OKLAHOMA CITY
COMMUNITY COLLEGE

WELCOME TO ECLIPSE 2024!

April 8, 2024
~ 1:45PM CDT

2024 SOLAR ECLIPSE

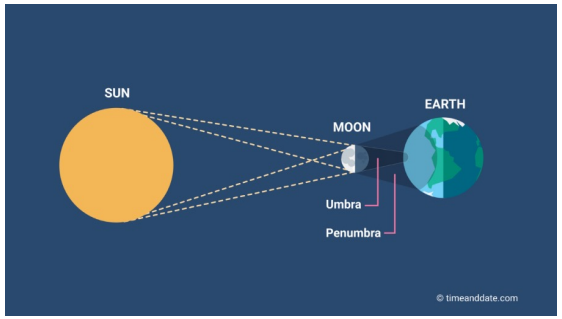
2024 SOLAR ECLIPSE

OKLAHOMA CITY COMMUNITY COLLEGE

Eclipse Information

An eclipse occurs when the new moon crosses between the earth and the sun. The resulting shadow passes across the earth in a predictable path approximately 115 miles wide.

On April 8, 2024, such a shadow will cross the United States. The shadow will cross into Texas from Mexico about 12:30 CST and continue northeast. Approximately 4:35 pm ADT, the shadow will pass into Canada.



People in the direct path (Path of Totality) of the umbral shadow will experience about 4 minutes and 28 seconds of darkness. People in the penumbral shadow will experience differing degrees of darkness, depending on how far from the Path of Totality they are.

ECLIPSE FUN FACTS & HISTORY

- Eclipses have been accurately predicted for more than twenty-five centuries. Eclipses repeat in approximately the same geographic location every 18 years, eleven days, and eight hours, a so-called “saros cycle.”
- China’s Shu Ching recorded over 900 eclipses over the last few millennia, including records of one occurring 4000 years ago that was not predicted prior to its commencement – which resulted in the ruler of the Xia Dynasty ordering the execution of his astronomers.
- Eclipses have often been so important to early cultures, that many of the great civilizations claim their founding to have coincided with a total eclipse. For example, the Aztec and the Romans both claim to have been founded during an eclipse.

ECLIPSE FUN FACTS & HISTORY

Eclipses have awed and inspired many people throughout history, sometimes inspiring great works of art like Cosmas Damian's **Vision of St. Benedict** which was inspired by the total eclipse of May 22, 1724.

ECLIPSE FUN FACTS & HISTORY

- Eclipses have been recorded since Sumerian times. The oldest such record is on a Sumerian clay tablet that could be from as far back as May 3, 1375 BC. By the time of the Assyrian and Babylonian empires, eclipses could be predicted in advance. These advance warnings had dire repercussions in some cases: Assyrian and Akkadian rulers had a practice of using a substitute for the ruler during an eclipse; a substitute who would typically be killed after the eclipse.
- Babylonian scholars, utilizing a sexagesimal system with a base count of 60, studied the movements of stars and planets for over seven hundred years, recording their findings in the Mul. Apin texts (roughly 2,000 clay tablets of astronomical observations) which paved the way for future Greek and Roman astronomers.

ECLIPSE FUN FACTS & HISTORY

Early Greek and Phoenician sailors combined the knowledge of the Babylonians with the Greek love of math and engineering to produce devices, like the Antikythera Mechanism, capable of predicting eclipses as well as navigating across great oceanic distances.

Tools like the Antikythera Mechanism were used to plot astronomical events with great accuracy. While there is no direct evidence, the accuracy of Thales prediction of the eclipse that still bears his name (Eclipse of Thales) might be on account of such a device.

ECLIPSE FUN FACTS & HISTORY

In other parts of the world, cultures such as the Mayans, the Puebloans, and the Cahokians developed their own methods for predicting astronomical events. The pueblos of Chaco Canyon and the vast city of Cahokia were all built and aligned with astronomical significance in mind.

While the Romans did not build cities along celestial lines, they still marked eclipses in their calendars and even commemorated memorable ones on their currency, such as the **Hadrian Coin** commemorating the near total eclipse in Rome on September 3, 118.

ECLIPSE FUN FACTS & HISTORY

By the Middle Ages, the so-called Dark Ages for the loss of ancient knowledge therein, eclipses were seldom predicted or even recorded except in rare cases. However, these rare references still have scientific uses.

For example, comparing eclipse accounts from the Middle Ages to volcanic eruptions helps scientists understand the role of the moon in volcanic eruptions (the approaching moon's gravitational force tends to increase the frequency of volcanic eruptions in the days just prior to a total eclipse).

ECLIPSE FUN FACTS & HISTORY

The first modern (post-Copernicus) approximation is awarded to astronomer Edmond Halley on May 3, 1715, whose approximation of a full solar eclipse was based on charts, tables, and calculations of celestial bodies over years.

He estimated the position based on longitude and latitude and the timing of the occurrence, down to the date and time, to see when a full solar eclipse will occur over London. He was four minutes off from when the true eclipse occurred.

ECLIPSE FUN FACTS & HISTORY

On May 15, 1836, an astronomer named Francis Baily observed a solar eclipse and noticed that, as the Moon overlapped the sun before it reached totality and after, some of the sun's rays were barely visible on the outskirts of the moon, resembling either a ring of fire or blots of light.

These lights, called Baily's Beads, are due to the light passing through the mountains and valleys of the Moon's surface and reaching the Earth's surface. After the wisps of light fade, the Sun's atmosphere, or the corona, becomes visible; this ring of intense light surrounds the moon in all directions and marks the approach of totality.

ECLIPSE FUN FACTS & HISTORY

In 1868, French physicist Jules Janssen observed the corona of the Sun to help identify what elements were present using a spectroscope. Using filter paper, he separated the Sun's rays into individual color patterns and their corresponding wavelength.

Each element has a unique array of colored light that they produce, like a barcode. He observed that hydrogen's unique colors of red, aqua blue, and purple. However, he also noticed an odd strand of double yellow in an uncommon place. After further tests and observations, Helium was discovered, years before it was found on Earth.

ECLIPSES TODAY

In modern times, the advent of a solar eclipse is not used to justify the founding of an empire or to warn of impending doom to a monarch (or the sacrificial substitute). However, scientists still eagerly anticipate eclipses as a chance to study effects of the moon on the earth and as a chance to study aspects of the sun that cannot normally be seen, such as the inner corona.

ECLIPSE SAFETY

No matter what your reason for anticipating the solar eclipse, make sure you watch the eclipse in a safe manner. Appropriate lenses, goggles, or mirrored surfaces should be used to view the eclipse. While the ancient belief that the gods would strike you blind for looking at the eclipse is no longer accepted, the damage of direct sunlight to the human eye remains.

SAFETY: When viewing an eclipse, only view it when looking through specially made glasses. Regular sunglasses and filter lenses will not protect you from the harmful Sun's rays. Do NOT look at the Sun through a camera lens, telescope, binoculars, or any other optical device while wearing eclipse glasses or using a handheld solar viewer. Remember to wear sunscreen, a hat, and protective clothing to prevent skin damage.

Eclipse Information Sources

1. NASA Science. (n.d.). Where, When, and How to Watch the Solar Eclipse of April 8, 2024. [Online] Available at: https://science.nasa.gov/eclipses/future-eclipses/eclipse-2024/where-when/
2. Chodas, P. (2017). How Did the Ancients Predicted Eclipses? The Saros Cycle. Sky & Telescope. [Online] Available at: https://skyandtelescope.org/astronomy-news/how-did-the-ancients-predicted-eclipses-the-saros-cycle/
3. Bettencourt, L. (2017). These 5 Ancient Cultures Thought Solar Eclipses Were Omens and Prophecies. Discover Magazine. [Online] Available at: https://www.discovermagazine.com/the-sciences/these-5-ancient-cultures-thought-solar-eclipses-were-omens-and-prophecies
4. Hoyos, D. (2002). On Solar Eclipses. The American Journal of Philology, 123(2), 291-295. [Online] Available at: https://www.jstor.org/stable/269789
5. "Rome was founded on Aprilius 1, 685 BC on the day of a solar eclipse." Historum. [Online] Available at: https://historum.com/t/rome-was-founded-on-aprilius-1-685-bc-on-the-day-of-a-solar-eclipse.197433/
6. Rodriguez-Antoniuk, C. (n.d.). The Vision of St. Benedict. Princeton University Art Museum. [Online] Available at: https://artmuseum.princeton.edu/transient-effects/eclipses-art/vision-st-benedict
7. Solar Physics Timeline. (n.d.). 1223BC - 200BC. High Altitude Observatory. [Online] Available at: https://www2.hao.ucar.edu/education/solar-physics-timeline/1223bc-200bc#:~:text=1223%20BC%3A%20The%20oldest%20eclipse%20record&text=Ancient%20ruins%20at%20Ugarit%20city,oldest%20eclipse%20record%20was%20discovered
8. Lester, B. (1985). Eclipses and the Saros. Archaeoastronomy, 8(1), S73-S80. [Online] Available at: https://www.jstor.org/stable/41134091
9. King for a Day: Eclipse as Substitute. (2017). The Metropolitan Museum of Art. [Online] Available at: https://www.metmuseum.org/blogs/now-at-the-met/2017/solar-eclipse-substitute-king
10. McKinnon, D. (2012). The Earliest Astronomers: A Brief Overview of Babylonian Astronomy. Astrobites. [Online] Available at: https://astrobites.org/2023/09/18/the-earliest-astronomers-a-brief-overview-of-babylonian-astronomy/
11. "An ancient Greek astronomical calculation machine reveals new secrets." (2021). Scientific American. [Online] Available at: https://www.scientificamerican.com/article/an-ancient-greek-astronomical-calculation-machine-reveals-new-secrets/
12. Cameron, A. et al. (2021). The Power of Total Solar Eclipses to Reveal the Corona's Innermost Mysteries. Scientific Reports, 11(1), 12257. [Online] Available at: https://www.nature.com/articles/s41598-021-84310-w

Eclipse Information Sources

13. Eclipse of Thales. (n.d.). Wikipedia. [Online] Available at: https://en.wikipedia.org/wiki/Eclipse_of_Thales
14. "How the Ancient Maya Were Able to Accurately Predict Eclipses." (2018). IFLScience. [Online] Available at: https://www.iflscience.com/how-the-ancient-maya-were-able-to-accurately-predict-eclipses-71113
15. Renfrew, C. & Hughes, R. (2008). The Cultural Dimensions of the Prehistoric Solar Calendar and Eclipses: Chaco Canyon and Stonehenge. The Southwestern Historical Quarterly, 111(3), 279-306. [Online] Available at: https://solsticeproject.org/chaco-cosmology/
16. Oppenheim, A. (1989). Eclipse Coins: History, Identification and Dating. Williams College. [Online] Available at: https://sites.williams.edu/eclipse/files/2019/04/Eclipse-coins.pdf
17. Medieval European Observations of Eclipses. (n.d.). Encyclopedia Britannica. [Online] Available at: https://www.britannica.com/science/eclipse/Medieval-European
18. Zelenski, C. (2021). Medieval Eclipse Records Help Scientists Understand Volcanic Eruptions. Smithsonian Magazine. [Online] Available at: https://www.smithsonianmag.com/smart-news/medieval-eclipse-records-help-scientists-understand-volcanic-eruptions-180981944/
19. Espenak, F. (n.d.). Earth's Rotation and the Eclipse. NASA Eclipse Website. [Online] Available at: https://eclipse.gsfc.nasa.gov/SEhelp/rotation.html
20. Chamberlin, A. (2015). On This Date in Science: Baily's Beads Discovered. EarthSky. [Online] Available at: https://earthsky.org/space/this-date-in-science-bailys-beads-discovered/
21. "The High-Flying, Death-Defying Discovery of Helium." (2017). Science History Institute. [Online] Available at: https://sciencehistory.org/stories/magazine/the-high-flying-death-defying-discovery-of-helium/
22. NASA Science. (n.d.). NASA Research on Solar Eclipses. [Online] Available at: https://science.nasa.gov/eclipses/nasa-research/
23. NASA Science. (n.d.). Safety During Solar Eclipses. [Online] Available at: https://science.nasa.gov/eclipses/safety/