

## Solar Eclipse

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**Do not EVER look directly at the Sun without proper eye protection, even during an eclipse. Even when the Sun is partially covered, your eyes can be seriously damaged by looking directly at it. Sunglasses are not proper eye protection for viewing the Sun.**

### Hiding the Sun

One of the sky's most spectacular events is a solar eclipse. When a solar eclipse occurs, what has happened is that the Moon has passed in front of the Sun and either partially or totally blocked it from our view. This can only occur during a new Moon phase and, to make things even more mysterious, sometimes the Moon blocks the Sun entirely, sometimes it appears that there has just been a circular slice taken out of a portion of the Sun and occasionally the Moon passes directly in front of the Sun without completely covering the Sun's face.

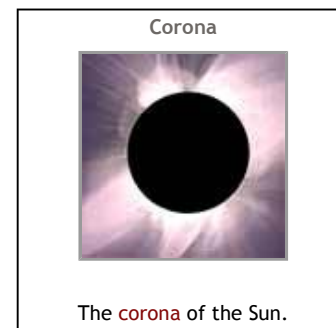
These are all different kinds of solar eclipses, but any of them puts on a marvelous show. Before our knowledge of the sky allowed us to predict when eclipses would happen, a solar eclipse was usually a cause for a lot of concern. After all, the Sun is very important to us here on Earth and to have it seem to disappear without warning was pretty upsetting.

Generally speaking, there are three different kinds of solar eclipses. The most impressive, of course, is a total solar eclipse, which is an eclipse where the Moon completely covers the face of the Sun. A partial eclipse happens when the Moon passes in front of, or occults, the Sun, but does not hide it completely from our view. When a partial eclipse happens, it looks like a semi-circular bite has been taken out of the Sun, and it looks kind of like a cookie after you have taken a bite out of it. The third type of eclipse is called an annular eclipse. These eclipses happen when the Moon passes directly in front of the Sun but, because of the Moon's distance from Earth, the Sun isn't completely hidden. During an annular eclipse, a small ring of the Sun's surface will still be visible around the Moon.

### Racing Darkness

When the Moon passes in front of the Sun, it naturally casts a shadow. During a solar eclipse, this shadow falls on Earth and races across the surface of our planet. As the eclipse progresses and more and more of the face of the Sun is covered, the shadow gets darker and darker until eventually we have complete darkness during the day. There are two general parts of the Moon's shadow that we see during an eclipse. The lighter part of the shadow is called the penumbra. If the eclipse is total, the darkest part of the shadow, where the eclipse is total, is called the umbra. If you are ever lucky enough to be in the path of the darkest part of the eclipse, also called the totality, you will first see the sky to get gradually darker and darker until it finally gets completely dark. What is happening is that you are standing in the path of the shadow of the eclipse.

When the sky starts to get darker, the edge of the shadow has reached where you are



standing. As the sky appears to get darker and darker, more and more of the eclipse's shadow has covered your location. When it gets totally dark, you are in the umbra, or darkest part of the eclipse's shadow.

The totality of the eclipse usually lasts around a minute, then the whole process reverses. The sky will gradually get lighter and lighter until eventually it seems as if nothing unusual has happened at all. This isn't the case, though, as you have likely experienced what will probably be a once in a lifetime event.

### An Eclipse on Jupiter

Eclipses occur other places in our solar system. In fact, eclipses should be possible anywhere in the solar system where a planet's moons are the right distance to cast a shadow on the surface of the planet.

In our solar system, Jupiter is the most obvious choice because of its Galilean moons. These moons are certainly close enough to cast shadows on the giant planet. The amazing image we have at right shows an eclipse of Io on Jupiter.

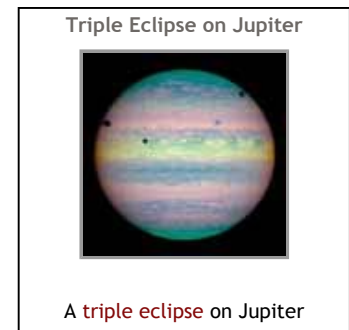


### A Triple Eclipse on Jupiter

About twice a decade, Jupiter has a triple eclipse, which means that three of its moons cast shadows on the surface of the giant planet.

On March 28th, 2004, the Hubble Space Telescope captured this image of the moons Io, Ganymede and Calisto casting shadows on Jupiter.

The image is a false color image created using one of the telescope's infrared cameras.



#### Find Out More About Solar Eclipses

##### [NASA's Eclipse Page](#)

NASA's eclipse page has lots of information about solar and lunar eclipses including the dates of upcoming eclipses

##### [The Exploratorium Eclipse Center](#)

The Exploratorium has a very interesting eclipse page including the legend of the sun-eating dragon

Note: All links will open in a new browser window

