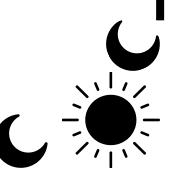
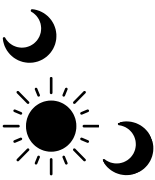
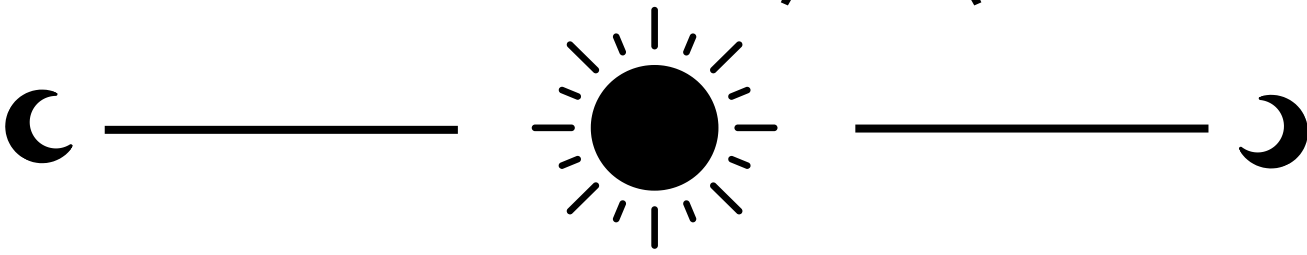
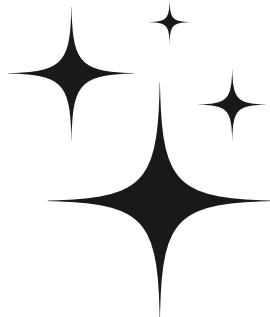
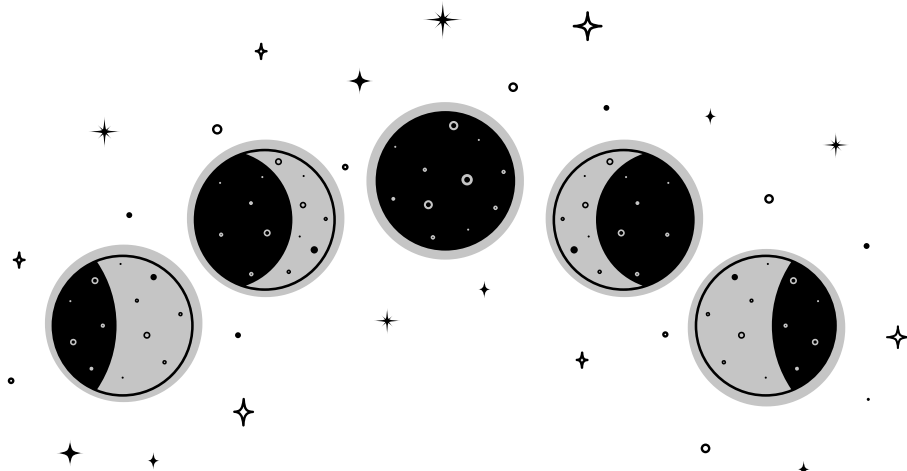



The Great North American Eclipse

Resource Pack





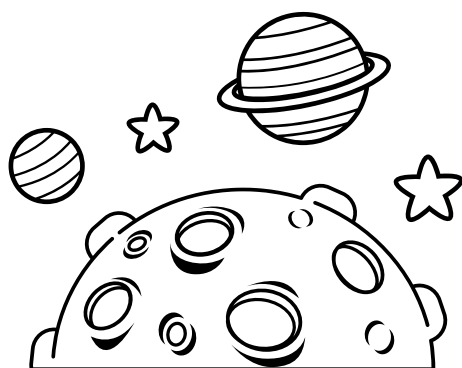
The Great North American Eclipse

What is the Great North American Eclipse?

The Great North American Eclipse will take place on **April 8, 2024**. It will be a **total solar eclipse**, meaning the light from the sun will be completely blocked out by the moon's shadow. The eclipse will be visible throughout most of North America, and over a dozen states are within the eclipse's path of totality!

Eclipses occur when the sun, moon and Earth all come into straight line with each other. If you view a solar eclipse (or an eclipse of the sun from Earth), the moon and sun look to be exactly the same size. They are not – this illusion happens because the sun is 400 times the diameter of the moon and the Sun is 400 times farther away than the moon.

While eclipses aren't necessarily rare events (in fact, as many as 5 solar eclipses can occur on Earth in a year), eclipses are typically only visible for a fraction of the Earth, and if you're in the path of totality, it's likely your specific location won't experience a total solar eclipse again for about **375 years!**



Remember

Never look directly at the sun without special eclipse glasses, even during a total eclipse.

Great North American Eclipse

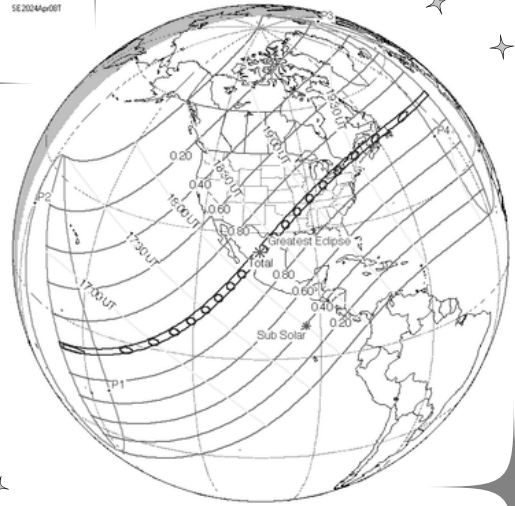
Info Sheet

The Basics

Date: Monday, April 8, 2024

Time: 12pm - 4pm, central time

Totality length: 4 minutes,
28 seconds



The path of
totality will pass
through **13 states**:
TX, OK, MO, IL, KY,
IN, OH, PA, NY,
VT, NH, and ME

The Nitty-Gritty

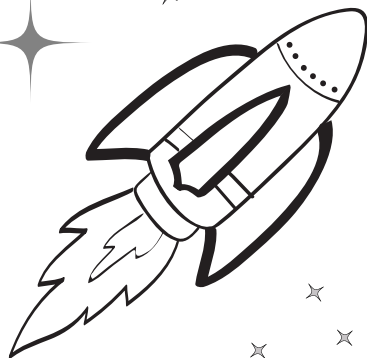
Part of **saros series 139**, which
began in 1501 and repeats every
18 years until 2763.

The last eclipse in this series that
was visible in the US took place
on **March 7, 1970**.

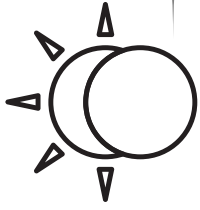
Fun Fact

Totality will be visible in astronaut
and lunar pioneer **Neil
Armstrong's hometown,**
Wapakoneta, OH!

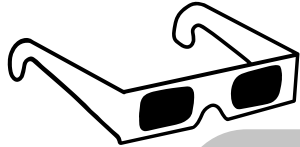
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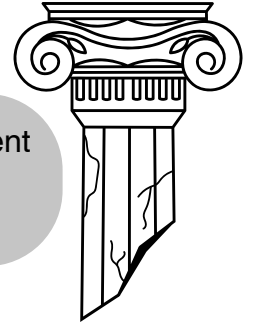
All About Eclipses



The earliest known record for a solar eclipse is from **Nov. 30, 3340 BCE**



The term “eclipse” comes from the ancient Greek word *ékleipsis*, meaning “**the abandonment.**”



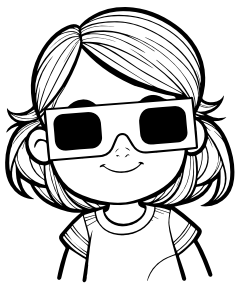
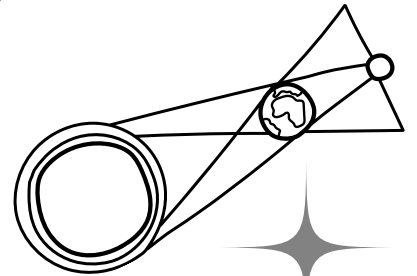
A solar eclipse can be classified as **annular, partial, total, or hybrid.**

Between the years 4000 BCE and 6000 CE, Earth will experience **23,740 solar eclipses.**



The longest possible duration for a total solar eclipse is **7 minutes, 31 seconds.**

Because of the alignment of the sun, moon, and Earth, there are **at least two solar eclipses each year** visible somewhere on Earth.



There will come a time **when eclipses are no longer possible.** In around 600 million years, the Earth's rotation will slow and the moon will be too far away from the Earth to obscure the sun.

Observers who travel across the world to observe eclipses as a hobby are called **eclipse chasers**, or *umbraphiles*.

$$E=mc^2$$

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Perhaps the most notable eclipse in human history took place on May 29, 1919, when astronomers used the solar eclipse to prove **Albert Einstein's theory of relativity.**



Eclipse Vocabulary



Annular eclipse

An eclipse event where the moon is too far from Earth to completely obscure the sun, leaving a ring of sunlight visible around the moon

Corona

The outermost part of the sun's atmosphere. It's hotter than the surface of the sun, and can be seen during a total eclipse

First Contact

The very beginning of an eclipse, when the moon starts to partially obscure the sun

Occultation

Occurs when the light of a celestial body is completely hidden by another celestial body. A total solar eclipse is an occultation of the sun by the moon.

Partial eclipse

An eclipse event where the sun, moon, and Earth do not align perfectly when the moon passes between the sun and Earth, leaving a crescent of sunlight visible around the moon

Penumbra

The lightest part of the moon's shadow, which partially blocks the sun during a partial eclipse

Total Eclipse

An eclipse event where the moon, sun, and Earth are aligned perfectly and the moon is close enough to completely cover the sun

Totality

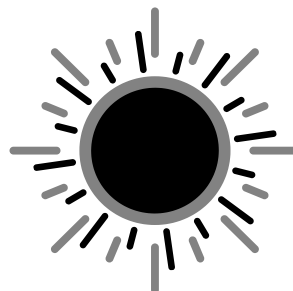
The maximum phase of an eclipse, when the sun is completely blocked by the moon's shadow

Transit

Occurs when a celestial body, like a planet, moon, or other satellite, passes between a larger celestial body and an observer

Umbra

The darkest part of the moon's shadow, which completely blocks the sun during a total eclipse



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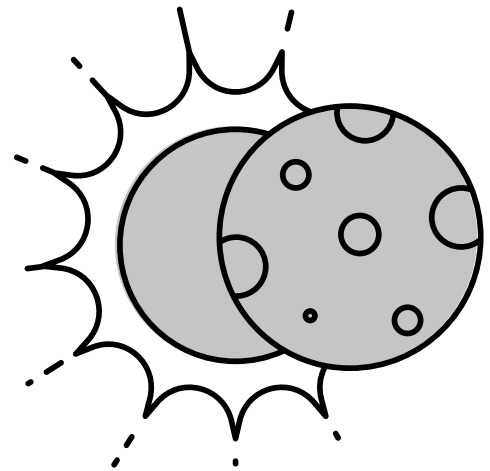
Eclipse Observation Sheet

Name: _____

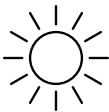
Age: _____

Location: _____

Temperature: _____

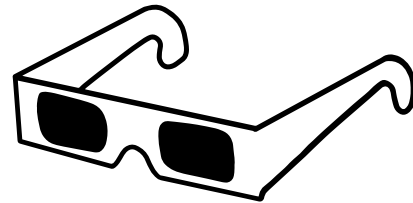


Weather Conditions:



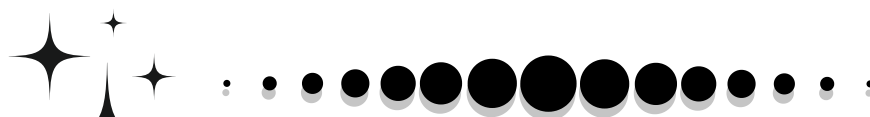
How did you view the eclipse?

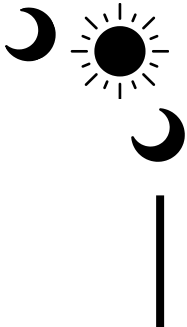
- eclipse glasses
- box projector
- TV/online streaming
- indirect viewing (shadowcasting)
- other _____



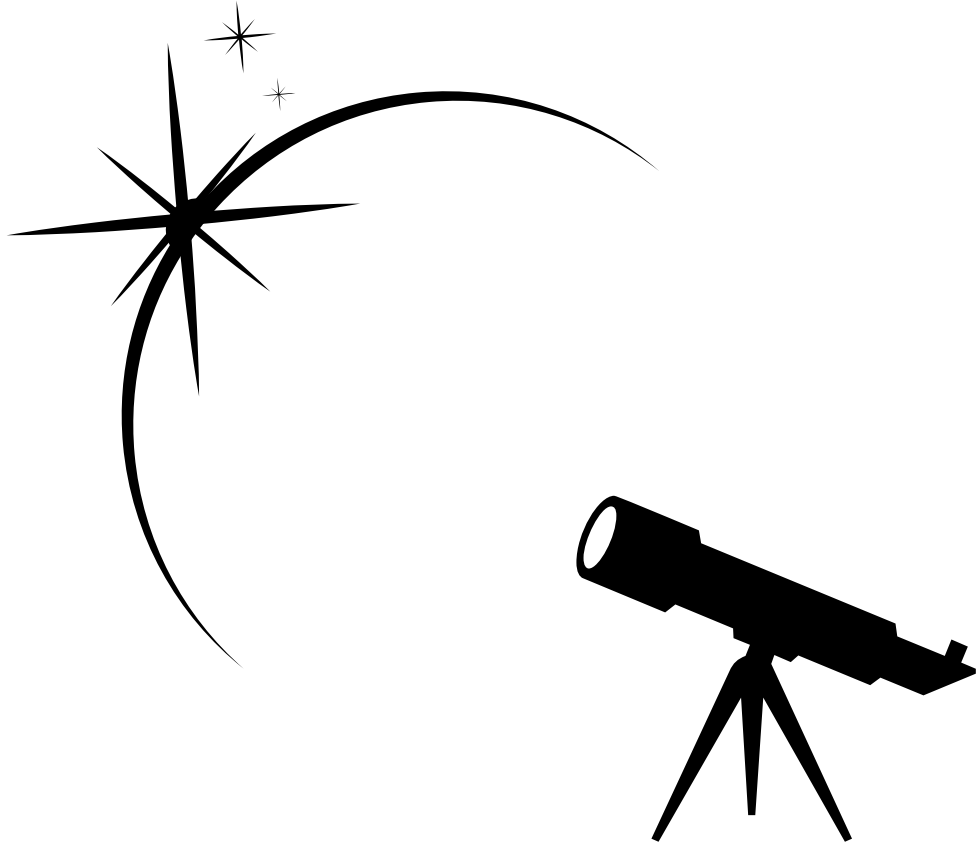
Do not look directly at the sun/eclipse without ISO-certified eclipse glasses! The only time it is safe to view the eclipse without glasses is during totality. **If you are not in the path of totality, it is not safe to view the eclipse directly without eclipse glasses.**

How would you describe the eclipse? _____

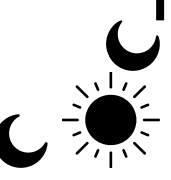
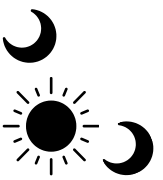
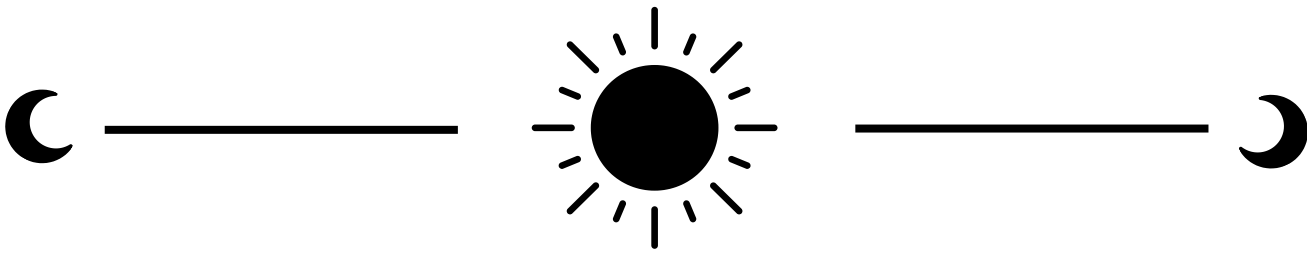




Eclipse Ingenuity



Ten astronomers whose observations have shaped our understanding of the sun, moon, and eclipses



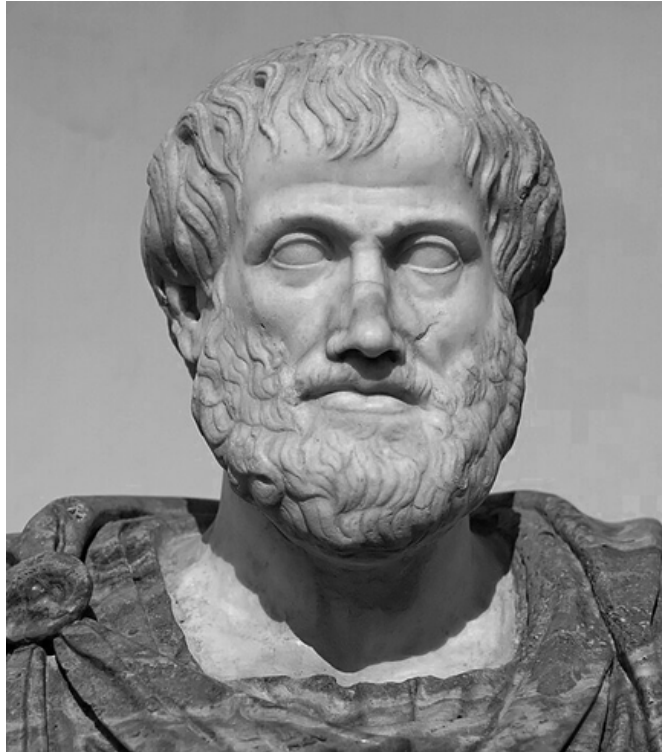
Edmond Halley (1656 - 1742)



English astronomer and mathematician

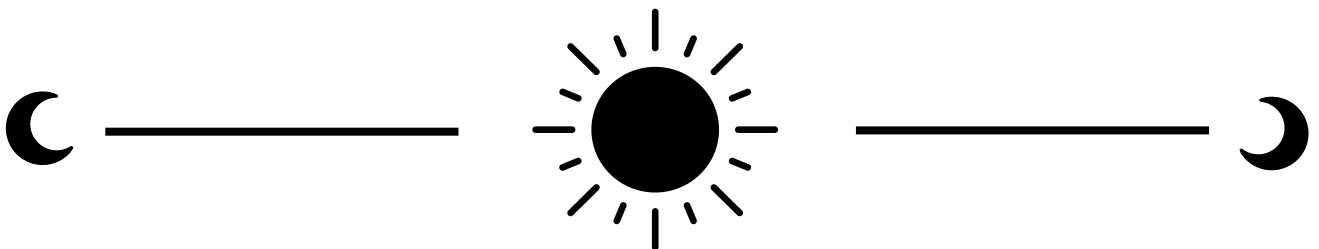
Accurately predicted the timing and path of the April 22, 1715 solar eclipse using Newton's law of universal gravitation. His map of the eclipse's path was so influential, astronomers continue to use Halley's style of mapping today.

Aristotle (384 - 322 BCE)



Ancient Greek philosopher

Observed that the Earth casts a circular shadow across the moon during a lunar eclipse and theorized that must mean the Earth is round.

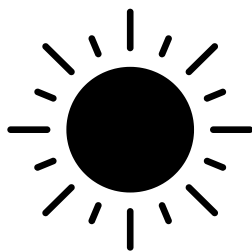


Arthur Eddington (1882 - 1944)



English astronomer

Conducted an experiment and confirmed Albert Einstein's theory of general relativity during the May 29, 1919 solar eclipse.

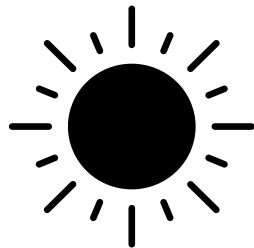


Plutarch (46 - 119 CE)



Middle Greek philosopher

First to describe the corona, the outermost part of the sun's atmosphere, which he observed during the March 20, 71 eclipse.

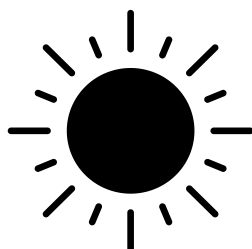


Francis Baily (1774 - 1874)



English astronomer

Observed and recorded notches of sunlight visible as a solar eclipse approaches totality. These notches are caused by craters on the surface of the Moon, and are known as “Baily’s beads.”



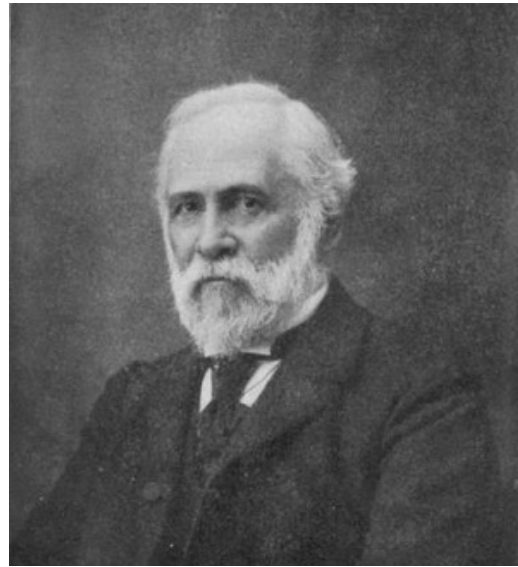
William Harkness
(1837 - 1903)



Scottish astronomer

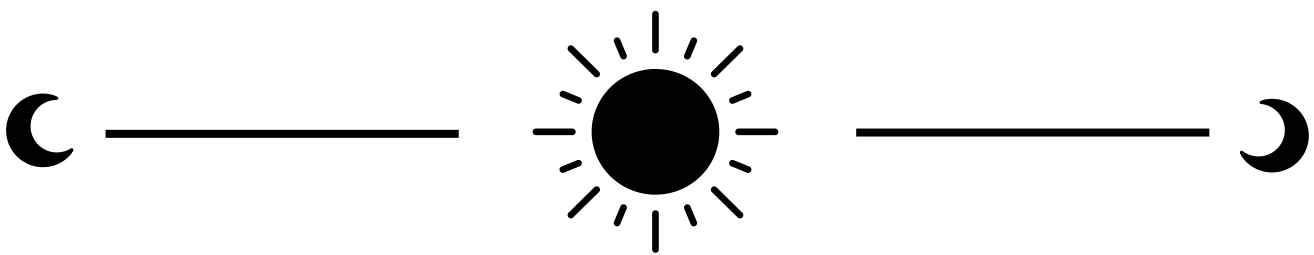
&

Charles Augustus Young
(1834 - 1908)



American astronomer

Used spectroscopes to observe the sun's corona in an 1869 eclipse and identified a green line they believed to be a previously unidentified element, for which they suggested the name *coronium*. Scientists would later understand this green line was not a new element, but rather highly ionized iron that's much hotter than the surface of the sun.



Norman Lockyear

(1836 - 1920)



English astronomer

Pierre Janssen

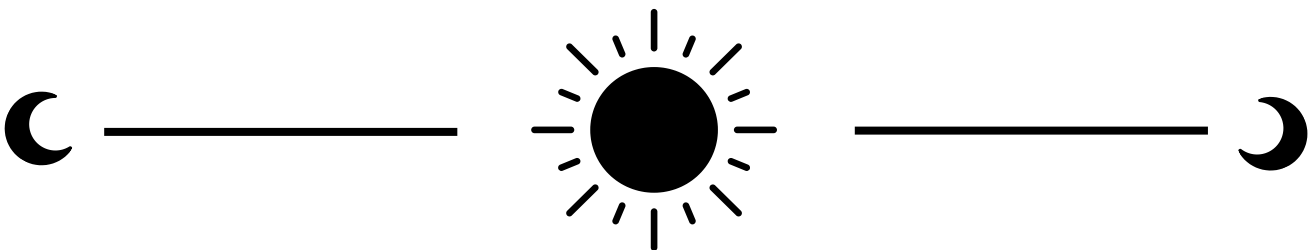
(1824 - 1907)



French astronomer

&

Discovered the element helium by observing the sun's chromosphere, the second layer of its atmosphere, during an 1868 eclipse.

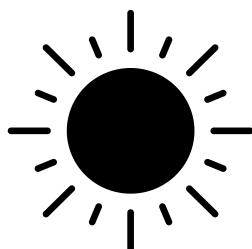


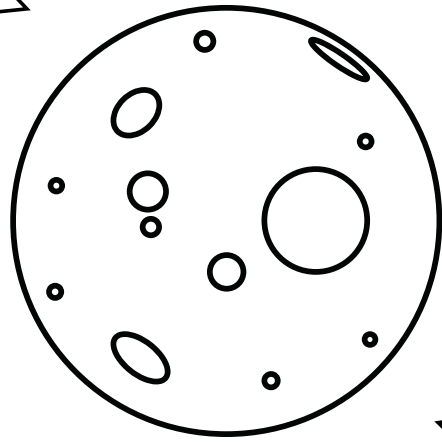
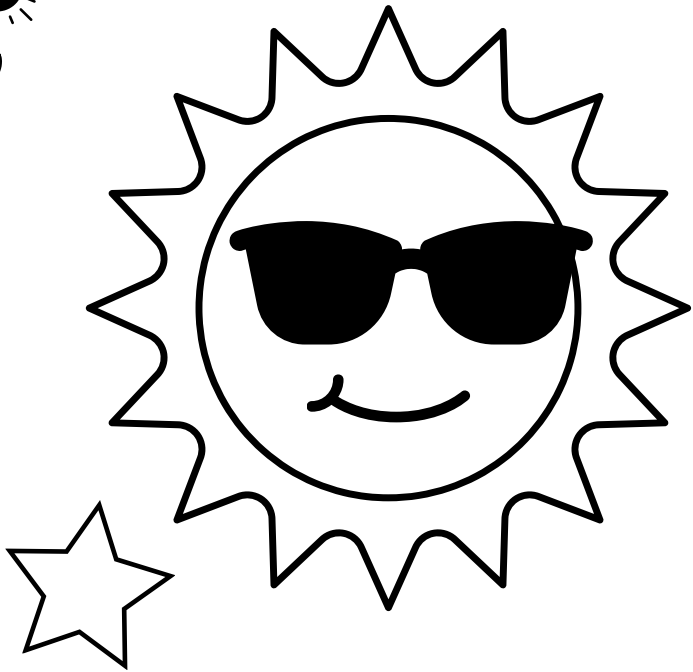
Anaxagoras (c.500 - c.428 BCE)



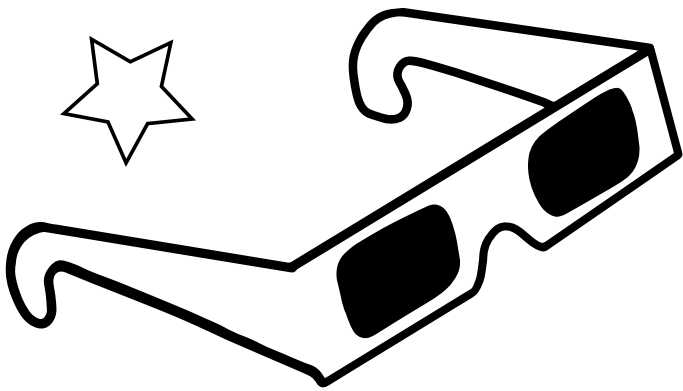
Ancient Greek philosopher

Offered the first scientifically correct explanation for lunar and solar eclipses, which he may have observed during a 463 BCE eclipse.





Lights, Camera,
OCCULTATION!



The Great North American Eclipse

2024