

Super Harvest Bloody Moon

On September 17, 2024 we'll have a Super Harvest Bloody Moon.

Kind of a fantastical, creepy name, but those three adjectives each describe a different celestial event, which will coincide in this one moon.

A Harvest Moon is the full moon nearest the autumnal equinox, called that because it gave farmers some extra light to bring in their crops. There's a Harvest Moon every year, but not often so close to the equinox, on September 22nd.

A supermoon occurs when the full moon coincides with the Moon's perigee—that's when it's nearest Earth in its elliptical orbit. This nearness makes a supermoon 14% bigger and 30% brighter.

The Moon's perigee doesn't often line up with the full moon, so supermoons only happen a few times a year.

A blood moon happens only during a lunar eclipse, when the Sun, Earth and Moon are perfectly aligned, and Earth blocks sunlight from reaching the Moon.

Because the Sun is a large light source, sunlight from the red end of the spectrum bends around Earth, which gives the moon a red shade.

This time we'll have only a partial lunar eclipse, giving the moon a slightly bloody tint.

Nonetheless, it's very rare that all three of these phenomena happen at once, so make sure you catch it on September 17th—a preview to the *full* lunar eclipse Super Harvest Blood Moon of 2033.



Totality during the lunar eclipse of May 15, 2022. Direct sunlight is blocked by Earth, and the only light reaching the moon is sunlight refracted by Earth's atmosphere, producing a reddish color. A partial lunar eclipse during the Super Harvest Moon on September 17–18, 2024, will provide a preview of the next Super Harvest Blood Moon in 2033.

Credit: Sergei Mutovkin from Irvine, California, United States, CC BY 2.0, via Wikimedia Commons

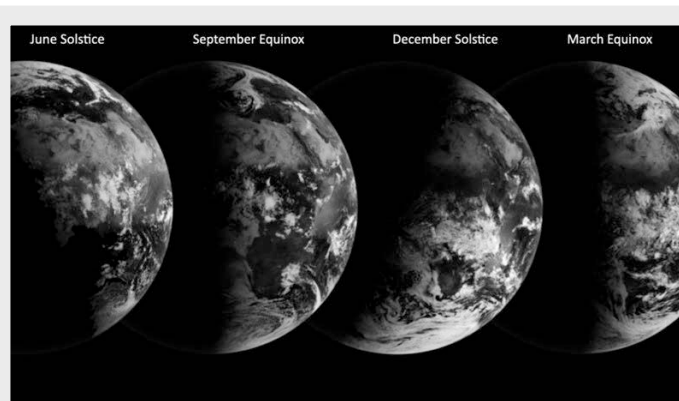


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Background: Super Harvest Bloody Moon

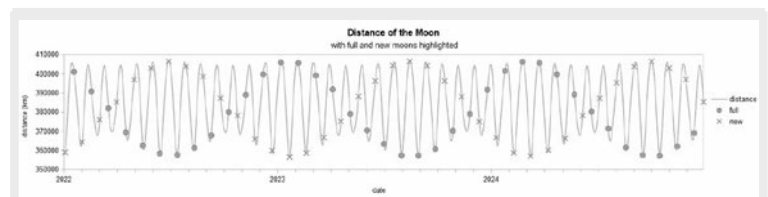
Synopsis: The full moon in September 2024 will be a Super Harvest Moon with a tinge of blood moon. It is a lot to unpack, but each of the three descriptors describes a specific celestial event that will coincide with the full moon on the night of September 17.

- Three celestial events will coincide to influence the appearance of the full moon in September 2024.
 - The full moon's closeness in time to the autumnal (fall) equinox makes it the Harvest Moon.
 - Its proximity to the perigee of the Moon's orbit around Earth makes it a supermoon.
 - The coincidence of a partial lunar eclipse will give a tinge of "blood moon" red to the big bright Super Harvest Moon.
- September's full moon is 2024's Harvest Moon.
 - The full moon occurs on September 17 at 10:34 p.m. eastern daylight time (EDT).
 - The Harvest Moon is the name of the full moon closest to the autumnal equinox because, historically, its light gave farmers more time to harvest their crops at the end of the growing season and was a reason to celebrate. Watch Neil Young's music video of his famous song "Harvest Moon."
- In 2024, the autumnal equinox occurs four and one-half days later, at 8:44 a.m. EDT on September 22, 2024, marking the moment when sunlight hitting Earth is equally distributed between the northern and southern hemispheres.
- Supermoons occur when the full moon phase coincides with the time when the Moon's elliptical path reaches its closest point to Earth, known as the perigee. The farthest point along the orbital path is called the apogee.
 - The Moon passes both the perigee and the apogee along its elliptical orbit, but its elliptical path is not synchronized with its phases, so supermoons don't happen for every full moon.
 - Just 12 hours after the full moon, on September 18 at 9:28 a.m. EDT, the Moon will reach its perigee, just 222,005 mi (357,283 km) away from Earth. (The following apogee will be 252,597 mi [406,516 km] away on October 2, 2024.)
 - The Moon will be about 30,000 mi (50,000 km) closer to Earth during the perigee, and that means it will look about 14% bigger and 30% brighter, producing a supermoon.
 - The smaller, dimmer Moon that occurs when a full moon coincides with apogee is known as a micromoon.



Satellite views of Earth on the solstices and equinoxes.

Credit: NASA Earth Observatory



Distance between Earth and its moon obtained from the NASA Jet Propulsion Laboratory (JPL) Horizons On-Line Ephemeris System, with full moons highlighted as dots and new moons highlighted as "x."

Credit: Lasunncty, CC BY-SA 4.0, via Wikimedia Commons

References: Super Harvest Bloody Moon

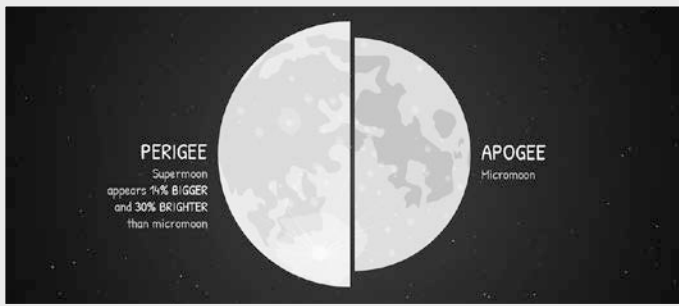
- What Is the Harvest Moon? | Old Farmer's Almanac
- What's a Supermoon and Just How Super Is It? | NASA Science
- What You Need to Know about the Lunar Eclipse | NASA
- What Are Lunar Eclipses and How Do They Occur? | Space.com
- What Is a Blood Moon? | Space.com

Contributors: Juli Hennings, Harry Lynch



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Fact Sheet:
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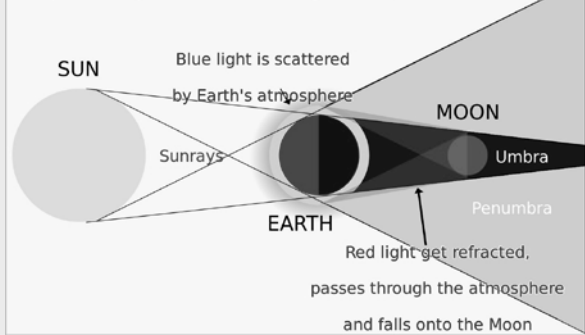
Background: Super Harvest Bloody Moon



Apogee and perigee impact the relative size and brightness of the Moon as viewed from Earth.

Credit: NASA/JPL-Caltech, public domain, via Wikimedia Commons

Graphical representation - why Blood Moons are red



The umbra is a cone-shaped shadow that Earth casts toward the Moon, while the penumbra occurs because the sun is a disk of light, not a single point. If the Moon passes completely within the umbra, a total lunar eclipse occurs. If it only grazes the umbra, a partial lunar eclipse occurs. Not to scale.

Credit: Sanu N, with correction by Eggishorn, CC BY-SA 4.0, via Wikimedia Commons

- Blood moons occur during lunar eclipses when the Sun, Earth and Moon are lined up so that Earth casts a shadow on the Moon. They can only happen at night.
 - The Moon's orbit is inclined about 5° relative to Earth's orbit, so lunar eclipses only occur when the Sun, Earth and Moon are in alignment, about three times a year. During other full phases, the Moon orbits above or below Earth's shadow.
 - Lunar eclipses always occur during the full moon phase because of this alignment of the Earth being between the Sun and the Moon, and they typically last 30 to 60 minutes. Here are a couple fun facts:
 - If you were standing on the Moon during a lunar eclipse, Earth would block your view of the Sun; it would be a solar eclipse. Additionally, from that vantage point, Earth would be surrounded by a thin red ring, as you view all of the sunrises and sunsets taking place on Earth at that moment from the Moon.
 - Earth's solar eclipses only occur when the Moon casts a shadow on Earth, so this can only happen during the new moon phase when the Moon is between the Sun and Earth.
 - When Earth passes directly between the Sun and the Moon, it casts a cone-shaped shadow, known as the umbra, that is more than twice the diameter of the Moon.

- Because the sun is a large circular light source, not a point source, it casts an outer shadow known as the penumbra, which is much larger.
- As sunlight passes through Earth's atmosphere, it is scattered into its many frequencies, with the red light being refracted more than other wavelengths so that it shines on the Moon within Earth's shadow.
- The intensity of the reddish hue depends on where the Moon is within the umbra and penumbra as well as the clarity of the stratosphere with respect to dust particles, water vapor and volcanic emissions, as we discussed in ED-088 Volcanoes and Eclipses.
- On September 17, between 10:12 and 11:15 p.m. EST, Earth's umbral shadow will just barely brush across the edge of the Moon, creating a 3.5% partial lunar eclipse that will look like a tiny bite out of the Moon from most of the Western Hemisphere.

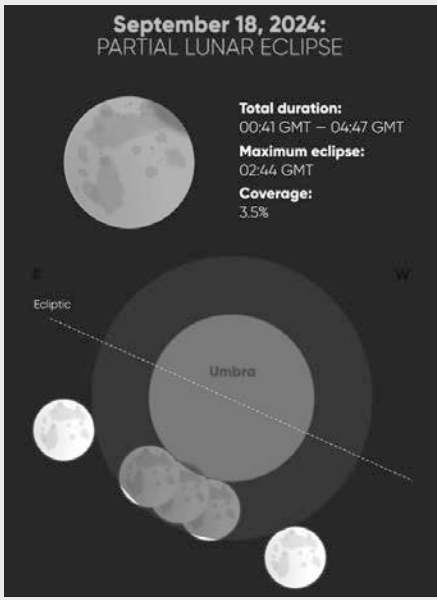
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- This partial lunar eclipse will be combined with a big bright supermoon for the spectacular 2024 Super Harvest Moon with a tinge of blood red.
- Unlike a solar eclipse, it is safe to look directly at the Moon during a lunar eclipse, because it is reflected light that is no brighter than moonlight. No special glasses are required, although you might enjoy using binoculars for the show, which will last 30 to 60 minutes.
- This blood-tinged Super Harvest Moon of 2024 is just a preview! Earth's next spectacular total lunar eclipse blood moon that coincides with a Harvest Super Moon will be in 2033. The last one was in 2015.



September 18, 2024:
PARTIAL LUNAR ECLIPSE

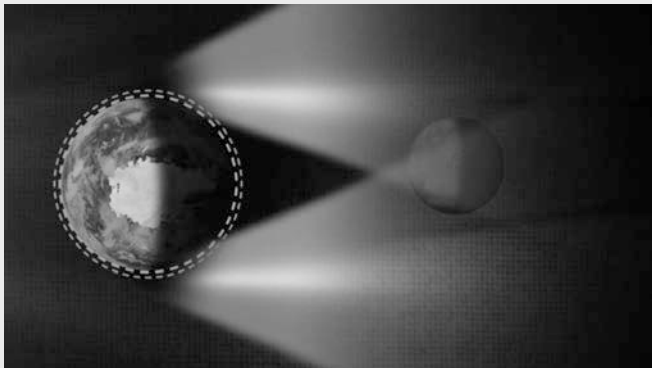
Total duration:
00:41 GMT – 04:47 GMT

Maximum eclipse:
02:44 GMT

Coverage:
3.5%

How the September 17, 2024, Moon will look during the partial lunar eclipse. (It will occur in the early morning hours of coordinated universal time on September 18 in Europe).

Credit: Starwalk.Space



During a lunar eclipse, Earth's atmosphere scatters sunlight. The blue light from the Sun is reflected outward, while longer-wavelength red, orange and yellow light are refracted inward around Earth, turning our Moon red. Not to scale.

Credit: NASA Goddard Space Flight Center/Scientific Visualization Studio



Where to see:
North America, South America, Europe, Western Asia, Africa.

Where the September 17–18 Moon can be viewed. The partial lunar eclipse will be visible from Europe, much of Asia, Africa, North America, South America, the Arctic and Antarctica.

Credit: Starwalk.Space

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