The Eclipse Is So Bright, I Have To Wear Shades

By Marcus A. East, M.D.

Where will you be on Monday, August 21, 2017? Hopefully, you will be enjoying the view with your solar shades on. In West Salem, at approximately 10:17am, you will experience 1 minute and 52 seconds of totality as we pass under the moon's darkest umbral shadow. Day turns into night, the birds stop chirping, and the temperature noticeably chills. This is the only time where it is safe to view the eclipse without protection. At all other times, whether the Sun is partially or not eclipsed, you must either use special-purpose solar filters or a projection method to protect your eyes.

When looking for your solar shades, make sure they meet the ISO 12312-2 certified standard and inspect them to be sure the filters are not torn, scratched, punctured, creased, or coming loose from their frames. Certified eclipse glasses are designed to reduce visible sunlight to a safe and comfortable level while at the same time, block harmful ultraviolet and infrared solar radiation.

Do not observe the uneclipsed or partially eclipsed sun through an unfiltered camera, telescope, binoculars, or any other optical device. This is true even when wearing your solar shades. The focused light will be magnified and even more intense, which will damage the filter of your shades and will be more likely to harm your eyes.

Never use homemade filters such as dark sunglasses, exposed film, space blankets, potato chip bags, or DVD's. These may dim the sun to a comfortable level but they do not offer protection from the entire electromagnetic spectrum. Solar infrared radiation and intense visible light can still damage the photoreceptors of the retina: the rods and cones. Photochemical and thermal injury can occur without discomfort as the retina has no pain fibers. If intense or of long enough duration, the light rays cause a burn of the fovea, the middle of the retina that gives us our central vision. The visual effects go unnoticed until several hours after exposure. Vision loss from this injury, called solar retinopathy,

often reduces visual acuity and causes distortion, both of which can be permanent.

You may don your solar shades to observe the stages of the eclipse. The moon will slowly block portions of the sun, creating a crescent shape of light. The crescent will progressively get smaller until it is just a thin rim of light. At this point, you may notice the light being broken up into small pieces, known as Baily's beads. This arises when the mountains and valleys at the horizon of the moon block or allow the passage of light, respectively. These beads of light will disappear until only a thin crescent and one bright spot remains, resembling a diamond ring. Only when the bright disc of the Sun is completely covered may you then remove your shades. In fact, you will want to remove your shades for totality, otherwise you won't see anything. With the naked eye, you will be able to see the Sun's outer atmosphere, the corona, peaking around the Moon. Less than 2 minutes later, the stages of partial eclipse will reverse as the light returns on the opposite side of the receding Moon. You must don your shades again before the second diamond ring stage occurs.

As an alternative to using solar shades, a projection method is another safe way to follow the stages of the eclipse. In this method, you are not viewing the Sun directly. Place a small pinhole in a card or aluminum foil and with your back to the sun, project the light rays onto a large piece of white paper several feet away, as on the inside of a large cardboard box. You can also interlace your fingers to create a pinhole effect and project multiple images of the partial eclipse onto the ground.

Did you miss it? Want to see it again? Well, don't throw your solar shades away. There will be 6 more total solar eclipses over the United States in the next 35 years.

Sources:

Boyd, Kierstan. "Solar Eclipse Eye Safety." American Academy of Ophthalmology, 13 Apr. 2017. Web. 22 May 2017.

Chou, B. Ralph. "Eye Safety During Solar Eclipses." NASA, 1 June 2012. Web. 23 May 2017.

Fienberg, Rick. "Eyewear & Handheld Viewers." Solar Eclipse Across America - August 21, 2017. American Astronomical Society: National Science Foundation, 27 Mar. 2017. Web. 17 May 2017.

Quillen, David A., and Barbara A. Blodi. "Photic Retinopathy." Clinical Retina. Chicago, IL: AMA, 2002. 110-11. Print.