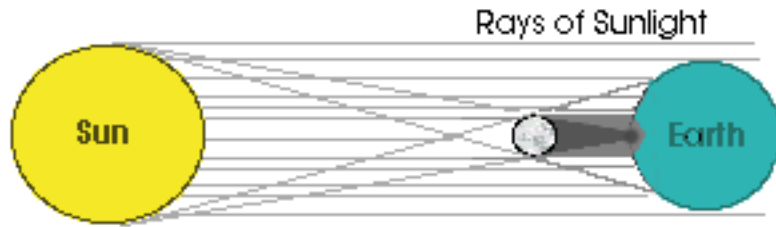
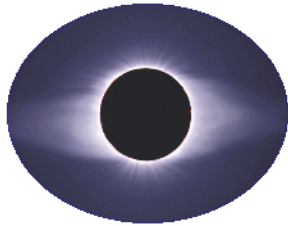


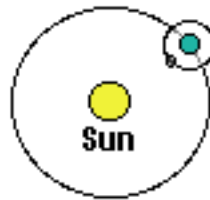
Solar Eclipses



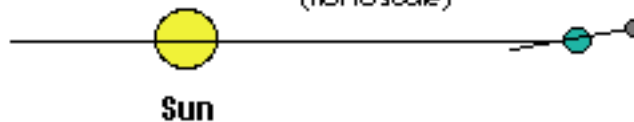
Definitely NOT to scale

Notice that both the Sun and the Moon appear in the sky to be about the same size: half of a degree. You can figure this out yourself, because the system has scaled itself. The Sun is around 400 times the size of the Moon in diameter. But, the Moon is about 400 times closer to us than is the Sun. These cancel out distance effects and scale the apparent sizes of the objects in the sky to the same size. Great! This means, geometrically, that if you could line them up one day, you could blot one out with the other. Because of the distances involved, which one would block the other? The Moon would block out the further Sun. What about when the Moon is on the other side of the Earth? The Earth would cast a shadow on the Moon when they were all three lined up.

When the Moon blocks the Sun, we call it a solar eclipse. (The other eclipse is when the Sun-Earth-Moon lineup is in effect, and the Earth blocks the Moon. But we want to focus on the solar eclipse....) What would that look like from space? What phase is the Moon for a solar eclipse? It is in New Moon (and conversely in Full Moon during a lunar eclipse. Does the Moon always block the Sun each time it moves into the Sun-Moon-Earth alignment? Do you experience an eclipse of the Sun each month? No. Why not? As it is, the Moon does not orbit in the same plane as the Earth orbits the Sun; the Moon orbits 5 degrees tilted to the Earth's orbital plane. So that small number of degrees is enough to limit the solar eclipses to around once a year. The fact that the Moon's shadow is so tiny also means that the number of solar eclipses which happen for a certain place are also limited. People who want to view a solar eclipse usually have to travel to go see one. Lunar eclipses, however, are easier to see, since the shadow of the Earth on the Moon is quite large.



From Above:
Earth orbits the Sun
Moon orbits Earth
 (not to scale)



From the Side:
Lines indicate planes of orbit
Moon's orbit is inclined 5°
from Earth's orbit
 (not to scale)