

TURNING DAY INTO NIGHT

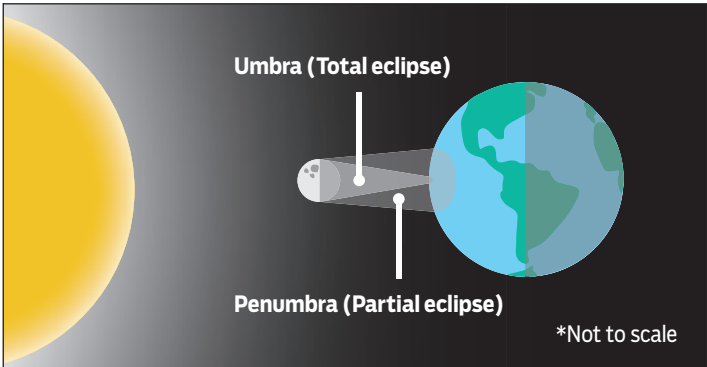


THE ASSOCIATED PRESS

This combination picture shows five stages of the solar eclipse over Germany in 1999. The chronological order begins at the left, and the center image shows the total eclipse.

TOTAL SOLAR ECLIPSES

HOW IT WORKS



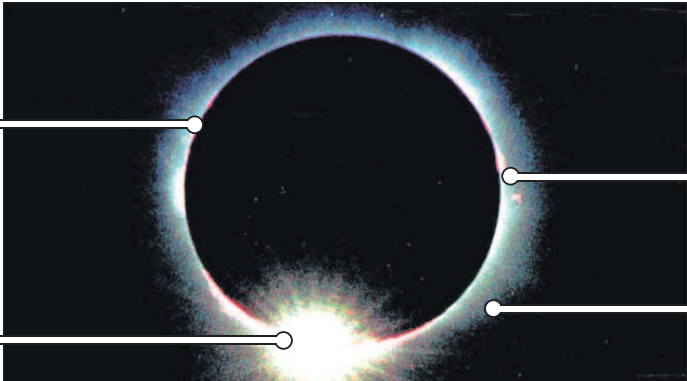
Solar eclipses happen when the moon moves between the Earth and the sun and casts a shadow. A total solar eclipse occurs when the moon completely covers the sun, as seen from Earth. Totality can be seen only from a limited area where the darkest part of the moon's shadow is cast. This part of the shadow is called the umbra and is almost as dark as night. The area that sees totality changes during the course of the eclipse because the moon and Earth are in constant motion. Areas outside the umbra may be able to see a partial eclipse because of the penumbra. This is the outer part of the moon's shadow that is faint.

TOTALITY PHENOMENA

Some unique sights can be seen only during a total solar eclipse.

Chromosphere: This is the lower atmosphere of the sun that appears as a thin reddish glow around the edge of the sun during a total solar eclipse.

Diamond ring: This effect is seen about 10 to 15 seconds before and after totality when there is a single point of sunlight shining through a valley on the edge of the moon.



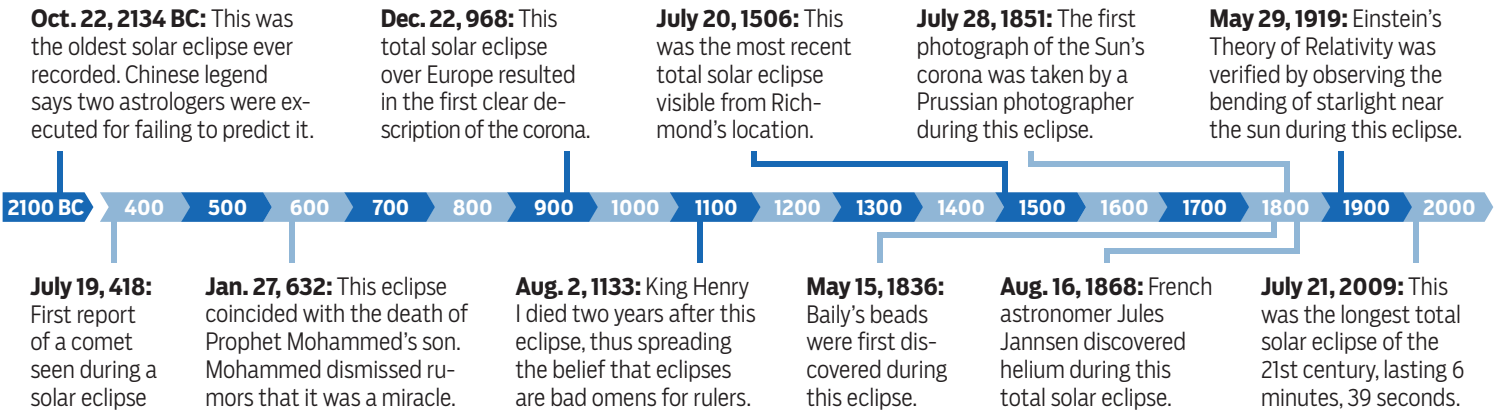
Shadow bands: These are faint ripples of light that are sometimes seen on flat, light-colored surfaces on the ground and along walls about one minute before and after totality.

Baily's beads: This effect is seen right before and after totality when only a few points of sunlight are visible through valleys on the moon.

Corona: This is the upper atmosphere of the sun. It appears as a halo around the sun during a total solar eclipse.

PAST AND FUTURE ECLIPSES

Ancient Chinese documents date one of the first recorded eclipses to over 4,000 years ago. Since then, this phenomena has been widely observed and studied. Eclipses have even lead to important scientific discoveries. Some notable eclipses in history are shown below.



SUPERSTITIONS

In ancient times, eclipses were feared, being associated with myths and superstitions to explain the temporary darkening of the sun. Even today, solar eclipses are considered a bad omen in many cultures.

Creatures eat the sun

In Vietnam, people believed that an eclipse was caused by a giant frog eating the sun. Norse cultures blamed wolves. In ancient China, it was thought to be a celestial dragon that devoured it.

Angry gods, quarreling sun and moon

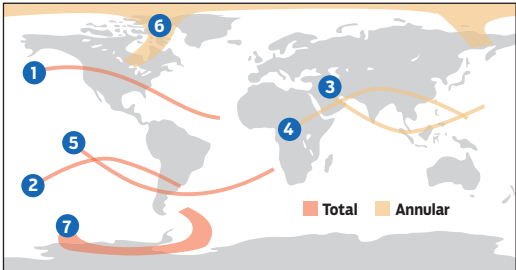
The ancient Greeks believed an eclipse was a sign of angry gods and that it was the beginning of disasters and destruction. But according to Batamaliba legends, the sun and moon were fighting and the only way to stop them was for people on earth to resolve all conflicts with each other.

Modern day superstitions

In many cultures today, people believe that eclipses can be a danger to pregnant women, so they stay indoors. In parts of India, people fast because they believe that any food cooked during an eclipse is poisonous.

FUTURE SOLAR ECLIPSES

Worldwide: The map below shows the total or annular solar eclipses that will happen across the globe in the next five years.



- 1 Aug. 21, 2017
- 2 July 2, 2019
- 3 Dec. 26, 2019
- 4 June 21, 2020
- 5 Dec. 14, 2020
- 6 June 10, 2021
- 7 Dec. 4, 2021

In Richmond

After Monday, the next partial eclipse covering over 50 percent of the sun and visible from Richmond will be on April 8, 2024. As for a total eclipse, it won't happen in Richmond until Sept. 14, 2099. The next annular solar eclipse visible from either Richmond or Virginia will be Aug. 4, 2111.

OTHER TYPES OF ECLIPSES

Annular solar eclipse



This occurs when the moon appears to be smaller than the sun and a bright ring of sunlight remains visible during the eclipse. This happens when the moon is near its farthest point from Earth.

Partial solar eclipse



This happens when the moon only partially covers the sun. Both total and annular solar eclipses are seen as partial from the areas on Earth outside the moon's inner shadow.

Hybrid solar eclipse

This rare type of solar eclipse changes from an annular to a total eclipse, and vice versa, along its path.

Total lunar eclipse



Sometimes called a blood moon, this occurs during a full moon when the dark part of Earth's shadow obscures all of the moon's surface.

Partial lunar eclipse



This can be observed when only a portion of the moon's surface is obscured by the dark part of Earth's shadow.

Penumbral lunar eclipse



This happens when the moon moves through the faint, outer portion of the Earth's shadow. It is often mistaken for a normal full moon.

Planet transit

This happens when Venus or Mercury, the only planets inside Earth's orbit, comes between Earth and the sun, appearing as a small dot only visible with filtered telescopes.