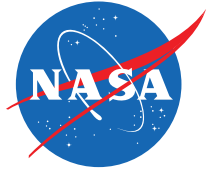


# Two Solar Eclipses Six Months Apart

October 14, 2023 and April 8, 2024

National Aeronautics and  
Space Administration



**Diagrams are not to Scale:**  
If the Sun's diameter is scaled to 10 cm (3.9 in), Earth would be about 0.09 cm (0.04 in) and 10 meters away (33 feet).

The next **total solar eclipse** visible over the continental United States will be on **April 8, 2024**.



## What is a Solar Eclipse?

A **solar eclipse** happens when the Moon—as it orbits Earth—fully or partially blocks the light of the Sun, thus casting its shadow on Earth.

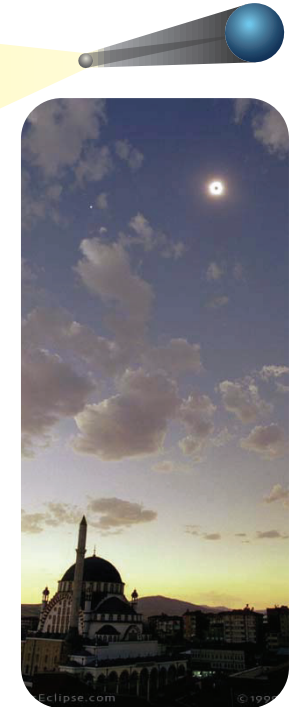
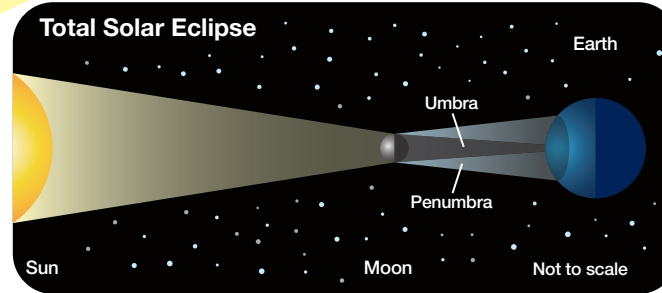
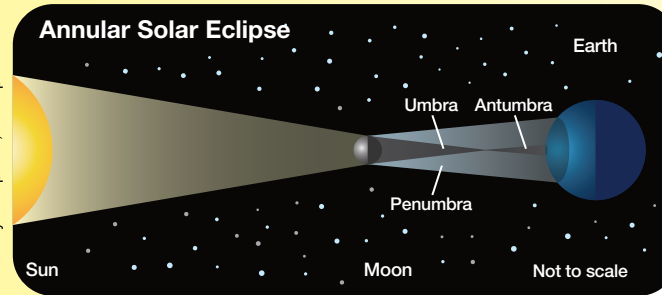
## What is a Total Solar Eclipse?

As observed from Earth, if the Moon is closer to Earth in its orbit and is aligned between Earth and Sun, it appears to be the same size as the Sun and a **total solar eclipse** occurs. The Moon blocks all the bright light from the surface of the Sun and the corona can be seen.

## What is an Annular Eclipse?

As observed from Earth, an **annular eclipse** occurs when the Moon is aligned between Earth and Sun and is far enough from Earth to appear smaller than the Sun so that a ring (annulus) of sunlight remains visible around the Moon.

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The predicted path of the **October 14, 2023 annular eclipse** and the **April 8, 2024 total solar eclipse**.

### Duration of Greatest Eclipse for Annular:

5 min 17 sec (18:00 UT=13:00 CDT=1 p.m. CDT)

### Location of Greatest Eclipse:

11 deg 22 min N; 83 deg 6 min W (Central America)

### Duration of Greatest Eclipse for Total:

4 min 28 sec (18:18 UT=13:18 CDT=1:18 p.m. CDT)

### Location of Greatest Eclipse:

25 deg 17 min N; 104 deg 8 min W (Mexico)



**Never look directly at the Sun unless you have filters that you know are safe.**

**For more information:** <https://solarsystem.nasa.gov/eclipses/future-eclipses/eclipse-2023/>  
<https://solarsystem.nasa.gov/eclipses/future-eclipses/eclipse-2024/>  
<https://solarsystem.nasa.gov/eclipses/safety/>  
<https://eclipse.aas.org/resources>

[www.nasa.gov](http://www.nasa.gov)



© 2012 by Alphonse Sterling, NASA/MSFC

**Annular Eclipse**  
Tokyo, Japan,  
May 20, 2012



© 2017 by Alphonse Sterling, NASA/MSFC

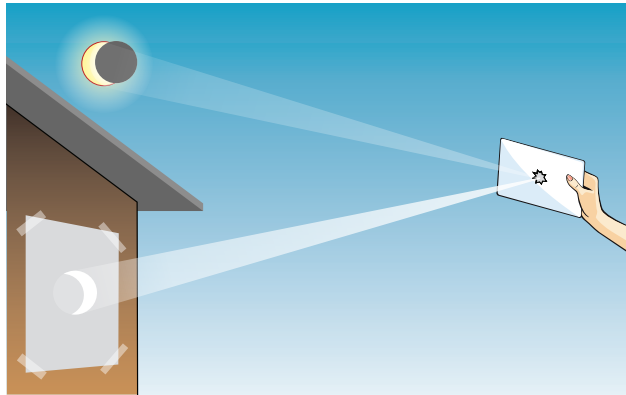
**Total Eclipse**  
Lewisville, Idaho,  
August 21, 2017

Mitzi Adams • [mitzi.adams@nasa.gov](mailto:mitzi.adams@nasa.gov) • 256-961-7626

MSFC G-605996

# Safely Observing the Sun

**WARNING: Never look directly at the Sun without proper eye protection. You can seriously injure your eyes.**



**Mirror in an Envelope**  
Slide a mirror into an envelope with a ragged hole cut into the front. Point the mirror toward the Sun so that an image is reflected onto a screen at least 5 meters (about 15 feet) away. The longer the distance, the larger the image.  
**Do not look at the mirror, only at the screen.**

Photograph (below) Copyright © Elisa J. Israel



**Strange Shadows!**  
Sunlight through trees produces projected crescents during partial phases.

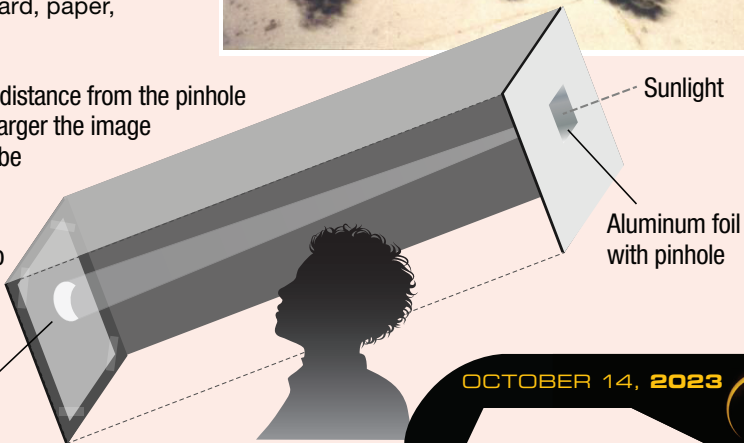
## Go Stick Your Head in a Box

You can make this simple "eclipse telescope" with some cardboard, paper, tape, and foil.

The longer the distance from the pinhole to screen, the larger the image of the Sun will be

White paper screen taped to inside end of box

Small image of partially eclipsed Sun



For any **total** solar eclipse, if the Sun is not 100% covered in your area, please travel to an area inside the path of totality to experience a fully eclipsed Sun.  
**You will be disappointed if you don't!**

## Local Area for Path of Annularity—October 14, 2023

Location	% Covered	Start (CDT)	Max (CDT)	End (CDT)
Eugene, OR	89%	10:05AM	11:18AM	12:39PM
Battle Mountain, NV	89%	10:06AM	11:23AM	12:48PM
Sevier, UT	89%	10:08AM	11:28AM	12:56PM
Monument Valley, UT/AZ	89%	10:10AM	11:31AM	1:01PM
Albuquerque, NM	90%	10:13AM	11:37AM	1:09PM
San Antonio, TX	90%	10:23AM	11:54AM	1:33PM

## Local Area for Path of Totality—April 8, 2024

Location	% Covered	Start (CDT)	Max (CDT)	End (CDT)
Vanderpool, TX	100%	12:13PM	1:33PM	2:54PM
Monument Valley, UT/AZ	60%	12:18PM	1:28PM	2:42PM
Sulfur Springs, TX	100%	12:25PM	1:45PM	3:04PM
Shreveport, LA	98%	12:27PM	1:47PM	3:07PM
Little Rock, AR	100%	12:33PM	1:52PM	3:11PM
Memphis, TN	98%	12:37PM	1:56PM	3:15PM
Cape Girardeau, MO	100%	12:41PM	2:00PM	3:17PM
Paducah, KY	100%	12:42PM	2:01PM	3:18PM
Indianapolis, IN	100%	12:50PM	2:07PM	3:23PM
Columbus, OH	99%	12:55PM	2:12PM	3:27PM
Amherst, OH	100%	12:58PM	2:14PM	3:28PM
Buffalo, NY	100%	1:04PM	2:20PM	3:32PM
Burlington, VT	100%	1:14PM	2:27PM	3:37PM
Baxter State Park, ME	100%	1:20PM	2:32PM	3:40PM

JAVA Script Solar Eclipse Explorer  
<http://eclipse.gsfc.nasa.gov/JSEX/JSEX-NA.html>



## Sun Funnel

Make this device for your telescope with simple instructions at: <https://eclipse2017.nasa.gov/make-sun-funnel>

## Cool in the Shades

Contact your local astronomical society to pick up a pair of eclipse glasses or visit this site for suggested resources:

<https://eclipse.aas.org/resources/solar-filters>



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