

SCHOOL DISTRICT OF THE CITY OF ERIE

***SCIENCE CLASSROOM
SAFETY POLICY***

KINDERGARTEN THROUGH GRADE 12

SDCE K-12 Science Classroom Safety Policy

This document summarizes the SDCE Science Program's efforts in instructional materials safety and management and follows the format described in OSHA Standards 29 CFR 1910.1200 (Occupational Exposures to Hazardous Chemicals in Laboratories). Included in this policy are the following sections:

- I. Introduction

- II. General Safety Policy
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I. Introduction

The purpose of the **SDCE K-12 Science Classroom Safety Policy** is to establish procedures, equipment, personal protective equipment, and work practices that will protect students, faculty, and staff from health hazards presented by hazardous materials used in their particular laboratory area. This plan is intended to comply with OSHA's Standard 29 CFR 1910.1450 (Occupational Exposures to Hazardous Chemicals in Laboratories).

The Occupational Safety and Health Administration's (OSHA) laboratory standard requires employers of laboratory employees to implement exposure control programs and convey chemical health and safety information to employees working with hazardous materials. Specific provisions of the standard require: laboratory chemical hood evaluations; establishment of standard operating procedures for routine and "high hazard" laboratory operations; research protocol safety reviews; employee exposure assessments; medical consultations/exams; employee training; labeling of chemical containers; and the management of Material Safety Data Sheets (MSDS) and other safety reference materials.

This document outlines how science instructional spaces comply with each of the elements in OSHA's Laboratory Standard. An official copy of the SDCE K-12 Science Classroom Safety Policy is located in the main office emergency file cabinet.

While the standard applies only to school employees (teachers and other staff), this plan applies to all students, faculty, and staff who are engaged in laboratory work that may expose them to hazardous materials.

II. General Safety Policy

1. **Have and enforce** a safety contract signed by students and parents.
2. **Identify** medical and allergy problems for each student to foresee potential hazards.
3. **Assess and minimize** barriers for students with disabilities.
4. **Model, post, and enforce** all safety procedures. Display safety posters and the numbers for local poison control centers and emergency agencies.
5. **Know** district and state policies concerning administering first aid.
6. **Report** all injuries immediately to appropriate personnel; including animal scratches, bites, and allergic reactions.
7. **Know** your school's fire regulations, evacuation plans, and the location and use of fire extinguishers.
8. **Post and discuss** emergency escape and notification plans/emergency phone numbers.
9. **Make certain** that the following items are easily accessible where applicable:
 - appropriate-size chemical splash goggles that meet American National Standards Institute (ANSI) Z87 or Z87.1 requirements (as indicated by a stamp or other marking on the goggles), type G, H, or K only.
 - non-allergenic gloves (material other than latex)
 - non-absorbent, chemical-resistant protective aprons
 - eyewash units
 - safety spray hoses/shower
 - Class ABC fire extinguisher(s)
 - flame retardant treated fire blanket
10. **Make certain** that all individuals are aware of and protected during experiments involving glass, heat, open flame, chemicals, projectiles, or dust-raising materials.
11. **Implement** procedures to decontaminate all reusable protective equipment such as goggles and aprons between uses.
12. **Keep** science work and floor surfaces clean and free of clutter.
13. **Keep** student working groups to a manageable size to prevent confusion and accidents.
14. **Do not allow** running or horseplay in the laboratory.
15. **Prepare** records [including Material Safety Data Sheets (MSDS) on all chemicals used] on safety training and laboratory incidents.
16. **Provide** adequate workspace for each student as well as low table sections for wheelchair accessibility.
17. **Do not permit** eating, drinking, the application of makeup or skin lotion, or gum chewing in any space where science investigations are conducted.
18. **Do not store** chemicals and biological specimens in the same refrigerator used for food and beverages. Never store chemicals over, under, or near a sink.
19. **Do not use** mercury thermometers. Any mercury thermometers still present should be reported to the Chemical Management Officer.
20. **Clean** up all spills properly and promptly.
21. **Never** pipette by mouth.

Glassware Precautions

- 22. Use** only glassware that is not chipped, etched, or cracked. A serious breakage hazard could occur.
- 23. Substitute** plastic ware for glassware when possible.
- 24. Possess** a broom, dust pan, and disposal container for broken glass.
- 25. Make certain** that students understand they are not to drink from any containers used for science experiments.

Chemical Precautions

- 26. Label** equipment and chemicals clearly with respect to hazards and other needed information.
- 27. Store** chemicals appropriately in secured cabinet or stockroom, at or below eye level. Storage space should be kept cool, dry, and locked. See specific directions in Chemical Hygiene Policy.
- 28. Make certain** that students understand that chemicals must never be mixed “just for fun” or “to see what might happen”; that they should never taste or smell chemicals; and that they should always wash their hands after working with chemicals.
- 29. Keep** chemicals in the chemical prep and storage area. If chemicals are moved to the classroom for lab, they must be returned to their proper storage location at the end of the day’s laboratory periods.

Electrical Precautions

- 30. Make certain** that students understand that activities involving electricity must only be done when supervised by the teacher.
- 31. Make certain** electrical cords are properly secured and plugged into the nearest socket. Emphasize that students grasp the plug, rather than the cord, when unplugging electrical equipment. Cords also must be in good repair. Do not tape over any worn insulation.
- 32. Be sure** students’ hands and surrounding surfaces are dry before plugging in electrical cords or turning on and off switches and appliances/tools.
- 33. Make sure** all electrical outlets are equipped with Ground-Fault Interrupters (GFIs).
- 34. Use** only three-prong (grounded) plugs when small electrical devices are used.
- 35. Instruct** students never to grasp any electrical device that has just been turned off, since it may be hot after use and result in serious burns.
- 36. Make certain** that students understand that connecting only a wire between the terminals of a battery will result in the wire getting hot and possibly causing serious burns.

III. Chemical Hygiene Policy

The Chemical Hygiene Policy is the major ingredient of the Laboratory Standard. The policy includes a plan for:

1. Protecting students, faculty, and staff from health hazards associated with hazardous chemicals in the laboratory.
2. Keeping chemical exposures below 20% of the established permissible exposure limits (PELs).

This policy must be readily available to employees. The school district shall review and evaluate the effectiveness of the policy at least annually and update it as necessary.

A. Responsibilities Responsibility for chemical health and safety rests at all levels, including the district administration, chemical management officer, school administrators, teachers, and students. The following outlines these responsibilities:

1. District Administration

The school district has a responsibility for implementing and providing on-going support and resources for an effective chemical hygiene plan. This includes designating a chemical management officer, making periodic inspections, providing appropriate training and protective equipment, and making all necessary information easily accessible. The school board and the school district superintendent have ultimate responsibility to ensure the institution complies with the Laboratory Standard.

2. Chemical Management Officer

The chemical management officer works with administrators and other employees to develop and implement appropriate chemical hygiene policies and practices, maintains current material safety data sheets for all laboratory areas in a centrally accessible location, conducts quarterly checks of safety equipment in all labs and seeks ways to improve the chemical management plan.

a. Recordkeeping

1. Record all chemical exposures and use monitoring instruments to get hard data. Obtain and keep up-to-date information provided by a medical examination.
2. Keep all documentation including all employee exposure and medical records. If you have no reason to believe you could exceed a PEL, you do not have to monitor exposure levels.
3. Report all incidents to district administration.

- b. Train employees to
 1. Understand the hazards of chemicals they use in the laboratory.
 2. Recognize signs and symptoms associated with overexposure to hazardous chemicals.
 3. Properly use personal protective equipment (fume hoods, goggles, etc.)
 4. Use proper laboratory procedures to avoid chemical exposures.
 5. Understand the content of the Chemical Hygiene Policy.
- c. Provide all employees access to
 1. MSDS (Material Safety Data Sheets).
 2. Previous exposure records (if any).
 3. Previous medical records (if any).
 4. The Laboratory Standard and Chemical Hygiene Policy.
 5. Permissible exposure limits of hazardous chemicals used in the laboratory.
- d. Evaluate any new chemicals that instructors would like to bring into the lab before the chemical is brought onsite, to ensure that it can be stored, handled and disposed of safely. Consider providing lists of banned or restricted chemicals or chemical groups.

3. School Administrators

The building principal has the responsibility to provide continuing support by ensuring the compliance of students, faculty, and staff to the Chemical Hygiene Policy. This includes making periodic inspections and making all necessary information easily accessible, including a copy of the SDCE K-12 Science Classroom Safety Policy in all laboratories.

4. Teachers

Teachers should lead by example and wear personal protective equipment; follow and enforce safety rules, procedures, and practices; and demonstrate safe behavior and promote a culture of safety. They should be proactive in every aspect of laboratory safety, making safety a priority. The following is a checklist for teachers highlighting essential information for working in the high school laboratory. This is a general safety checklist and should be periodically re-evaluated for updates.

- a. Upkeep of Laboratory and Equipment
 1. Conduct regular inspections of safety and first aid equipment as often as requested by the administration. Record the inspection date and the inspector's initials on the attached equipment inspection tag.
 2. Notify the administration in writing if a possibly hazardous condition (e.g. malfunctioning equipment or chemical hazard) is identified in the laboratory and follow through on the status.
 3. Never use defective equipment.

b. Recordkeeping

1. Keep organized records on personal safety training for as long as required by the school system.
2. Keep records of all laboratory incidents for as long as required by the school system.

c. Safety and Emergency Procedures

1. Educate students on the location and use of all safety and emergency equipment prior to laboratory activity.
2. Identify safety procedures to follow in the event of an emergency/accident.
3. Provide students with verbal and written safety procedures to follow in the event of an emergency/accident.
4. Know the location of and how to use the cut-off switches and valves for the water, gas, and electricity in the laboratory.
5. Know the location of and how to use all safety and emergency equipment (i.e., safety shower, eyewash, first-aid kit, fire blanket and fire extinguishers).
6. Keep a list of emergency phone numbers near the phone.
7. Conduct appropriate safety and evacuation drills on a regular basis.
8. Explain in detail to students the consequences of violating safety rules and procedures.

d. Maintenance of Chemicals

1. Perform regular inventory inspections of chemicals.
2. Update the chemical inventory at least annually, or as requested by the administration.
3. Provide a copy of the chemical inventory to the local emergency responders (i.e., fire department).
4. Do not store food and drink with any chemicals.
5. If possible, keep all chemicals in their original containers.
6. Make sure all chemicals and reagents are labeled.
7. Do not store chemicals on the lab bench, on the floor, or in the laboratory chemical hood.
8. Ensure chemicals not in use are stored in a locked facility with limited access.
9. Know the storage, handling, and disposal requirements for each chemical used.
10. Make certain chemicals are disposed of properly. Consult the label and the Material Safety Data Sheet for disposal information and always follow appropriate chemical disposal regulations.

e. Preparing for Laboratory Activities

1. Before each activity in the laboratory, weigh the potential risk factors against the educational value. Always perform first-time chemical demonstrations in front of other instructors to evaluate the safety of the demonstrations.
2. Have an understanding of all the potential hazards of the materials, the process, and the equipment involved in every laboratory activity.
3. Inspect all equipment/apparatus in the laboratory before use.
4. Before entering the laboratory, instruct students on all laboratory procedures that will be conducted.
5. Discuss all safety concerns and potential hazards related to the laboratory work that students will be performing before starting the work.
6. No new chemicals may be brought into the laboratory until the Chemical Management Officer has reviewed and approved the proposed use, handling storage and disposal of that chemical.

f. Ensuring Appropriate Laboratory Conduct

1. Be a model for good safety conduct for students to follow.
2. Make sure students are wearing the appropriate personal protective equipment (i.e., chemical splash goggles, laboratory aprons or coats, and gloves).
3. Enforce all safety rules and procedures at all times.
4. Never leave students unsupervised in the laboratory.
5. Never allow unauthorized visitors to enter the laboratory.
6. Never allow students to take chemicals out of the laboratory.
7. Never permit smoking, food, beverages, or gum in the laboratory.

5. Students

a. Conduct

1. Do not engage in inappropriate behavior in the laboratory.
2. The use of personal electronic equipment is prohibited in the laboratory.
3. The performance of unauthorized experiments is strictly forbidden.

b. General Work Procedures

1. Read and return student and parent signed Safety Contract each year.
2. Comply with Student Safety Contract. (Document Section)
3. Know and follow emergency procedures.

6. General Chain of Communication



B. Training

1. Topics

Employees working with chemicals in the laboratory receive training that includes but is not limited to:

- a. Content and location of the Chemical Hygiene Policy.
- b. Personal protective equipment.
- c. Location and availability of Material Safety Data Sheets (MSDS).
- d. Chemical labeling, handling, and storage.
- e. Hazardous materials.
 - i. Procedures
 - ii. Disposal
 - iii. Emergencies
- f. Proper use and location of safety equipment.
- g. Applicable Safety and Health Regulations (OSHA, EPA, Hazmat, Erie County Department of Health, etc.).

2. Scheduling

- a. All District science teachers, building principals, and custodial staff will complete required training sessions, per their specific role.
- b. Each building will review the policy yearly.
- c. Training is offered twice annually.
- d. Chemical Management Officer will make the provisions for district level training.

3. Student Training

Students working with chemicals in the laboratory receive training by their instructor that includes, but is not limited to:

- a. Location and operation of safety equipment
- b. Proper use of personal protective equipment
- c. Laboratory safety procedures

C. Hazard Identification and Labeling

The District adheres to the standard industry chemical labeling system that uses a combination of colors, numbers, and symbols to show the level of hazard involved in four categories – health, flammability, specific hazard, and reactivity. The hazard rating is part of the employee training program. Visual aids (wall

charts) represent the labeling system as a reference for all lab staff. Containers may contain this information in word form rather than utilize this alphanumeric hazard-rating scheme.

1. All chemical containers must be labeled for proper identification of content and hazard. Container means any bag, barrel, bottle, box, can, cylinder, drain, reaction vessel, storage tank, or the like that contains a hazardous chemical. While temporary in-plant containers (containers used for transfer, weighing, or transport purpose and always in control and possession of the person placing the contents therein) are exempted, school staff may label a temporary container if it is routinely used to contain a chemical that is deemed sufficiently hazardous to require such identification.
2. The identity of the chemical in the container shall appear on the label with the same name that is on the MSDS, and also the common name used at the school if that is different. Hazard warning labels may be those provided by the manufacturer, or written warnings and/or the alphanumeric hazard system placed on the container by school personnel,
3. If experience indicates that normal manufacturing practices (such as discoloring fumes) make a label difficult to read, signs or placards may be used in lieu of labels. The sign or placard shall indicate the common industrial name of the chemical and the appropriate hazard warning information.
4. All prepared chemical solutions must be labeled with the identity of the contents, date, concentration, hazard information, and preparer's name.
5. All stock chemicals must be labeled with the date they were received.
6. All labels shall be inspected yearly and replaced if necessary. Copies of the MSDS are maintained and accessible to the lab staff.

D. Inventory Procedures

1. Keep an updated inventory of all chemicals, their amounts, and location.
 - a. Each quarter the inventory tracking sheet is submitted to the Science Materials Specialist. (See Document Section)
2. Stored chemicals should be examined annually for replacement, deterioration, and chemical integrity.
3. Record all stored chemicals in the inventory system.
4. Use district inventory system to obtain information regarding available chemicals.

E. Storage Procedures

1. Identification

All cabinets and storage areas are to be labeled with the identity of the hazardous nature of the products within. This will allow fire department officials to quickly identify a potentially hazardous area.

2. Conditions

- a. Establish a separate and secure storage area for chemicals.
- b. All chemicals are to be stored with proper segregation between incompatible materials.
- c. Store corrosives in appropriate cabinets.
- d. All flammable materials are to be stored in approved flammable storage cabinets.
- e. Do not store chemicals under a fume hood.
- f. Keep items in the original shipping packages, when possible. (i. e. acids and bases in Styrofoam cubes)
- g. Chemicals are not to be stored on the floor except in approved shipping containers.
- h. Storage area should be adequately ventilated according to building and safety standards.
- i. Never store food in a laboratory refrigerator.
- j. Avoid chemical exposure to heat or direct sunlight.

3. Location

- a. Avoid storing chemicals on shelves above eye level.
- b. Avoid storing chemicals on shelves above any work area, including sinks.
- c. Shelving sections are to be secured to walls or floor to prevent tipping of entire sections.
- d. Water-reactive solids (sodium metal, potassium metal, etc.) should be stored under dry oil.
- e. Open cans of ether (ethyl ether) should be properly disposed of after use and not stored unless absolutely necessary. Rely on expiration date to dispose of the material.
- f. Store chemicals in a separate, locked, dedicated storeroom.
- g. Store all poisons in a locked cabinet.
- h. Only authorized personnel are allowed in the chemical storage area. Students should never be allowed in this area.

4. Requirements

- a. Flammable Chemicals
 - i. Store all flammables in a dedicated flammables cabinet.
 - ii. Keep at controlled room temperature at all times.
 - iii. Store away from all sources of ignition.
 - iv. Store away from all oxidizers.

- v. Never store flammables in refrigerators.
- vi. Avoid storing any chemicals, especially flammable materials, in direct sunlight.
- b. Reactive Chemicals
 - i. Store in segregated cabinets.
- c. Corrosive Chemicals and Contact-Hazard Chemicals
 - i. Store corrosives in appropriate cabinets. Ensure that acids and bases are properly segregated.
 - ii. If possible, keep chemicals in the original shipping package, e.g., acids and bases in Styrofoam cubes.
 - iii. Inspect metal shelf parts for possible corrosion on a quarterly basis.

F. Handling Procedures

1. Once opened, incoming shipments of chemicals must be transported by trained personnel.

2. Compressed Gas

- a. Compressed gases should be handled as high-energy sources.
- b. The protective cap that comes with the cylinder must always be in place except when the cylinder is connected to a system for use.
- c. Avoid exposure of cylinders to heat or direct sunlight.
- d. Never lubricate, modify, force or tamper with a cylinder valve.
- e. Cylinders of toxic, flammable or reactive gases should be used only under a fume hood.
- f. Do not extinguish a flame involving a combustible gas until the gas is shut off—otherwise it can reignite—possibly causing an explosion.
- g. Gas cylinders must be secured in place. They must be protected to prevent valve damage that may be caused by falling.

3. General Precautions

- a. Laboratory work with liquids and solids that pose an inhalation hazard with potential for exposure above the Permissible Exposure Limit will be conducted in a fume hood, glove box, or similar device, which is equipped with appropriate traps and/or scrubbers.
- b. Additional special precautions must be taken when using particularly hazardous substances such as "select carcinogens," reproductive toxins and substances which have a high degree of acute toxicity (as defined in the OSHA Lab Standard). These substances must be identified, kept and used in specially designated areas, and have specific procedures for safe disposal and decontamination of equipment, PPE, surfaces, etc.
- c. Only use flammable solids (sodium, potassium, lithium, etc.) in very small quantities. Use a safety shield when igniting flammable solids.
- d. Use extreme caution when handling finely divided (dust-like) material. Finely divided materials may form explosive mixtures with air.

- e. Flammable/combustible liquids should be used only with proper ventilation and away from sources of ignition such as open flame, sparks, or heat.

G. Chemical Waste Disposal

1. Follow local, state and federal regulations regarding disposal of hazardous materials.
2. Disposal is to be in accordance with the MSDS information.
3. Consult with the Chemical Management Officer for proper collections and disposal of all quantities of hazardous materials.
4. In general, chemicals must never be discarded by pouring them down the drain or allowing them to evaporate in a fume hood. The Chemical Management Officer will provide information about any specific exceptions to this rule.

H. Chemical Exposure Assessment

1. Individual concerns about excessive exposures occurring in the laboratory should be brought to the attention of the principal and the Chemical Management Officer immediately. They will investigate all suspected overexposures to chemicals in a prompt and timely fashion.
2. Signs of overexposure include:
 - a. Accidental breakage of a hazardous material container.
 - b. A skin rash or irritation to eyes, face, or body occurring because of contact with a chemical.
 - c. Symptoms such as nausea, dizziness, and others.
3. In the event of an overexposure, all chemicals and circumstances involved are to be documented and submitted to principal and Chemical Management Officer.
4. The assessment will initially be qualitative and, based upon the professional judgment of the Chemical Management Officer, may be followed up by specific quantitative monitoring.
5. A report documenting the assessment will be sent to the individuals involved. A copy of the assessment report can be found in the Document Section.

I. Equipment and Control Measures

1. Safety Equipment

- a. Safety equipment must be functional at all times. Non-functioning equipment must be reported immediately to the Chemical Management Officer.
- b. Requirements of safety items
 1. Fire extinguishers must be of the right type and must be routinely inspected. Only properly trained personnel may use a fire extinguisher.
 2. Fire blankets must be accessible in all labs.
 3. Fume hoods must be operational.
 4. Lab areas are to be adequately ventilated according to building and safety standards.
 5. Eyewashes (and safety shower) must be functional and flushed on a routine basis.
 6. Acid showers must be functional.

2. Personal Protective Equipment and Guidelines

- a. Inspect all protective personal protective equipment (PPE) before use. Dispose of defective equipment.
- b. PPE shall include, but not limited to:
 1. Protective eyewear (goggles) must be worn whenever there is chance of splatter from chemicals or danger from projectiles and must meet the requirements of American National Standards Institute.
 2. Gloves are to be worn when working with hazards. Gloves must be of an appropriate material that is impervious to the chemicals being used. Disposable gloves must be discarded as soon as they are removed. Reusable gloves must be properly cleaned between uses.
 3. Aprons are to be worn to protect from spills and corrosive materials. Long sleeves must also be worn when an apron is required.
 4. Totally enclosed shoes made of non-absorbent material must be worn during all laboratory activities.
 5. Handling corrosive chemicals requires special protection for the eyes and face. A face shield must be worn along with goggles when working with corrosives.
- c. Protective Guidelines
 1. Long hair must be tied back.
 2. No dangling jewelry
 3. No loose sleeves
 4. No contact lenses worn when fumes are present.

J. Emergency Procedures

1. Spill Procedures

- a. If spill is assessed as dangerous:
 1. Move everyone to a safe location.
 2. Notify administration/seek additional help.
 3. When the emergency is over, fill out a detailed accident report.
- b. If spill is not assessed as dangerous:
 1. Follow approved spill clean-up procedures.
 2. Spills should be cleaned up only by approved personnel.
 3. Clean up spills immediately and thoroughly.
 4. A bucket of dry sand should be available as a Class D fire extinguisher and to aid in providing traction on a slippery floor.
 5. Neutralizer for both acid and base spills should be available in the event of a chemical spill.

2. Evacuation Plan

- a. Evacuation plan must be posted in each laboratory.
- b. Students, faculty, and staff should be familiar with evacuation plan.
- c. Proceed per the current school safety plan.

K. Medical Consultation

The purpose of a medical consultation is to determine whether a medical examination is warranted. When warranted the employee will obtain medical consultation from or under the direct supervision of a licensed physician.

The following provisions shall apply regarding medical consultations and examinations.

- 1.** The school shall provide all students and employees who work with hazardous chemicals an opportunity to receive medical consultation and examination when the person in question develops signs or symptoms associated with a hazardous chemical to which they may have been exposed.
- 2.** The physician shall be provided with the identity of the hazardous chemical or chemicals to which the person in question may have been exposed; the exposure conditions and the signs and symptoms of exposure the victim is experiencing.