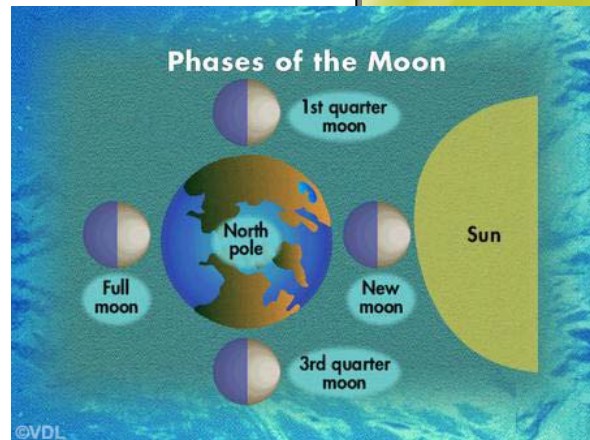


A solar eclipse occurs when the Moon's path takes it between Earth and the Sun. When this happens, the Moon may block part or all of the Sun from view. For most people, viewing a solar eclipse is a rare experience. Solar eclipses occur between two and five times per year, but they are not visible from everywhere on Earth. If you would like to see a solar eclipse, there are several things you need to know.

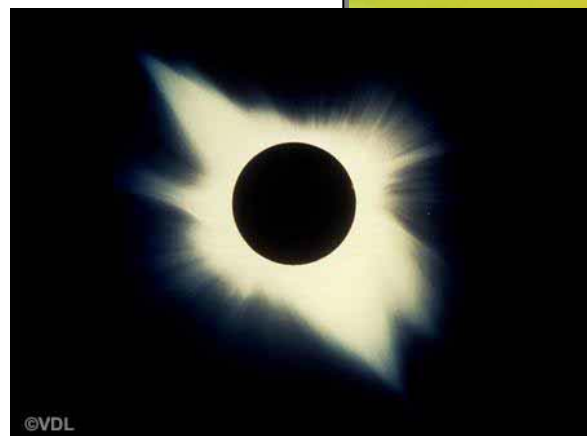
Types of Eclipse

There are four types of solar eclipse. In each type, a different part of the Sun is blocked from view. The type of eclipse that occurs depends on how the Moon, Earth, and the Sun are aligned as well as the distance between the Moon and Earth at the time of the eclipse. If a viewer is in the right place at the right time, he or she might be able to see a total eclipse. In a total solar eclipse, the Moon completely obscures the Sun. A total eclipse is visible from a very small area on Earth's surface. It can happen only when the Moon appears large enough in the sky to block the entire disk of the Sun. During this type of eclipse, viewers can see the Sun's glowing corona (the ring of plasma, or highly charged elements, that encircles the Sun.)

Due to its elliptical orbit, the Moon is not the same distance from Earth all the time. Sometimes it is closer to Earth, and sometimes it is farther away. When the Moon is closer to Earth it appears larger in the sky. When the Moon is farther from Earth, it appears smaller in the sky. If an eclipse occurs when the Moon is farther from Earth, the Moon might not block the entire Sun from view. This event is known as an annular eclipse. During an annular eclipse, the Moon moves between Earth and the Sun, but it does not appear large enough to completely block the Sun. Instead, a thin border of the Sun shows around the outside of the moon. Some people call this kind of eclipse a "ring



A solar eclipse can happen only during a new Moon, when the Moon is between Earth and the Sun.



During a total eclipse, the Sun's glowing corona extends out from the Moon's edges.

of fire” eclipse. The Sun looks like a glowing, fiery ring in the sky.

Sometimes, the type of eclipse seen depends on the location from which you view the eclipse. A hybrid eclipse appears as a total eclipse to some viewers but looks like an annular eclipse to others. Hybrid eclipses do not occur very often.

A partial eclipse occurs when the Sun is only partially blocked by the Moon. Technically, partial eclipses and total or annular eclipses are not different events. Which type of eclipse is visible depends on the viewer’s location on Earth. In general, a person can view a partial solar eclipse from a large area on Earth’s surface, while a total or an annular eclipse can be seen only from a very limited area on Earth’s surface.

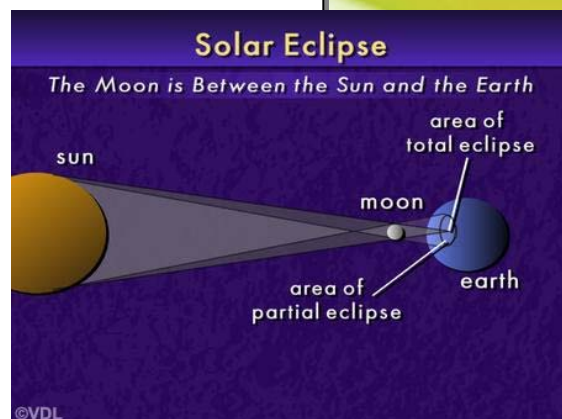
Viewing a Solar Eclipse

Viewing solar eclipses can be very dangerous. Never look directly at the Sun. Even during an eclipse, enough solar energy reaches Earth to damage your eyes. For this reason, never use a telescope or binoculars to watch an eclipse. The lenses in these devices focus the light from objects that are far away. If an artificial lens concentrates sunlight on the eyes, the intense light can cause permanent eye damage—even blindness.

Once the location where an eclipse will be visible is determined, it is best to make a pinhole projector to safely view the solar eclipse. To make this simple device, first find two long, narrow shipping boxes (such as those used to mail posters). Cut off one end from each box. Then, tape the two boxes together to make one long tube. Cut a small hole in one end of the tube, and tape aluminum foil over the hole. Next, use a pin to poke a tiny hole in the middle of the piece of foil. Then, cut a large, rectangular viewing window on the side



An annular eclipse leaves a “ring of fire” around the edges of the Moon.



Each total, partial, or annular eclipse is visible only from certain places on Earth. However, partial eclipses are visible over a larger area on the planet’s surface.

of the box near the other end of the tube, opposite the pinhole. Finally, tape a piece of white paper inside that end of the tube.

To use the pinhole projector, raise the end of the tube with the aluminum-foil pinhole towards the eclipse. The light will come through the pinhole and make an image of the Sun on the white paper. You will be able to watch the whole eclipse through the viewing window on the side of the box.

Make sure to arrive at the correct location in plenty of time to set up your projector. Expect to share the location with other people waiting to see the eclipse. Some viewers will have pinhole projectors, while others may have elaborate camera setups. Stay alert, and be ready for the eclipse to begin. From start to finish, a total or annular eclipse may last about 6 minutes. A little patience and preparation will ensure the experience of a lifetime.

Note: Up-to-date information about past and upcoming solar eclipses can be found at the following Web site, which is maintained by the National Aeronautics and Space Administration (NASA): <http://eclipse.gsfc.nasa.gov/solar.html>



This time-lapse photo shows the process of an annular eclipse. The Moon takes about 90 minutes to pass from one side of the Sun to the other. However, the Moon completely eclipses the Sun for only about 6 minutes.