

## METHOD FOR OBSERVING A LUNAR ECLIPSE

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**Abstract.** This article describes the methods of observing the lunar eclipse and focuses on the circumstances of the formation of the lunar eclipse.

**Keywords:** moon, lunar eclipse, observing, astronomy, methods, umbra, penumbra.

## МЕТОД НАБЛЮДЕНИЯ ЛУННОГО ЗАТМЕНИЯ

**Аннотация.** В данной статье описываются методы наблюдения лунного затмения и основное внимание уделяется обстоятельствам формирования лунного затмения.

**Ключевые слова:** луна, лунное затмение, наблюдения, астрономия, методы, тень, полутень.

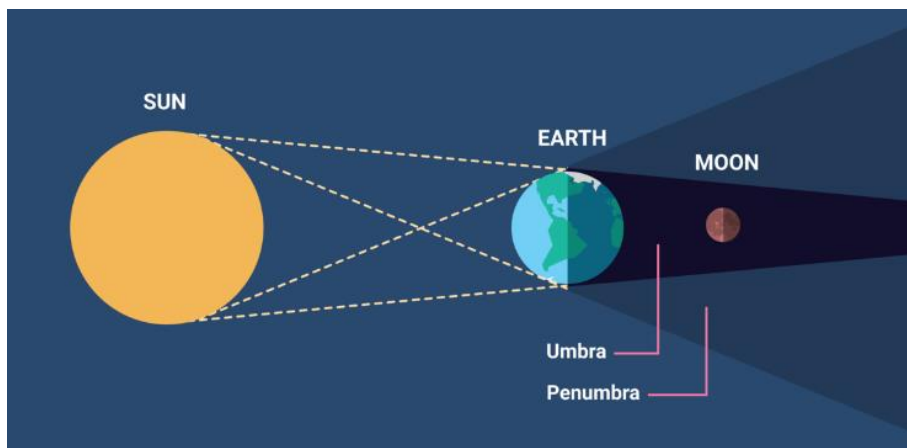
A huge amount of literature is devoted to the theory and methods of observing lunar eclipses, for this reason we will not discuss this topic in detail. All of the following refers to the method of observing lunar eclipses with modern equipment available to amateur astronomers. Observations of lunar eclipses are necessary to solve many scientific problems related both to the physics of the phenomenon itself and to the influence of the state of the earth's atmosphere on the color and brightness of the moon. Often a situation arises when, due to weather conditions, it is impossible to observe lunar eclipses in different geographical points of the Earth. In these cases, well-placed observations of amateur astronomers provide invaluable assistance.

Information about the time of lunar eclipses is published in annual calendars.

Observation of this natural phenomenon can be organized as an evening class session or students can be encouraged to make independent observations.

Lunar eclipses, unlike solar eclipses, for all observers located on the shadow (foot) side of the Earth, begin and end at the same time. The duration of a total lunar eclipse can be almost 2 hours, and the interval between entering and leaving penumbra lasts more than 5 hours.

Observations of a lunar eclipse are made with the naked eye or through a telescope with low magnification so that the entire disk of the moon is visible in the field of view of the



picture 1. Total Lunar eclipse

eyepiece. Students, having circles depicting the disk of the Moon previously drawn on paper, draw the view of the Moon during the entire eclipse at certain intervals, indicating the moment of sketching.

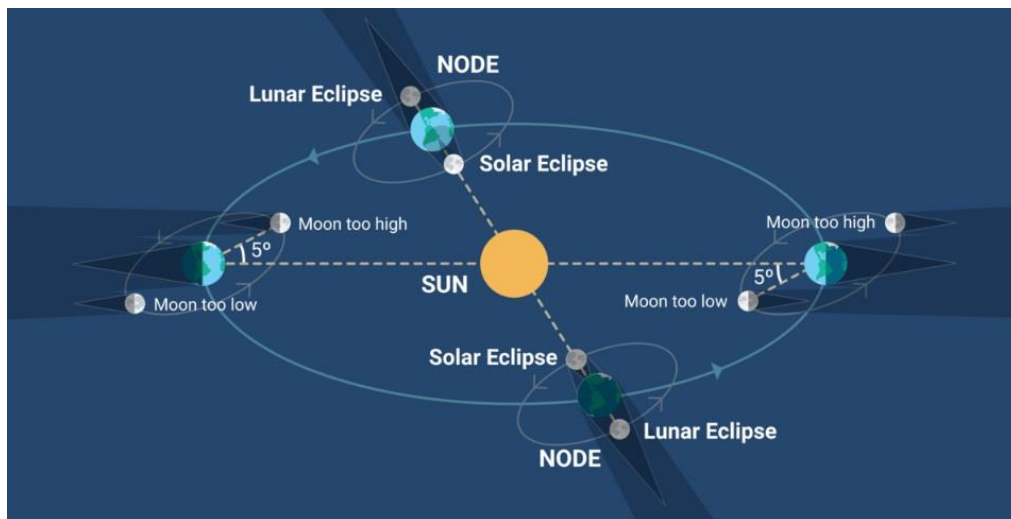
Photographers can do this work with a

camera.

When observing the eclipse with a telescope, students follow the movement of the earth's shadow on the lunar surface and note in the observation log the moments of immersion in the shadow of individual craters.

Order of observation of a lunar eclipse

1. Mark the moment of darkening on the left eastern edge of the lunar disk - the beginning of the Moon's entry into the Earth's penumbra.
2. Periodically mark the phases of the eclipse with the registration of time points when the Moon moves in the Earth's penumbra. The eclipse zone moves to the western edge of the Moon.
3. Register the onset of the total eclipse region on the eastern edge of the disk - the moment the Moon plunges into the Earth's shadow.
4. Note periodically the movement of the darkened zone to the western edge of the Moon.
5. Record the duration of the complete immersion of the Moon in the Earth's shadow (the shaded zone reaches the western edge of the disk).
6. Record the duration of the total eclipse, during which the Moon was completely in the shadow of the Earth. Mark the moment when the Earth's penumbra appears on the eastern edge of the Moon's disk.
7. Finish observations by repeating registration (points 1 - 4) in reverse order.



With a partial shadow eclipse, points 5 and 6 are replaced by the registration of the moment of the largest phase of the eclipse. The observation of a partial penumbral lunar eclipse should not be planned, as it is not visible to visual and photographic observations.

Students may not register these moments, as the darkening of the lunar disk is gradual. If the school physics office has an electrophotometer for astronomical observations, then registration is carried out with its help.

Observers with good color perception can register a change in the color of the earth's shadow on the lunar disk from grayish-black (at the beginning of the eclipse) to red-brown (during the total eclipse). The moon during an eclipse is reddish in color, because the sun's rays, passing through the earth's atmosphere, are refracted and illuminate the lunar surface. Blue and violet rays experience great refraction in the earth's atmosphere and are scattered by it, while red

rays, experiencing little refraction and scattering in the atmosphere, go inside the cone of the earth's shadow and reach the darkened part of the lunar disk, giving it a reddish tint.

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