

# Lunar Eclipse FAQ's

Courtesy Prof. Patricia Reiff, the Rice Space Institute

(<http://rsi.rice.edu>; <http://earth.rice.edu>)

## 1. Why does a lunar eclipse only happen during full moon?

(Answer: only during full moon and new moon is the Moon in a line with the Earth and Sun. If the Earth is in the middle, the Moon is 'full' and we can sometimes get lunar eclipses [the Earth's shadow falling on the Moon]; if the Moon is in the middle, the Moon is 'new' and we can sometimes get solar eclipses [the Moon's shadow falling on the Earth]. )

## 2. Why don't we have a lunar eclipse every month?

(Answer: the plane of the moon's orbit around the Earth is not exactly the same as the plane of the Earth's orbit around the Sun, so the Earth (as seen from the Moon) generally passes over or under the Sun during times of Full Moon. Only twice a year, when the orbits cross, at the "nodes", are eclipses possible, called "eclipse seasons"; even then, the Moon also has to be in the right place in its orbit to give an eclipse. There will generally be at least two partial lunar eclipses each year, but can be more. If there is a total solar eclipse that season, then there must be at least a partial lunar eclipse two weeks earlier or two weeks later.)

## 3. A lunar eclipse is when the Moon moves into the Earth' shadow. What would you see if you were standing on the Moon?

(Answer: a partial or total \*solar\* eclipse - the Earth will cross in front of the Sun).

## 4. Will it look like a solar eclipse as seen from Earth?

(Answer: not exactly, because the Earth's atmosphere can scatter and refract (bend) sunlight. The "penumbra" is the area of the earth's shadow that is only partially dark (the earth covers all of the sun), whereas the "umbra" is the area of the shadow where the Earth covers all of the Sun, and so is the darkest.)

## 5. If it is in the "partial" phase at Earth will it be in the partial phase at the Moon?

(Answer: it depends on where you are on the Moon. If your location is in the umbra, you will see a total solar eclipse. If you are in the brighter part, the penumbra, you will see a partial solar eclipse. When we see a "total" lunar eclipse, then the entire Moon is inside the umbra and EVERYwhere on the Moon would see a total eclipse.)

## 6. Why does the Moon turn red during a lunar eclipse?

(Answer: The light from the Sun is refracted (bent) by the earth's atmosphere, whereas the blue light is scattered. That's why the Sun looks red to us at sunset and the sky looks blue! If you are on the Moon during a total lunar eclipse, you will see a dark earth with a red halo of the atmosphere around it. )

**7. Will all parts of the Moon be the same color?**

(Answer: the edge of the Moon which is closest to the penumbra will need less bending of the light, so will be brighter. So, I predict that the SOUTH edge of the Moon will be brighter during totality for this eclipse. See the diagram on page <http://sunearth.gsfc.nasa.gov/eclipse/LEmono/TLE2008Feb21/TLE2008Feb21.html> )

**8. Are all lunar eclipses the same color?**

(Answer: sometimes because of volcanoes or dust storms on Earth, the Earth's atmosphere is dustier and so less light can get through. In that case the Moon will appear a darker red because less light will reach it).

**9. If you were on the Moon, could you see the solar corona during a lunar eclipse?**

(Answer: It would not be as easy as during a total solar eclipse from Earth. The scattered sunlight through the Earth's atmosphere would be brighter than the corona, but you might see it peeking up behind it. The angular size of the Earth is four times the diameter of the Sun as seen from the Moon [why?], so the Earth will cover up the brightest part of the corona, except just after totality begins (or if you are in a location near the edge of the umbra). No human has ever viewed a solar eclipse from the Moon!)

**10. Is it safe to view with the naked eye?**

Absolutely, **lunar** eclipses are always safe - use eyes, binoculars, telescopes, any kind of camera or videocamera - enjoy it! Be sure you use a "fast" setting so that time exposures don't cause the image to blur. Solar eclipses, on the other hand, are DANGEROUS except for the lucky ones in the path of totality, and only while the eclipse is TOTAL. If you haven't ventured to to a total solar eclipse, go if you can – it is one of nature's most wonderful marvels!