McPherson Eye Research Institute Outreach Kit:

# Be Wise & *Shade* Your Eyes

1. Materials:
   a. 2 "Be Wise & *Shade* Your Eyes" (Owl) Posters*,
      1 stuffed owl toy, wearing sunglasses
      ***Doris*** contacted and purchased from Dreamstime the license to use the owl with sunglasses graphic.
   b. 3 Posters of the Electromagnetic Spectrum and tape to hang the one laminated poster
   c. David Cox' Bookmarks on cardstock showing the UV Index chart in color on side A; on side B, the URL of the UV Index Forecast plus reminders of why and when it's important to wear sunglasses
   d. Suzanne Peyer's illustrated sheets listing the "Seven Sight-saving Steps"
   e. Sunglasses for adults & children, from Outreach Committee contributions.
      Anna Shen said colorless polycarbonate safety glasses are UV-opaque.
   f. Samples of lenses and glasses contributed by the UW Optical shop.
   g. [PVC/Plastic rack to display sunglasses [to be acquired]
   h. UV detecting beads (Nasco SB48486M; 1000 "Energy" beads* for $19.50)
   i. Samples of polarizing sunglasses/lenses
   j. Colored pipe cleaners on which to string the beads.
   k. 2 Rayovac 9 LED UV/Black Light LED Flashlight [UV-A 400 +/- 5nm] (Batteries + Bulbs RAYVBUV-B $9.99; 7 hour run time, includes 3 AAA batteries)
   l. Spare AAA batteries for the UV flashlights (Batteries + Bulbs DURMN2400B24 Duracell Coppertop 24 pack $17.99)
   m. Page-protected instructions for experiments with the UV-detecting beads, fplus copies to give away; box of colored pencils.
   n. Personal computer with power cord/or URL which can be accessed directly on a smart phone
   o. A plastic bin to carry materials
2. **Activities**
   a. Show children the location of UV light on the electromagnetic spectrum.
   b. String 3 UV-detecting beads** onto a pipe cleaner to form a zipper/backpack fob or bracelet. **"Not for children under 3 years."
   c. Expose the UV-detecting beads to the light from the UV flashlight.
      Demonstrate how well sunglasses/various lenses protect the beads from the UV light. Explain the effects of UV light on the eyes.[1]
      Encourage children to use the UV-detecting beads to do their own studies investigating UV conditions.
   d. On the laptop, or smart phone, display the UV Index Forecast for the day (https://www.epa.gov/sunsafety/uv-index-applications) & relate it to the UV Index on the bookmarks.
   e. On the laptop, show "How the Sun Sees You" – a demonstration of UV effects and sun block (https://www.youtube.com/watch?v=o9BqrSAHbTc).
   f. -Give each **child** a UV Index bookmark
      -Give each **family** the sheet, "Seven Sight-saving Steps"
      -Give especially interested observers a sheet of suggestions for Ultra-violet light detecting bead experiments that they can do.

[1]National Eye Institute (July 5, 2022)

## Protecting your eyes from the sun's UV light

**(https://www.nei.nih.gov/about/news-and-events/news/protecting-your-eyes-suns-uv-light)**

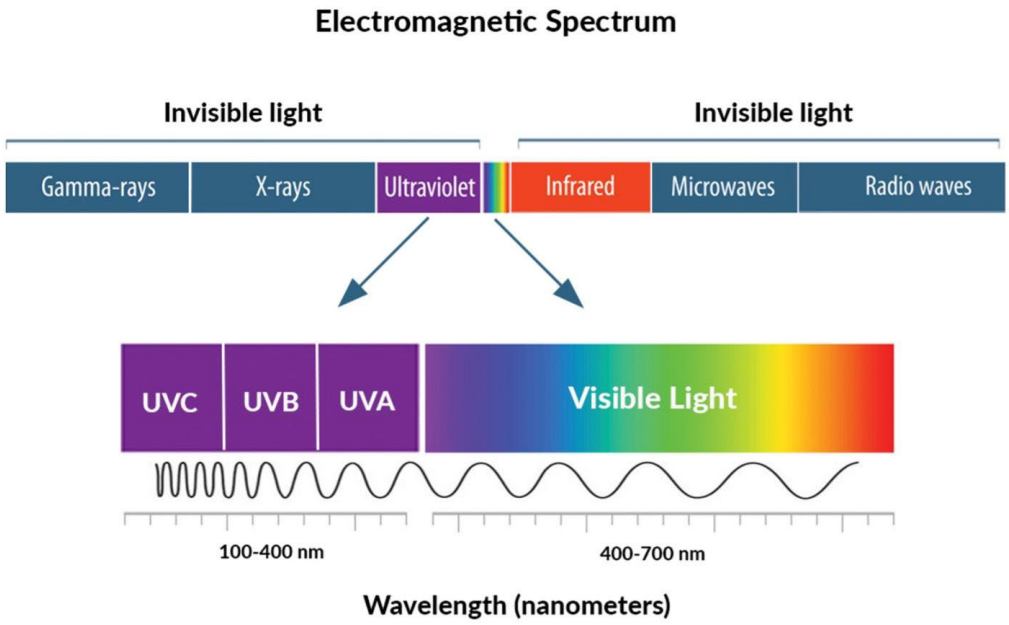
Too much sun causes skin damage, but its ultraviolet (UV) rays can also damage the eyes. Here are some common questions and answers about UV light and how to protect your eyes from the sun.

### Q: What is UV light?

UV light is a form of electromagnetic radiation. It is invisible to the human eye because of its very short wavelength. Only a very small part of the electromagnetic spectrum is visible to the human eye as light.

There are three types of UV light, based on **wavelength range**.

- UVA is the longest and least energetic, 315 to 400 nanometers
- UVB is 280 to 315 nanometers in length
- UVC is the shortest and most energetic, 100 to 280 nanometers.



*Within the spectrum of visible and invisible light, just a small portion can be seen by human eyes. UV light is not visible. Credit: NEI*

**Q: Why do I need to protect my eyes from UV light?[5]**

UV light actually penetrates eye tissues much less than visible light, but what does enter potentially increases the risk of eye problems. UVA penetrates more than UVB.

Among the three types of UV light, UVA carries the least energy but can cause aging of the skin. Wrinkles and "sunspots" are some of the most common long-term effects of UVA, and it is also linked to some skin cancers. Although much UVA light is absorbed in the cornea and the lens, some can penetrate the eye all the way to the retina, possibly worsening retinal damage from (age-related) macular degeneration.

UVB carries slightly more energy than UVA. UVB damages DNA directly and is responsible for sunburns and most UV-related cancers, increasing the risk of skin cancer and lens cataracts.

UVC carries more energy than UVA and UVB but is mostly blocked by the Earth's ozone layer. UVC also comes from welding torches and UV sanitizing bulbs. It only affects superficial tissues, potentially damaging skin cell DNA.

**Q: How do I protect my eyes from UV light?**

Wearing sunglasses and a hat is the simplest and safest way to protect your eyes from UV rays. Choose sunglasses that that fit well and that block light from coming in around the lenses. Choose a hat with a broad, dark brim that shades your eyes and reduces glare.

Consider staying indoors during parts of the day when the sun is strongest, usually between 10 a.m. and 4 p.m. Check your local weather forecast for the UV index, a measure of UV intensity. Be aware that the UV index can be high even on cloudy days.

**Q: What eye problems are linked to UV light exposure?**

Several eye problems are linked to UV exposure.

**A cataract is a cloudy area in the eye's lens. Prolonged exposure to UV rays modifies lens proteins, leading to cataract formation and worsening eyesight.** Over time, cataracts can make vision blurry, hazy, or less colorful.

**Age-related macular degeneration (AMD)** blurs central vision due to the breakdown the macula — the part of the eye that controls sharp, straight-ahead vision. The macula is part of the light-sensitive retina in the back of the eye. Some **studies indicate prolonged exposure to UV rays without protection increases the risk for AMD, but Dr. Barbara Blodi says, "We don't have enough evidence that UV light can cause AMD."**

A pinguecula is a protein and fat deposit in the white part of the eye (sclera). It can cause irritation and, in rare cases, affect how tears cover the eye.

A pterygium (Surfer's Eye) is a growth that extends from the sclera to the clear tissue called the cornea, which covers the iris and pupil.

Cancers of the eyelid, including basal cell carcinoma and squamous cell carcinoma, are linked to UV exposure. No link has been made between UV exposure and other types of ocular cancers.

**Q: How can I protect my children's eyes from UV?**

Sunglasses are available in many sizes, including kids' sizes. But sunglasses may not be practical for all kids. A hat may be a more practical solution.

**Q: How do sunglasses work?**

**All sunglasses work by blocking and/or reflecting the harmful UV light away from the eyes**.

**Q: How do I choose a pair of sunglasses?**

UV-blocking lenses are the most important feature of all sunglasses but should not be the only one to be considered when buying a new pair.

Consider the following factors when choosing sunglasses:

- **Lens material**. Sunglasses lenses can be made from a variety of materials, including plastic or polycarbonate. By law, retailers must indicate level of UV protection. **Look for lenses that provide 99 to 100 percent protection from UVA and UVB or marked as having a UV400 rating.** The U.S. Food & Drug Administration (FDA) regulates non-prescription sunglasses as medical devices. It requires that manufacturers and retailers meet minimum requirements for UV protection, lens quality, impact resistance, labeling, and more. Unsure if your sunglasses have UV-blocking lenses? Many optical shops have a device called a photometer to test them.
- **Fit**. Choose comfort over style when selecting sunglasses frames. They should feel good, stay in place, and cover the skin around your eyes. A good fit will minimize light that enters the eye from the top, bottom, and sides of the lenses.
- **Use**. Choose sunglasses according to your activity. Activities near water, snow, sand, and other reflective surfaces increase UV exposure by reflecting light. Polarized lenses are good for reducing glare from snow or water. Consider wearing wraparound sunglasses or goggles to protect yourself from intense light or when doing yardwork or other activities that create flying debris.

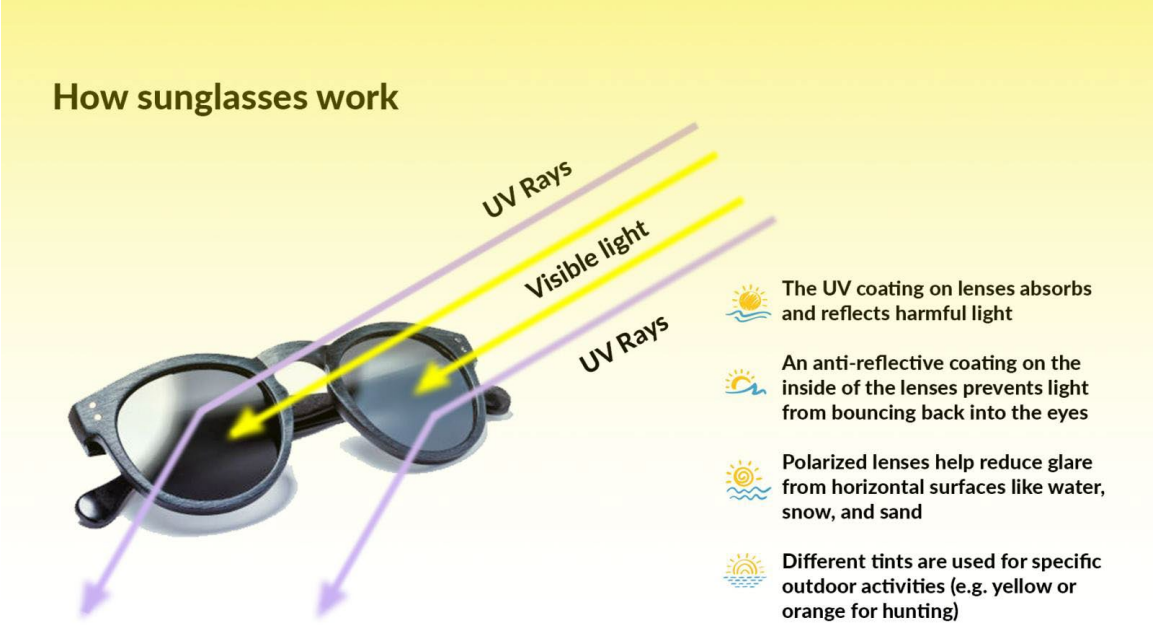



*Image credit: NEI*

**Q: Should I avoid cheaper sunglasses?**

Don't assume that expensive, designer sunglasses provide better UV protection than sunglasses available from grocery stores or discount vendors. **Buy sunglasses that are clearly marked as providing 99 to 100 percent protection from UVA and UVB or marked as having a UV400 rating**.

**Q: Do contact lenses provide UV protection?**

**Some contact lenses block UV**. Wearing UV-blocking sunglasses over your contact lenses will help protect the skin around your eyes as well the portion of your eyes that contact lenses don't cover.

**Resources:**

1. American Optometric Association (AOA): Ultraviolet (UV) protection

2. Food and Drug Administration (FDA) - regulates nonprescription sunglasses as medical devices: Sunglasses, Spectacle Frames, Spectacle Lens and Magnifying Spectacles

3. All About Vision – guide to choosing high-quality sunglasses: https://www.allaboutvision.com/sunglasses/quality-buyers-guide/

4. Check the daily UV Index from the National Weather Service: https://www.cpc.ncep.noaa.gov/products/stratosphere/uv_index/bulletin.txt

5. Richard R. Dubielzig, DVM and Barbara Blodi, MD edited the section, "**Q: Why do I need to protect my eyes from UV light?"** in March 2025.

Contact
**Claudia Costabile**
Email