

SKYWATCH: November brings a lunar eclipse to the Quad Cities

Alan Sheidler, Popular Astronomy Club, Nov 9, 2021



This photo was taken by Alan Sheidler of the Popular Astronomy Club during the lunar eclipse of April 15, 2014. A lunar eclipse occurs when the Moon enters the Earth's shadow and passes into the darkest part of that shadow, known as the umbra. Some sunlight still reaches the Moon after going through Earth's atmosphere, giving a reddish tone to the lunar surface.

In the early morning of Friday, Nov. 19, there will be a lunar eclipse visible from the Quad-Cities (if we have clear skies). A lunar eclipse occurs when the Earth passes between its satellite, the moon, and the sun.

The Earth's shadow sort of resembles a "bullseye," with a very dark inner region called the umbra and a less dark outer region called the penumbra. As the moon enters this bullseye, it will slowly and unperceptively, at first, dim as it enters the penumbra.

If the moon's orbit is well-aligned with Earth's shadow, as it will be for the Nov. 19 lunar eclipse, the moon will venture into the umbra. If the moon's entire disk enters into the umbra, the result is a total lunar eclipse. This means direct illumination by the Sun of the moon's entire surface would be completely blocked by the Earth.

Technically, this particular lunar eclipse is not a total lunar eclipse, but it will be darn close. In this case, at maximum eclipse, about 97% of the moon will be covered by the Earth's umbra shadow. So this will be an excellent opportunity for anyone wanting to enjoy one of nature's most interesting astronomical events.

The eclipse technically starts with the full moon entering the penumbra at around 12:02 a.m. However, you may not be able to notice anything happening for another half hour or so, when you may just be able to notice a slight darkening of the one side of the moon.

At 1:19 a.m., the moon will begin entering into the dark umbra shadow. Soon thereafter, you should notice very dark "bite" increasing in size as the moon treks further into the Earth's umbra.

By around 3:03 a.m., the moon will be about 97% enveloped by the dark umbra. At this point, much of the moon's surface will be significantly dimmer and may take on a very interesting shade of a dull red, brick red, orange, copper, or even gray color. The 3% of the moon's surface not inside the umbra will probably be yellowish and slightly brighter than the darker reddish umbra.

We won't know the colors we will be able to see until the eclipse happens. Theoretically, the Earth's umbra region should be completely dark and devoid of sunlight. But this typically is not the case.

If you could be an astronaut standing on the surface of the moon and looked up in the lunar sky during the eclipse, what you would see would be something beautiful and miraculous. As you watch the Earth pass in front of the Sun, you would still see the Earth's atmosphere glowing like a reddish halo as sunlight is refracted or bent around the Earth.

This reddish halo is caused in the same way we have red sunsets or sunrises on Earth. Of course, the major difference is you are seeing the light of sunsets or sunrises as they would appear way out in space (on the surface of the moon, in this case) rather than on Earth's surface.

The refracted sunlight from the Earth's atmospheric halo dimly illuminates the moon's surface. So even though there is no direct sunlight falling on the portion of the moon lying within the umbra, it will still be visible as a dimly lit orange, red or copper color.

The colors seen on the moon may be very different depending on if there have been recent volcanic eruptions, clouds or thunderstorms on Earth prior to the eclipse. Dust particles and clouds can filter the sunlight, causing dramatic shades of red. Total lunar eclipses sometimes are referred to as a blood moon because they can look almost blood red.

This month's lunar eclipse should be a good one. Seek a location with a clear view of the southwestern sky and bring a pair of binoculars or a small telescope

For a lunar eclipse, which occurs at night, there is no danger to your eyes, and you can use binoculars or a telescope without a filter.

As you may have gathered, a lunar eclipse is only possible when the moon is full. Because the full moon is very bright, the sky glow or light pollution from the bright moon will drown out dimmer, deep-sky objects. As the lunar eclipse proceeds, however, the moon will dim way down and allow other nearby objects to shine through.

One example of this is a very beautiful open star cluster called the Pleiades or the Seven Sisters, which will be very near the moon during this month's eclipse. You may initially have difficulty seeing the Pleiades but, after the moon has darkened, the cluster should easily be visible as a fuzzy patch of light to the naked eye.

The Pleiades will be a little higher up in the sky from the eclipsed moon. A pair of binoculars will reveal the beautiful nature of this open cluster of stars.

There will be another, even better lunar eclipse on May 16, 2022. This one will be total, with the moon passing deep within the Earth's umbra shadow. Totality will begin at around 10:30 p.m., so you won't have to stay up to the wee hours of the morning either.

The Popular Astronomy Club meets the second Monday of the month at 7 p.m. at the Butterworth Center in Moline. All are welcome to attend. You can also find us on Facebook or visit our website, at <https://www.popularastronomyclub.org>.

We also have public observing sessions in the parking lot of Niabi Zoo on the third Saturday every month from March through November (weather permitting). See you there, and keep looking up!