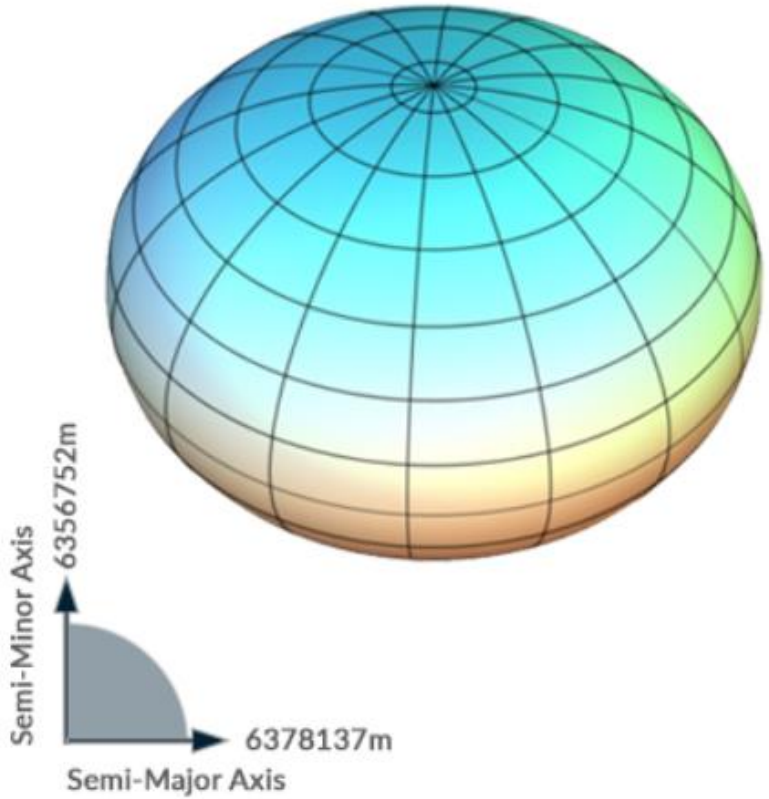
Topic 1: Planet Earth

The Shape of the Earth

- Oblate Spheroid
- Caused by Earth's Rotation
- Diameter at the equator is larger than the diameter at the poles
- The mean diameter of the Earth is approximately 13,000 km.

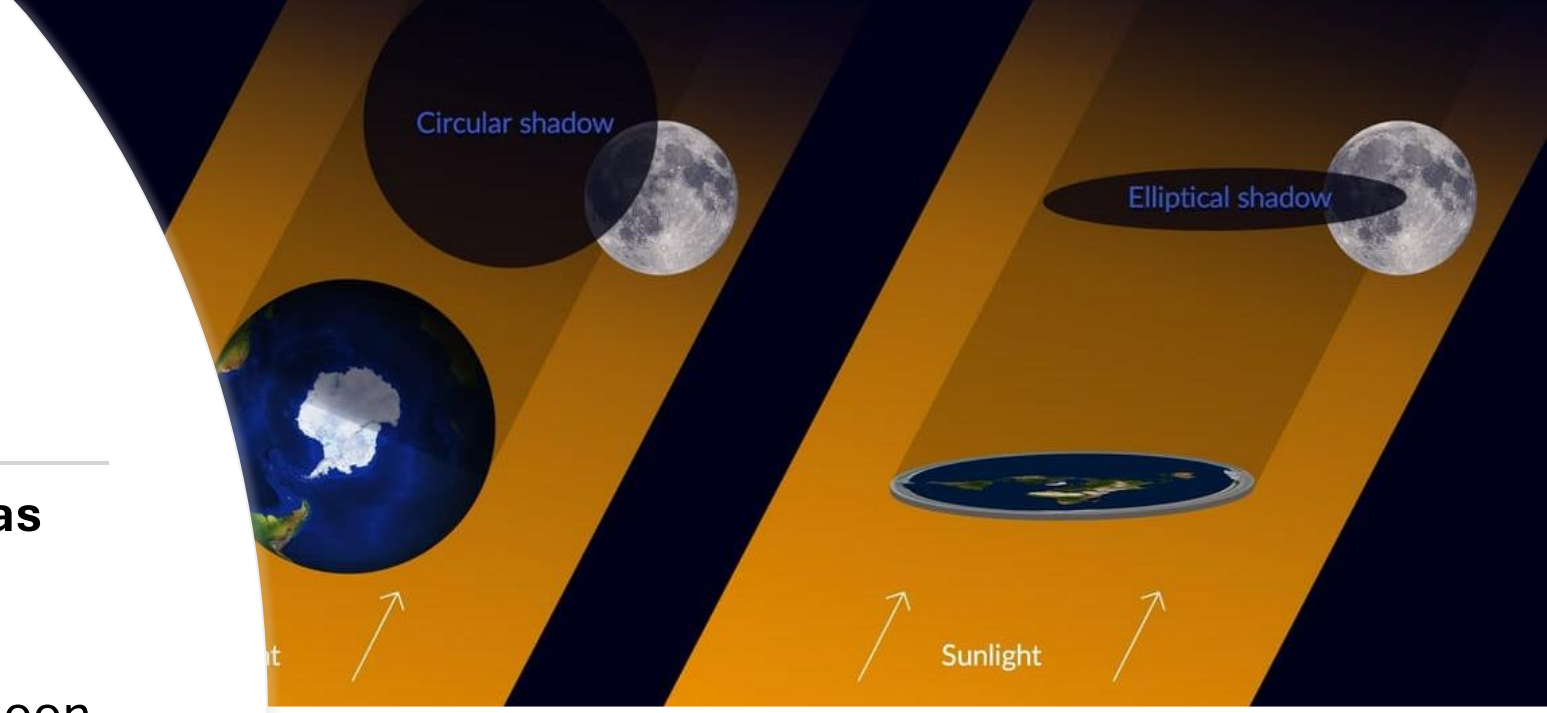


Q: Which planet's diameter is approximately 54% of the diameter of the Earth?

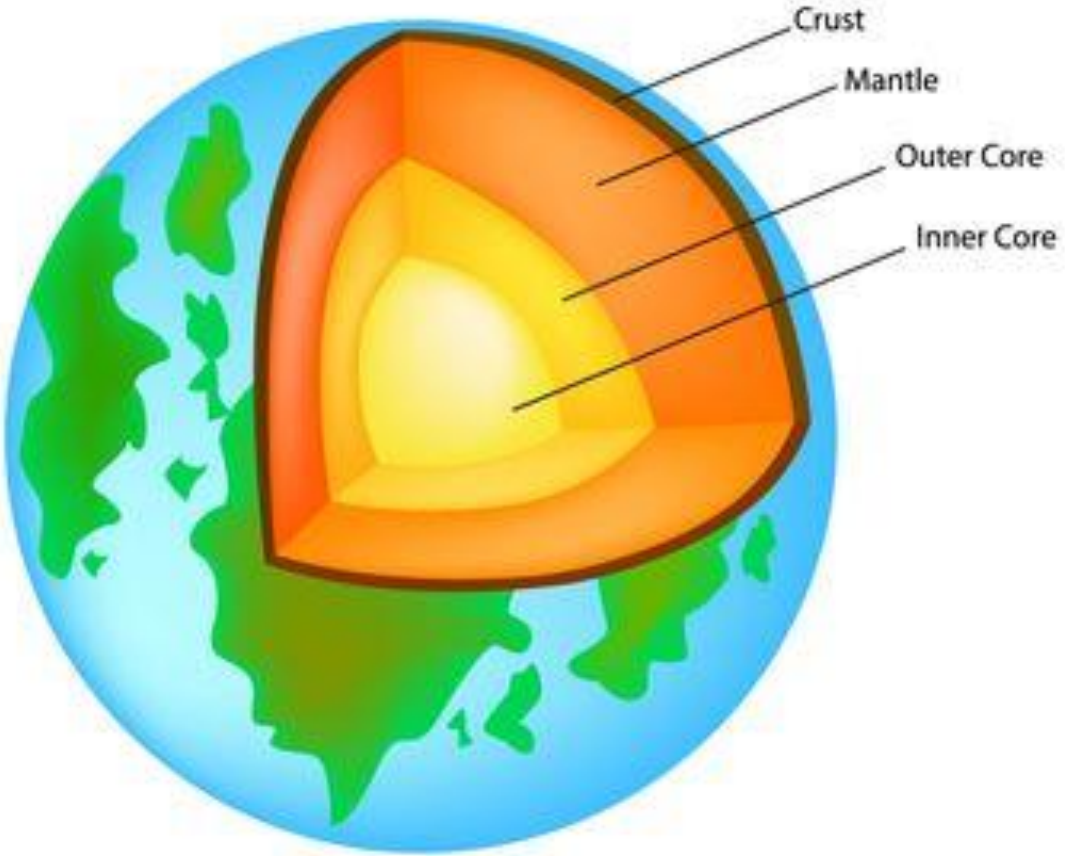
The Shape of the Earth

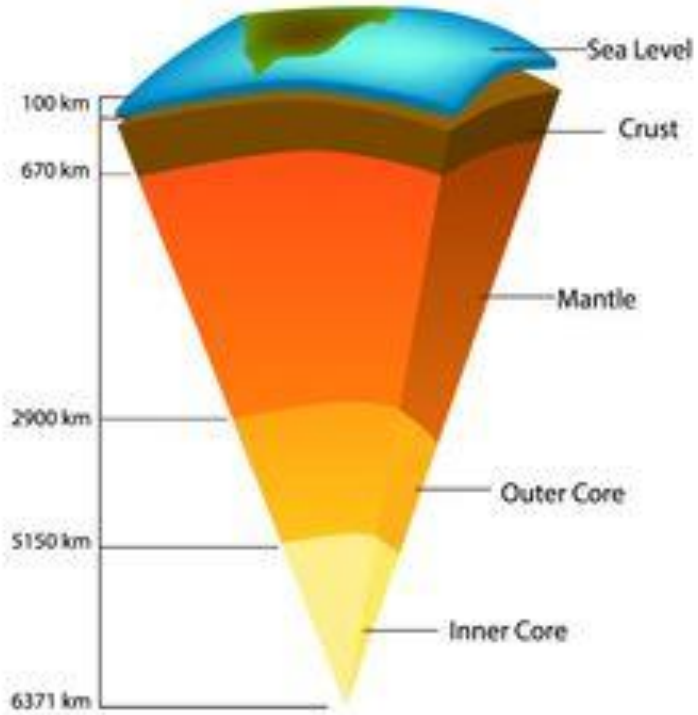
Early astronomers knew that Earth was round for several reasons:

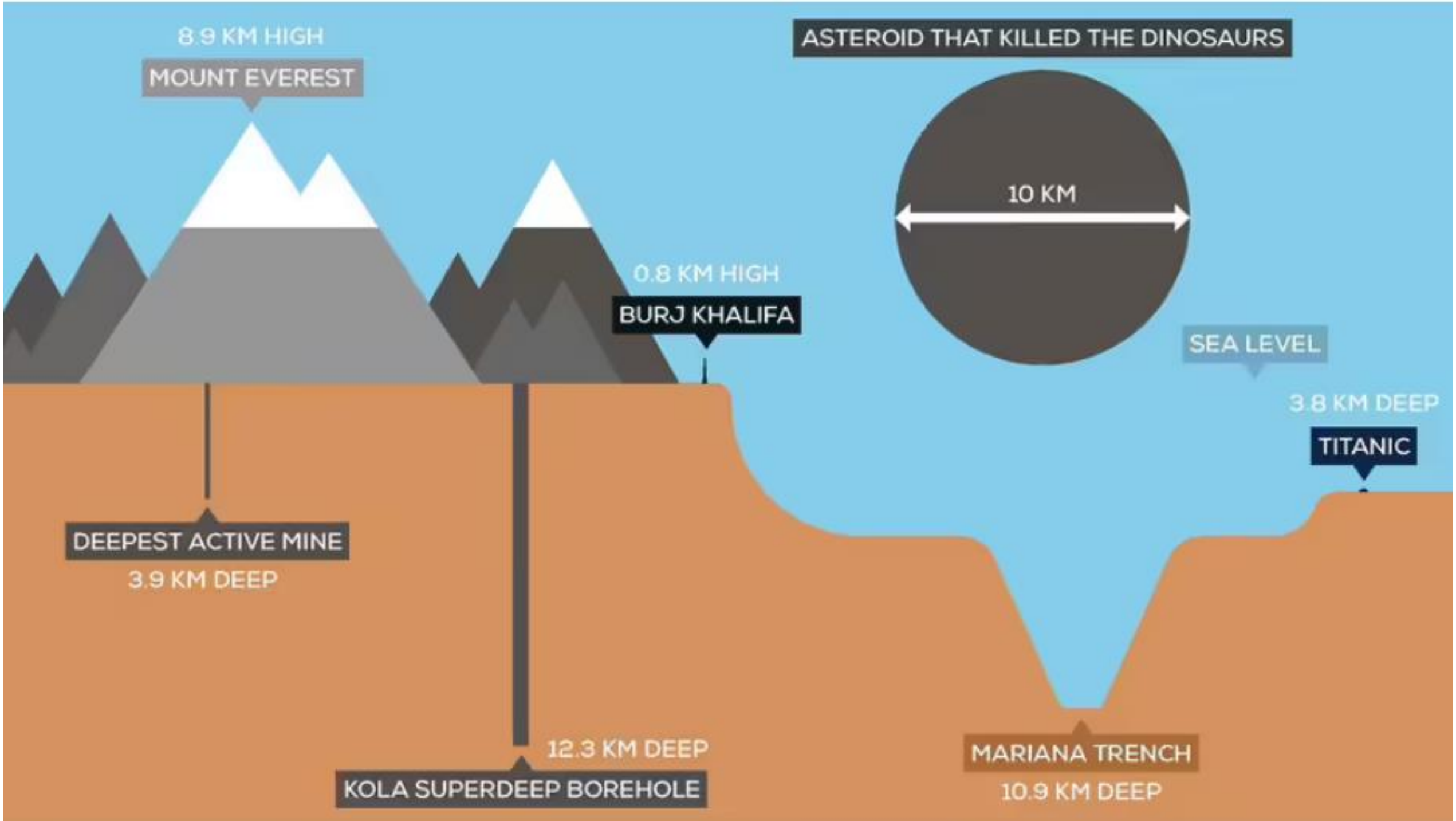
- The Moon is round.
- The shadow of the Earth on the Moon during a lunar eclipse is round.
- Travellers going north or south see different stars not visible from elsewhere.
- Travellers recording shadows at different angles on the same date.
- The existence of a horizon
- Tall ships appearing to 'sink' as they move over the horizon



Internal Structure of the Earth



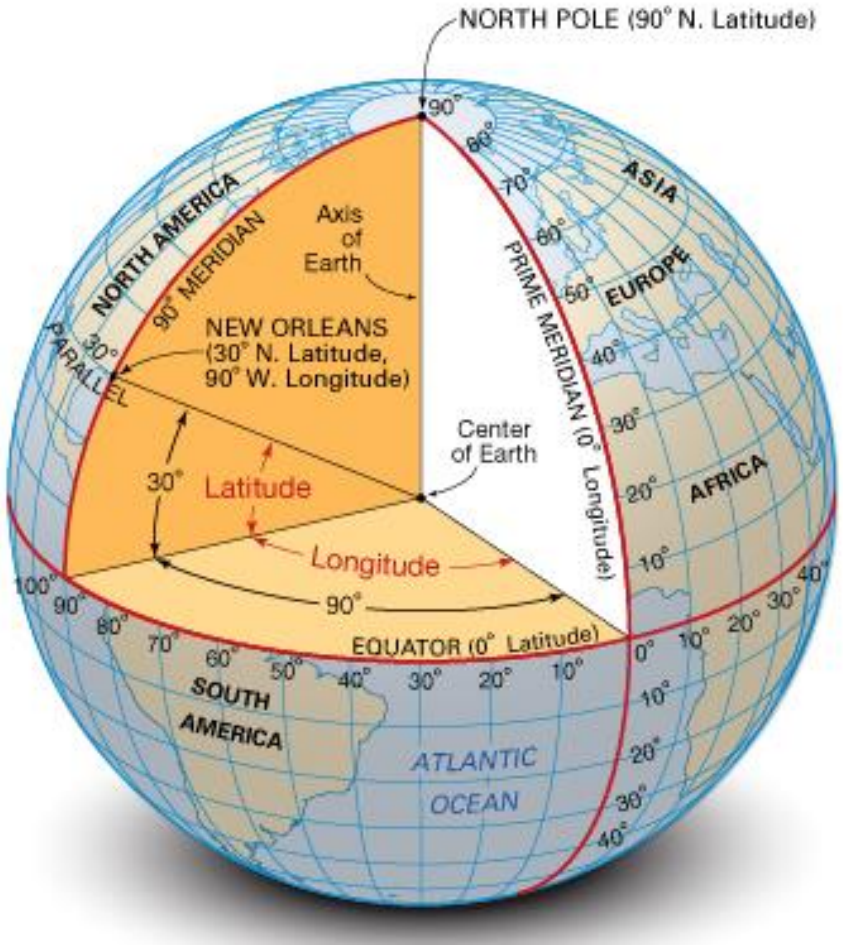



8.9 KM HIGH
MOUNT EVEREST
ASTEROID THAT KILLED THE DINOSAURS
10 KM
0.8 KM HIGH
BURJ KHALIFA
SEA LEVEL
3.8 KM DEEP
TITANIC
DEEPEST ACTIVE MINE
3.9 KM DEEP
12.3 KM DEEP
KOLA SUPERDEEP BOREHOLE
MARIANA TRENCH
10.9 KM DEEP

Latitude and Longitude

- **Latitude** measures position **north or south** of the Equator (0° to ±90°). It is given as an angle between your position and the equator, as measured from the centre of the Earth.

- **Longitude** measures position **east or west** of the Prime Meridian (0° to ±180°).



Major Divisions of Earth's Surface

Equator (0° latitude)

Tropic of Cancer (23.5°N)

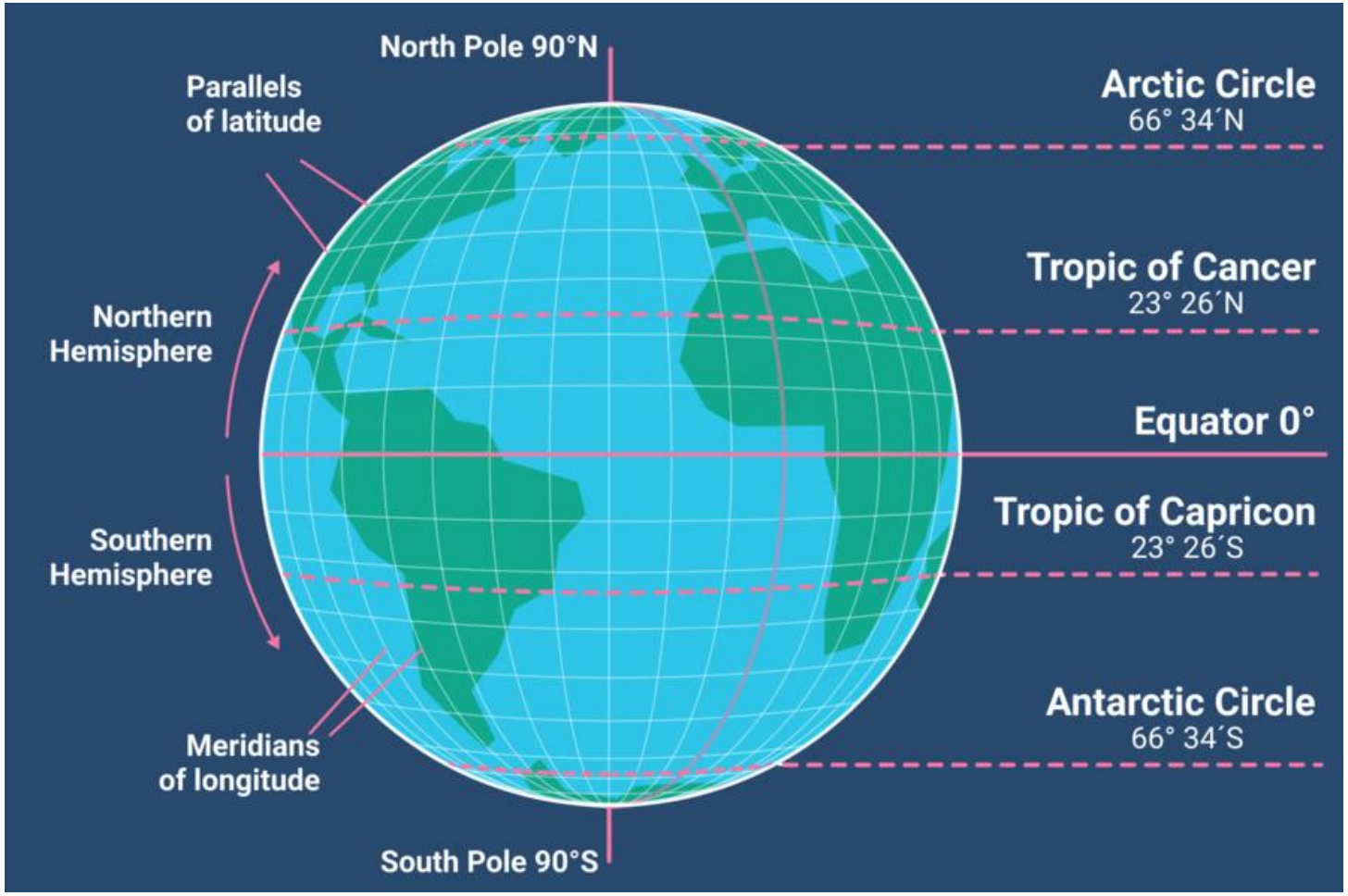
Tropic of Capricorn (23.5°S)

Arctic Circle (66.5°N)

Antarctic Circle (66.5°S)

Prime Meridian (0° longitude)

North Pole (90°N) and South Pole (90°S)



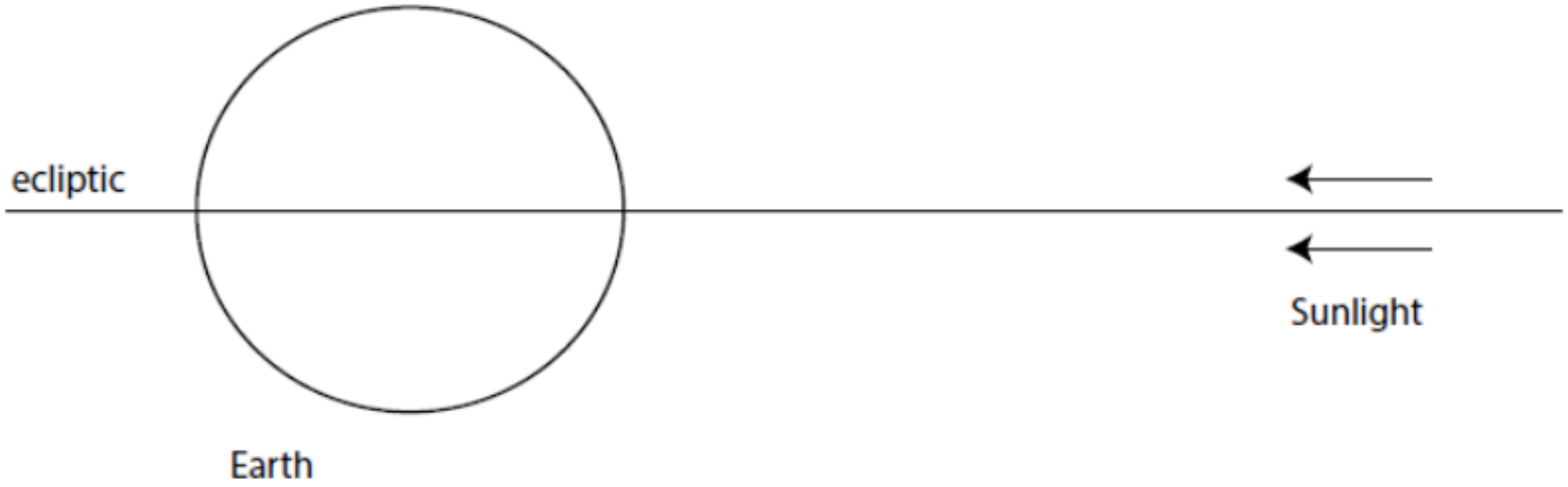
https://www.earthspacelab.com/app/solar-time/

Major Divisions of Earth’s Surface

The latitude of the Tropic of Capricorn is 23.5° South.

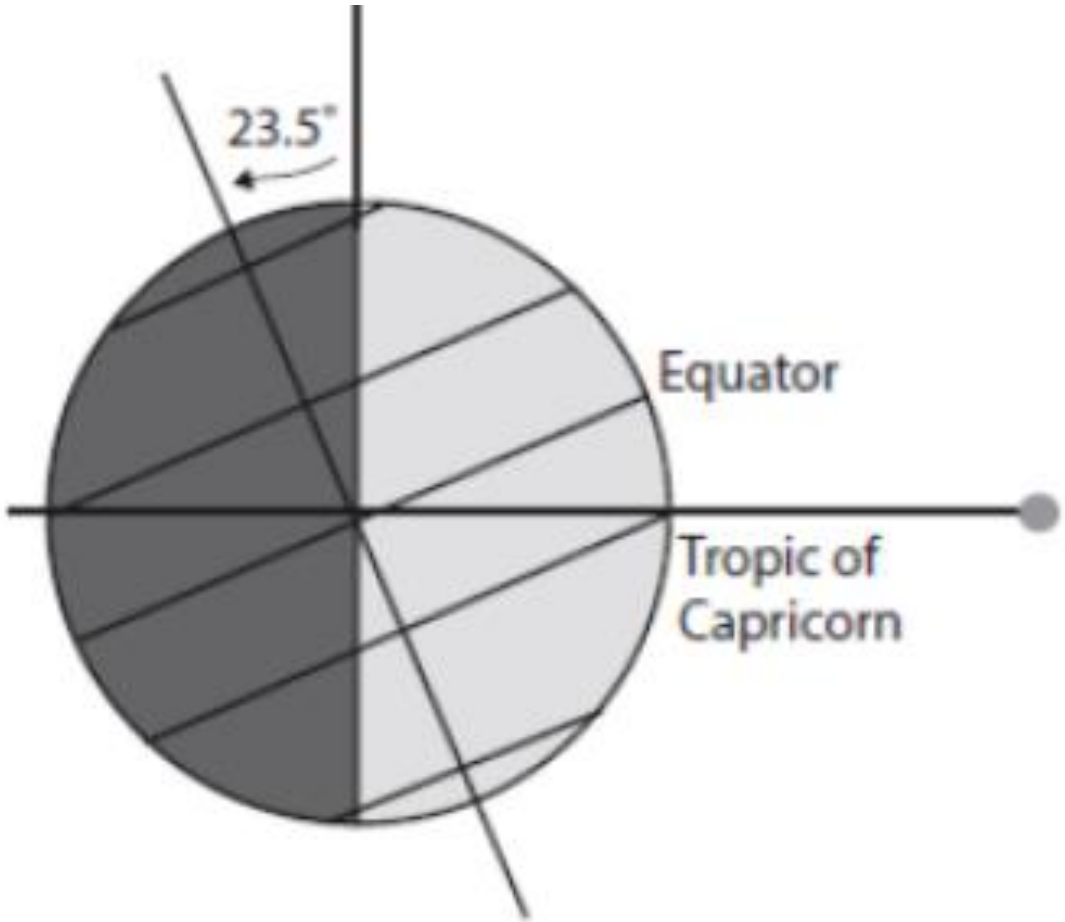
Complete the diagram to show how the tilt of the Earth's axis determines this angle.

(2)



(Total for question = 2 marks)

Major Divisions of Earth's Surface



DMS and Decimals

We can write angles in degrees, minutes, and seconds (DMS), where 1 degree = 60 minutes and 1 minute = 60 seconds. For example, 35°20'15”.

Angles can also be written in decimal degrees, where minutes and seconds are converted into fractions of a degree. For example, 35°20'15” = 35.3375°.

Bourne Grammar School:

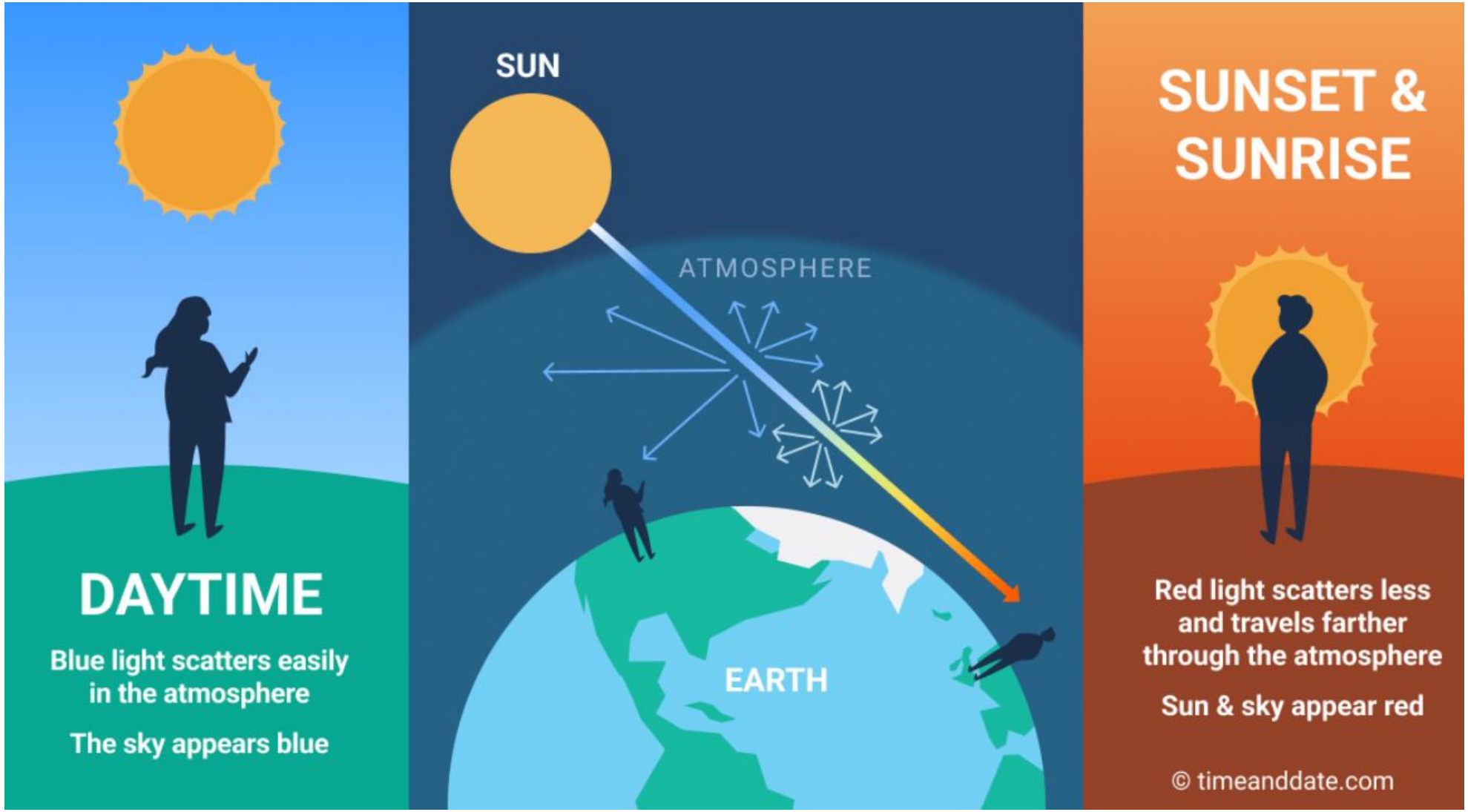
52.7623° N and 0.3737° W

52° 45' 44“ N and 0° 22' 25“ W

The Effects of Earth's Atmosphere on Astronomy

Sky Colour:

The atmosphere **scatters blue light** more than other wavelengths, making the sky appear blue.



Skyglow (Light Pollution):

Artificial light brightens the night sky, making it harder to see stars. It reduces contrast between the sky and the stars we are trying to observe.
Observatories are often built in **remote areas** to avoid this.

https://www.darkskymap.com/nightSkyBrightness

Before and during the 2003 Northeast blackout, a massive power outage that affected 55 million people. Photo by of Todd Carlson

Twinkling (Seeing Conditions):

Caused by **turbulence** in the atmosphere, distorting starlight. Stars appear to ‘twinkle’ more when lower on the horizon.

Jupiter, imaged during bad seeing (on the left) and good seeing (on the right). Credit: Steve Marsh

https://upload.wikimedia.org/wikipedia/commons/transcoded/e/e0/Szintillation.Sirius.480.webm/Szintillation.Sirius.480.webm.480p.vp9.webm