Safety in the Elementary (K-6) Classroom

Safety through Organization
Many potential hazards can be eliminated if the teacher has an organized and disciplined classroom. To do this, the teacher needs first to perform the experiment prior to assigning it to the students. Then as a result of the prior performance, the teacher will be familiar with the activity, will have the materials ready to distribute to the students, will be ready to supervise the activities of the students, will have a plan for collecting materials after the activity, and will be able to instruct the students in what is expected of them.

Helpful suggestions can be found in several resources. The teacher’s edition of the textbook being used should have safety information on the activities. The state department of education should have publications available to assist with matters of safety and disposal. Many science supply houses, such as Flinn Scientific, have safety and disposal publications available. Experts are available through organizations such as the American Chemical Society, the Institute for Association of Biology Teachers, and National Science Teachers Association. If a college or university is nearby, members of the science faculty are usually willing to assist in safety matters. (Addresses and telephone numbers of the organizations italicized above are listed at the end of this publication.)

Eye and Personal Protection
1. Teachers should always wear chemical-splash proof goggles when working with chemicals as should students working or watching in the area. Child-sized goggles are available from science materials suppliers.
2. Safety goggles should also be worn by the teacher and students when there is a possibility of flying objects or projectiles, such as when working with rubber bands.
3. Safety goggles used by more than one person should be sterilized between uses. One possible method of sterilization is to immerse the goggles in diluted laundry bleach followed by thorough rinsing and drying.
4. Proper precautions must be taken when using sharp objects such as knives, scalpels, compasses with sharp points, needles, and pins.
5. Students should not clean up broken glass. Teachers should use a broom and dustpan without touching the broken glass. Broken glass must be disposed of in a manner to prevent cuts or injury to the teacher, students, and custodial staff.
6. The teacher may decide to wear a laboratory apron or smock to prevent soiling or damage to clothing; if so, students should be similarly attired.
7. When working with hot materials, noxious plants, or live animals, appropriate hand protection should be worn.
8. The teacher and students should wash their hands upon completion of any experimental activity or at the end of the instructional session.
Fire and Heating Safety
1. Teachers should never leave the room while any flame is lighted or other heat source is in use.
2. Never heat flammable liquids. Heat only water or water solutions.
3. Use only glassware made from borosilicate glass (Kimax or Pyrex) for heating.
4. When working around a heat source, pull back long hair and secure loose clothing.
5. The area surrounding a heat source should be clean and have no combustible materials nearby.
6. When using a hot plate, locate it so that a child cannot pull it off the workshop or trip over the power cord.
7. Never leave the room while the hot plate is plugged in, whether or not it is in use, never allow students near an in-use hot plate if the teacher is not immediately beside the students.
8. Be certain hot plates have been unplugged and are cool before handling. Check for residual heat by placing a few drops of water on the hot plate surface.
10. Students should use candles only under the strict supervision of the teacher. Candles should be placed in a “drip pan” such as aluminum pie plate large enough to contain the candle if it is knocked over.
11. The teacher should wear safety goggles and use heat resistant mitts when working with hot materials. All students near hot liquids should wear safety goggles.
12. The teacher should know the location of a fire extinguisher near the activity and be trained in its use.
13. The teacher should know what to do in case of fire. If a school policy does not exist, check with local fire officials for information.

Dangerous Materials and Procedures
1. Use only safety matches. Even safety matches should be used only with direct teacher supervision.
2. Use only non-mercury thermometers. Mercury from broken thermometers is difficult to clean up and the vapors from spilled mercury are dangerous. Remember that thermometers are fragile, supervise their handling to prevent occurrences such as a thermometer being used as a stirring rod or placed so it could roll off the edge of a table.
3. Store batteries with at least one terminal covered with tape. Batteries exhibiting any corrosion should be discarded. Because the contents of batteries are potentially hazardous, batteries should not be cut open or taken apart. Check to see if batteries can be recycled in your area.
4. Never tell, encourage, or allow students to place any materials in or near their mouth, nose, or eyes.
5. Materials to be used may include household chemicals. Before using household chemicals or other materials, study the label carefully to learn the hazards and precautions associate with such materials. Similarly, study the labels of chemicals purchased from a scientific supply house. The commercial suppliers of
laboratory chemicals will furnish Materials Safety Data sheets (MSDSs) which describe the hazards and precautions for such materials in detail. These MSDSs should be on file in the school district office and copies available in the classroom.

6. Do not touch “dry ice” (solid carbon dioxide) with the bare skin. Always wear cotton or insulated gloves when handling dry ice. Do not store or place dry ice in a sealed container.

7. Liquid spills can be slippery. Clean up any spill immediately and properly as soon as it occurs. Follow the cleanup instructions given on the label or the MSDS for the substance.

8. Do not mix or use chemicals in any manner other than that stated in the approved procedure to be employed. At no time should a teacher undertake a new procedure without prior and full investigation of the chemical and physical properties of the materials to be used, and of the outcomes of the proposed procedures. When planning to undertake a new procedure, it is a good practice to consult with a professional who is familiar with the potential problems of the new procedure.

Safety with Plants
1. Wash hands after working with seeds and plants. Many store-bought seed have been coated with insecticides and/or fertilizers.
2. Never put seeds or plants in the mouth.
3. Do not handle seeds or plants if there are cuts or sores on the hands.
4. There are some 700 species of plants that are known to cause death or illness. Be aware of plants in the local area that are harmful. For more information, contact the local county agriculture agent.
5. Be aware of the signs of plant poisoning and act quickly if a student exhibits such signs after a lesson. Symptoms may include one or more of the following: headache, nausea, dizziness, vomiting, skin eruption, itching, or other skin irritation.
6. Be particularly alert of plant safety on field trips.

Safety with Animals
1. All handling of animals by students must be done voluntarily and only under immediate teacher supervision.
2. Students should not be allowed to mishandle or mistreat animals.
3. A safety lesson should be given to teach the students how to care for and treat the animal. This safety lesson should be given, if possible, before the animal is brought into the classroom.
4. Animals caught in the wild should not be brought into the classroom. For example, turtles are carriers of salmonella, and many wild animals are subject to rabies.
5. On field trips or other outdoor activities with potential exposure to wild animals, be aware of the danger of rabies exposure. Also be aware of potential hazards of insect bites such as bee stings of allergic individuals or diseases spread by ticks and fleas.
6. At no time should dissection be done on an animal corpse unless it was specifically purchased for that purpose from a reliable supplier.

7. Any animal species which has been preserved in formaldehyde should not be used.

**Emergency Procedures**

1. Establish emergency procedures for at least the following: emergency first aid, electric shock, poisoning, burns, fire, evacuations, spills, and animal bites.
2. Evaluate each experimental procedures in advance of classroom use so that plans may be made in advance to handle possible emergencies.
3. Be sure that equipment and supplies needed for foreseen emergencies are available in or near the classroom.
4. Establish procedures for the notification of appropriate authorities and response agencies in the event of an emergency.

**Disposal**

Except for the disposal procedures described in the textbook in use, it is not likely that any of the waste generated in elementary science activities will be harmful to the environments. If the teacher has any questions concerning waste disposal, the science supervisor for the school or school district should be consulted.

**Safety Awareness of Students**

Safety instruction should begin at the earliest possible age. Students can begin to learn the importance of safety in the classroom, laboratory, and life, in general, at the elementary school level. The teacher must set the rules, but the teacher should explain to the students why the rules are necessary. The students must also realize that any student who does not follow the rules will lose the privilege of taking part in the fun, hands-on activities.

To reinforce the rules, they may be discussed by the students. One activity could be a poster contest. The winning posters could be displayed in the room and used throughout the year to stress safety and enforce the safety rules.

**General Safety Rules for Students**

Always review with the students the general safety rules prior to the beginning of an activity.

1. Never do any experiment without the approval and direct supervision of your teacher.
2. Always wear your safety goggles when your teacher tells you to do so. Never remove your goggles during an activity.
3. Know the location of all safety equipment in or near your classroom. Never play with the safety equipment.
4. Tell your teacher immediately if an accident occurs.
5. Tell your teacher immediately if a spill occurs.
6. Tell your teacher immediately about any broken, chipped, or scratched glassware so that it may be properly cleaned up and disposed of.
7. Tie back long hair and secure loose clothing when working around flames.
8. If instructed to do so, wear your laboratory apron or smock to protect your clothing.
9. Never assume that anything that has been heated is cool. Hot glassware looks just like cool glassware.
10. Never taste anything during a laboratory activity. If an investigation involves tasting it will be done in the cafeteria.
11. Clean up your work area upon completion of your activity.
12. Wash your hands with soap and water upon completion of an activity.
## Resources

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<th><strong>American Chemical Society</strong></th>
<th><strong>National Association of Biology Teachers</strong></th>
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<tbody>
<tr>
<td>Chemical Safety Referral Service</td>
<td>11250 Roger Bacon Drive, No. 19</td>
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<tr>
<td>1155 Sixteenth Street, NW</td>
<td>Reston, VA 22090</td>
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<tr>
<td>Washington, DC 20036</td>
<td>(703) 471-1134</td>
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<td>(800) 227-5558</td>
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<th><strong>Institute for Chemical Education</strong></th>
<th><strong>National Science Teachers Association</strong></th>
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<tbody>
<tr>
<td>University of Wisconsin</td>
<td>1742 Connecticut Avenue NW</td>
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<tr>
<td>Department of Chemistry</td>
<td>Washington, DC 2009-1171</td>
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<tr>
<td>1101 University Avenue</td>
<td>(202) 328-5800</td>
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<tr>
<td>Madison, WI 53706</td>
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<tr>
<td>(608) 262-3033</td>
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<th><strong>Laboratory Safety Workshop</strong></th>
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<tr>
<td>1071 Blue Hill Avenue</td>
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<tr>
<td>Milton, MA 02186</td>
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<td>(617) 237-1335</td>
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## Disclaimer

This material is taken from a pamphlet titled “Safety in the Elementary (K-6) Science Classroom” published by the American Chemical Society.