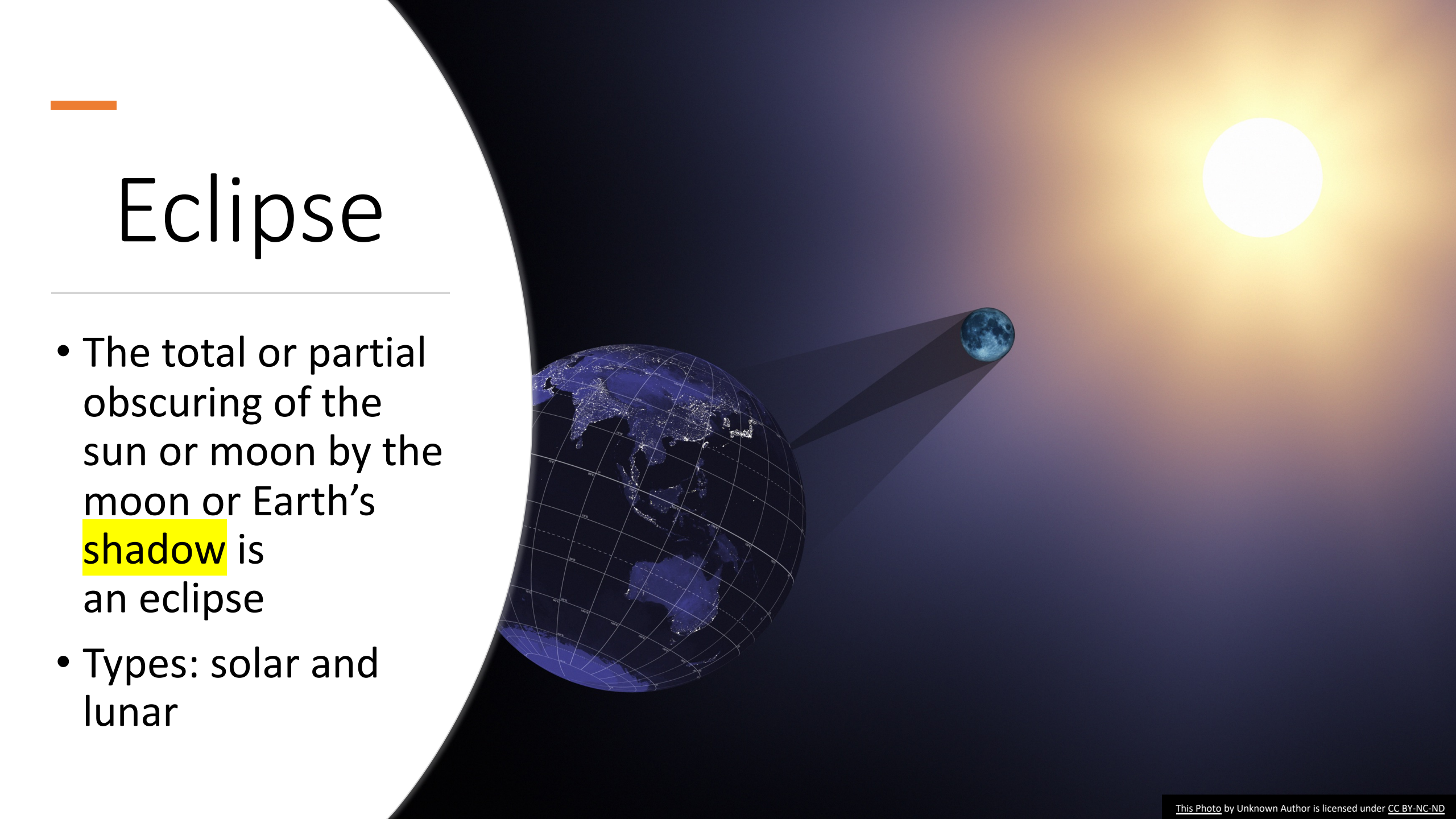
Eclipses and Tides

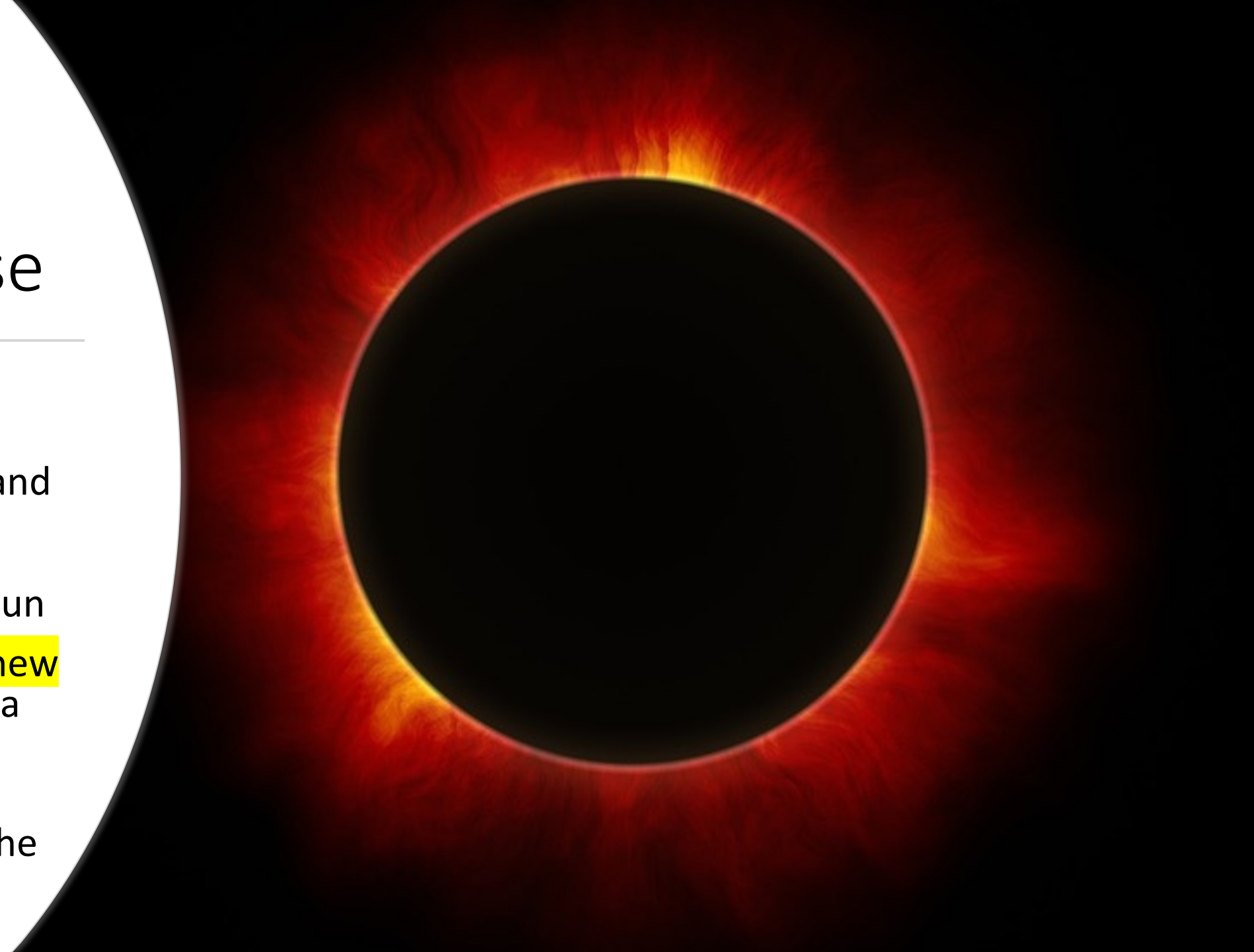
Eclipse

- The total or partial obscuring of the sun or moon by the moon or Earth's shadow is an eclipse
- Types: solar and lunar



Solar Eclipse

- Occurs when the Moon passes between the Earth and the Sun totally or partially obscuring Earth's view of the sun
- The moon is in the new moon phase during a solar eclipse
- The moon casts a shadow on part of the Earth.



Total vs Partial Eclipse

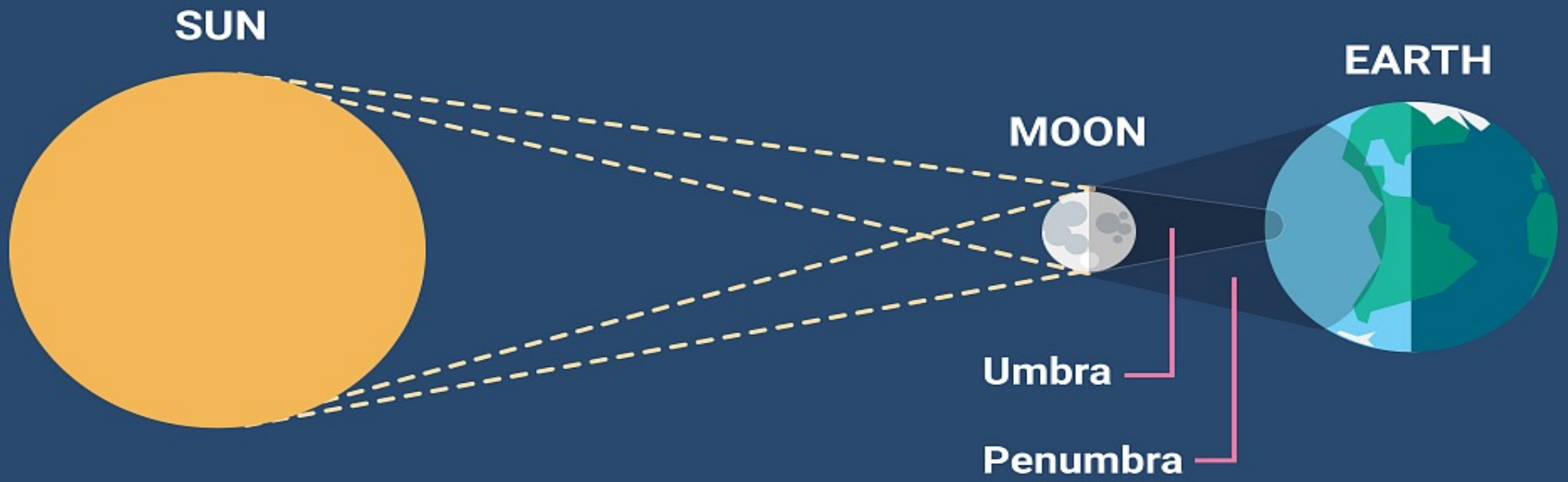
Total Eclipse

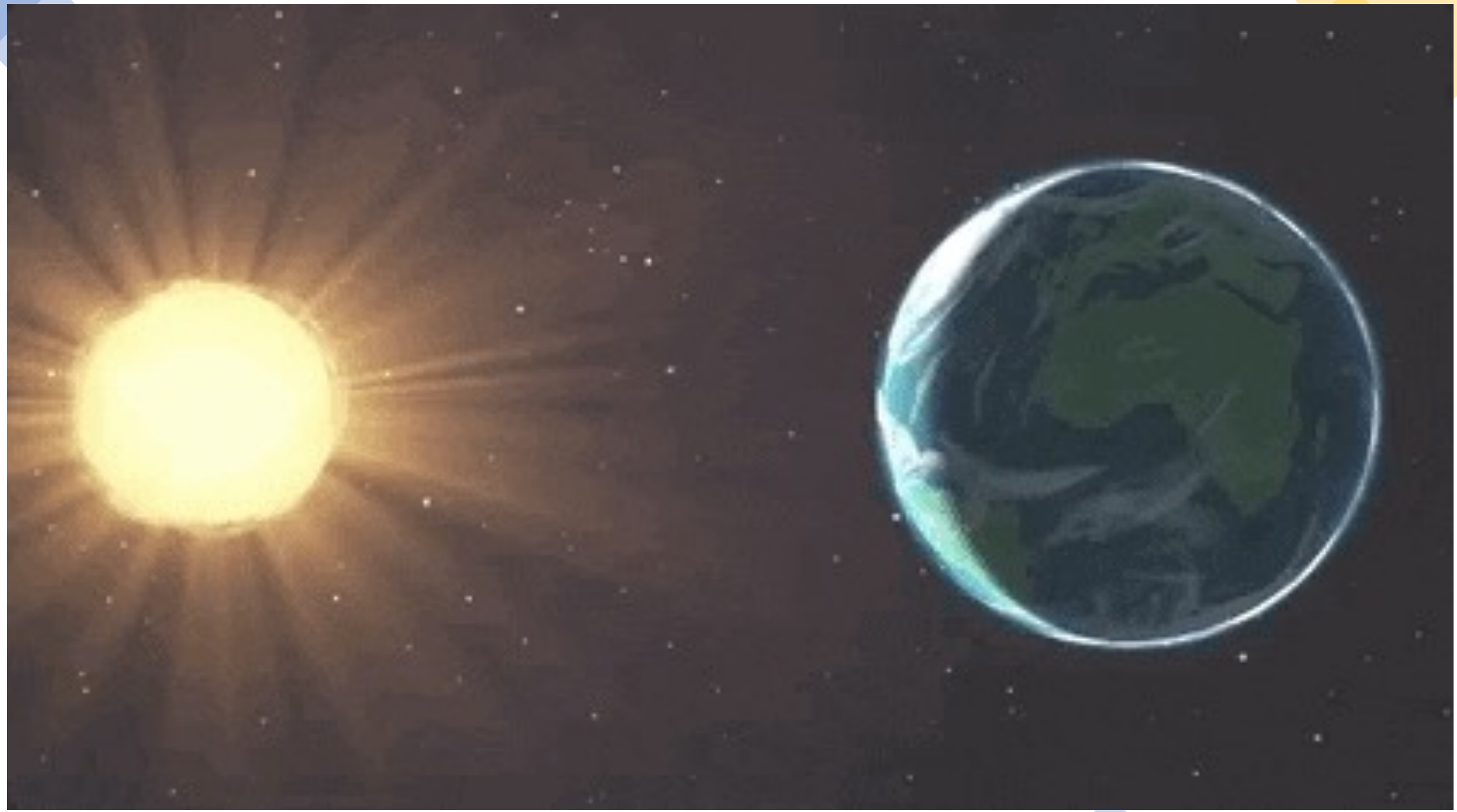
- A total solar eclipse occurs when the moon blocks out all of the sun's light.

Partial Eclipse

- A partial solar eclipse occurs when the moon blocks out only a part of the sun.

Solar Eclipse Diagram





https://www.wdel.com/news/the-2017-total-eclipse-everything-you-need-to-know/article_055e88d0-8101-11e7-a1d9-4b7f14acd4f6.html

Annular Eclipse

- When the Moon is at its furthest point in orbit
- Its shape will not cover the Sun completely.
- This is when you can see a thin ring of light emerging from the outside rim of the moon.

Lunar Eclipse

- Occurs when the Earth passes between the Moon and the Sun.
- The Earth casts a shadow on the Moon blocking all or a portion of it.
- The moon is in the full moon phase during a lunar eclipse
- Occurs at night

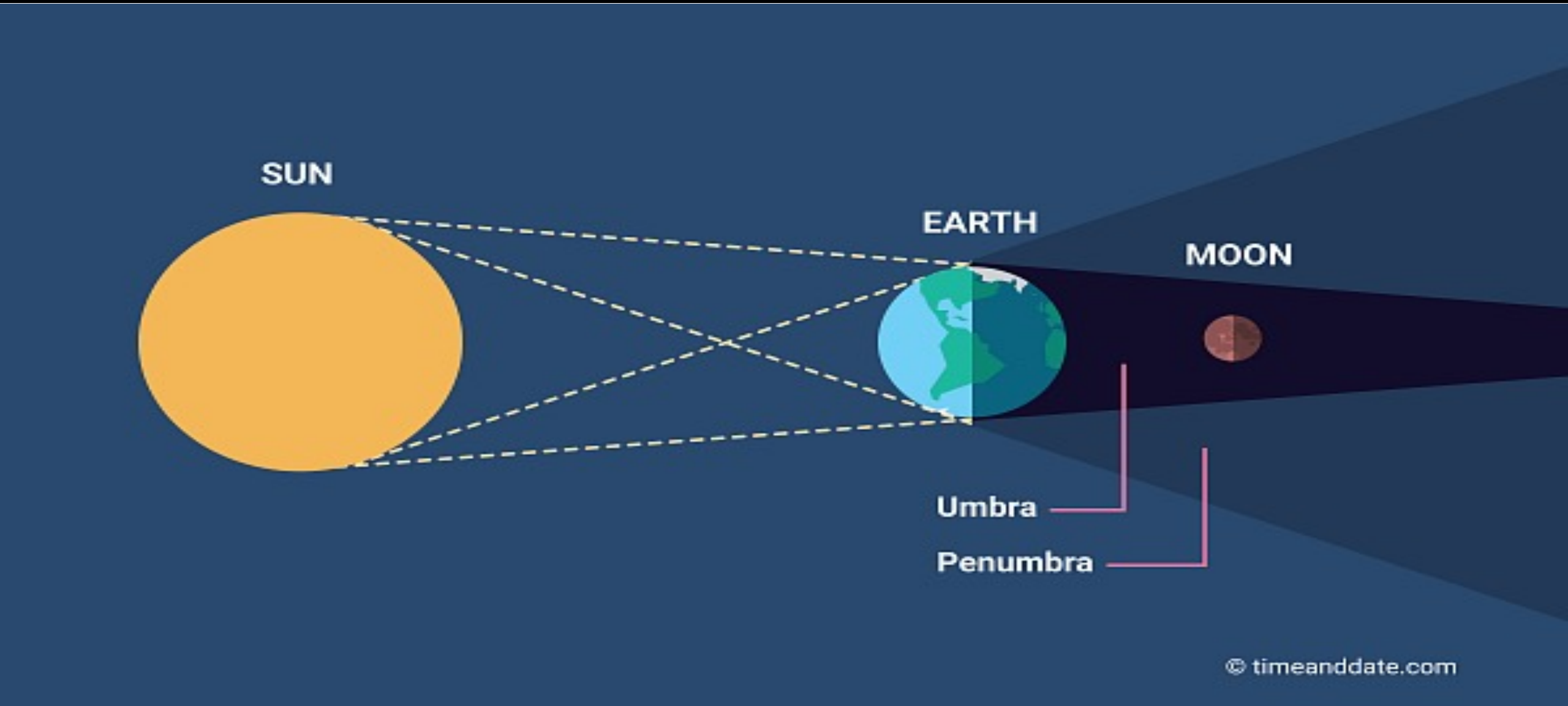
Total Eclipse

- A total lunar eclipse occurs when the moon completely passes into the darkest part (umbra) of Earth's shadow
- Only occurs during full moon phase
- Occurs at night

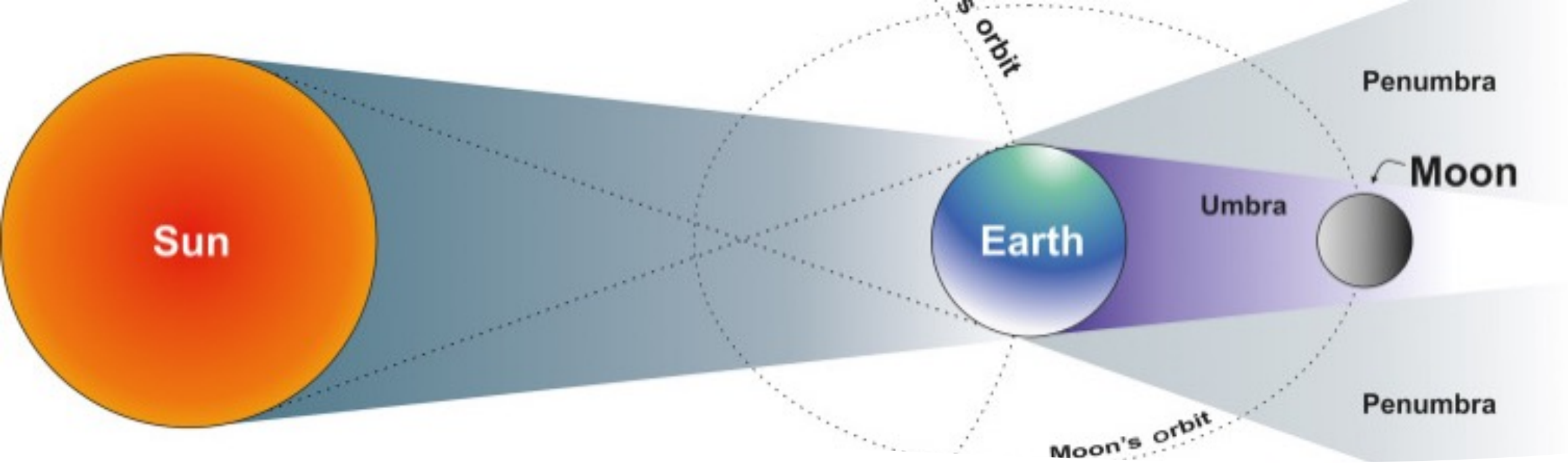
Partial Eclipse

- A partial lunar eclipse occurs when the moon passes into the lightest part (penumbra) of Earth's shadow.
- Occurs only at Full moon phase
- Occurs at night

Lunar Eclipse Diagram

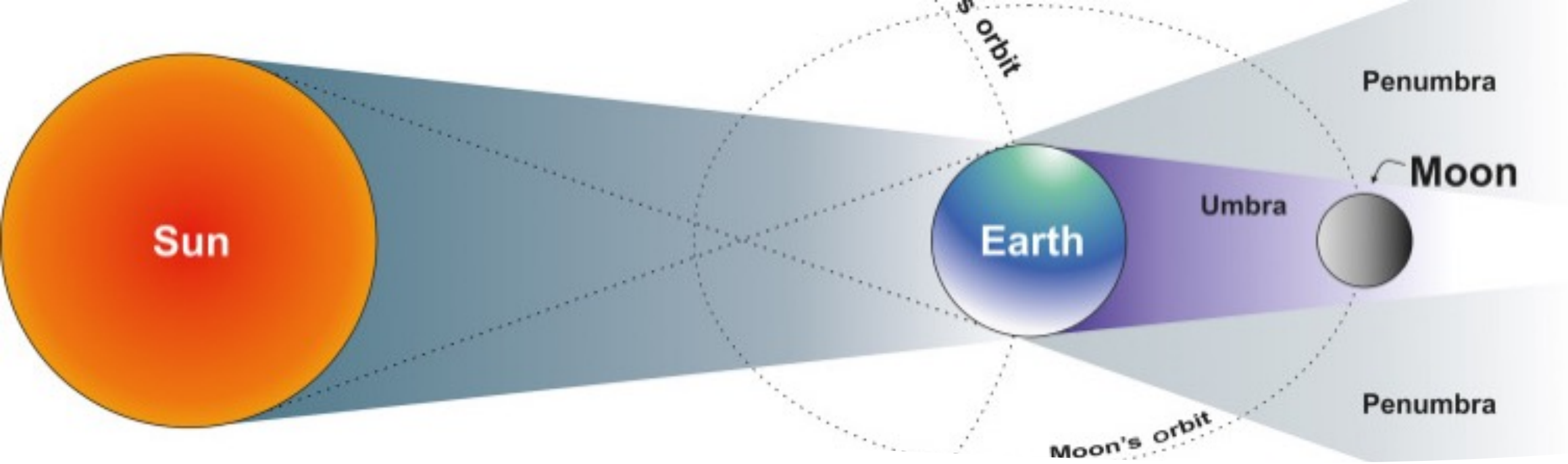


https://www.youtube.com/watch?v=uzorkQxyc-g



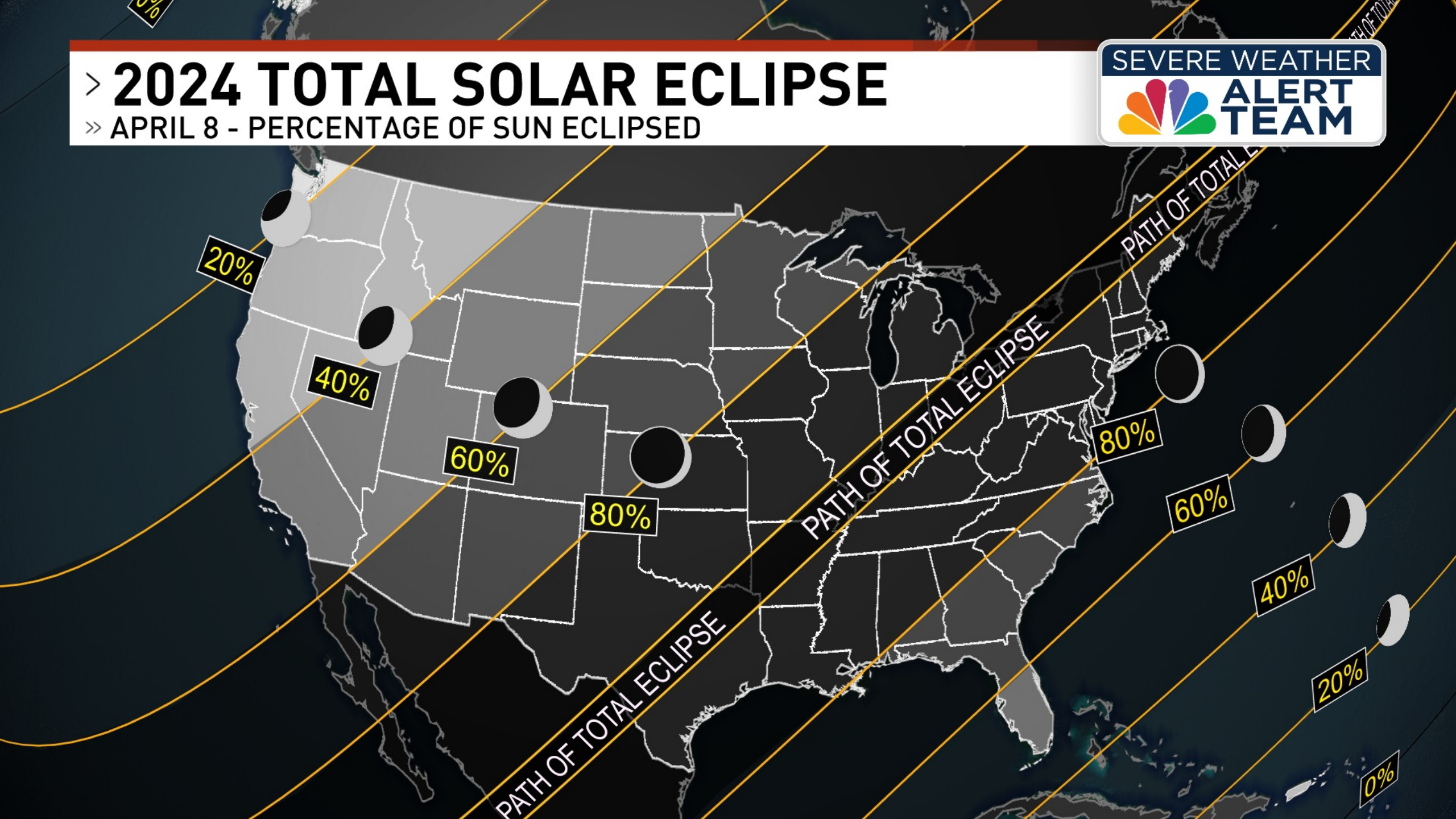
Umbra

- The darkest part of a shadow is the umbra
- The cone-shaped region of full shadow cast by Earth and the Moon during an eclipse.
- ***(This is where <u>total eclipses</u> occur, whether it's solar or lunar)***



Prenumbra

- The area of partial shadow surrounding the total shadow cast in an eclipse is the penumbra


2024 TOTAL SOLAR ECLIPSE
APRIL 8 - PERCENTAGE OF SUN ECLIPSED
SEVERE WEATHER
ALERT
TEAM
20%
40%
60%
80%
PATH OF TOTAL ECLIPSE
PATH OF TOTAL ECLIPSE
PATH OF TOTAL ECLIPSE
80%
60%
40%
20%
0%

Reno Eclipses?

Last Solar Eclipse

- August 21, 2017 (80%)

Last Lunar Eclipse

- March 13, 2025

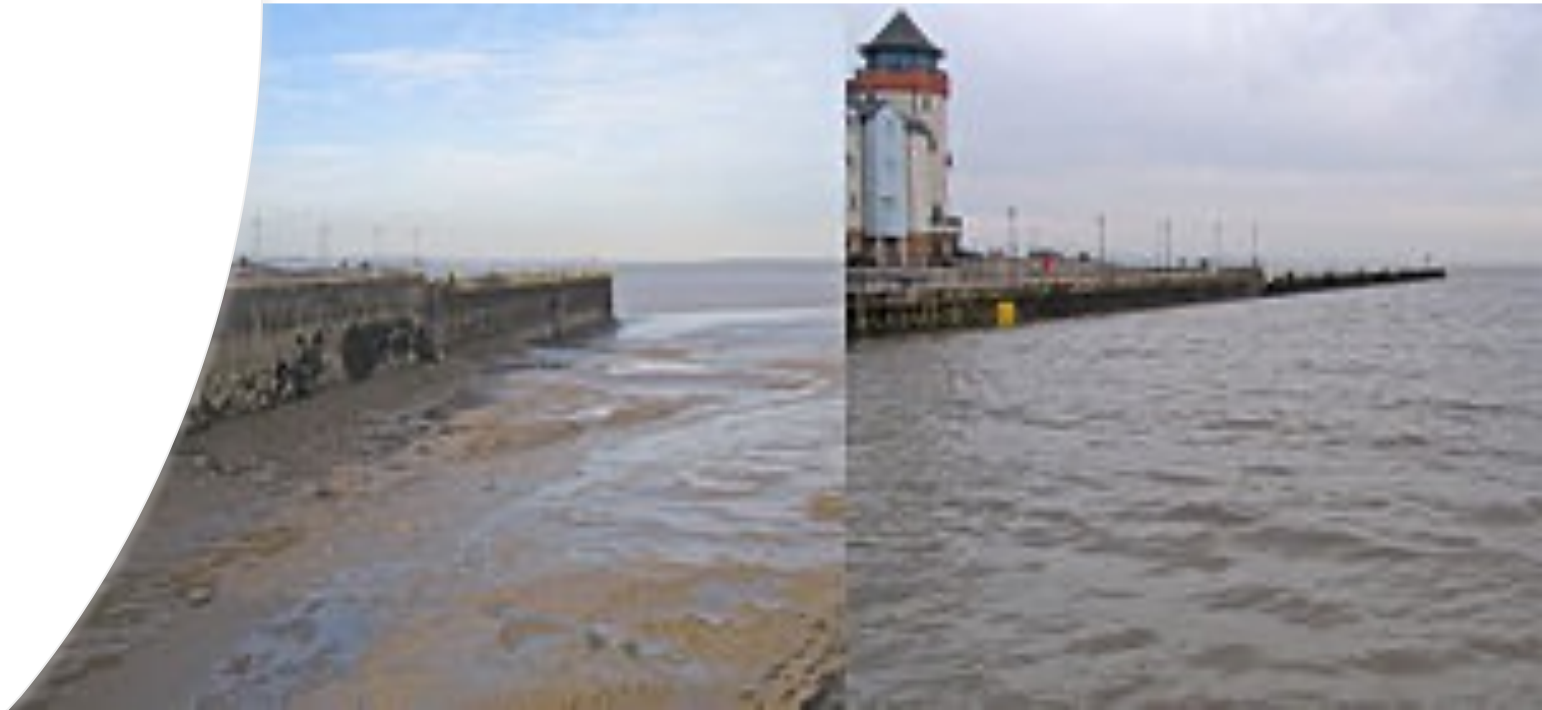
Next Total Solar Eclipse

- August 12, 2045

Next Total Lunar Eclipse

- March 3, 2026

Tides



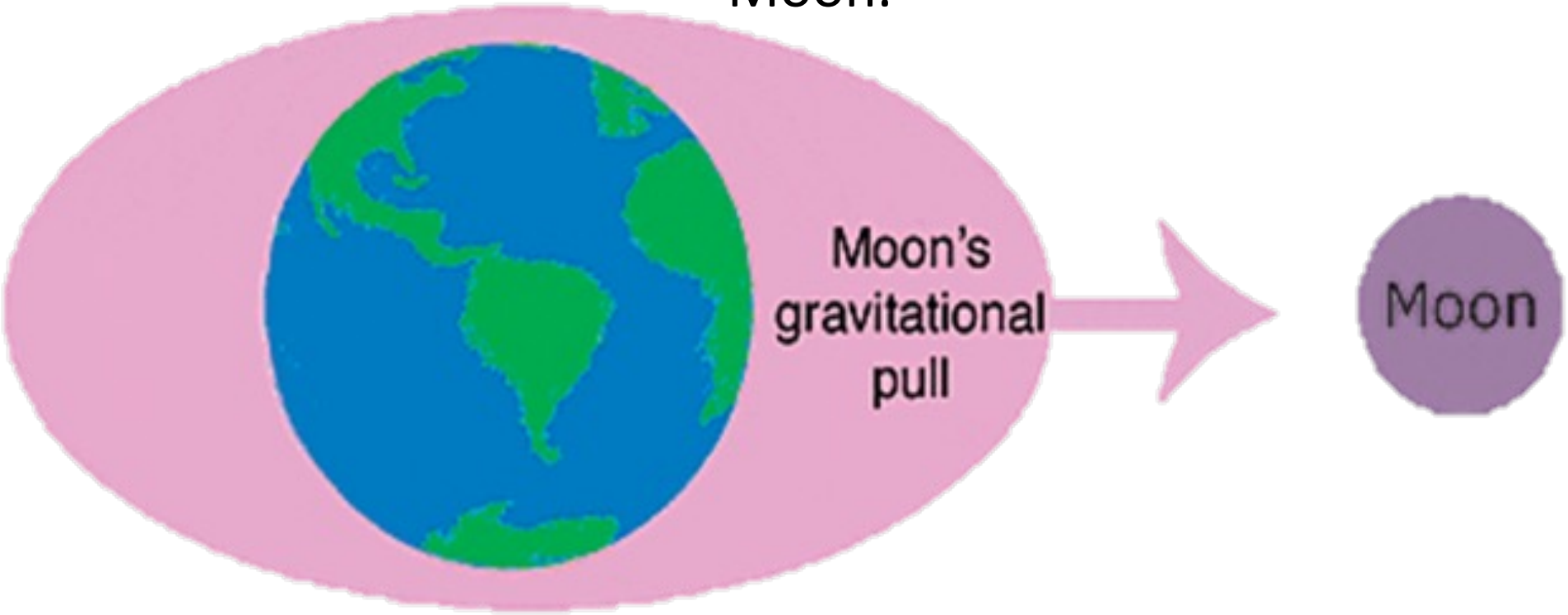
What Causes Tides?

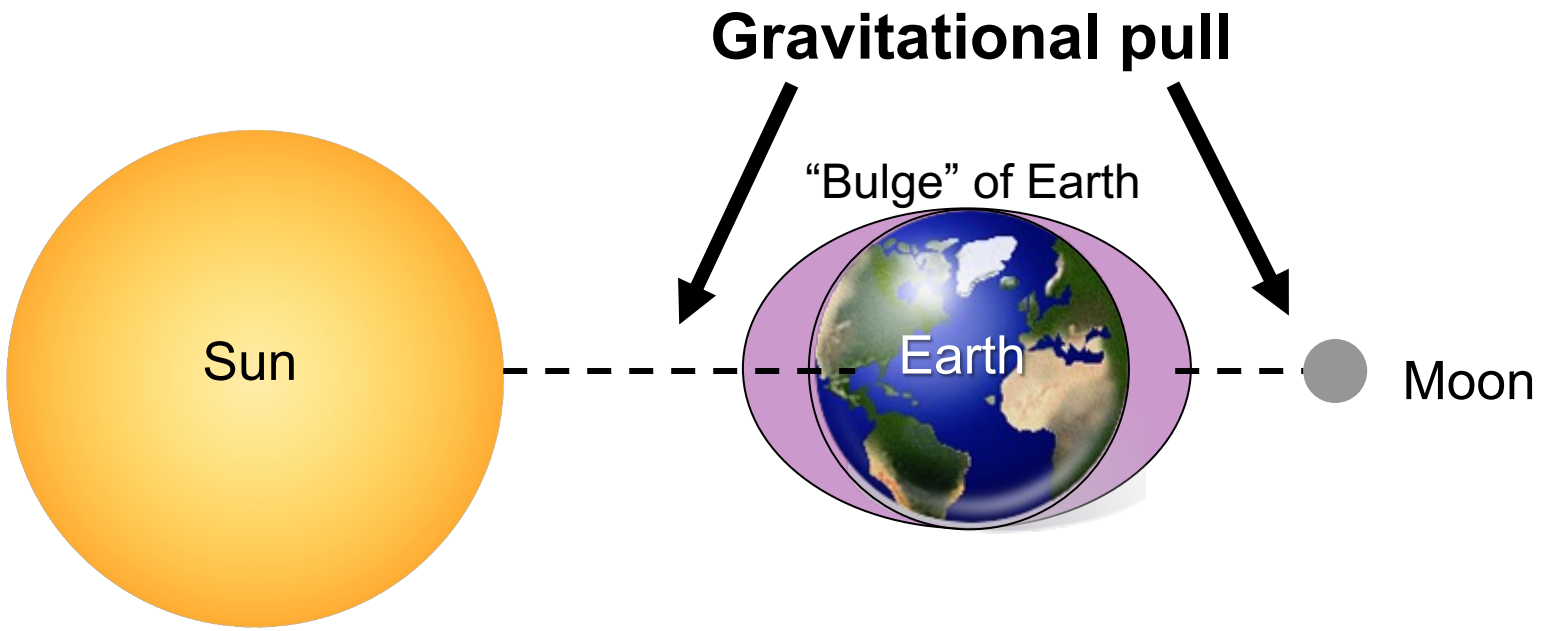
The gravitational pull from the Moon, and the rotation of the Earth on its axis, cause the ocean and sea water to bulge, producing the tides.

https://www.youtube.com/watch?v=8bSXuxjIACU

- The Moon pulls on the water on the side nearest to it more strongly than it pulls on the center of the Earth.

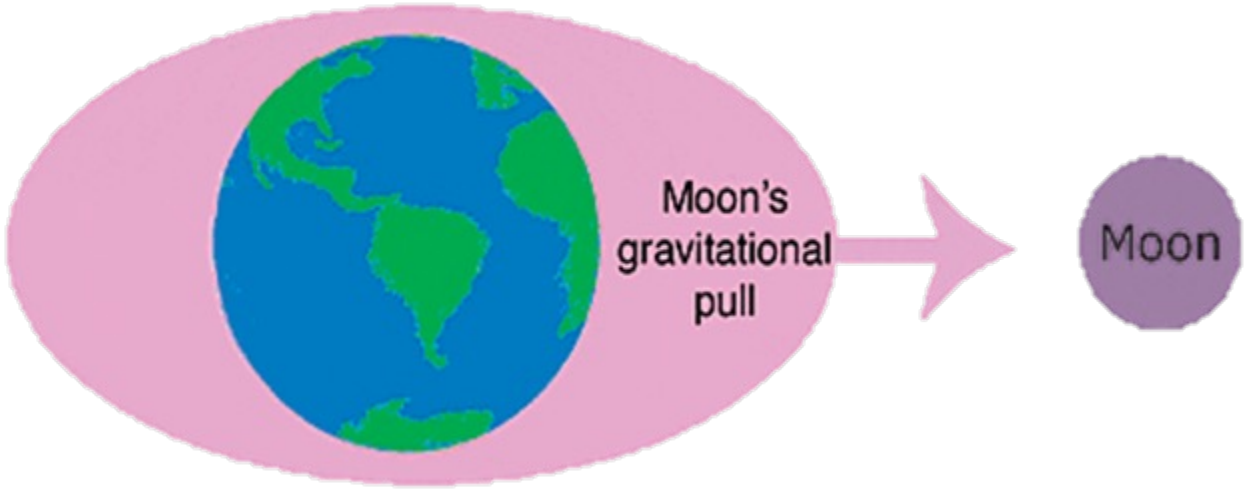
- This pull creates a bulge of water on the side of Earth facing the the Moon.



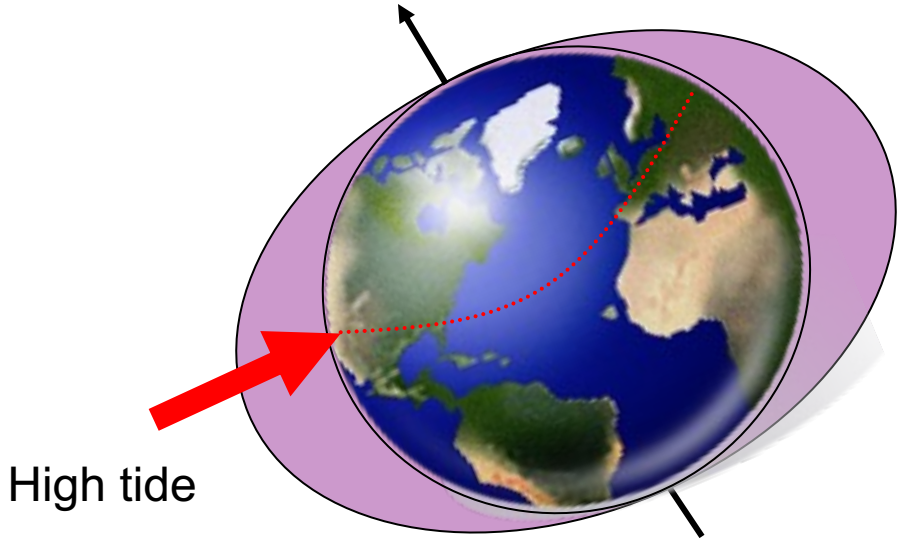

Gravitational pull
“Bulge” of Earth
Sun
Earth
Moon

- The water on the side of Earth facing away from the Moon has a less strong pull.

- As Earth rotates, different places on the planet's surface pass through the areas of the tidal bulges and have the change in water levels.

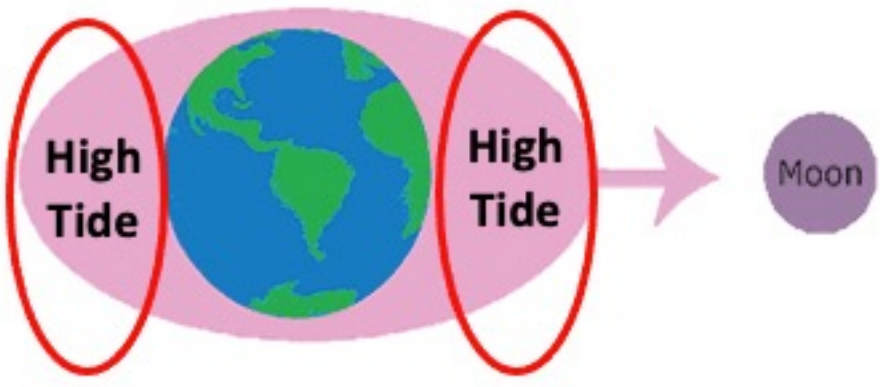


The Earth rotates one full turn in 24 hours, but the bulge of water stays on the side of the Earth facing the moon. The bulge stays in place as the Earth moves under it.



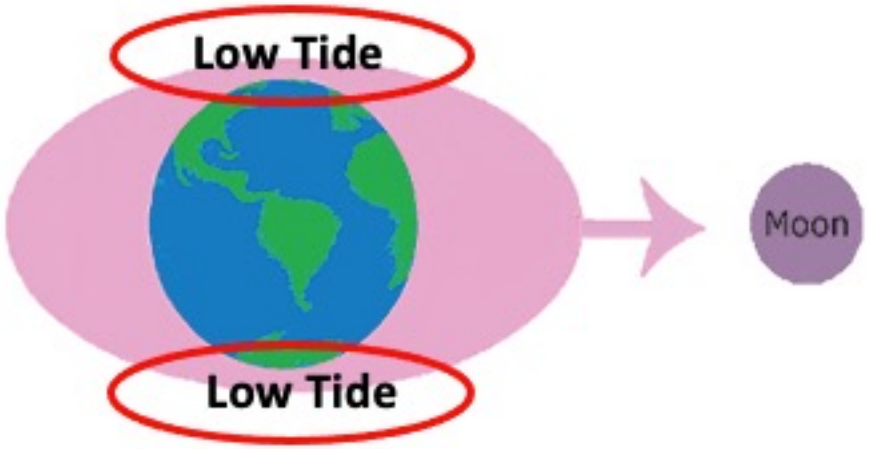
High Tide

- In places where there are tidal bulges, high tide is occurring along the coastlines.



Low Tide

- In places between the tidal bulges, low tide is occurring along the coastlines.



Spring Tides

Occur during the full moon and new moon.
Extreme tides; risk of coastal flooding.