Contact Lens Demonstration

Safe Laboratory Practices

Introduction

Many school and industrial laboratories prohibit the wearing of contact lenses in the laboratory. The fear is that chemicals splashed in the eye may wick under the contact lens due to capillary action. The chemicals will then be held in close contact against the surface of the cornea, possibly causing permanent eye damage. This phenomenon can be easily demonstrated.

Concepts

- Eye safety
- Contact Lenses

Materials

Acetate film, 1 sheet
Overhead projector
Permanent marker
Pipet or eye dropper
Water with food coloring

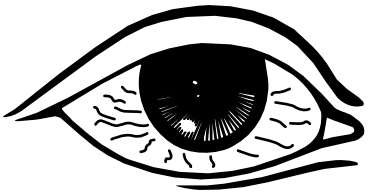

Figure 1.

Preparation

1. Cut an 8½ × 11 inch sheet of acetate in half.
2. Draw an eye on one half of the acetate sheet with a permanent marker (see Figure 1).
3. Cut a circle from the other half of the acetate sheet approximately the size of the iris of the eye. This is the contact lens.
4. Prepare a solution of colored water using a few drops of food coloring and tap water.

Procedure

1. Place the half sheet of acetate with the drawing of the eye on the overhead projector.
2. Place the "contact lens" acetate circle on the iris of the eye.
3. Turn the overhead projector on.
4. Use an eyedropper or pipet to place a few drops of colored water immediately next to the edge of the "contact lens".
5. Observe the capillary action of the solution being drawn under the lens.

Discussion

Recent studies have shown that contacts may not pose the risk once thought, but good eye protection is always necessary. For more information, read the article on the back of this Safety Fax.

Connecting to the National Standards

This laboratory activity relates to the following National Science Education Standards (1996):

Unifying Concepts and Processes: Grades K–12
Evidence, models, and explanation

Content Standards: Grades 5–8
Content Standard F: Science in Personal and Social Perspectives, personal health; risks and benefits, science and technology in society

Content Standards: Grades 9–12
Content Standard F: Science in Personal and Social Perspectives, personal and community health, natural and human-induced hazards

Publication No. 91202
061616

Acknowledgment

Flinn Scientific thanks John Brodemus, Oak Lawn High School, Oak Lawn, IL for bringing this demonstration to our attention.

Flinn Scientific—Teaching Chemistry™ eLearning Video Series

A video of the *Contact Lens Demonstration* activity, presented by Bob Lewis, is available in *Safe Laboratory Practices*, part of the Flinn Scientific—Teaching Chemistry eLearning Video Series.

Materials for *Contact Lens Demonstration* are available from Flinn Scientific, Inc.

Catalog No.	Description
AP8464	Acetate Sheets
AP1297	Permanent Marker

Consult your *Flinn Scientific Catalog/Reference Manual* for current prices.

Contact Lenses in the School Science Laboratory

Are They Safe? Should They Be Allowed?

Contact lenses are commonly worn by students and, in many instances, are the only corrective eyewear they possess. What type of policy should you set for regulating the use of contact lenses in the science laboratory? The answer is not clear and opinions have been changing over the last few years. First, let's explore the three primary hazards associated with the wearing of contact lenses in the science laboratory.

- Should a chemical splash to the eye occur, the chemical could be held under the contact lens and against the surface of the cornea, possibly causing permanent eye damage.
- Involuntary spasm of the eyelid, and the "panicked" nature of the victim who has the chemical splashed in his eye, makes removal of the contact lens virtually impossible. By the time the lens is removed, irreversible damage already may have occurred.
- In a situation where the victim is unconscious, people attempting to irrigate the victim's eyes may be unaware that the victim wears contacts.

Teachers should know which students wear contact lenses. Students should also know if their lab partners are wearing contact lenses. A good way to find out which students wear contact lenses is to ask them on the first day of class. Perhaps you will want to make this question a part of your safety contract. Record this information in your grade or lesson plan book. Whatever method is used, it is the teacher's responsibility to know which students wear contact lenses.

The hazards of wearing contact lenses in the science laboratory are why safety specialists stated for years, "Contact lenses should not be worn in a laboratory."[1,2]

However, the American Chemical Society (ACS) has recently studied the issue of wearing contact lenses in the laboratory and has reversed its stance. A careful review of the literature by knowledgeable consultants has refuted many of the risks. In addition, recent studies and experience have suggested that contact lenses do not increase the risks of eye damage and may in fact minimize injury in many situations. Therefore, the ACS suspended its prohibition against contact lenses in the laboratory provided that the appropriate eye protection is also worn.[3,6]

OSHA and the American National Standards Institute (ANSI) agree that "wearers of contact lenses shall be required to wear appropriate covering eye and face protection devices in a hazardous environment. It should be recognized that dusty and/or chemical environments may represent an additional hazard to contact lens wearers."

The National Institute of Occupational Health and Safety (NIOSH) lists more than 400 chemicals in their Pocket Guide to Chemical Hazards. Most of the chemical listings recommend against contact lens use. Everyone agrees, including Prevent Blindness America, that all contact lens wearers should be identified and some policy towards the use of contact lenses be written.

The fact is that science teachers probably cannot prevent a student from being involved in laboratory experiments if that student insists on wearing contact lenses. What should the teacher do?

First, adopt a policy which states that appropriate protective eyewear must always be worn in the laboratory. Second, inform students of the special dangers that contact lenses may pose in the science laboratory. Many students who wear contact lenses also have eyeglasses and should be encouraged to wear them on lab days. Third, students who wear contact lenses should be provided a pair of non-ventilated chemical splash goggles. These goggles will keep out irritating vapors. Finally, it should be stressed that contact lenses by themselves do not provide adequate protection in any environment in which the chance of an accidental splash of a chemical can be reasonably anticipated. Appropriate protective eyewear must always be worn.

Some states may have their own regulations pertaining to contact lenses. We recommend you consult your state department of education for any specific regulations or guidelines concerning the use of contact lenses in the science laboratory.

Science teachers must establish a policy concerning the use of contact lenses in the science laboratory. No matter what policy is set, the use of properly adjusted chemical splash goggles offers the best eye protection in a chemical laboratory and will greatly reduce all eye accidents.

We hope the information provided in this article will help you design a contact lens policy for your school's science laboratories. If you want more information, a recent series of review articles has been published.[4,5,6]

1 Wood, C. G. Safety in School Science Labs; J. Weston Walch: Portland, Maine, 1991; p 50.
2 Prudent Practices for Handling Hazardous Chemicals in Laboratories; National Academy of Science: Washington, DC, 1981; p 155.
3 Safety in Academic Chemistry Laboratories 6th ed.; American Chemical Society: 1995; Washington, DC, pp 46–47.
4 Segal, E. B. Chemical Health and Safety, 1995, 2, 12–24.
5 Segal, E. B. Chemical Health and Safety, 1997, 33–37.
6 Chemical Health and Safety, 1998, 3, 32.