

Find the Distance to the Moon!



On March 23rd, 2016 there will be a [penumbral lunar eclipse](#) visible from North America.

What is a lunar eclipse? Sketch and label a picture to demonstrate.

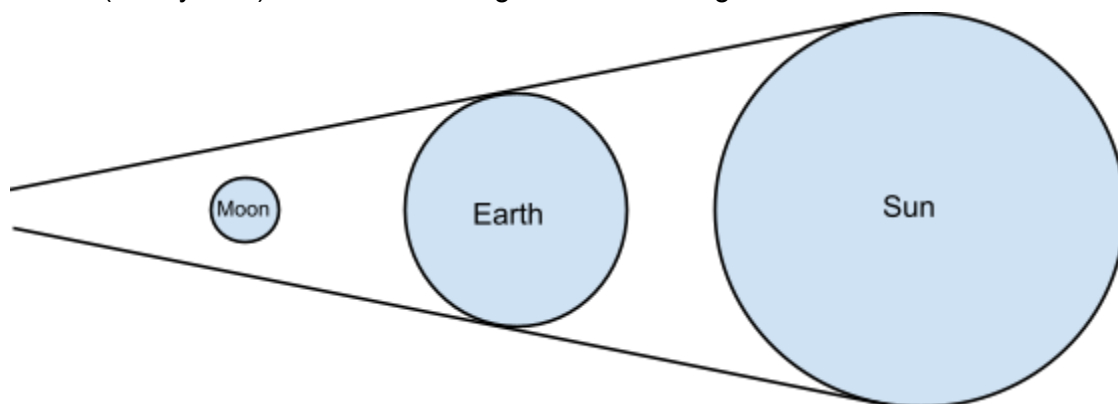
See a simulation of the event at [this webpage](#). One of the early methods people used to estimate the Moon-Earth distance was by using trigonometry during a lunar eclipse. Compare the [Moon's distance you find online](#) with the one you calculate using the following assumptions:

Assumptions:

1. The average [Earth radius](#) is 3,959 miles.
2. The average [Sun radius](#) = 109 x Earth radius.
3. The average [Moon radius](#) = 0.2724 x Earth radius.
4. The average [Earth-Sun distance](#) is 1 AU = 92.955807 million miles.
5. The [shadow of the Earth](#) is approximately 2.6x the diameter of the Moon as the eclipse happens.

Questions:

- A. Find the length of Earth's shadow in space.
- B. Calculate the approximate distance to the Moon from Earth.
- C. Compare that distance with one found online. Discuss any room for error.
- D. Find the length of the Moon's shadow in space when there is not an eclipse (or any time). Consider drawing in another triangle.



- Activity: Pick a planet (not Earth) and find the length of it's shadow in space (pay attention to units)
 - [Diameter of Planets and their Distance from the Sun](#)
 - Present your planet's shadow solution
 - Compare with other classmates who chose the same planet
 - Submit work in class