LATITUDE & LONGITUDE

PARMAR SSC



EARTH



The shape of Earth is Geoid or Oblate spheroid. A little flat from top and bottom and bulged at the centre.

Reason

Centrifugal Force (Due to Rotation of Earth)

Radius of Earth

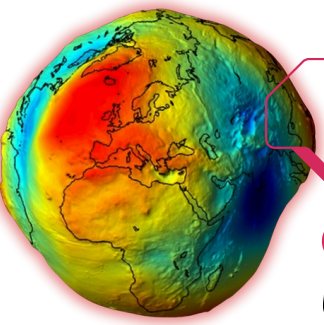
- Equatorial Radius : 6378 km
- Polar Radius : 6357 km
- Mean Radius : 6371 km

Circumference of Earth

- Polar : 40,007.863 km
- Equatorial : 40,075 km
- Mean : 40,040 km

- Equatorial radius > Polar radius
- Equatorial circumference > Polar circumference
- Equatorial speed > Polar speed

(All because the Earth is bulged at the equator and flattened at the poles)



Actual Shape Of Earth

Geodesy is the science of accurately measuring and understanding the earth's geometric shape, orientation in space and gravity field



Rotation Of Earth

- Earth rotates on its axis from west to east (Anticlockwise.)
- One rotation of Earth = 23 Hours 56 Minutes 4 Seconds
- The phenomenon of day and night is caused by earth's rotation .
- Rotational Speed is maximum at the equator and minimum at the poles.

Revolution Of Earth

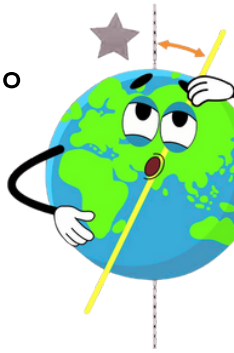


- Earth Revolves around the sun in elliptical orbit.
- 1 Revolution = 365 days 6hr & 9min
- Orbital Speed = 29.8 km/sec
- Mercury has the maximum Orbital Speed
- Neptune has the minimum orbital speed.
- The phenomenon of seasons is due to the revolution of earth around the sun and the tilt of its axis..



Sun	Moon
• The point in the planets orbit when it is closest to the Sun is called Perihelion. On January 3rd the earth is closest to the Sun. (147 Million KM) • When Earth is farthest from the Sun, it is called Aphelion. On July 4th the earth is farthest from the Sun. (152 Million Km)	• The point in the moon's orbit when it is closest to Earth is called Perigee, The moon appears large in the sky. • When Moon is farthest from the earth, it is called Apogee. At Apogee The moon's tide raising force is smaller and the tidal ranges are less than average.

Inclination of Earth's Axis



- Axial Inclination = Inclination of Earth on its axis is 23.5°
- Orbital Inclination = Inclination of Earth on its orbital plane is 66.5°.

Latitudes



- They are Imaginary Horizontal Lines on the globe that run from East to West
- It is the Angular Distance of a place from the Equator
- Distance between each latitude is same.
- Total latitudes: 181
- 1 ° of Latitude is Approx equal to 111 km.
- Latitude Circles: 179
- All parallel circles from equator to poles are called "Parallel of Latitudes"

Important Latitudes

- Largest Latitude- Equator
- Smallest Latitude- Poles
- Tropic Of Cancer= 23.5°N
- Tropic of Capricorn = 23.5° South
- Arctic Circle= 66.5°N
- Antarctic Circle : 66.5° S
- Radius of earth at equator is 6378 Kms.



Longitude

- They are Imaginary Vertically lines over the globe that run from North to South.
- Least distance at Poles & Maximum distance at Equator - 111.32 km
- Total Longitudes: 360
- The Part between 2 longitude is called 'Gore'

Important Longitudes

- International Date Line- 180° Longitude
- Prime Meridian- 0° longitude (Also called Greenwich mean time , passes through : Burkina Faso, Spain, France, Ghana, Algeria, Mali, Togo, UK)

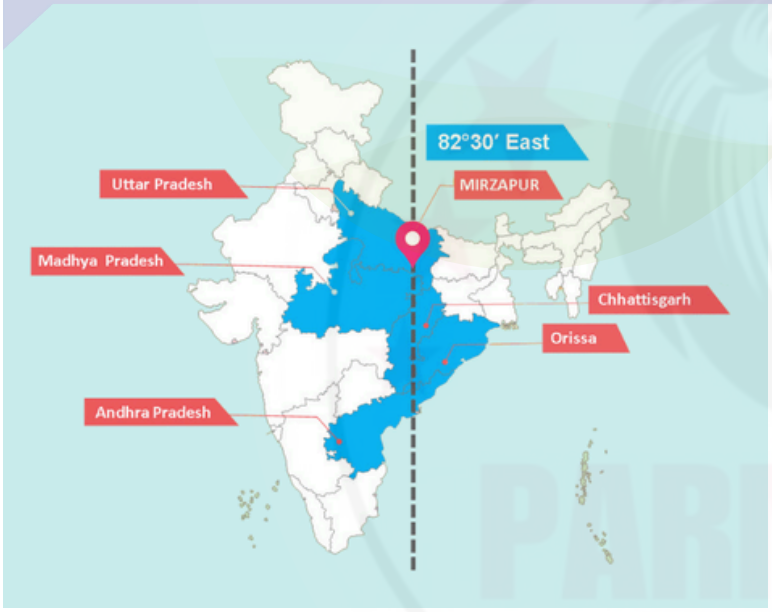
- The Difference between Polar Diameter and Equatorial Diameter of earth is 42 or 44 km

Greenwich Mean Time



- GMT Passes through 3 continents; Europe, Africa, Antarctica
- Also known as Prime Meridian.

Indian Standard Time



It is 82.5° longitude. IST passes through 5 states of India.
Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Odisha, and Andhra Pradesh



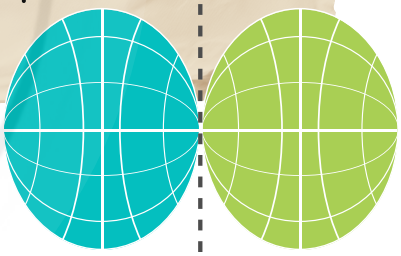
- USA has 6 time Zones.
- India and China has only one time zone.
- Russia has 11 time Zones.
- France has maximum number of time zones; that is 13.

International Date Line

- It is the imaginary zig zag line passing through the Pacific Ocean from where the date changes.
- While crossing international date line eastbound that is from east to west (like: Japan to USA), date is subtracted by 1 or in other words, the person gains a day and vice versa.

Concept of Great Circle

- A great Circle is the largest possible circle that can be drawn around a sphere.
- It divides the Earth into two Equal Parts called Hemispheres (Northern and Southern)
- All longitudes are considered great circles, but only one latitude is considered a great circle and that is Equator (0° latitude)
- It is the shortest distance between two points



Hemisphere

- Equal Division of earth in two parts.
- Equator : It divides the globe horizontally into 2 equal parts, i.e. Northern and Southern Hemisphere
- Prime Meridian : It divides the globe into two equal parts i.e. Eastern & Western Hemisphere
- Our India is located in North Eastern Hemisphere



Solstice

A Solstice is an astronomical event that occurs twice a year when the sun reaches its highest or lowest point in the sky, resulting in the longest day or shortest day of the year



Summer Solstice

- It Occurs on 21st June.
- It is the longest day of the year in Northern Hemisphere
- The vertical rays of sun are directly overhead on Tropic of Cancer
- Northern Hemisphere gets more heat.
- Continuous sunrise fall on the North Pole for 6 months.



Winter Solstice

- It Occurs on 22nd December.
- It is the shortest day of the year in Northern Hemisphere
- The vertical rays of sun are directly overhead on Tropic of Capricorn.
- Southern Hemisphere gets more heat.
- Continuous sunrise fall on the South Pole for 6 months.



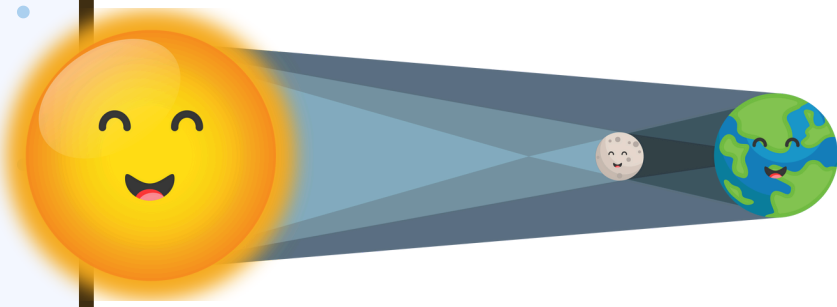
Equinox

An Equinox is a time when the Sun's apparent path in the sky crosses the equator, making day and night approximately equal in length.

- Vernal Equinox : 21st March
- Autumnal Equinox : 23rd September

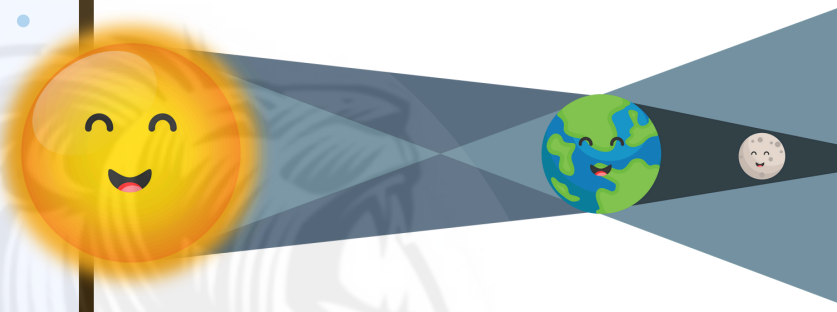
Solar Eclipse

- It occurs when the Moon passes between the Earth and the Sun, Casting a shadow on Earth. This can only happen during a new moon (Amavasya)



Lunar Eclipse

- It occurs when the Earth passes between the moon and the sun, casting a shadow on Moon. This can only happen during a full moon.(Purnima)





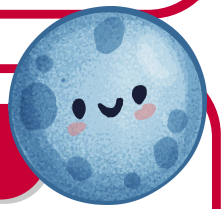
Red Moon

When Earth blocks the Sun's light (light refraction), it causes blue colour (scatters more) light to vanish and red light to reach moon (scatters less)



Super Moon

A supermoon occurs when the Moon's orbit is closest to the Earth during a full/new moon. The Moon appears bigger than its normal size.



Blue Moon

Occurs when there are two full moons within a single calendar month.

When the Sun, Moon and Earth, all are aligned in a straight line, the alignment is known as Syzygy.

Two Types of Syzygy are:

1. Syzygy Conjunction
2. Syzygy Opposition



1 Torrid Zone

Receives direct overhead rays of the Sun due to which it is the hottest zone. It is located between Tropics.



2 Temperate Zone

Region between Tropic of cancer and Arctic circle or Tropic of Capricorn and Antarctic circle. It receives slanting rays of Sun.



3 Frigid Zone

Coldest Region on earth which experiences daylight for 6 months and 6 month of night (due to tilt of earth).



Tides

Tides are the periodic rise and fall of the ocean's water levels. They are caused by gravitational Pull of the moon and the Sun on the Earth's Oceans.

Spring Tide

They Occur when the Earth, Sun and Moon are aligned along a straight line.

Neap Tide

They Occur when the Earth, Sun and Moon are in perpendicular alignment.

Ebb or Flood Tide

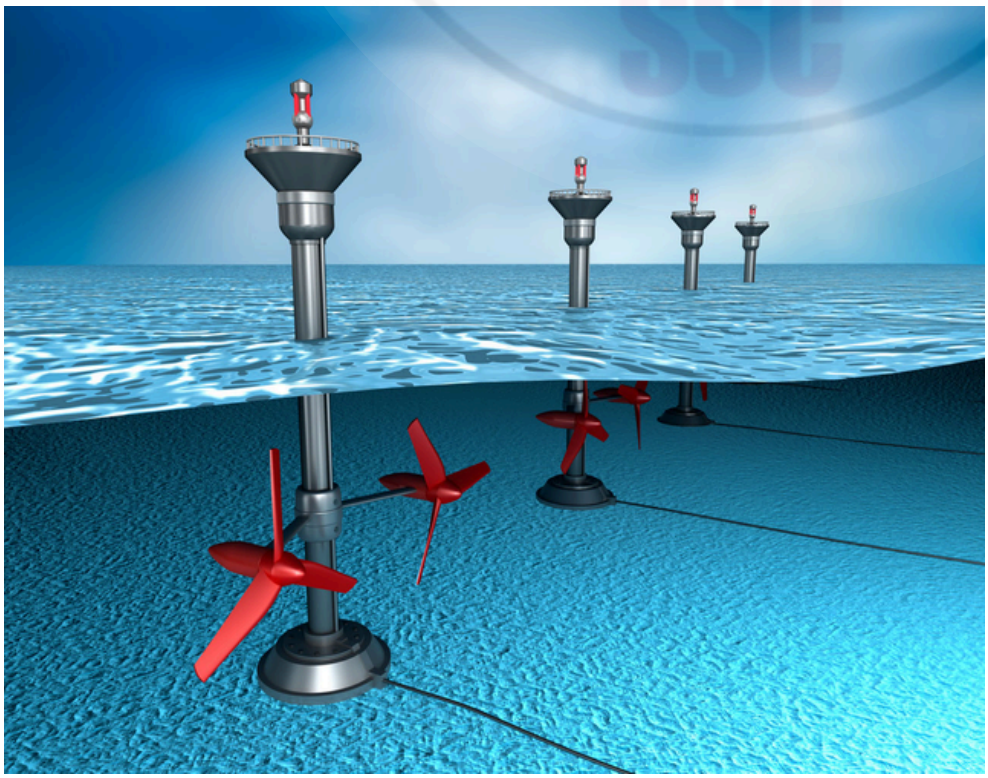
The change from low to high tide is called the 'flood tide' or flow. The change from high to low tide is called 'ebb tide'

- Diurnal Tides : One High tide and One low tide in a day.
- Semi-Diurnal Tides: Two high tide and Two low tide in a day.
- Time gap between two high & two low tides is 12 hrs 25 minutes.
- Time gap between one High tide and One low tide is 6 hrs 12 minutes.

Tidal Energy

- Tides are high where continental shelves are wide.
- Tides are also high where geographical feature is like funnel shape.





- Harnesses the predictable, powerful rise and fall of ocean tides, caused by the gravitational pull of the moon and sun, to generate electricity