

Eclipse

Eclipses

- An eclipse takes place when one heavenly body such as a moon or planet moves into the shadow of another heavenly body.
- There are 3 objects that we consider for an eclipse formation with respect to earth.
- Sun (illuminating body)
- Earth (rotating around the sun)
- Moon (rotating around the earth)
- With the three objects, we can have the following scenarios:-
- The 3 can be in straight line (Syzygy)
- The 3 can be perpendicular (Quadrature)

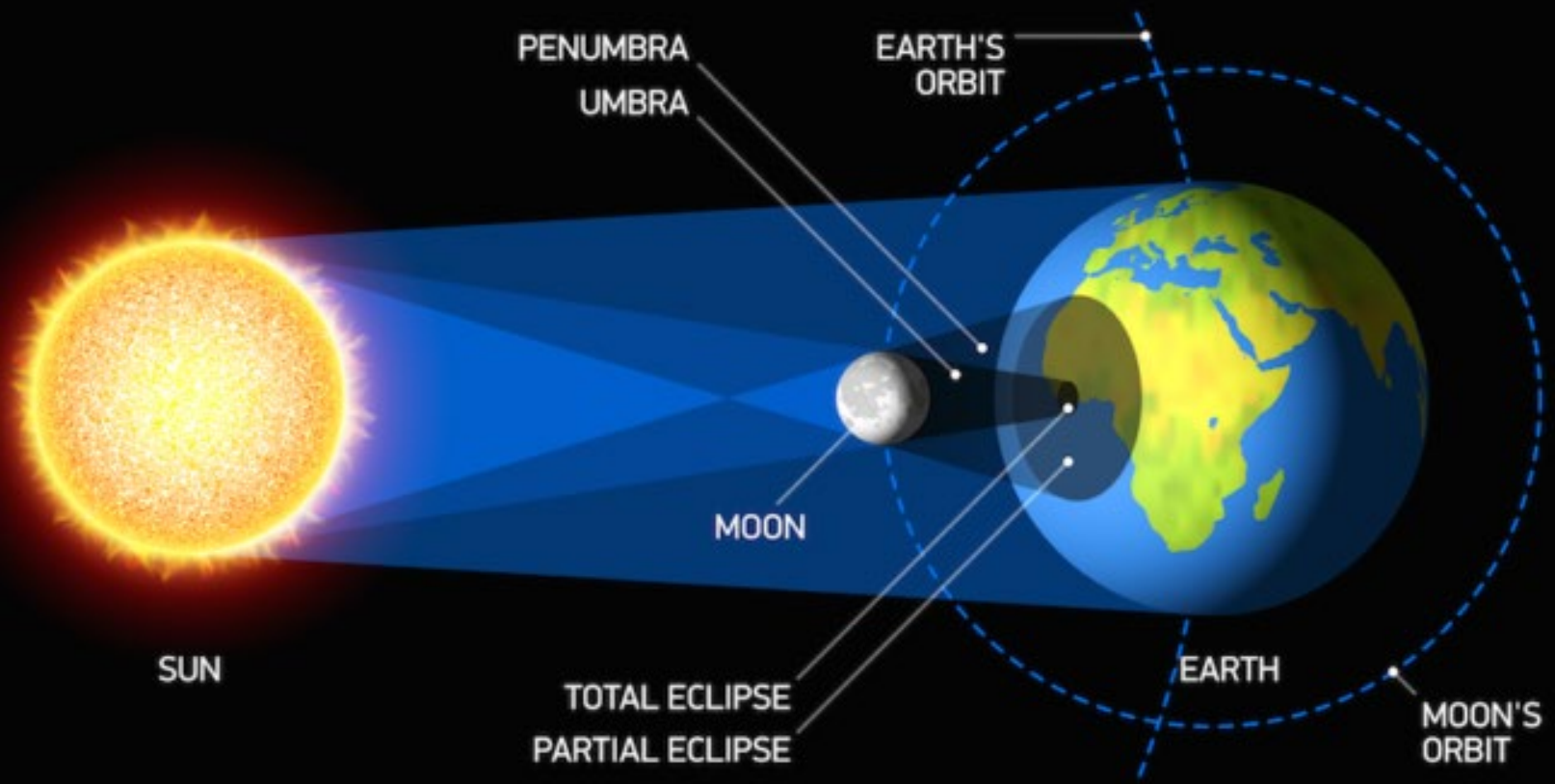
Syzygy

- If the three objects are in straight line.
- This straight line can happen in 2 ways.
- Sun, Moon and Earth in one line (Solar Eclipse)
- Sun, Earth and Moon in one line (lunar eclipse)

Solar Eclipse

- This happens when moon casts its shadow on the earth.
- Sometimes, when the moon orbits around Earth, it moves between the Sun and Earth.
- When this happens, the moon blocks the light of the sun from reaching Earth.
- It can happen only on a New Moon day (Amavasya). (not on every new moon day).

- Average time of solar eclipse is 2 minutes.
Maximum time is 8 minutes.
- There are between 2 and 5 solar eclipses every year.
- There are different types of Solar Eclipse.
 - Total solar eclipse
 - annular solar eclipse
 - Partial solar eclipse.



Total solar eclipse

- A total solar eclipse is only visible from a small area on Earth.
- The people who see the total eclipse are in the center of the moon's shadow when it hits Earth.
- Perigee Position -The moon is nearest to the Earth, The sky becomes very dark, as if it were night.
- For a total eclipse to take place, the sun, moon and Earth must be in a direct line.

Annular solar eclipse

- An annular eclipse happens when the moon is farthest from Earth
- Apogee position – when moon is farthest from the Earth.
- Because the moon is farther away from Earth, it seems smaller.
- It does not block the entire view of the sun. The moon in front of the sun looks like a dark disk on top of a larger sun-coloured disk.
- This creates what looks like a ring around the moon.

Partial solar eclipse

- It happens when the sun, moon and Earth are not exactly lined up.
- The sun appears to have a dark shadow on only a small part of its surface.

Types of Solar Eclipses

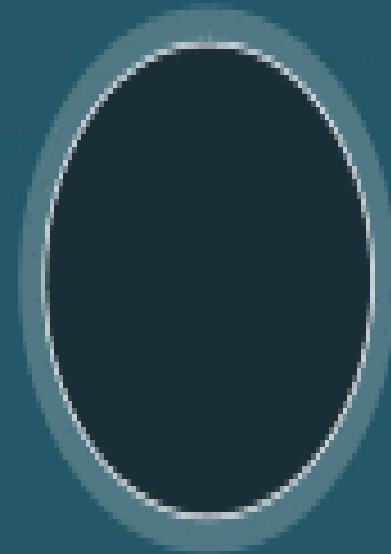
Partial



Annular

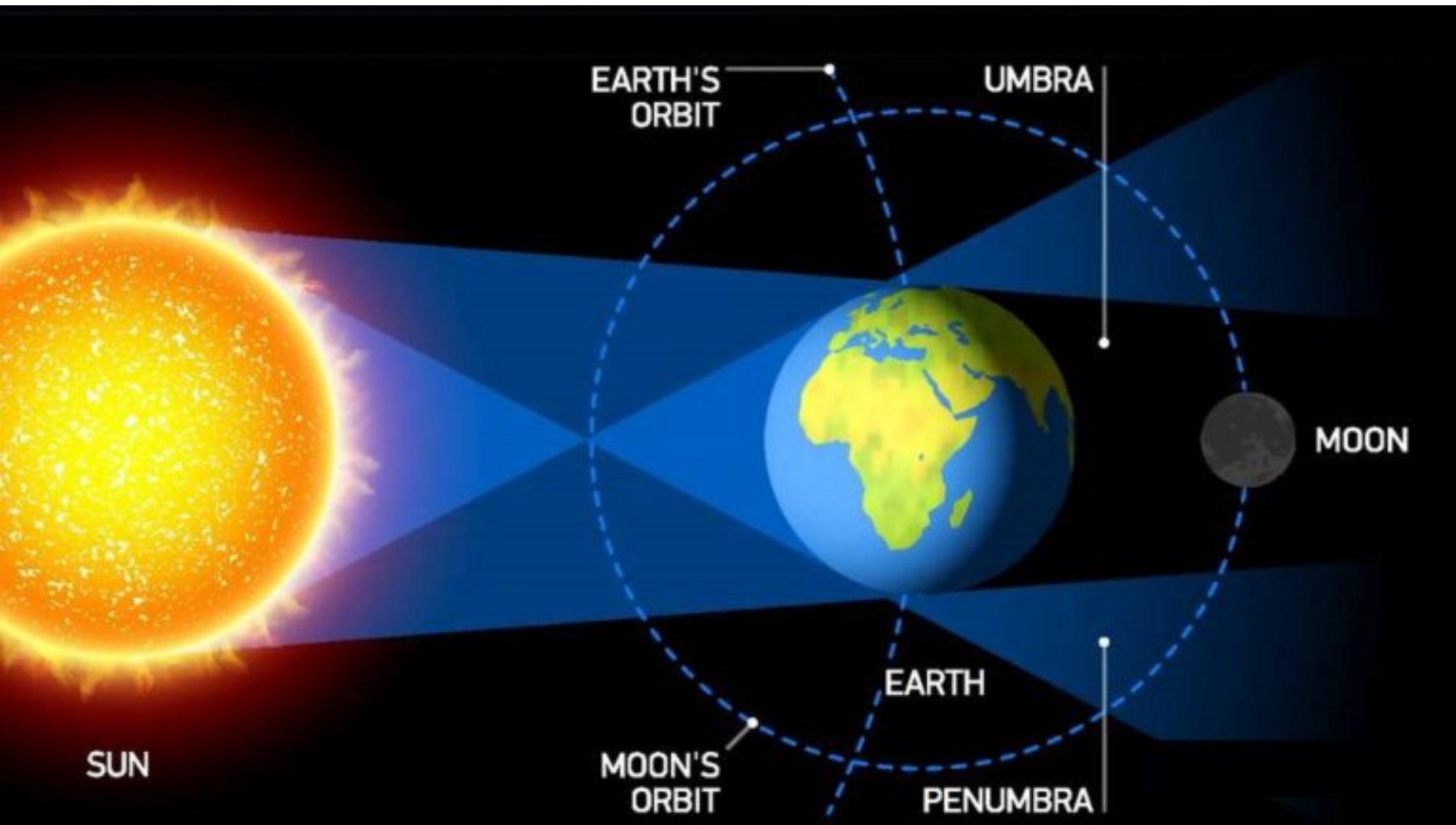


Total

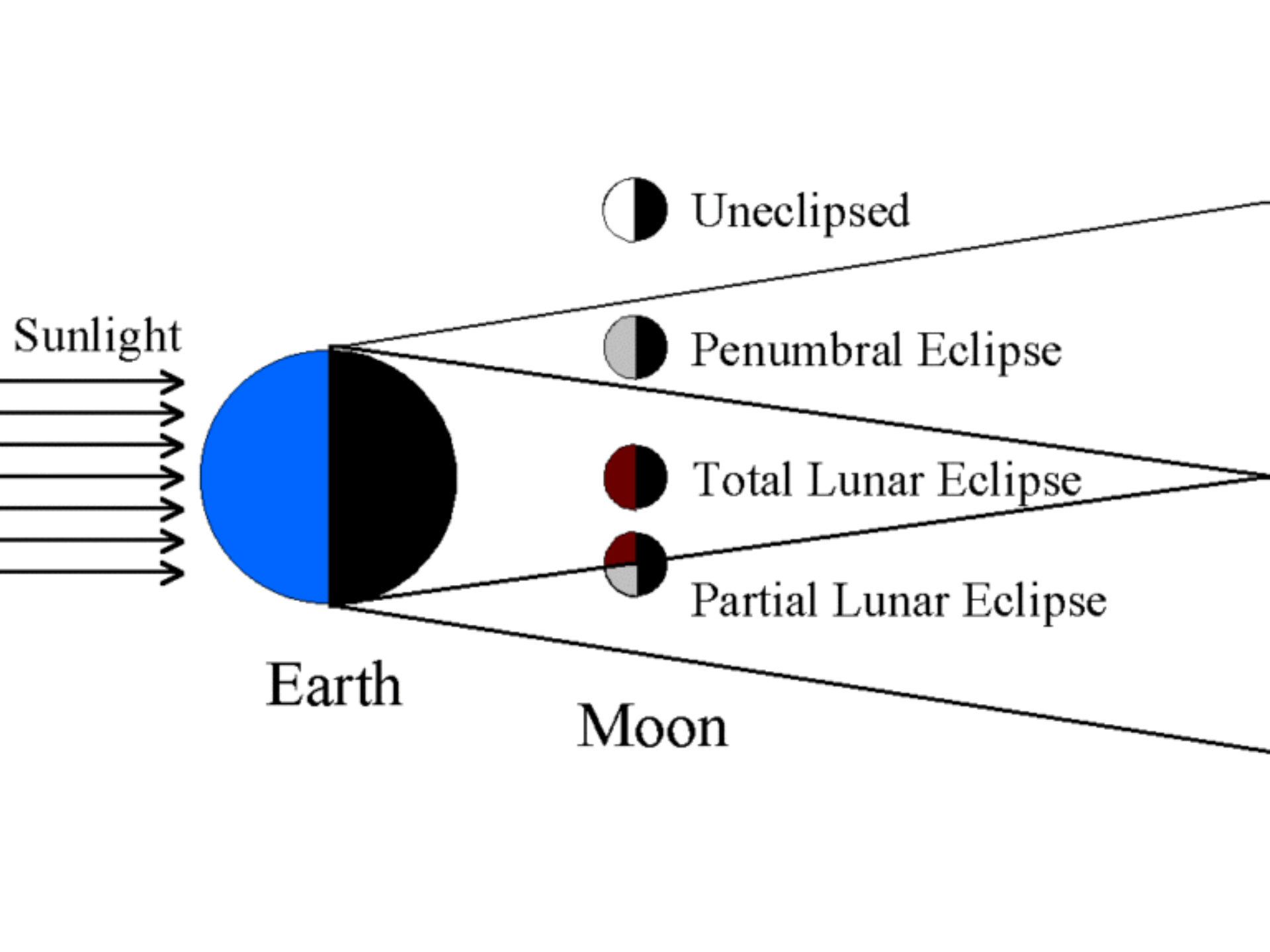


Lunar Eclipse

- This happens when earth casts its shadow on moon.
- The Moon does not have its own light. It shines because its surface reflects the Sun's rays.
- A lunar eclipse occurs when Earth comes between the Sun and the Moon and blocks the Sun's rays from directly reaching the Moon.
- Lunar eclipses only happen at Full Moon (not on all full moon days).



- There are 3 kinds of lunar eclipses: total, partial, and penumbral.
- **A Total lunar** eclipse occurs when Earth's umbra – the central, dark part of its shadow – obscures all the Moon's surface.
- **A Partial lunar** eclipse can be observed when only part of the Moon's surface is obscured by Earth's umbra.
- **A Penumbral lunar** eclipse happens when the Moon travels through the faint penumbra portion of Earth's shadow.



Super Moon

- the moon's orbit around the earth is not a perfect circle.
- It travels in an ellipse that brings it closer to and farther from earth.
- The farthest point is called the apogee, about 405,500 kilometres from earth on average.
- Its closest point is the perigee, about 363,300 kilometres from earth.
- During every 27-day orbit around earth, the moon reaches both its apogee and perigee.

- Full moons can occur at any point along the moon's elliptical path, but when a full moon occurs at or near the perigee, it looks slightly larger and brighter than a typical full moon
- This is called a supermoon.
- The moon appears 14% larger and 40% brighter.



Red moon

- During a total lunar eclipse, though the Moon gets shadowed by the Earth,
- sunlight passing through the Earth's atmosphere, break down in its constituent colours and the red part gets scattered by the atmosphere
- falls on the Moon's surface, thereby making it take on a reddish copper hue.
- For this reason since antiquity, a totally eclipsed Moon is called a "Blood Moon".
- It has no other special relevance other than the fact that the colour of the Moon looks blackish-red.



Blue Moon

- This full Moon occurs twice in a calendar month, the last one being on January 2. The next one, on January 31, is termed a “Blue Moon”.
- The Moon does not turn blue but historically the second full Moon of an English calendar month is termed as a Blue Moon.
- Hence the oft-quoted phrase of a rare occurrence of any event as “once in a Blue Moon”.