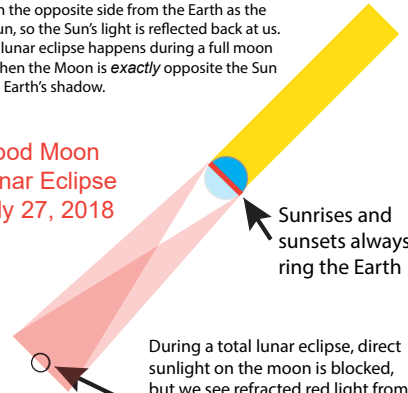


The best way to understand the night sky is through the classical idea of the ecliptic. Earth and the visible planets orbit the Sun in nearly the same plane (the ecliptic plane), and the Moon orbits the Earth in close to the same plane. So we see the Sun, Moon, and planets in nearly one line across the sky (the ecliptic). As the Earth rotates daily, the celestial sphere appears to rotate, and the Sun, Moon, and planets rise and set in sequence along the ecliptic. The Sun and the visible planets appear to move slowly along the ecliptic through the Zodiac constellations that divide it, with the planets' sequence and apparent motion changing based on where they are in their orbits.

### The Ecliptic

A full moon happens when the moon is on the opposite side from the Earth as the Sun, so the Sun's light is reflected back at us. A lunar eclipse happens during a full moon when the Moon is *exactly* opposite the Sun in Earth's shadow.

**Blood Moon  
Lunar Eclipse  
July 27, 2018**

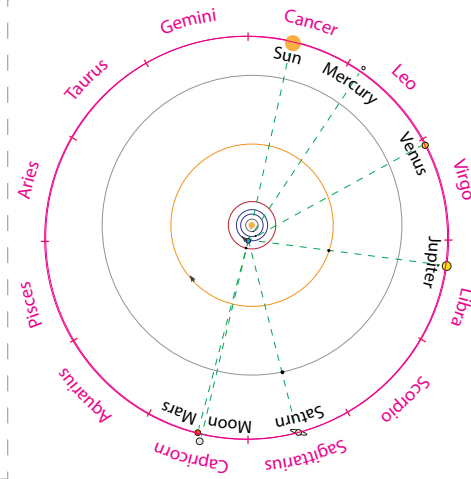


Sunrises and sunsets always ring the Earth

During a total lunar eclipse, direct sunlight on the moon is blocked, but we see refracted red light from all the sunsets and sunrises around the world shining on the moon.

### Solar and Lunar Eclipses

In its monthly orbit around the Earth, when the Moon is between the Earth and the Sun it is not visible from Earth in the bright sky (New Moon), and when it is opposite the Sun it fully reflects the Sun's light (Full Moon). When a New Moon happens just as the Moon crosses the ecliptic plane, the Moon blocks the Sun, briefly creating a solar eclipse. When a Full Moon happens just as the Moon crosses the ecliptic plane, the Earth blocks the Sun from shining directly on the Moon, creating a lunar eclipse. Some sunlight is refracted through the edge of Earth's atmosphere and still reaches the Moon. Since this light comes through the atmosphere as part of all the sunrises and sunsets in a ring around the Earth, it is also red. Hence the Moon turns a light pink or red from this refracted light.



Sun, Moon, Visible Planet  
Positions on 7/27/2018  
Frustrum-shaped star finder,  
celestial sphere, pinpoint planetarium  
Globetarium.com

Know the sky • Know the ecliptic •  
G

### Construction Instructions

- 1) Poke out holes for stars using a push-pin.
- 2) Fold up along dashed lines.
- 3) Tape together edges with clear tape.

### Viewing Instructions

- 1) Look in from below to see constellations.
- 2) In a small darkened room, shine cellphone light in from below to see stars on ceilings and walls.

Selected constellations, asterisms, and bright stars shown. Sun, Moon, and planets not to scale.

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