

MTWTFSS Discuss Eclipses?

DATE: _____

Eclipses:

An eclipse is an astronomical event that occurs when one celestial body moves into the shadow of another.

There are two main types of

eclipse

Solar
eclipse

Lunar
eclipse

Hadith: "The sun & moon are two signs from among the signs of Allah. They do not eclipse because of the death or life of anyone. So when you see them offer prayer." (Sahih Bukhari) Hadith no 1043

This hadith was said when an eclipse occurred at the time of the prophet Muhammad (PBUH) it emphasizes that eclipses are natural signs of Allah's power,

not Superstitious omens.

Famous Astronomer Albiruni stated in his Book "Kitab al Taflim" that:
 "The eclipse is a natural phenomenon caused by the interposition of one Celestial body b/w another & the observer on Earth."

Solar eclipse:

The sun is hidden not b/c it sets but b/c something else comes in front of it "Aristotle"

A solar eclipse is a celestial event that occurs when moon passes b/w the Earth & Sun. When this happens, the moon blocks the light of the Sun, from reaching Earth. This alignment causes the shadow of the moon to fall on the Earth. This is called Solar eclipse.

The shadow on Earth consists of two regions -

Umbra

The central darkest part of the shadow where all Sun light is blocked

Penumbra

The lighter outer part of the shadow where only a portion of the sun is obscured

DATE: _____
MTWTFSS happens once every 18 months.

→ It happens during the new moon phase when Sun, moon & Earth aligned in a straight line called Syzygy.
→ Last for a few minutes

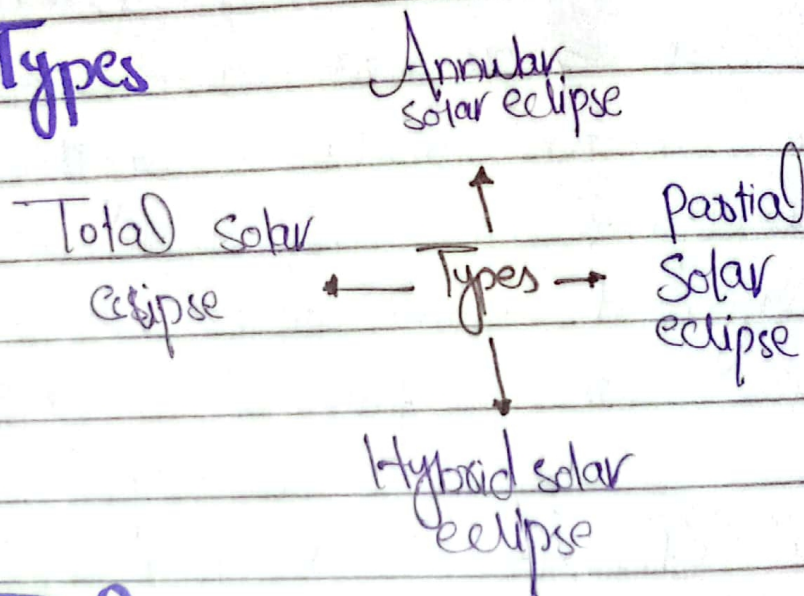
→ The moon casts a shadow on Earth

Umbra → The central darkest part

Penumbra → The outer outer part

Antumbra → The region where the moon appears completely inside the sun's disk creating an annular eclipse
the moon is too far to completely cover the sun

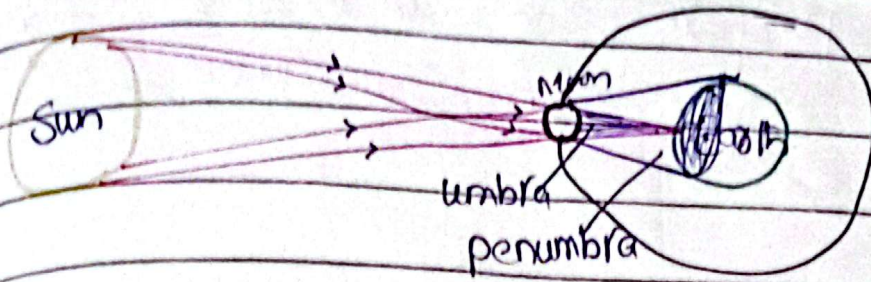
Types



Total:

→ occurs when the moon completely covers the sun as seen from earth

→ Day temporarily turns to night
stars become visible



People ~~from~~ on Earth who are in the umbra region cannot see the sun at all.

one of the greatest spectacles of nature

Looking at solar eclipse without any protective eye cover severely damage/harm one's eyes

In round numbers sun's diameter is 400 times that of the moon. & the sun distance from Earth is also 400 times that of the moon. Therefore moon's disk appears large enough to cover the sun's disk.

Total solar eclipse can last only up to 7.5 minutes at any place.

Partial

When Earth, moon & sun do not align in perfect straight line, Moon partially covers the sun.

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People on the Earth on Penumbra
region can see this

Annular:

- When moon is directly in front of the sun but appears smaller & does not cover the entire sun.
- This creates a ring fire around the moon.
- Happens when the moon is farther from Earth in its orbit.
- Sun remains visible during the eclipse.

Hybrid:

A rare type that appears as total in some locations & annular in other due to Earth's curvature.

Why don't we see a Solar eclipse every month?

Even though a new moon occurs every month but Solar eclipse are rare & don't happen in every month because:

The Three bodies only align perfectly during eclipse season when the moon is near to line of nodes (in two points where its orbit crosses the ecliptic).

The moon's orbit is tilted about 5° to Earth's orbit around the sun.

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Lunar Eclipse

During a lunar eclipse, the Earth casts a curved shadow on the moon, this proved that the Earth is round/spherical.

A lunar eclipse occurs when the Earth comes directly b/w the Sun & Moon & Earth's shadow falls on the moon. This can only happen during a full moon when Sun, moon & Earth are aligned in a perfect straight line.

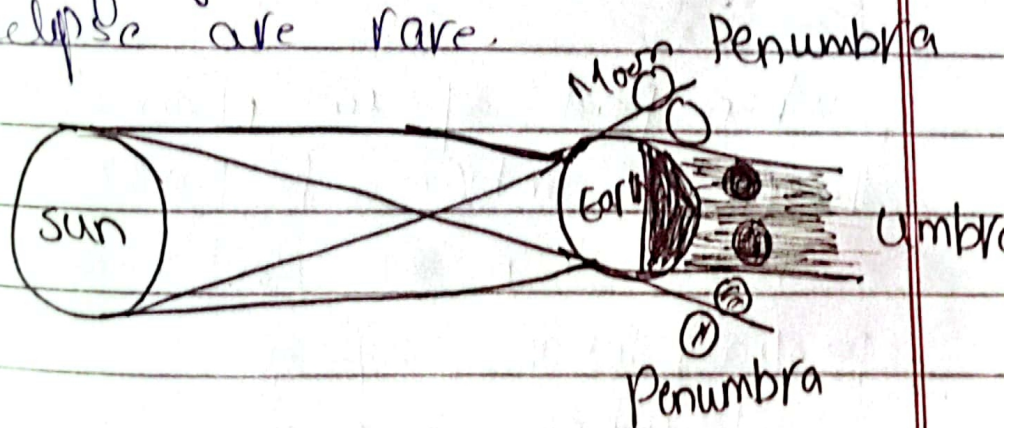
A lunar eclipse occurs when Earth comes b/w the Sun & moon & Earth's shadow falls on the moon (NASA.)

How it happens:

The moon orbits the Earth
Earth orbits the Sun

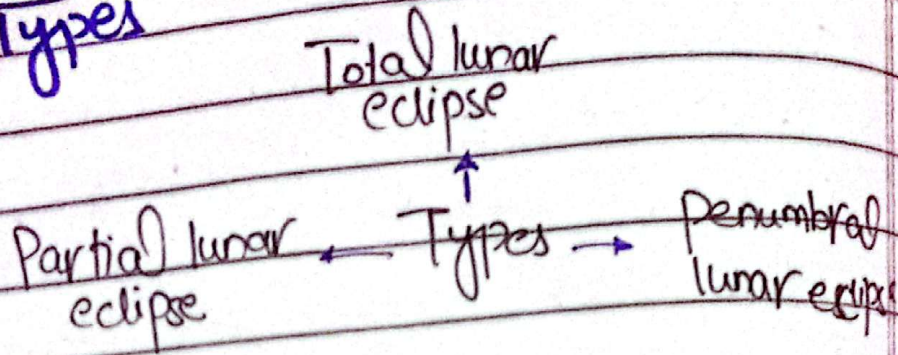
Sometimes Earth moves b/w Sun & moon

- During a full moon, moon passes through Earth's shadow. it is partially or fully blocked from the sun light.
- Normally sunlight reflected by the moon & moon shines but during a lunar eclipse when Earth comes b/w moon & sun, sun light reflect to Earth instead of light hitting the moon's surface, Earth's shadow falls on it.
- the moon appears darkened & reddish.
- It lasts for a few minutes.
- two partial lunar eclipse happen every year but total lunar eclipse are rare.



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Types



Total:

- when entire moon passes through umbral region of Earth's shadow
- The moon is totally obscured
- Moon appears reddish called Blood Moon due to Rayleigh scattering of sunlight by Earth's atmosphere.

Partial

when part of the moon passes through the umbra of Earth's shadow then it is termed as partial lunar eclipse.
As its whole area is not obscured by the shadow.

Penumbra:

- When the moon passes through the penumbra of Earth's shadow.
- it is rarely visible from Earth as there is slight change of colour of the moon.
- often hard to notice with naked eyes.

Why lunar eclipse don't occur every month?

The moon orbits around the sun but lunar eclipse doesn't happen every month because. Though the moon goes around Earth but it doesn't always get in Earth's shadow. The moon's orbit is tilted by 5° to Earth's orbit, so the sun, Moon & Earth perfectly align at certain times. That's why we get 1-3 lunar eclipses every year.

not every full moon

Visibility of Lunar eclipse

unlike solar eclipse, lunar eclipse are visible from anywhere on the night side of Earth. So more people can see a lunar eclipse than a solar one.

Duration

Total lunar eclipse last over 1 hour

Much longer than solar eclipse which are usually ^{just} a few minutes

