field setting; using, storing, disposing/recycling, or transporting chemicals; or engaging in other related activities.
- Modify or alter activities in a safe manner, or select alternative activities to perform, when in the exercise of their duty, they determine that the proposed activities cannot be performed safely or a safe environment cannot be maintained.
- Identify, document, and notify school and district officials about existing or potential safety issues that impact the learning environment, including hazards such as class-size overcrowding in violation of occupancy load codes (BOCA 1996, ICC 2003, NFPA 2006) or contrary to safety research (West et al. 2005), inadequate or defective equipment, inadequate number or size of labs, or improper facility design (Motz et al. 2007), and give necessary recommendations to correct the issue or rectify a particular situation. Overcrowding has two research-based safety concerns: sufficient supervision and adequate individual workspace. Classes containing more than 24 students engaged in science activities cannot safely be supervised by one teacher. Additionally, research data show that accidents rise dramatically as class enrollments exceed 24 students or when inadequate individual workspace is provided (West et al. 2005).
- Communicate fully and regularly (at least once quarterly) with administrators regarding issues impacting the provision of safe science instruction.
- Share the responsibility with school district officials in establishing and implementing written safety standards, policies, and procedures, and ensure their compliance.
- Understand the scope of the duty of care in acting as a reasonably prudent person in providing science instruction, and acknowledge the limitations of insurance in denying coverage for reckless and intentional acts, as well as the potential for individual liability for acts outside the course and scope of employment. [*See generally*, Restatement (Second) of Torts §202. 1965; Anderson et al. 1999, p. 398.]

To ensure a safe learning environment, school district officials—such as administrators, principals, assistant principals, science supervisors, and superintendents—should:

- Understand that for science to be taught properly and effectively, lab activities—conducted in the laboratory, classroom, or field setting—must be integrated fully and safely into the science curriculum (NSTA 2007).

- Develop and implement comprehensive safety policies with clear procedures for engaging in lab activities. These safety policies should comply with all applicable local and state health and safety codes, regulations, ordinances, and other rules established by the applicable oversight organization, including the Occupational Safety & Health Administration (OSHA), International Code Council (ICC), Building Officials and Code Administrators (BOCA), and National Fire Protection Association (NFPA).
- Ensure that all safety policies, including those related to safety training, are reviewed and updated annually in consultation with school or district science educators.
- Support and encourage the use of laboratory investigations in science instruction, and share the responsibility with teachers to develop and fully integrate these activities into the science curriculum.
- Become knowledgeable of and enforce all local, state, and federal codes and regulations to ensure a safe learning environment for students and educators. Particular attention should be given to means of hazard prevention, including reasonable class sizes to prevent overcrowding in violation of occupancy load codes (BOCA 1996, ICC 2003, NFPA 2006) or contrary to safety research (West et al. 2005); replacement or repair of inadequate or defective equipment; adequate number or size of labs (Motz et al. 2007), or proper facility design; and the proper use, storage, disposal, or recycling of chemicals.
- Understand that the number of occupants allowed in the laboratory must be set at a safe level based on building and fire safety codes, size and design of the laboratory teaching facility, chemical/physical/biological hazards, and students' needs (NSTA 2000; Roy 2006). Science classes should have no more than 24 students to allow for adequate supervision during science activities, even if the occupancy load limit might accommodate more (NSTA 2004). It is equally important to ensure adequate workspace for each student. NSTA recommends 60 sq. ft. for each secondary student and 45 sq. ft. for each elementary student in a laboratory/classroom setting (Motz et al. 2007). Research data show that accidents rise dramatically as class enrollments exceed 24 students or when inadequate individual workspace is provided (West et al. 2005).
- Require teachers to develop, maintain, and implement chemical hygiene plans based on OSHA's Laboratory Standard criteria (OSHA 29 CFR 1910.1450) and Right to Know Standard (OSHA 29 CFR 1910.1200).
- Support teachers of science by obtaining materials and resources from national, state, and local organizations that will inform and educate teachers about safe laboratory activities, safety procedures, and best practices in the teaching of laboratory-based science instruction.
- Review existing insurance policies to ensure adequate liability insurance coverage for laboratory-based science instruction.

- Provide teachers with sustained, comprehensive training in lab logistics—including setup, safety, management of materials and equipment, and assessment of student practices—at the time of initial assignment and before being assigned to a new exposure situation (OSHA 29 CFR 1910.1450[f][2]). This includes storage, use, and disposal of materials and chemicals; use of personal protective equipment; engineering controls; and proper administrative procedures. To ensure ongoing safety, annual training should be provided to keep teachers well informed about changes in safety procedures (NSTA 2000).
- Support the decisions of teachers to modify or alter activities in a safe manner or select safe alternative activities to perform in the science classroom/laboratory.
- Maintain adequately supplied, properly equipped, and safe facilities for performing lab instruction by conducting annual facilities audits (Motz et al. 2007; Ryan 2001).

To ensure a safe learning environment, members of the school board should:

- Recommend and support upgrading and improving school science facilities and science curriculum/instruction. If possible, a districtwide review of science facilities and instruction should be conducted at least every 3–5 years.
- Ensure that the district has adequate insurance to cover liability claims arising in the science classroom/laboratory.
- Adopt districtwide policies for safety, including guidelines for a safe working environment for all employees.

*Adopted by the
NSTA Board of Directors
September 2007*

References

Anderson, E. R., J. S. Stanzler, L. S. Masters. 1999. *Insurance coverage litigation*. 2nd ed. New York, NY: Aspen Law & Business Publishers.

Building Officials and Code Administrators (BOCA). 1996. Section 1008.0 Occupant Load (National Building Code).

Gerlovich, J. A., D. McElroy, R. Parsa, and B. Wazlaw. 2005. National school science safety indexing project: A beginning. *The Science Teacher* 72 (6): 43–45.

International Code Council (ICC). 2003. Section 15.1.7 and Table 1004.1.2 Occupant Load.

Motz, L. L., J. T. Biehle, and S. S. West. 2007. *NSTA guide to planning school science facilities*, Second Edition. Arlington, VA: NSTA Press.

National Fire Protection Association (NFPA). 2006. Section 10-1.7.0 Occupant Load, Life Safety Code 101–97.

National Research Council (NRC). 2006. *America's lab report: Investigations in high school science*. Washington, DC: National Academy Press.

National Science Teachers Association (NSTA). 2007. NSTA Position Statement: The Integral Role of Laboratory Investigations in Science Instruction.

National Science Teachers Association (NSTA). 2004. *Investigating safely; A guide for high school teachers*. Arlington, VA: NSTA Press.

National Science Teachers Association (NSTA). 2000. NSTA Position Statement: Safety and School Science Instruction.

Occupational Safety & Health Administration (OSHA). 1987. 29 CFR 1910.1200 Hazard Communication Standard (Right to Know Law).

Occupational Safety & Health Administration (OSHA). 1990. 29 CFR 1910.1450. The Laboratory Standard, Part Q (Chemical Hygiene Law).

Occupational Safety & Health Administration (OSHA). 1990. 29 CFR 1910.1450(f)(2). Occupational Exposure to Hazardous Chemicals in Laboratories.

Prosser, W. L., W. P. Keeton, D. B. Dobbs, R. E. Keeton, and D. G. Owen, eds. 1984. *Prosser and Keeton on torts*. 5th ed. Eagan, MN: West Group.

Roy, K. 2006. Proactive safety. *Science Scope* 30 (1): 72, 74.

Ryan, K. 2001. *Science classroom safety and the law: A handbook for teachers*. Batavia, IL: Flinn Scientific, Inc.

West, S. S., J. F. Westerlund, *A. L. Stephenson, and *N. Nelson. 2005. Conditions that affect secondary science safety: Results from 2001 Texas Survey, Overcrowding. *The Texas Science Teacher* 34 (1).

Additional Resources

Americans with Disabilities Act of 1990 (ADA). See www.usdoj.gov/crt/ada/adahom1.htm and www.ada.gov/pubs/ada.htm.

Building Officials and Code Administrators (BOCA). See www.iccsafe.org/help/redirect-bocai.html.

Individuals with Disabilities Education Act (IDEA). See www.ed.gov/offices/OSERS/Policy/IDEA/index.html and www4.law.cornell.edu/uscode/20/1400.html.

International Code Council (ICC). See www.iccsafe.org.

National Fire Protection Association (NFPA). See www.nfpa.org.

Occupational Safety & Health Administration (OSHA). U.S. Department of Labor. See www.osha.gov.