

Personal Protective Equipment

A safety resource from the National Science Teachers Association

Personal protective equipment (PPE) includes safely designed and constructed garments or equipment, such as clothing, gloves, protective hearing devices, shoes, or goggles, designed to protect a person's body from injury or infection by minimizing exposure to workplace biological, chemical, and physical hazards. When engineering, work practice, and administrative controls are not feasible or do not provide sufficient protection, employers must provide personal protective equipment (PPE) to their employees and ensure its use. To ensure the greatest possible protection for employees, employers must perform a hazard analysis and risk assessment of the workplace to identify and control physical and health hazards. To address these hazards, they should identify and provide appropriate PPE for employees and train them in the use and care of the PPE, which is required by [OSHA regulations](#).

PPE should be inspected, cleaned, and maintained at regular intervals so that the PPE provides the required protection. PPE should be designed and constructed to meet NIOSH (National Institute for Occupational Safety and Health) or ANSI (American National Standards Institute)/ISEA (International Safety Equipment Association) standards, and used and maintained in accordance with manufacturers' instructions. Consult a safety data sheet (SDS) for the specific recommendation for a chemical hazard. Better compliance by users occurs when the PPE has good ergonomic design, fits well, and is comfortable. Eliminate or substitute the hazard with a safer alternative, and apply engineering or administrative controls to decrease the level of PPE needed to provide a safer experience.

[OSHA, Personal Protective Equipment](#)

Eye Protection

Personal protection equipment for eyes must match the hazard, including chemical splash, contaminated fingers, vapors, dust, impact, laser, projectiles, or welding. PPE must be worn during the entire activity, as well as set-up and take down. All students and adults must clean up and wash hands. PPE should be removed only after any possibility of contamination, such as contaminated hands touching eyes, is gone. If an SDS is available, consult for specific eye protection.

Teachers have a [Duty of Care](#) to ensure that the safety goggles or glasses that students wear fit properly, and are being worn correctly (i.e., goggles/glasses should cover the eyes—they should not hang around the neck or be placed on the forehead). In addition, the goggles or glasses need to be disinfected and cleaned after they are worn.

Additional eye protection is addressed in NSTA's [Eye Protection and Safer Practices FAQ](#), located on NSTA's [safety portal](#).

[*Personal Protective Equipment \(1910.133\) Eye and Face Protection*](#)

[*Occupational and Educational Personal Eye and Face Protection Devices*](#)

Ear Protection

Noise can be a hazard in K–12 science education settings. Generally, the louder the noise, the shorter the exposure time before hearing protection is required. Hearing protection devices reduce only the amount of noise that gets through to the ears. The amount of this reduction is referred to as attenuation, which differs according to the type of hearing protection used and how well it fits. Hearing protection in the form of earplugs or earmuffs can be used. NIOSH and OSHA recommends that exposures to noise be reduced to a level equivalent to 85 dBA for eight hours to reduce occupational [noise-induced hearing loss](#).

[OSHA, Occupational Noise Exposure - 1910.95](#)

Feet and Leg Protection

Closed-toe shoes or boots and long pants can provide protection against chemical or physical hazards such as chemical spills, dropped objects, penetrations, or field hazards such as snakes or debris, or walking over uneven ground. Work involving exposure to hot substances or corrosive or poisonous materials requires the use of personal protective equipment to cover exposed body parts, including legs and feet. Use of non-conductive foot protection should also be worn when working with electricity. The exception to this is workplace exposure to static electricity, which may necessitate the use of conductive footwear.

[OSHA Personal Protective Equipment \(1910.136\) Foot Protection](#)

[OSHA Personal Protective Equipment](#)

Gloves

Gloves are essential in providing skin protection from chemicals, heat, UV/solar, biological agents, or mechanical trauma resulting in cuts, lacerations, abrasions, or punctures. Similar to other hazards, the choice of gloves must match the hazard. Gloves should be selected based on the hazard present, conditions, and duration of use. Some examples of gloves commonly used as PPE include rubber or latex gloves, and cut- or heat-resistant gloves. Users should consult an SDS for the specific recommendation for the hazard. Given some individuals are allergic to

latex, use non-latex type gloves when possible. Note: As of January 18, 2017, the FDA banned the use of powdered surgeon's patient examination gloves in health care settings.

[Glove Selection Guide](#)

[OSHA Standard 29 CFR 1910.138, Hand Protection](#)

Laboratory Coats or Aprons

Similar to other hazards, the choice of protective laboratory coat or apron **must match the hazard**, such as an accidental chemical spill or microbial work. Although laboratory aprons are typically made of corrosive-resistant material, once again the choice of material should match the hazard. When possible, non-latex type aprons should be used. Users should always consult an SDS for the specific recommendation for the hazard.

NSTA would like to thank its Science Safety Advisory Board for developing this resource. Questions or comments about its content should be directed to NSTA at 703-243-7100 or safety@nsta.org.

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