# IV. Personal Safety Provisions

## Protecting Students' Eyes and Bodies

Providing a safe laboratory environment involves a combination of many efforts. In addition to proper training, procedures, ventilation, and emergency equipment, it is important to provide teachers and students with proper personal protection.

### A. Eye Protection Concerns

**SAFETY IN THE SCHOOL LABORATORY REQUIRES . . .**

- **the availability and, when necessary, the wearing of aprons and gloves.**
- **care in preventing clothing or long hair from becoming a hazard.**
- **special attention to prevent eye damage by wearing appropriate goggles.**

Annotated Code of Maryland, Education Section (GED) Article 7-407, covers the legal requirements for providing eye protection in the laboratory. In addition to specifying some requirements for career and technology classrooms, the article states that "Each student and teacher in a school...shall be required to wear an industrial quality eye protective device at all times while working in...[a] chemical or combined chemical-physical laboratory that involves any caustic or explosive chemical or hot liquid or solid." In applying the legal standards, a "better safe than sorry" attitude is recommended.

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1. **Goggles**

   a. Teachers, students, and visitors should wear chemical splash safety goggles at all times during laboratory work since the student – and sometimes even the teacher – cannot reliably judge the presence of risk. The teacher has the responsibility to train students in the proper use and care of goggles.

   b. Chemical splash safety goggles should be used as the standard protective eyewear. Such goggles should fit the face surrounding the eyes snugly to protect the eyes from a variety of hazards. Ventilation of the goggles should be adequate but well protected from splash entry. Safety glasses are not an acceptable substitute for chemical splash safety goggles because they provide protection from impact only and not from chemical splashes.

   c. The eye protectors should meet the requirements of the American National Standard Z87.1-1989, Practice for Occupational and Educational Eye and Face Protection.

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   d. Keep the lenses clean. Dirty lenses obscure vision and may lead to eye fatigue. Never clean lenses with abrasive hand soap, since it will scratch them. When cleaning plastic lenses, any abrasive dirt which may be on the surface should be flushed off by holding the lenses under running water; otherwise, the lenses will become scratched by the abrasive matter being

rubbed into the lenses. Glass lenses with surface scratches should be replaced since the hardened glass has thus been weakened.

e. Chemical splash safety goggles should never be left with the lenses in contact with hard surfaces such as table tops.

f. Chemical splash safety goggles should not be carried unprotected and in the same pocket with other objects such as pencils or files. It is good practice to keep goggles in a case when they are not being worn.

g. Goggle sterilization cabinets should be located in the laboratory work area.

▸*See* Chapter XI.G.3, Laser Guidelines, for information on eye protection when working with lasers.

2. **Face Shields**

   a. Full face shields protect the face and neck better than goggles.

   b. Face shields are not a substitute for chemical splash safety goggles.

   c. When maximum protection from flying particles and harmful liquids is needed, face shields should be worn with goggles.

3. **Contact Lenses**

   Wearing contact lenses in the laboratory is a complicated issue. Teachers may recommend that students not wear contact lenses, or they may allow selected and identified students to wear them. The following are important considerations in deciding about and governing the use of contact lenses.

   a. Soft contact lenses can absorb chemical vapors.

   b. Students who are not wearing their corrective eyewear (contact lenses or prescription glasses) may present a different type of hazard because of their limited vision.

   c. Students who wear contact lenses should be required to wear chemical splash safety goggles.

   d. If a student wearing contact lenses spills or splashes harmful chemicals in his or her eyes, the contact lenses must be removed immediately and the eyes flushed with water.

## B. General Guidelines for Dress in the Laboratory

1. Loose fitting, frilly, or highly flammable clothing should not be worn in the laboratory. Ties should be tucked into shirt or removed.

2. Sandals, open-toed shoes, and shoes with canvas or mesh uppers should not be worn in the laboratory.

3. Long hair and loose clothing or jewelry must be confined when working in the laboratory.

4. Finger rings should not be worn while working with reagent chemicals or equipment that has moving parts. Rings can react with chemicals or puncture laboratory gloves. Chemicals can get trapped under rings and irritate the skin.

## C. Protective Apparel

1. **Aprons**
   a. Aprons should be worn during all chemistry laboratory work.
   b. Rubber-covered muslin aprons provide good protection from corrosive or irritating liquids.
   c. A plastic apron can accumulate a considerable charge of static electricity and should be avoided in areas where flammable solvents or other materials could be ignited by a static discharge.
2. **Gloves**
   a. Gloves should be worn whenever it is necessary to handle corrosive materials, rough or sharp-edged objects, very hot or very cold materials, or whenever protection is needed against accidental exposure to chemicals.
   b. Gloves should not be worn around moving machinery.
   c. Many different types of gloves are commercially available. Consult a laboratory supply catalogue for descriptions of the various types available and their specified uses.
   d. Before each use, gloves should be inspected for discoloration, punctures, and tears.
   e. Before removal, gloves should be washed appropriately. (NOTE: Some gloves, including those made of leather and polyvinyl alcohol, are water permeable.)
   f. Glove materials are eventually permeated by chemicals. However, they can be used safely for limited time periods if specific use and glove characteristics (i.e., thickness and permeation rate and time) are known. Some of this information can be obtained from glove manufacturers.
   g. Gloves should be replaced periodically, depending on frequency of use and permeability to the substance(s) handled.
3. **Laboratory Coats**

   Laboratory coats are intended to prevent contact with dirt and the minor chemical splashes or spills encountered in laboratory work. The cloth laboratory coat is, however, primarily a protection for clothing and may itself present a hazard (e.g., combustibility) to the wearer. Cotton and synthetic materials are satisfactory, but rayon and polyesters are not. Laboratory coats do not significantly resist penetration by organic liquids and, if significantly contaminated by them, should be removed immediately.

4. **Respiratory Protection**

Federal regulations prohibit the use of respirators by untrained personnel or students (29 CFR 1910.134). Activities that require the use of respirators should not be performed in a classroom laboratory setting.

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