



# Experience a Solar Eclipse



Credit: S. Habbal, M. Druckmüller and P. Aniol

## WHAT IS A SOLAR ECLIPSE?

A solar eclipse happens when the Moon moves between the Sun and Earth, casting a shadow on Earth, fully or partially blocking the Sun's light in some areas. There are different types of solar eclipses.

### 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 become very dark, as if it were night. 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.

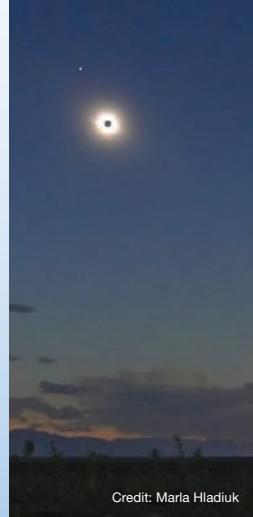
### Annular Solar Eclipse

An annular eclipse happens when the Moon is lined up between the Sun and Earth, but at its farthest point from Earth. Because the Moon is farther away from Earth, it seems smaller. It does not block the entire view of the Sun. The Moon in front of the Sun will look like a dark disk on top of a larger, bright disk. This creates what looks like a ring around the Moon.

Known as a hybrid eclipse, sometimes an eclipse can shift between annular and total as the Moon's shadow moves across Earth's surface.

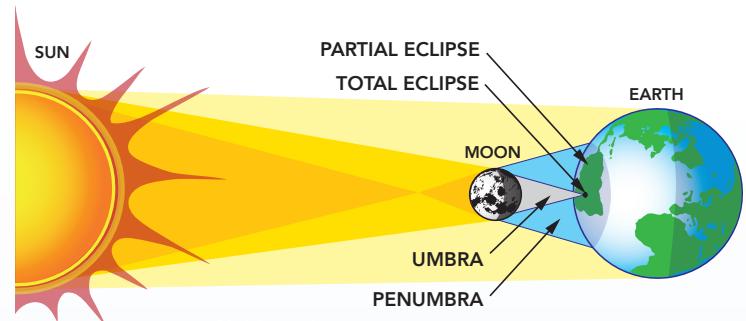
### Partial Solar Eclipse

This happens when the Sun, Moon and Earth are not exactly lined up. The Sun will appear to have a dark shadow on only part of its surface. During a total or annular solar eclipse, people outside the Moon's inner shadow see a partial solar eclipse.



Credit: Marla Hadiuk

## TOTAL SOLAR ECLIPSE



Not to scale: If drawn to scale, the Moon would be 30 Earth diameters away from Earth. The Sun would be 400 times that distance.



Credit: Rick Fienberg, TravelQuest International and Wilderness Travel

In this series of stills from 2013, the eclipse sequence runs from right to left. The center image shows totality; on either side are the 2nd contact (right) and 3rd contact (left) diamond rings that mark the beginning and end of totality respectively.



### WHERE TO WATCH

Find a nice, clear spot with a good view of the sky.



### HOW TO WATCH

You can see the Sun and an eclipse with special eclipse or solar viewing glasses. NEVER look directly at the Sun without appropriate eyewear. Regular sunglasses are not safe to view an eclipse. <https://go.nasa.gov/342otv5>



### HOW LONG WILL IT LAST

A total eclipse, when the Sun is completely blocked by the Moon, will last up to a few minutes, depending on your location.



Credit: International Space Station

This photo taken from the International Space Station shows the Moon's umbral, or inner, shadow during the total solar eclipse of March 29, 2006.

# SAFELY observing THE SUN

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



View the eclipse with special eclipse glasses.

Regular sunglasses are not safe to view the eclipse.

Check with local science museums, schools and astronomy clubs for eclipse glasses—or purchase an ISO 12312-2 compliant pair of these special shades! Always inspect your solar filter before use. If scratched or damaged, discard it.

## BUILD A SOLAR VIEWER

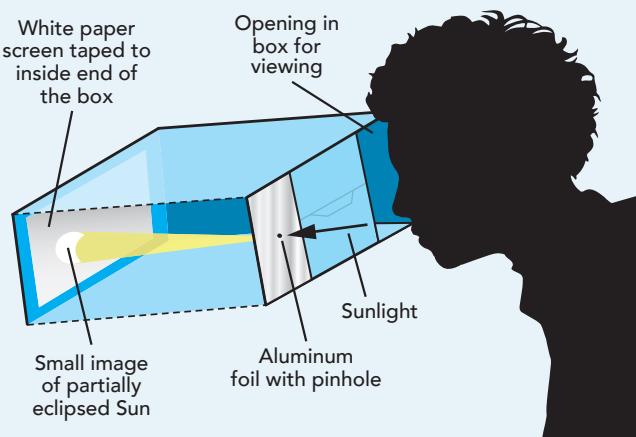
Create an inexpensive but functional, safe solar viewer with just plywood, lenses, rubber bands, paper and popsicle sticks! <https://go.nasa.gov/3yxoA0T>

## MAKE YOUR OWN 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.

**NEVER** look directly at the Sun without appropriate eyewear.

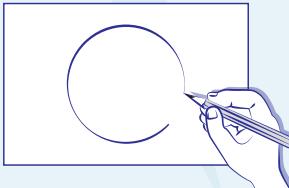


**ECLIPSES IN THE UNITED STATES:** The next solar eclipses that cross the United States are on Saturday, October 14, 2023 (Annular Solar Eclipse) and Monday, April 8, 2024 (Total Solar Eclipse).

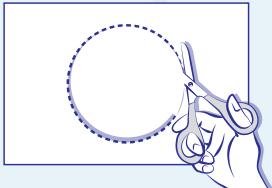
## DRAW THE CORONA

Long before there were cameras or telescopes, eclipse watchers recorded what they saw in the sky in words, drawings, and paintings. You can have fun creating your own picture of a solar eclipse with chalk and paper! You can do this activity before an eclipse to predict what you'll see, or after to record what you saw.

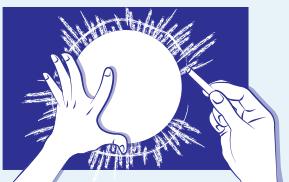
First, trace a large circle template on stiff paper.



Carefully cut out the circle.



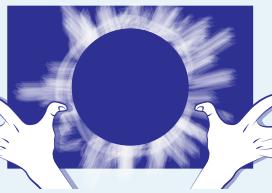
Place the template on dark paper and hold or tape it down. Draw a thick circle or lines of chalk around the template a few times — it doesn't need to be neat!



Holding the template in place, smudge the chalk away from the center of the circle using a finger to create the corona of the Sun.



When you are done smudging, remove the circle template and add words, pictures, or fun designs.



You've made total solar eclipse art!



The whole family can get involved in learning about eclipses! Morgan (age 5) and Chelsea (age 2) drew these dazzling coronas.

For more on eclipses: <http://www.nasa.gov/eclipse>

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