

What would an eclipse look like from the moon?

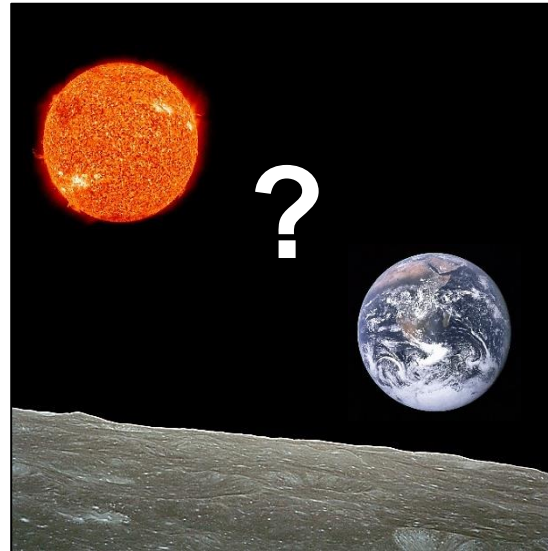
From the moon, what would the Earth look like during a) a solar, b) a lunar eclipse on Earth?

If you were standing on the moon, ask:

- What would the Earth look like when it is going through a solar eclipse?
- What would the Earth look like when it is going through a lunar eclipse?

Asking these deep questions will help the class to visualise the different positions of the Sun, Earth and moon during eclipses, and so consolidate their learning.

*Earthrise image by Bill Anders.
Sun image from http://sdo.gsfc.nasa.gov/assets/img/browse/2010/08/19/20100819_003221_4096_0304.jpg
'Blue marble' image from https://www.nasa.gov/multimedia/imagegallery/image_feature_329.html.
All three images released by NASA and in the public domain.*



The back up

Title: What would an eclipse look like from the moon?

Subtitle: From the moon, what would the Earth look like during a) a solar, b) a lunar eclipse on Earth?

Topic: A deep question discussion on solar and lunar eclipses.

Age range of pupils: 11 years upwards

Time needed to complete activity: 10 minutes

Pupil learning outcomes: Pupils can:

- describe Sun, Earth, moon alignments in a solar and a lunar eclipse;
- explain what the view from the moon might look like at those times.

Context:

Solar eclipse

During a solar eclipse the alignment is Sun – moon – Earth. So, from the moon you would see the moon's shadow pass across a fully-illuminated Earth (a 'full Earth'). The size of the shadow can be gauged from this map of a total solar eclipse.



Map of the 2017 total solar eclipse across parts of the USA.

US solar eclipse map from <https://eclipse2017.nasa.gov/downloadables>, released by NASA into the public domain

Lunar eclipse

In a lunar eclipse, the alignment is Sun – Earth – moon. The Sun would be completely hidden by the Earth and the dark side of the Earth would be facing you (a 'new Earth'). You can gauge the relative sizes of the Earth and the Sun by thinking about the view of the Earth from the moon, as in the image below, and the size of the Sun, as seen from the Earth during the day (not sunrise or sunset, when the Sun's image is enlarged by the refraction of the atmosphere). So the Earth appears much larger than the Sun.



Earthrise – seen from the moon.

As you see only the dark side of the Earth, the view would look like the image on the next page, whilst the moon would be very dark, being covered by the shadow of the Earth.



What the Earth might look like from a dark moon surface during a lunar eclipse of the Earth – annotated NASA images.

The 'Black Marble Americas' image released by NASA is in the public domain.

Following up the activity:

Ask what the view from the Sun, of the Earth and the moon would be during solar and lunar eclipses. *A. In a solar eclipse, with a powerful telescope, you would see the moon, but not the Earth just hidden behind it; in a lunar eclipse you would see the Earth, but not the tiny-looking moon behind it.*

Ask whether or not you might see signs of a solar or a lunar eclipse from Mars. *A. With a powerful telescope, you might see the moon's shadow passing over parts of the Earth during a solar eclipse and the unusually dark moon in the Earth's shadow during a lunar eclipse.*

Underlying principles:

- Eclipses involve the complete alignment of the Sun the Earth and the moon.
- A solar eclipse has the Sun – moon – Earth alignment with the moon completely covering the Sun during a total eclipse, since the sizes of the moon and the Sun appear almost the same. Only the Sun's corona is visible.
- A lunar eclipse has the Sun – Earth – moon alignment, with the shadow of the Earth partially or completely covering the moon.

Thinking skill development:

Abstract thinking is involved in viewing eclipses from different perspectives.

Resource list:

- none

Useful links:

Put 'eclipse' into a search engine like Google and click 'images' for many different views of solar and lunar eclipses.

Source: Chris King of the Earthlearningidea Team.

© **Earthlearningidea team.** The Earthlearningidea team seeks to produce a teaching idea regularly, at minimal cost, with minimal resources, for teacher educators and teachers of Earth science through school-level geography or science, with an online discussion around every idea in order to develop a global support network. 'Earthlearningidea' has little funding and is produced largely by voluntary effort. Copyright is waived for original material contained in this activity if it is required for use within the laboratory or classroom. Copyright material contained herein from other publishers rests with them. Any organisation wishing to use this material should contact the Earthlearningidea team. Every effort has been made to locate and contact copyright holders of materials included in this activity in order to obtain their permission. Please contact us if, however, you believe your copyright is being infringed: we welcome any information that will help us to update our records. If you have any difficulty with the readability of these documents, please contact the Earthlearningidea team for further help.

