The Total Solar Eclipse of 2024: Tips and Facts from your Friendly Neighborhood IU Optometrist

What is a solar eclipse?

A solar eclipse occurs when the moon is between the sun and the Earth. The moon blocks part of the sun, casting a shadow on the Earth. Depending on the position of the moon, the alignment, and where you are on Earth, we see different types of solar eclipses.

**Total solar eclipse**

On Monday April 8th, 2024, there will be a total solar eclipse that can be witnessed throughout many parts of Indiana. The path of totality begins in Mexico’s Pacific coast and travels across the United States and exits on the Atlantic coast of Newfoundland, Canada. Indianapolis and Bloomington are among a number of cities in the path of totality. If you are observing this eclipse outside the path of totality, you will see a partial eclipse.

**Partial solar eclipse**

Partial eclipses occur when the sun, moon, and Earth are not perfectly lined up. You will be outside the moon’s inner shadow, so only part of the sun appears to be covered by the moon.

**Viewing Safety**

It is NEVER safe to stare directly at the uneclipsed or partially eclipsed sun without proper filters. This can temporarily or permanently damage your eyes and vision. However, it IS safe during totality, a short period of time during a total solar eclipse when the moon is completely covering the sun.

If you saved your eclipse viewer from the partial eclipse in 2023, you can reuse it! **Always check your filters for damage prior to use.** Do not use the filter if it is torn, dented, scratched, or falling apart. Make sure your filters are from a reputable source, as many fake filters are sold online. For **free viewers**, check with your local library, science museum, or local astronomy clubs! Commercially available welder’s glass shade level 12 or higher are also safe.

See a list of **reputable vendors** at this QR code:

**Cleaning Tips for Eclipse Viewers**

If you need to clean the eclipse filter, the AAS recommends using a soft, nonabrasive tissue or cloth such as a microfiber cloth or Kimwipes. **DO NOT use water, glass cleaner, baby/wet wipes, or any other solvents or liquids to clean the filters.**
In many areas in the state of Indiana, we will observe a total solar eclipse on April 8\textsuperscript{th}, 2024. For \textbf{direct viewing}, special eclipse viewers with \textit{International Organization for Standardization (ISO) 12312-2 filters} are required for safely viewing during the partial phases of the eclipse. \textbf{Unsafe viewing} may cause solar retinopathy, a condition that causes temporary or permanent damage to your vision! If you are in the \textit{path of totality}, it is safe to view the eclipse without the viewers \textit{during totality}, which will last up to 4 minutes depending on your location. At the first sign of the sun reappearing, look away or put your viewers back on! Check to see if your city is in the path of totality with the QR code.

For \textbf{indirect viewing}, use a pinhole projector! With your back to the sun, look at the shadow cast by a pinhole onto white paper. Look only at the projected shadow! Do \textbf{NOT} look at the sun directly through the pinhole!

For ideas on a do-it-yourself (DIY) pinhole projector or sun funnel, visit AAS at this QR code for instructions.

\textbf{AAS instructions to check if your viewers are legit:}
- Through the viewer, a typical bright sun should appear comfortably bright and in focus against a dark sky
- Through the viewer, you should only be able to see the sun or something comparably bright such as:
  - Sun reflected off a mirror/shiny metal
  - Bright LED (smartphone flashlight)
  - Bright bare incandescent/halogen bulb
- Through the viewer, you should \textbf{NOT} be able to see shaded lamps or household light fixtures that are not bare bulbs, if you can, these are unsafe and dangerous

\textbf{Examples of unsafe filters:}
- Sunglasses (or multiple pairs of them)
- Smoked glass
- Photo film negatives
- X-ray film
- Polarizing filters
- Neutral density filters
- Damaged eclipse viewers

\textbf{A total solar eclipse is about as bright as a full Moon — and just as safe to look at. But the Sun at any other time is dangerously bright. View it only through special-purpose solar filters that comply with the transmittance requirements of the ISO 12312-2 international standard for filters for direct solar viewing. From the American Astronomical Society}