Teacher's Guide

DuPont™ Science Safety Zone™

Science Safety Awareness Program*

PROGRAM OVERVIEW

Why Science Safety?

As a growing number of classroom teachers turn to hands-on lab experiments to enhance their science curriculum, science safety becomes more critical than ever before. While participation in lab experiments can engage students' interest and boost their understanding, lab accidents can lead to undesirable results and even injury.

Studies have shown that a surprisingly high percentage of educators, both new and veteran, have not received much—if any—science safety training. This finding strongly reinforces the call for teachers and administrators to review essential safety guidelines before embarking on science experiments.

From the student perspective, some of the most basic safety issues loom large. For example, in one survey, 93 percent of teachers stated that the biggest reason for accidents in science labs was due to *"students' failure to carefully read and understand laboratory activity instructions."* Lack of maturity among students in lower grades also is regularly cited as a major factor in science lab mishaps.

Promoting Awareness

Recognizing the indispensability of science safety, DuPont sponsored the development of a **Science Safety Awareness Program.** The enclosed mini-poster and Teacher's Guide provide teachers with important materials. As the name suggests, this innovative program is intended to heighten the safety awareness of both students and classroom teachers involved in science lab activities.

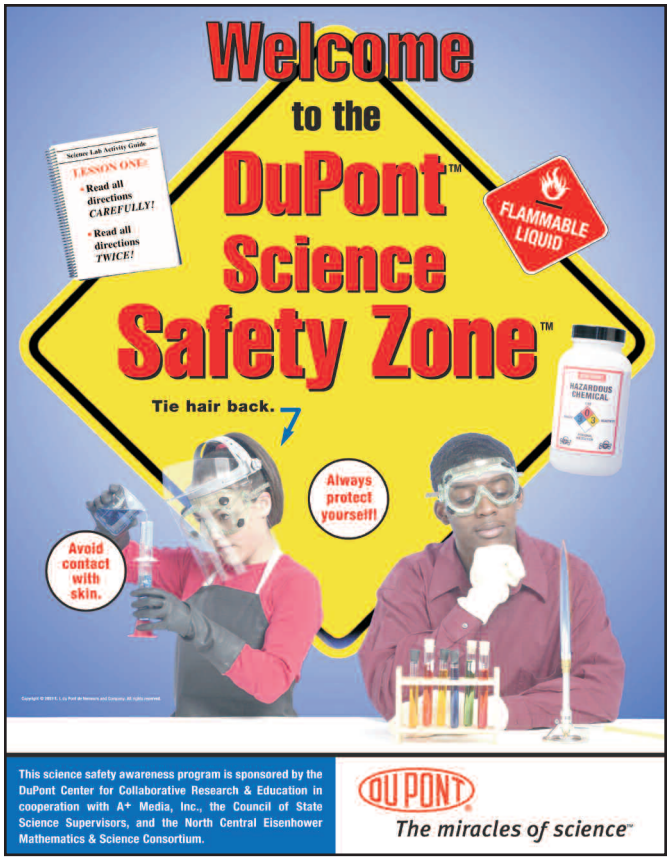
Summary of Program Components

Safety Zone Poster. The accompanying poster is meant to help students view their lab experiment work area (whether it is the classroom or an actual science lab) as a **Safety Zone**, requiring heightened awareness of safety and proper lab conduct. Specific images on the poster address some of the most common science safety issues, such as eye safety, fire safety, and procedural safety.

Science Safety Checklist. In the Teacher's Guide, you'll find an introductory Science Safety Checklist based on general lab safety recommendations prepared by the Council of State Science Supervisors.

Additional Resources. For more comprehensive information about science safety, be sure to review the recommended resources. Also, be sure to check with your school and district science supervisors to be certain you're aware of all district and state safety requirements.

Student/Parent Safety Zone Pledge. The last page of the Teacher's Guide features a reproducible letter and pledge form that teachers can use with parents and guardians to help reinforce the importance of science lab safety.



A Special Message from DuPont

Ellen J. Kullman
Chief Executive Officer

At DuPont, we understand that safety is a priority every hour of every day at all of our locations around the globe. As a result, we support your efforts to teach essential science safety skills to your students. Success in science classrooms — and our workplace — depends on all of us knowing and maintaining the highest standards of safety.

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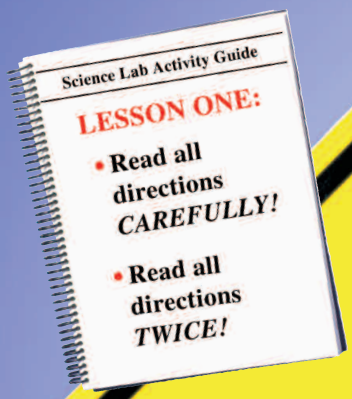
*This science safety awareness program is sponsored by the DuPont Center for Collaborative Research & Education in cooperation with A+ Media, Inc., the Council of State Science Supervisors, and the North Central Eisenhower Mathematics & Science Consortium.

Welcome to the DuPont™ Science Safety Zone™



Tie hair back.

Always protect yourself!

Avoid contact with skin.

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General Science Safety Checklist

Science safety is a team effort involving not only teachers and students but also school administrators and parents. But where can you go for guidance about proven safety practices?

Many—if not all—issues related to science safety are addressed by the Council of State Science Supervisors (CSSS). From chemical storage to safety equipment recommendations, CSSS's Web site provides readers with a wealth of practical information.

The following is a suggested checklist of safety concerns in K-12 science labs adapted with permission from the Council of State Science Supervisors.

Safety Equipment

- ☑ Keep appropriate safety equipment on hand, including an emergency shower, eye-wash station, fume hood, fire blankets, and fire extinguisher. All students and teacher(s) should have and wear safety goggles and protective aprons when working in the lab.
- ☑ Ensure proper eye protection devices are worn by everyone engaged in supervising, observing, or conducting science activities involving potential hazards to the eye.
- ☑ Provide protective rubber or latex gloves for students when they dissect laboratory specimens.
- ☑ Use heat-safety items such as safety tongs, mittens, and aprons when handling either cold or hot materials.
- ☑ Use safety shields or screens whenever there is potential danger that an explosion or implosion might occur.
- ☑ Keep a bucket of 90 percent sand and 10 percent vermiculite or kitty litter (dried bentonite particles) in all rooms in which chemicals are handled or stored. The bucket must be properly labeled and have a lid that prevents other debris from contaminating the contents.

General Science Safety Checklist

Teaching Procedures

- ☑ Set a good example when demonstrating experiments by modeling safety techniques such as wearing aprons and goggles.
- ☑ Help students develop a positive attitude toward safety. Students should not fear doing experiments or using reagents or equipment, but they should respect them for potential hazards.
- ☑ Always demonstrate procedures before allowing students to begin the activity. Look for possible hazards and alert students to potential dangers.
- ☑ Explain and post safety instructions each time you do an experiment.
- ☑ Maintain constant supervision of student activities. Never allow students to perform unauthorized experiments or conduct experiments in the laboratory alone.
- ☑ Protect all laboratory animals and ensure that they are treated humanely.
- ☑ Remind students that many plants have poisonous parts and should be handled with care.
- ☑ For safety, consider the National Science Teachers Association's recommendation to limit science classes to 24 or fewer students.

Student Safety Tips

- ☑ Read lab materials in advance. Note all cautions (written and oral).
- ☑ Never assume an experiment is safe just because it is in print.
- ☑ Do not eat or drink in the laboratory.
- ☑ Keep personal items off the lab tables.
- ☑ Restrain long hair and loose clothing. Wear laboratory aprons when appropriate.
- ☑ Avoid all rough play and mischief in science classrooms or labs.

General Science Safety Checklist

- ☑ Wear closed-toed shoes when conducting experiments with liquids or with heated or heavy items.
- ☑ Never use mouth suction when filling pipettes with chemical reagents.
- ☑ Never force glass tubing into rubber stoppers.
- ☑ Avoid transferring chemicals to your face, hands, or other areas of exposed skin.
- ☑ Thoroughly clean all work surfaces and equipment after each use.
- ☑ Make certain all hot plates and burners are turned off before leaving the laboratory.

Lab Environment

- ☑ Place smoke, carbon monoxide, and heat detectors in laboratories and storerooms.
- ☑ Ensure that all new laboratories have two unobstructed exits. Consider adding additional exits to rooms with only one door.
- ☑ Frequently inspect a laboratory's electrical, gas, and water systems.
- ☑ Install ground fault circuit interrupters at all electrical outlets in science laboratories.
- ☑ Install a single central shut-off for gas, electricity, and water for all the laboratories in the school, especially if your school is in an earthquake zone.
- ☑ Maintain Material Safety Data Sheets (MSDS) on all school chemicals and an inventory of all science equipment.
- ☑ Conduct frequent laboratory inspections and an annual, verified safety check of each laboratory.

Use of the enclosed materials cannot serve as a substitute for the comprehensive science safety training required in many school districts. Educators should consult with their departmental or district science supervisor to determine their specific science safety policies.

Additional Resources

The **DuPont™ Science Safety Zone™** poster and Teacher's Guide are meant to be an introduction and awareness tool for science safety. For more in-depth, comprehensive information on this important subject, we encourage you to visit the following Web sites:

Council of State Science Supervisors
csss-science.org

National Science Teachers Association
nsta.org

Wellesley College Science Center Safety Manual
http://www.wellesley.edu/ScienceCenter/Safety/safety_index.html

The Laboratory Safety Institute
labsafetyinstitute.org

American Chemical Society
acs.org

Search for "science safety" for useful publications, links, and other resources.
American Chemical Society's Committee on Chemical Safety
chemistry.org/committees/ccs

Science equipment suppliers that provide science safety information

Flinn Scientific
flinnsci.com

Carolina Biological Supply Company
carolina.com/labsafety

Jakel, Inc.

showcase.netins.net/web/jakel

ENC Learning
goENC.com

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Dear Parents:

We are about to begin conducting science experiments as part of our commitment to providing your child with the most up-to-date, practical science education curriculum. It is well-documented that students who have hands-on science experiences are more likely to better understand science concepts, leading to improved achievement in science.

For your child and other students to fully benefit from these hands-on experiences, they must all understand the importance of science safety. Consequently, we would appreciate your recognizing and addressing with your child that safety rules include a wide range of issues such as:

- Proper conduct and avoiding horseplay that could cause accidents
- Listening and reading directions very carefully
- Wearing proper protective items as directed (such as goggles or aprons)

After discussing the importance of science safety with your child, we ask that you sign and return the **Science Safety Zone Pledge** below. Thank you for supporting our efforts to ensure the safety of all of our students.

Sincerely,

_____

Teacher

Science Safety Zone Pledge

I, _____, understand that science safety is of utmost
Student Name
importance and I pledge to think first about safety and follow the safety guidelines to make sure my classmates and I are able to safely and successfully conduct science experiments.

_____ _____

Student Signature *Teacher Signature*

_____

Parent Signature