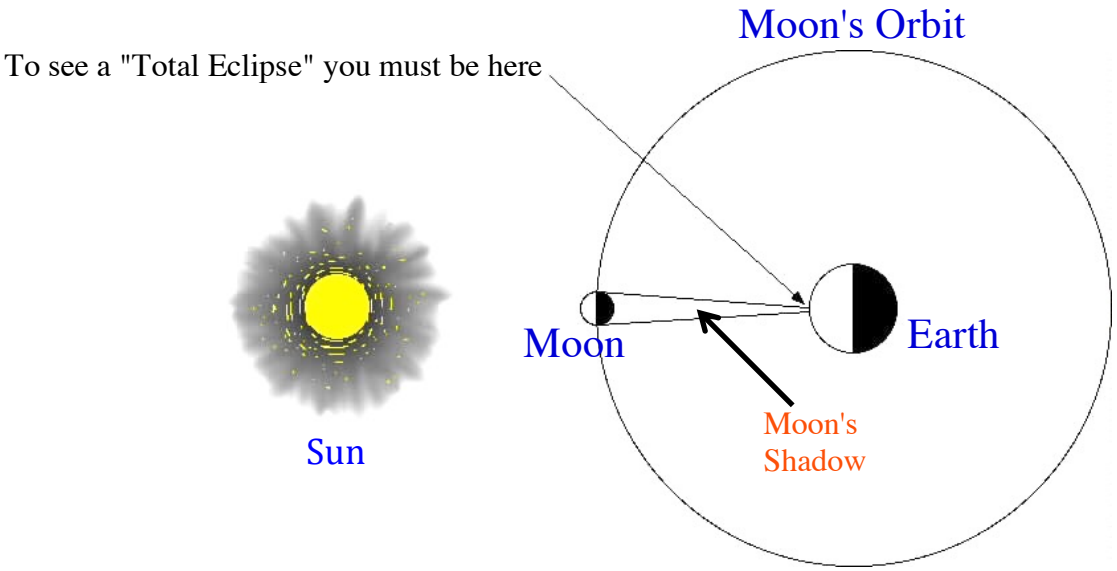
Solar and Lunar Eclipses

Solar eclipses pages 1-3. Lunar eclipses page 4.

Solar Eclipse

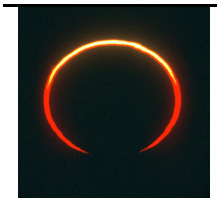


Total Solar Eclipse and eclipse watchers wearing *eclipse glasses*, August 21, 2017, photos ©John Meader.

Do not look directly at the Sun anytime, even during an eclipse, without a proper solar filter such as eclipse glasses. **Sunglasses are *not* adequate or safe protection!** The black circle in the middle is the Moon, the white light around it is the Sun's corona (outer atmosphere).

There will be a ***total solar eclipse in Maine on April 8, 2024***, get ready to safely observe it. Eclipse glasses are inexpensive, only a few dollars a pair. It should not be missed!

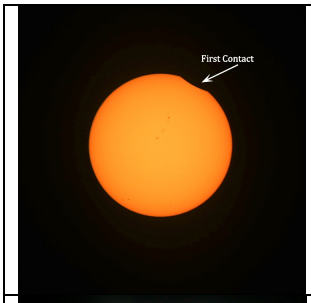
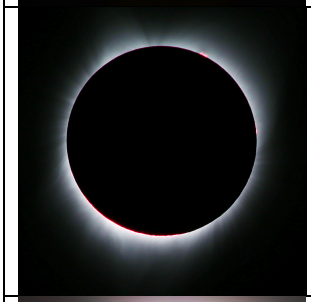
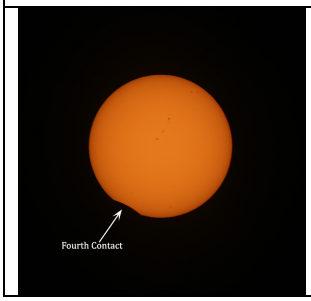
3 Types of Solar Eclipses

	**Partial Eclipse**	All eclipses start with a *partial eclipse* when the Moon only partly covers the Sun. If it moves in a way that it totally covers the disk of the Sun it becomes a total eclipse. Some eclipses are just partial and never become total. If you are outside the path of totality, then only the partial eclipse will be seen. Eclipse glasses are required to safely view.
	**Annular Eclipse**	Because the Moon orbits Earth in an oval or elliptical orbit, sometimes an eclipse happens when the Moon is at its furthest point from Earth. Being further away, the Moon appears smaller than the Sun and therefore won't totally cover the Sun's disk, leaving a glowing ring. This is called an *annular eclipse*. Eclipse glasses are required to safely view.
	**Total Eclipse**	If the eclipse happens when the Moon is at a closer point in its orbit, then the Moon will totally cover the disk of the Sun. This is a *total eclipse* and is by far the most spectacular to witness. The closer the Moon is to Earth during the eclipse, the longer totality will last. The white light surrounding the dark disk of the Moon is the Sun's corona or outer atmosphere. Since the corona is dynamic, it looks different with each eclipse.

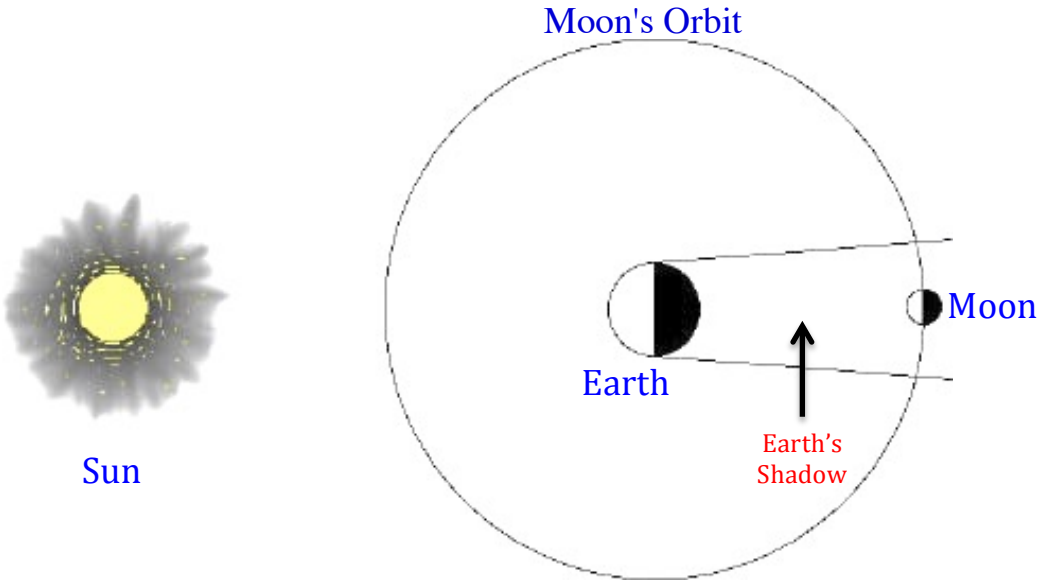
The Eclipse Path

Solar eclipses always happen during a New Moon and happen during daytime hours. Since the Moon's shadow is roughly 60 miles in diameter when it hits Earth, to see a total eclipse you have to be where the shadow hits, and because Earth rotates and the Moon is moving, so does the Moon's shadow, moving along a path across Earth's surface. To see a total solar eclipse you must be somewhere along the shadow path of the Moon. On April 8, 2024, there will be an eclipse that will traverse Maine between 2:15 and 4:30 p.m. It will start in the Pacific Ocean, cross Mexico and Texas, then head north across the eastern United States, crossing Maine, then New Brunswick, Prince Edward Island, and Newfoundland before ending far out at sea in the Atlantic Ocean.

There are 4 stages to a solar eclipse

	First Contact	This is when the Moon first appears to "touch" the Sun's edge. It appears as a small dimple on the right side of the Sun. The eclipse has begun. This is the beginning of the partial eclipse stage. Be sure to wear eclipse glasses to safely observe this.
	Second Contact	This is when the Moon totally covers the sun's disk. This is the start of totality. Just as it happens, the last glimpses of the Sun's light shines between mountains on the Moon making a momentary line of lights, called *Bailey's Beads*.
	Third Contact *Diamond Ring*	This is when the Sun first reappears. This is the end of totality. The first glimpse of the Sun is the light shining through a deep valley between mountains on the Moon, creating the Diamond Ring Effect, followed by Bailey's Beads, which are both momentary. Now the ending partial eclipse stage has begun and will last until Fourth Contact.
	Fourth Contact	This is when the Moon's edge last touches and then leaves the Sun's edge. It appears as a dimple on the left side of the Sun. This is the end of the partial eclipse. When the dimple disappears the entire eclipse is over.

Lunar Eclipse



Partial and Total Lunar Eclipse Images, September 27, 2015, photo ©John Meader.

Lunar eclipses can be seen from a greater part of Earth's surface and therefore are seen more frequently. Since observing a lunar eclipse happens at the full moon, it is totally safe to look directly at.

The orange color is only visible during lunar totality, it is due to sunlight being bent into Earth's shadow by the Earth's atmosphere. It's reddish-orange for the same reason the sunset is reddish-orange.