

Teachers' Guide to Lunar Eclipses: *September 27/28, 2015*

What is a lunar eclipse?

Every month, the Moon makes one trip, or orbit, around Earth. The Moon's orbit around Earth is tilted ever so slightly ($\sim 5^\circ$), so, for example, from the Sun's perspective, the Moon usually passes a little above or below Earth as it orbits around Earth. Occasionally, the Moon reaches a position where it is in a straight line with Earth and the Sun. When this happens, eclipses occur. A lunar eclipse happens when Earth is directly between the Moon and the Sun. Conversely, a solar eclipse happens when the Moon is directly between the Sun and Earth. There are at least four eclipses each year. A total lunar eclipse will be visible from most of North America on September 27 & 28, 2015. To see what time the eclipse will be visible from your location, enter your city at <http://www.timeanddate.com/eclipse/in/usa>.

During a total lunar eclipse, the Moon turns a reddish-orange color. Why? During a total lunar eclipse, Earth blocks the Sun's light from reaching the Moon. While the Moon remains completely within Earth's shadow, some sunlight still manages to reach the Moon. Light reaches the Moon because it is "bent" as it encounters the Earth's atmosphere. As the sunlight (which is made of all the colors of the rainbow) passes through the Earth's atmosphere, most of the blue colored light stays in the atmosphere. The remaining light that makes it to the Moon is a deep red or orange in color and is much dimmer than pure white sunlight.

Upcoming Events

Find information and resources about upcoming celestial events and NASA mission milestones to share with your students at http://www.lpi.usra.edu/education/look_up.

Lunar Eclipses in Your Classroom!

Use the resources below to enable your students to explore lunar eclipses. Create a lunar eclipse lesson or unit that fits into your classroom curriculum with hands-on activities, demonstrations, video clips, online exploration, and presentations by local scientists. Encourage your students to follow the news and explore more about eclipses!



Explore eclipses in your classroom with hands-on activities!

Moon Phases and Eclipses

<http://cosmictimes.gsfc.nasa.gov/teachers/downloads/lessons/1919/eclipse.pdf>

Grade Level(s): Middle School

Using a foam ball and a lamp, learners create a solar eclipse, a lunar eclipse, and learn more about why the Moon appears differently from one night to the next. MS-ESS1-1 (Middle School); Developing and Using Models; Patterns

This and other NASA educational activities, can be found at <http://nasawavelength.org>.

Clarifying Science Through Natural Events

http://marsed.asu.edu/stem-lesson-plans/natural_events

Grade Levels: Middle School, High School

Natural events happen around us on a daily basis and are frequently reported widely in the media. The students in our classrooms are aware of them, curiously engaged or often perplexed as to why they happen. Through this lesson, learn how to turn these timely natural events into NGSS-aligned teachable moments.

Websites

September 27/28, 2015 Total Lunar Eclipse

<http://www.timeanddate.com/eclipse/lunar/2015-september-28>

Lunar Eclipses for Beginners

<http://www.mreclipse.com/Special/LEprimer.html>

Lunar Eclipse Pics from Mr. Eclipse

<http://www.mreclipse.com/MrEclipse.html#Moon>

Lunar Eclipse Visualization: Shadow View

<https://svs.gsfc.nasa.gov/cgi-bin/details.cgi?aid=4340>

Lunar Eclipse Visualization: View from the Moon

<https://svs.gsfc.nasa.gov/cgi-bin/details.cgi?aid=4341>

Lunar Eclipse Viewing

Consider holding an eclipse viewing at your school! Ask your local astronomical society to bring their telescopes for a viewing. Use the links below to locate a local astronomy club and/or speaker.

Night Sky Network

<http://nightsky.jpl.nasa.gov/clubs-and-events.cfm>

The Night Sky Network is a nationwide coalition of amateur astronomy clubs bringing the science, technology, and inspiration of NASA's missions to the general public.

NASA/JPL Solar System Ambassadors

<http://www2.jpl.nasa.gov/ambassador/directory.htm>

Solar System Ambassadors is a nationwide program consisting of volunteers who communicate the excitement of NASA/JPL's space exploration missions and information about recent discoveries to people in their local communities.