



Credit: NASA/Aubrey Gemignani

# EXPERIENCE THE 2024 TOTAL SOLAR ECLIPSE THROUGH THE EYES OF NASA ▶ [go.nasa.gov/Eclipse2024](https://go.nasa.gov/Eclipse2024) MONDAY • APRIL 8, 2024



## WHAT IS A TOTAL SOLAR ECLIPSE?

For a total eclipse to take place, the Sun, Moon, and Earth must be in a direct line. The people who see the total eclipse are in the center of the Moon's shadow when it hits Earth. The sky will darken, as if it were twilight. Weather permitting, people in the path of a total solar eclipse can see the Sun's corona, the outer atmosphere of the Sun. A total solar eclipse is the only type of solar eclipse where viewers can watch without their eclipse glasses – and they can only remove them when the Moon is completely blocking the Sun.



A total solar eclipse is about as bright as the 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 transmission requirements of the ISO 12312-2 international standard for filters for direct viewing of the Sun.

Credit: AAS

## WHAT IS A PARTIAL SOLAR ECLIPSE?

A partial solar eclipse happens when the Sun, Moon, and Earth are not exactly lined up. Only a part of the Sun will appear to be covered. During a total or annular solar eclipse, people outside the Moon's inner shadow see a partial solar eclipse.

### Where to Watch

To find out what's happening in your area, go to: [go.nasa.gov/Eclipse2024](https://go.nasa.gov/Eclipse2024)



### How to Watch

You can see the Sun and an eclipse with special eclipse or solar viewing glasses. NEVER look directly at the uneclipsed or partially eclipsed Sun without appropriate eye wear. Sunglasses are not safe to view an eclipse. Find More: [go.nasa.gov/EclipseSafety](https://go.nasa.gov/EclipseSafety)

### How Long Will It Last

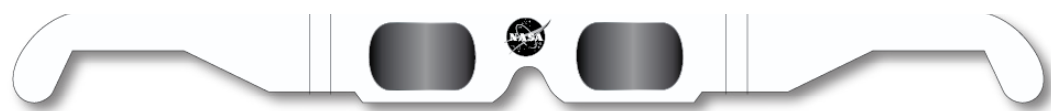
A total eclipse, when the Sun is completely blocked by the Moon, will last up to a few minutes. Times for partial and total phases of the eclipse vary depending on your location. Totality can range anywhere from a few seconds to approximately 5 minutes.

## WHERE WILL YOU BE?

On April 8, 2024, a total solar eclipse will cross North America creating a path of totality. You can access more exciting information about these eclipses, including downloadable activities, information about our Sun, and alternative ways to view the eclipse at [go.nasa.gov/Eclipse2024](https://go.nasa.gov/Eclipse2024).



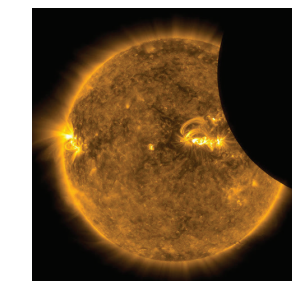
Credit: Michala Garrison and the Scientific Visualization Studio (SVS), in collaboration with the NASA Heliophysics Education Activation Team (NASA HEAT), part of NASA's Science Activation portfolio. Eclipse Calculations by Ernie Wright, NASA Goddard Space Flight Center.



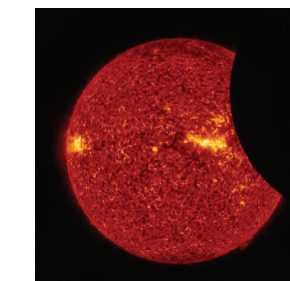
This product is supported by the NASA Heliophysics Education Activation Team (NASA HEAT), part of NASA's Science Activation portfolio.

## WHY NASA STUDIES ECLIPSES?

Eclipses aren't just beautiful – they're great for science. In addition to inspiring artists and musicians, eclipses have driven numerous scientific discoveries. For over a century, solar eclipses helped scientists decipher the Sun's structure and explosive events, find evidence for the theory of general relativity, and discover the element helium, among other things.

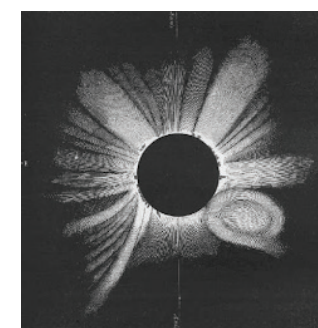


Credit: NASA/GSFC/SDO

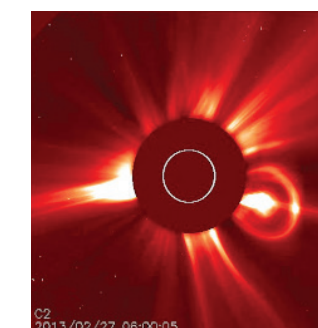


Credit: NASA/GSFC/SDO

Total eclipses are a unique opportunity to study the Sun because they allow scientists to see a part of the Sun's atmosphere – known as the corona – which is key to answering fundamental questions about how heat and energy are transferred from the Sun out into the solar wind, the constant stream of particles that the Sun scatters into the solar system.



Left: Drawing of the 1860 solar eclipse. Credit: G. Tempel.



Center: A coronagraph simulates a solar eclipse, blocking the Sun to reveal its outer atmosphere. Credit: NASA/ESA SOHO



Right: Ancient rock art in Chaco Canyon may depict a total solar eclipse in 1097. Credit: National Park Service

## HELIOPHYSICS BIG YEAR

October 2023 - December 2024 A global celebration of heliophysics science. Find More: [go.nasa.gov/HelioBigYear](https://go.nasa.gov/HelioBigYear)

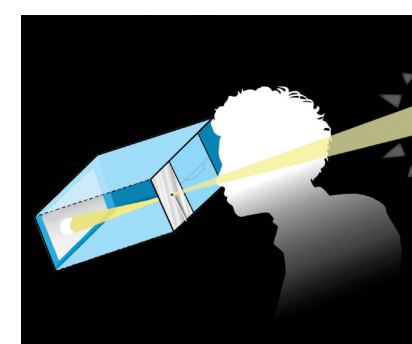


## SAFE ECLIPSE VIEWING

The Sun is never completely blocked by the Moon during an annular solar eclipse. When watching a partial or annular solar eclipse directly with your eyes, you must look through safe solar viewing glasses ("eclipse glasses") or other safe solar filters at all times.

### Eclipse Projector

You can make this simple eclipse projector with almost any cardboard box, paper, tape, and foil. The longer the distance from the pinhole to screen, the larger the image of the Sun will be.



Credit: NASA

### Eclipse Glasses

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Credit: NASA/Shannon Reed

### Colander Projector

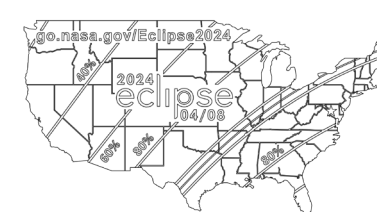
Do you have a colander at home? The circular holes of a colander project crescent images of the Sun onto the ground during the partial phases of a solar eclipse.



Credit: NASA/Joy Ng

## Pinhole Projectors:

Pinhole projectors allowed early scientists to view the shapes of illuminated objects, like the Sun, by shining the light from the object through a very small hole, projecting the image of the object onto the ground, wall, or other flat surface. Explore the 2D paper cut and 3D printed versions of the annular eclipse pinhole projectors and activity. These are a great method for safe solar viewing. Be sure that when using, the Sun is always behind you. Find More: [nasa3d.arc.nasa.gov/detail/usa-eclipse-2024](https://nasa3d.arc.nasa.gov/detail/usa-eclipse-2024)



Credit: NASA HEAT/J. Patrick Haas



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