

Lesson Three: Fun in the Sun

Objectives:

- Teach students
 - What is ultraviolet radiation?
 - Why is ultraviolet radiation dangerous?
 - How do I protect from ultraviolet radiation?

Time Required:

One class period

Materials:

- Optional: Small table lamp, black light and white paper or handkerchief to demonstrate ultraviolet glow
- Eyeglass frames with non-prescript lenses (approximately one pair per five students)
- Vaseline and Paper Towels

Instructions:

- Define ultraviolet radiation for students, explaining that what we call a “rainbow” is the spectrum of light energy from the sun that we can see. At each end of this visible light are other forms of invisible energy—from radio waves to x-rays. Some of this energy is in the form of ultraviolet waves, or UV. UV is not normally visible, but you might have seen its purplish glow from a special “black light” bulb that makes things glow in the dark. (NOTE: if possible demonstrate the purplish glow using a table lamp, black bulb and piece of white paper.)
- Explain that the ozone layer is a thin layer in the upper atmosphere that blocks the sun’s ultraviolet rays. Because of the ozone layer being depleted, more ultraviolet radiation is getting through to Earth.
- Explain that ultraviolet radiation can be very dangerous to both skin and eyes. While we can’t see ultraviolet radiation, it can see - and harm - us if we are not careful. Over exposure to UV radiation can cause serious health problems including sunburn, skin disorders, eye damage and cataracts.
 - Skin cancer is the most common form of cancer, with one in five people developing it during their lifetime.
 - Eighty percent of a person’s lifetime exposure to UV radiation occurs before they turn 18.
 - 79% of people know that the sun can cause skin cancer, but only 6% know it can harm the eye.
- Explain that a cataract is a clouding on the lens of our eye that might make it hard to see. In a normal eye, the lens is almost transparent and can change shape to focus objects at different distances from the eye. When the lens loses its flexibility and becomes ‘opaque,’ we call it a cataract.
- Remind students that even on an overcast day, UV light from the sun can cause sunburn of the skin and the cornea of our eyes, which is called photokeratitis. Exposure to UV radiation can also damage your retina that might lead to total blindness.

Activity:

- Invite students to come to the front of the room and feel a simulated difference between a healthy eye and an eye with a cataract. Reiterate to students that a cataract does not grow on the eye but rather changes the consistency of the lens.

- Let students put on glasses to acclimate themselves to looking through them. Then, smear a little Vaseline on both lenses of a few sets of glasses to simulate a cataract. Take turns looking at objects with the Vaseline on the lenses and without.
- Lead a discussion about how having cataracts would impair daily life.

Conclusion:

- Ask students to share their ideas on how they can protect themselves from ultraviolet radiation. Ensure the discussion covers the following areas:
 - Limit exposure to the sun during the middle of the day when the sun's rays are at their strongest. Check the UV index for your area, available on metservice.co.nz, to assess danger levels.
 - Wear a hat when outdoors. Try to select a hat that has a floppy brim to cover your eyes, ears, face and neck.
 - Use sunscreen with a minimum sun protection factor (SPF) of 15 or higher when outdoors. Be sure to cover any areas that have skin showing. Alternately, wear clothing that covers your skin.
 - And, of course, wear sunglasses that block 100% of ultraviolet radiation. Photo chromic lenses are a good option as they automatically block 100% of UV, and change from light to dark when UV radiation is present.