





Intro

- Only natural satellite.
- Closest celestial object.
- Diameter => 2159 miles (3475 km) .
- Distance => 2,38,860 miles (3,82,500 km) .
- Perigee => 2,24,000 miles (Supermoon occur 14% large) .
- Apogee => 2,52,000 miles.
- Surface area => 37,90,00,000 km².
- Mass => 0.0735×10^{24} Kg.
- Density => 3.34 g/cm³.
- Gravity => 1.6 m/sec².
- Escape velocity => 2.38 km/sec.
- Moon Tour



Formation

- The mars sized planet **theia** collided with early molten earth (giant impact hypothesis) after 95 million year solar system form.
- A cloud of dust and derbies formed.
- Gravity holds and bound those cloud.
- Apollo mission, brought data & 382 kg lunar samples.

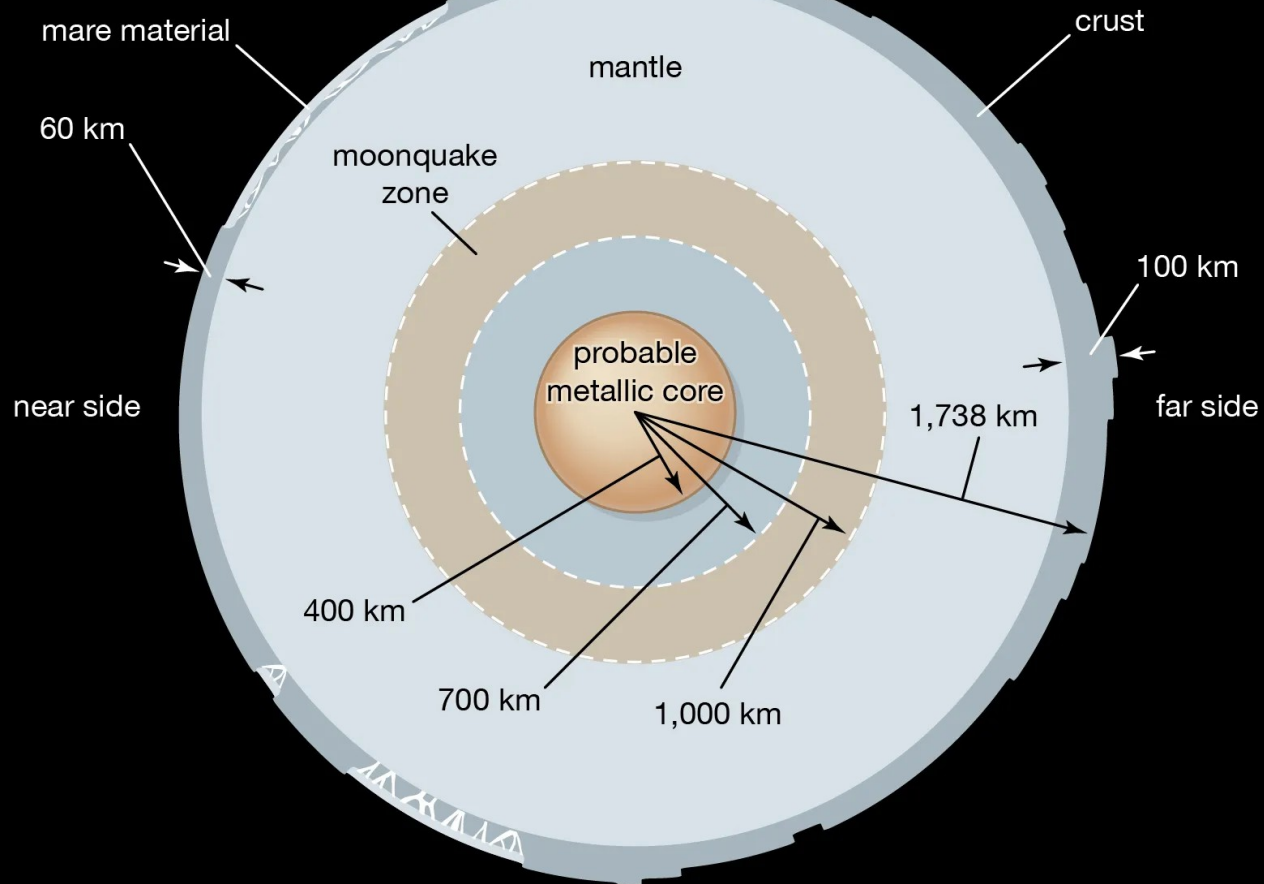


Surface

- Identical surface with earth.
- Three layer- core, mantle and crust.
- **Core** is smaller than others, 149 miles of iron rich inner core surrounded by 56 miles of liquid iron shell. Thickness 93 miles.
- **Mantle** – made of minerals like olivine and pyroxene which are of magnesium, iron, silicon and oxygen atom.
- **Crust** thickness 43 miles on near-side and 93 on far-side. Oxygen, silicon, magnesium, iron, calcium, and aluminum, with small amounts of titanium, uranium, thorium, potassium, and hydrogen are present.



The Moon's interior



MARIA ORIGINS

1. Object impacts on Moon



2. Creates crater / impact area



3. Lava flows inside Moon. Some escapes into impact area



4. Lava cools to form flat Maria



| Elements | Percentage % |
|-----------|--------------|
| Oxygen | 43 |
| Silicon | 20 |
| Magnesium | 19 |
| Iron | 10 |
| Aluminum | 3 |
| Chromium | 0.42 |
| Titanium | 0.18 |
| Manganese | 0.12 |

Phases

- The change in moon's appearance.
- Due to geometry of sun , moon and earth.
- Eight phase over period of 29.5 days.
 - New Moon (solar eclipse occur)
 - Waxing Crescent
 - First Quarter
 - Waxing Gibbous
 - Full Moon (Lunar eclipse occur)
 - Waning Gibbous
 - Last Quarter
 - Waning Crescent



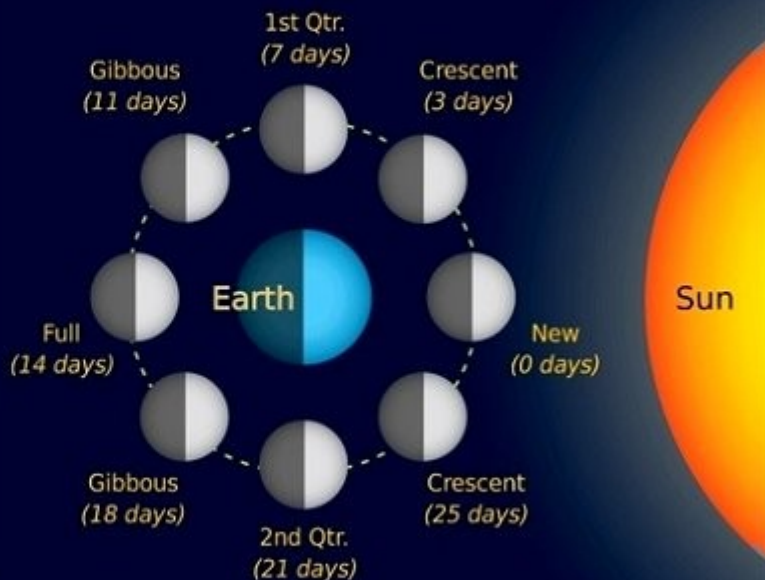
Moon Phases

(Not to scale)

As Viewed from Earth

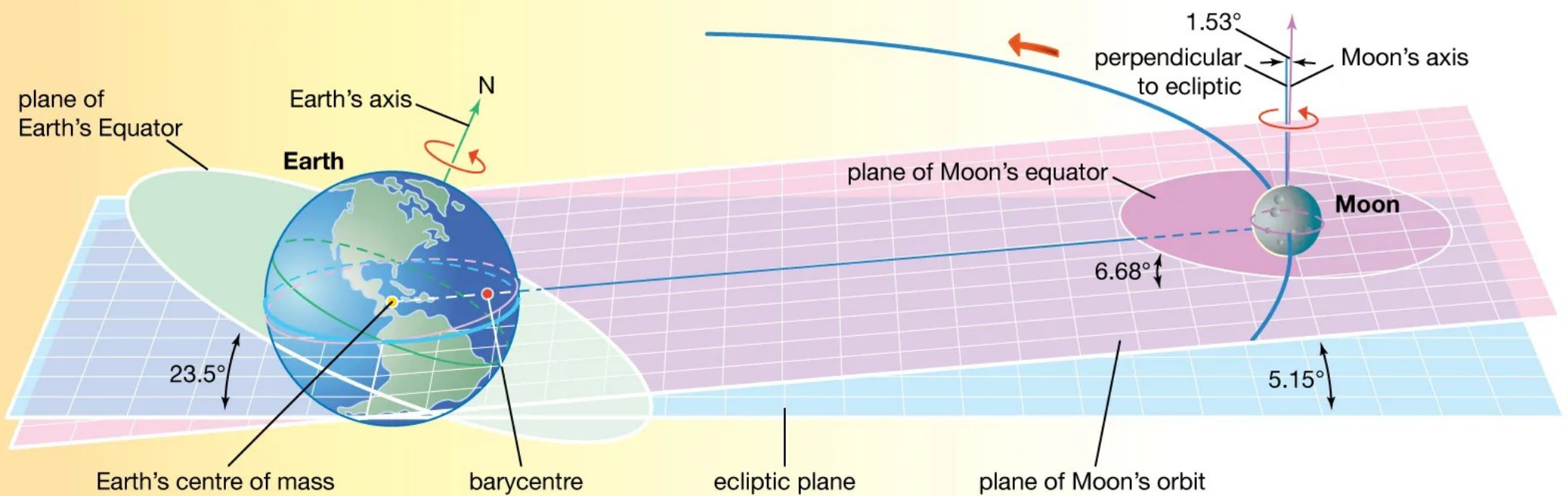


Moon's orbit around Earth



Starry Night
EDUCATION

Geometry and motions of the Earth-Moon system



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Moon & Tide

Moon's gravity affect whole earth.

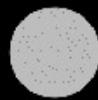
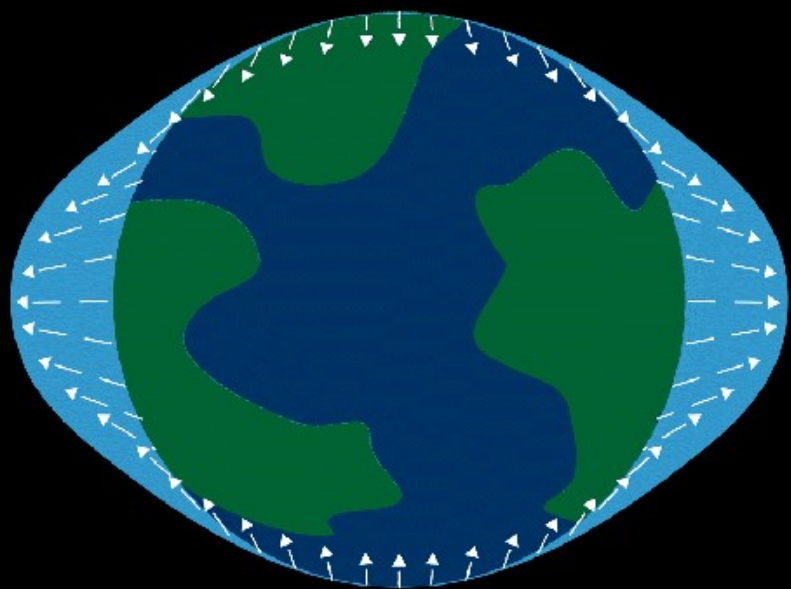
Strongest pull on nearest point and week on far point.

Spring tide (high tide) – sun, moon and earth aligned straight.

Neap tide (half tide) - When three at right angle sun force cancel moon's tide creating force.

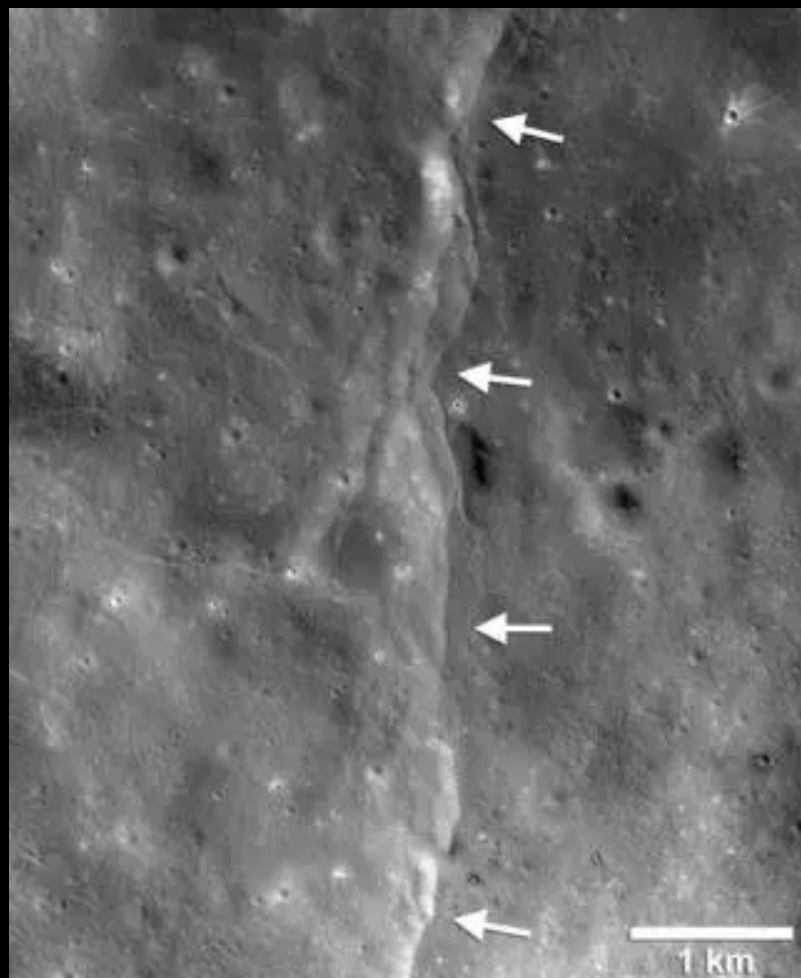
Earth gravity cause land tide on moon measured by laser which will about 4-6 inch.



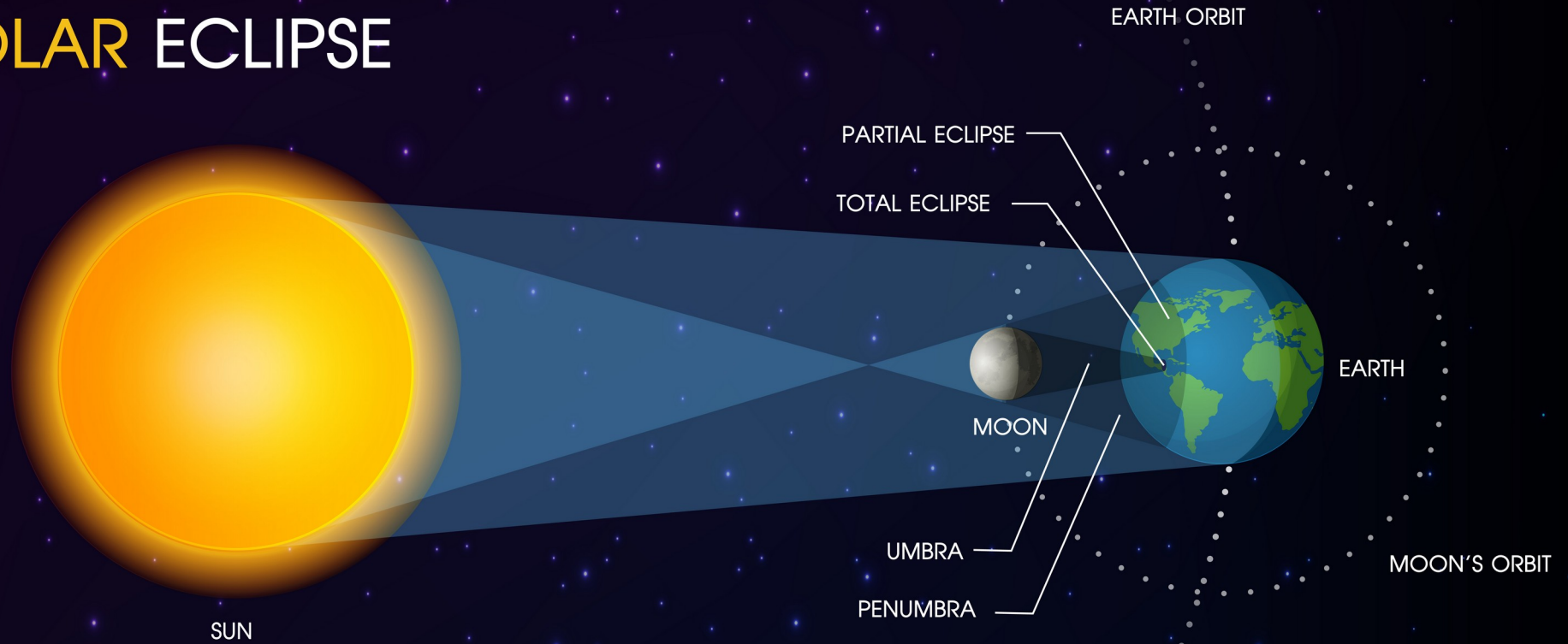


Moon

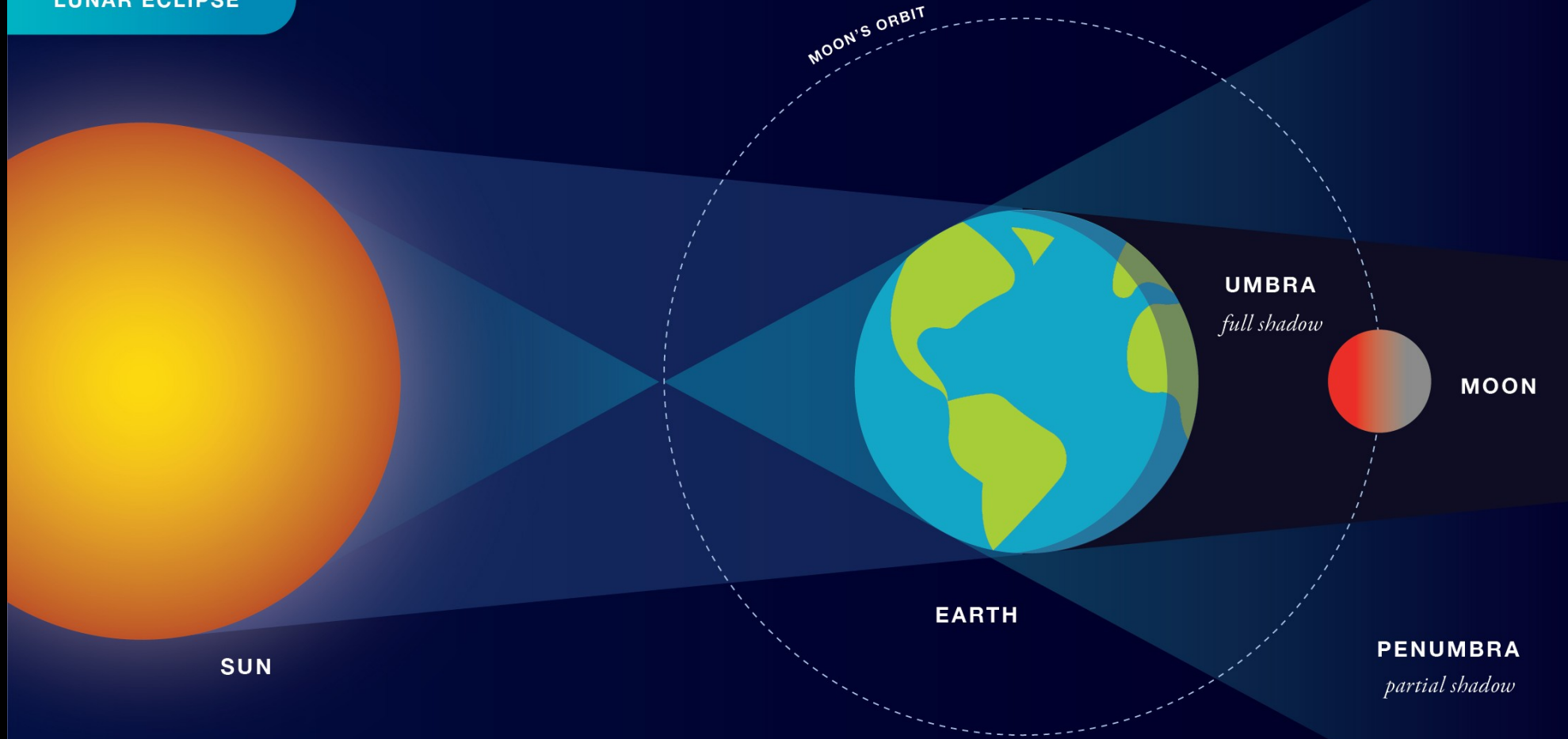
Net Tide Generating Force



SOLAR ECLIPSE



LUNAR ECLIPSE



Discussion Time



Thank You

