

Discussion and Notes

The Flinn Scientific Student Safety Contract was developed in collaboration and consultation with experienced science teachers from all across the country. This comprehensive safety contract is available in high school and middle school versions in both English and Spanish. Visit our Web site at www.flinnsci.com, click on Safety, then click on Safety Contracts and Safety Exams, and follow the links to download a copy of the appropriate safety contract.

*Proper instruction is not just for beginning students. Imagine that you are teaching a senior biology elective—should you **assume** that students know how to use a Bunsen burner to sterilize an inoculating loop?*

Start with Safety

The ability to work with students in the lab—allowing them to observe, question, engage and discover—is one of the most rewarding aspects of any science teacher’s responsibilities. It is also potentially one of the most dangerous. The purpose of the Flinn Scientific Safety Training Notes is to provide a forum for science teachers to review safety requirements and procedures, discuss their safety concerns, and set goals to improve safety. Understanding their safety roles and responsibilities will help science teachers increase safety awareness, reduce accidents, and improve science education.

General Safety Responsibilities

Science teachers owe their students a duty of care to anticipate dangers that are reasonably foreseeable and to take the necessary precautions to prevent accidents and protect students from harm. The teacher’s responsibilities include the following:

- ◆ Supervising students in the classroom and lab.
- ◆ Providing adequate instructions for students to perform the tasks required of them.
- ◆ Warning students of the possible dangers involved in performing lab activities.
- ◆ Providing safe laboratory facilities for performing experiments and demonstrations.
- ◆ Maintaining laboratory equipment in proper working order.

The Safety Contract

The first step in creating a safe laboratory environment is to develop a safety contract that describes the rules of the laboratory that your students must follow. The safety contract is the foundation of any school science safety program. Before a student ever sets foot in the lab, the safety contract should be discussed in class and then signed by the student and a parent or guardian. Review the rules not just the first day of class, but on a regular basis. Incorporate safety into each class or laboratory exercise—begin every lab period, in particular, with a discussion of the procedures or chemicals used in the experiment and the general and special safety precautions that must be observed. Pre-lab assignments are another way to ensure that students are prepared for lab and understand the safety requirements.

Supervision

Teachers must be physically present at all times to supervise students wherever and whenever laboratory equipment or chemicals are being used. Never leave students unattended—be prepared and remain alert to what students are doing in order to prevent accidents before they happen. The best defense is a good offense!

Proper Instruction

It is not sufficient to merely give students lab directions or procedures in the form of a handout or textbook reading assignment. Proper instruction requires that teachers explain the nature of the equipment or chemicals that students will be using and how they are to perform tasks in the lab. Proper instruction also includes demonstrating new or unusual laboratory procedures and teaching students the safe way to handle chemicals, glassware, and other equipment. Remember to record all safety instruction in your lesson plans. Being able to provide evidence of documented safety instruction will reduce your liability in the unlikely event of an accident.

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Flinn Scientific maintains a library of simple, practical, effective safety demonstrations to reinforce the importance of following safety precautions. Please call or e-mail us at flinn@flinnsci.com to request a complimentary copy of our "Acid in the Eye" safety demonstration, Publication No. 801. If you want students to remember something, don't just tell them, show them!

The Chemical Hygiene Plan is one of the most important tools that schools have at their disposal to maintain safe practices in school science labs, classrooms, and stockrooms. Have you updated your Chemical Hygiene Plan recently?

Warning Students of Hazards

Teachers have a responsibility to specifically identify hazards and warn students about the possible dangers of working with chemicals or performing tasks in the lab. Consider the following chemical hazard warning: Hydrochloric acid is corrosive—avoid contact with eyes and skin. What is the first thing students think of when they hear the term corrosion? Rust! Students do not always understand the proper meaning of hazard warnings or safety precautions. Warning students requires showing the students what these words mean in the context of lab safety. Just as with any instruction, it is important to demonstrate the concepts and to assess student understanding of the safety concepts.

Maintaining a Safe Lab Environment

The school administration and science teachers share a responsibility to maintain a safe lab environment for students. The school must provide safety equipment that is appropriate for the hazards and maintain the equipment in proper working order. The science teacher's duty of care in this respect is to communicate with the administration, keep them informed about the safety requirements, recommend safety equipment, practices and procedures, and inspect safety equipment on a regular basis. All equipment and glassware must be in good working order before it is used in the lab. Inspect equipment before setting it out for student use, and remove any defective materials. Instruct students to check glassware regularly for cracks and chips, especially if glassware will be heated or subjected to pressure differences (vacuum, etc.).

Helping Students Meet Their Responsibilities

Students are required to follow all rules, guidelines, and instructions provided by the school district and their teacher. Signing the safety contract signifies that students have read the contract, understand the rules, and agree to abide by the safety requirements in the school science laboratory. The safety contract should also be signed by parents or a guardian to document that they are aware of the rules their child must follow and the potential consequences of not following them. Students have a responsibility to come to class prepared for the laboratory activity. One of the leading causes of laboratory accidents is students' failure to carefully read and understand lab instructions. Students must wear all the required personal protective equipment, including safety glasses or chemical splash goggles and chemical-resistant gloves and aprons, as instructed by the teacher.

Flinn Scientific Values Your Support

Flinn Scientific has provided your Science Department Safety Training Notes. Without your orders, the safety training notes and the indispensable *Flinn Scientific Catalog/Reference Manual* would not be possible. Please continue to support our efforts to improve safety in school science labs by sending Flinn Scientific your valuable orders.

Next Month's Topic

Laboratory Safety Challenge

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Shared Responsibilities of the School, the Teachers, and the Students

Regular safety training relating to hazards in the workplace is a key requirement of both the federal and most state Right-to-Know laws. The purpose of the Flinn Scientific Safety Training Notes is to help science teachers and school science departments increase safety awareness, improve safety, and reduce accidents.

This safety training note should take about 10 minutes to present. The discussion period will vary depending on the issues that need to be addressed or additional questions that teachers may have about the safety policies of the school.

It is very important to keep a copy of these safety training notes and a signed attendance sheet to verify that regular safety training meetings were held. The sign-up sheet is almost as important as the training notes and is usually the first thing that is requested and reviewed by regulatory inspectors. A copy of the sign-up sheet that we suggest using may be found at www.flinnsci.com/Sections/Safety/SNotes/signup.pdf.

Materials (one per staff member)

- ◆ Flinn Scientific Science Department Safety Training Notes, Volume 8-1
- ◆ Sign-up Sheet (one for group)

Additional Questions for Discussion

1. Does the science department have a uniform and consistent safety policy for all science courses and do all science teachers use a safety contract in their classes?
2. The school has a duty of care to provide safety equipment that is appropriate for the hazards that will be encountered in the science labs and to maintain the equipment in proper working order. Discuss any outstanding concerns regarding the availability of safety glasses and chemical splash goggles, goggle sanitizers, eyewash stations, fire extinguishers, etc. in your labs.
3. Does the department have a plan for inspecting safety equipment on a regular basis and replacing defective equipment?
4. Students not following directions is a common cause of lab accidents and injuries. It is also an ongoing problem that most science teachers struggle with at one time or another. What strategies have teachers found to be most effective in dealing with this problem?
5. The beginning of the school year is a good time to set department-wide safety goals for the year. What are the top three safety issues or problems in the school science department? Briefly review these issues and establish realistic goals for addressing any problem areas during the school year.

We Welcome Your Comments

Are the Science Department Safety Training Notes useful to you? Are they working for you and your department? Do you have any suggestions for topics that you would like to see covered or for how we can improve these notes? We really want to hear from you! Please e-mail us with your comments and suggestions. Our e-mail address is flinn@flinnsci.com.