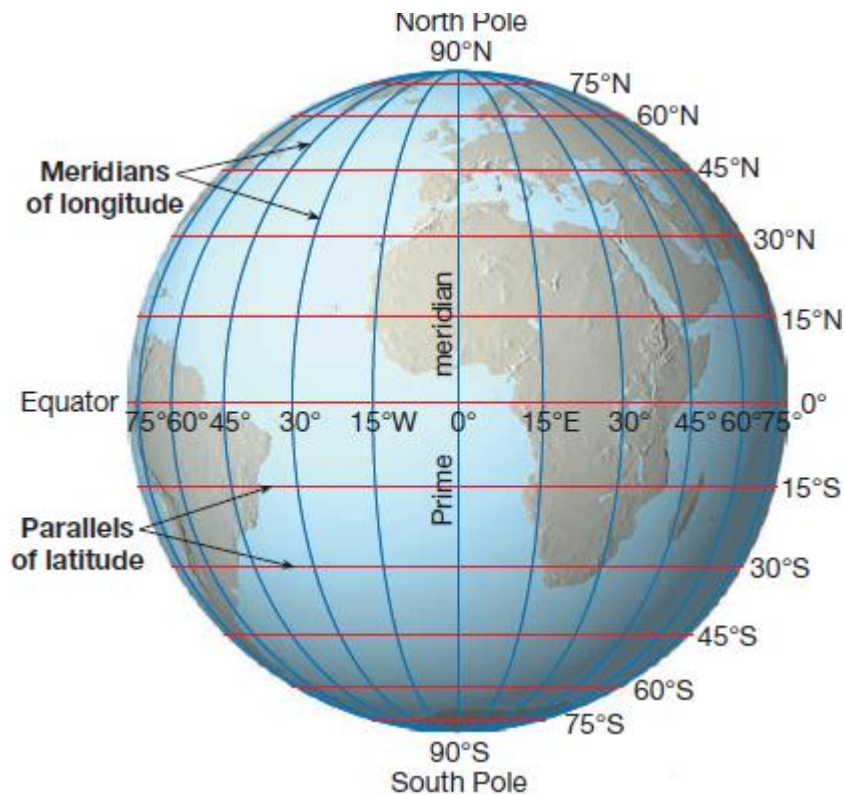


LATITUDE AND LONGITUDE

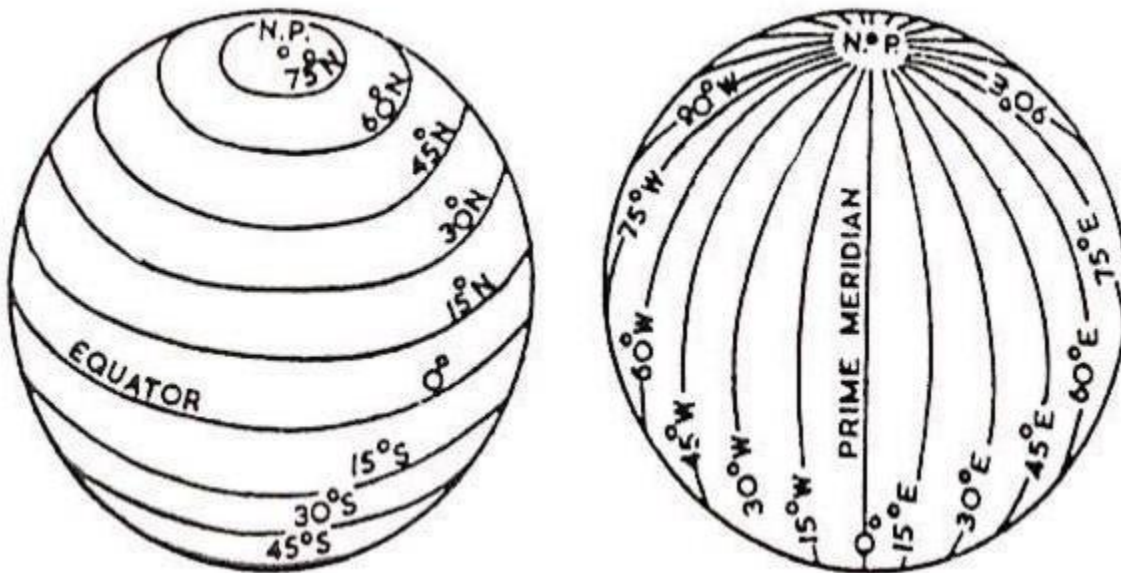
- Our earth is slightly flattened at the North Pole & South Pole and bulged in the center
- Globe is the true miniature form or the model of our earth. A needle is fixed through the center of the globe in a tilted manner, which is called as axis.



- Earth moves from West to East.
- Earth's axis is an imaginary line which passes through the North Pole and South Pole around which the earth spins.
- It is inclined by 66.5 degrees from the earth's orbital plane, which means that it is tilted 23.5 degrees from a vertical 90 degrees.
- Generally an axis is an imaginary or physical line which prescribes an objects movement. An axis also includes a point that is known as Center of Gravity.
- Another imaginary line which divides the earth into two equal parts running through the middle of the globe is called Equator.
- The north half of the equator is called as Northern Hemisphere. The south half of the equator is called as Southern Hemisphere. They are both equal halves.
- All parallel lines from the equator to the poles on the globe are called as Parallels of Latitudes. Latitudes are measured in Degrees.



- As we move away from the equator, the size of the parallels of the latitude decreases.
- All parallels to the north of equator are called north latitudes and all parallels to the south of the equator are called South latitudes.



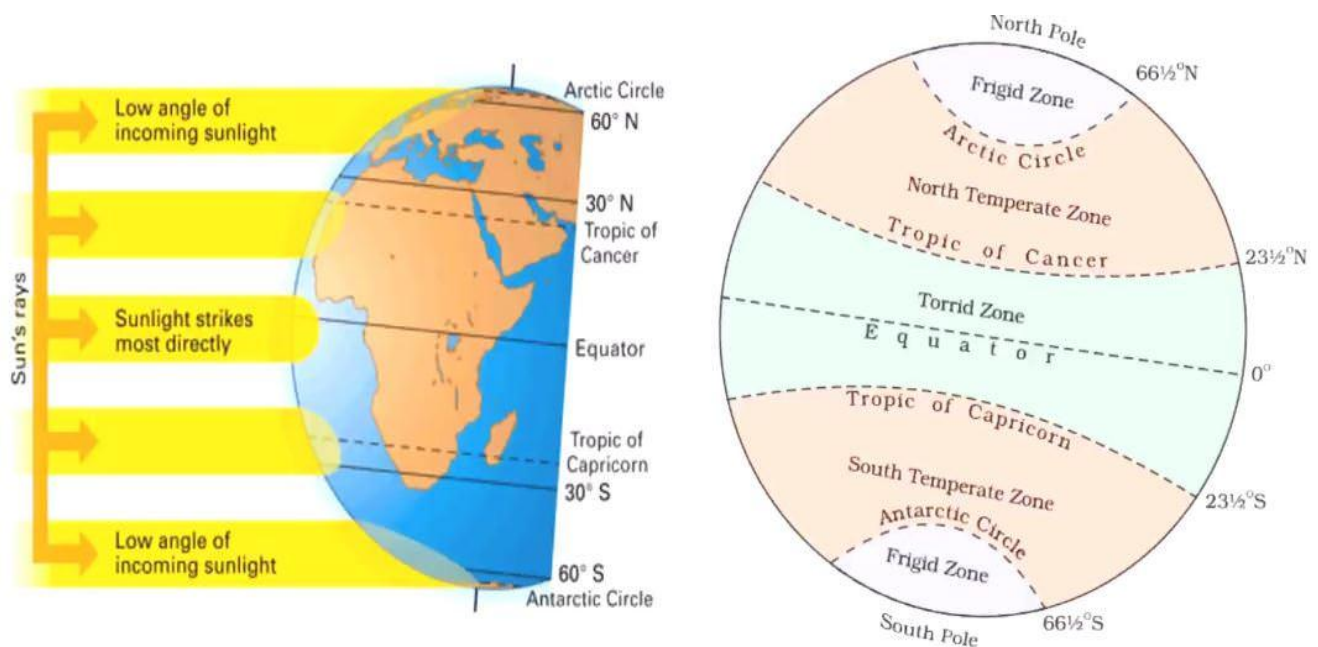
- Since the distance from the equator to each of the poles is 1/4th of a circle round the earth, it will measure 1/4th of 360 degrees. Thus 90° North latitude marks the North Pole and 90° south latitude marks the South Pole.
- By measuring the angle of the pole star from your place you can know the latitude of your place

Important Parallels of Latitude

- Besides the equator (0°), the North Pole (90°N) and the South Pole (90° S), there are four important parallels of latitudes–
 1. Tropic of Cancer (23½° N) in the Northern Hemisphere
 2. Tropic of Capricorn (23½° S) in the Southern Hemisphere
 3. Arctic Circle at 66½° north of the equator
 4. Antarctic Circle at 66½° south of the equator

Heat zones of the Earth

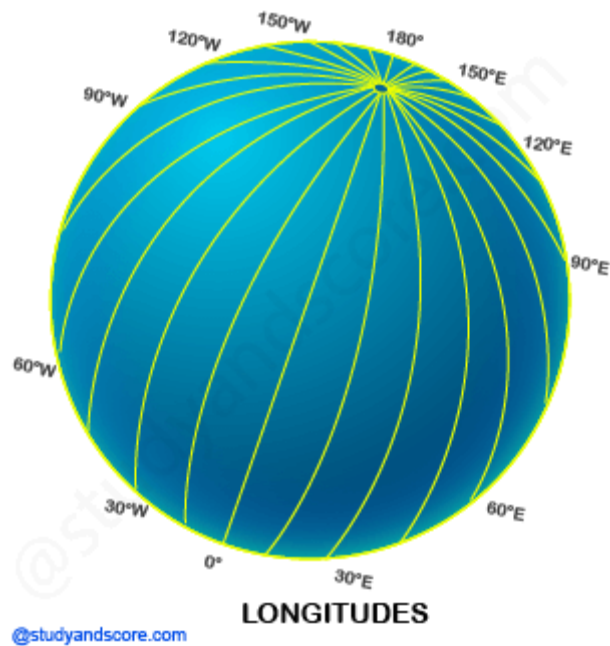
- The mid-day sun is exactly overhead at least once a year on all latitudes in between the Tropic of Cancer and the Tropic of Capricorn. Therefore this area receives the maximum heat and is called the **Torrid Zone**.



- The mid-day sun never shines overhead on any latitude beyond the Tropic of Cancer and the Tropic of Capricorn. The angle of the sun's rays goes on decreasing towards the poles.
- The areas bounded by the Tropic of Cancer and the Arctic Circle in the Northern Hemisphere and the Tropic of Capricorn and the Antarctic Circle in the Southern Hemisphere have moderate temperatures. Therefore these areas are called **Temperate Zones**.
- Areas lying between the Arctic Circle and the North Pole in the Northern Hemisphere and the Antarctic Circle and the South Pole in the Southern Hemisphere, are very cold.
- It is because here the sun does not raise much above the horizon. Here the sun rays are always slanting. Therefore these areas are called **Frigid Zones**.

Longitudes of the Earth

- The line of reference running from the North Pole to the South Pole is called **meridians of longitude** and the distance between them are measured in degrees of longitudes. Each degree is further divided into minutes, and minutes into seconds.
- They are semi-circles and the distance between them decreases steadily pole wards until it becomes zero at the poles, where all the meridians meet.
- The parallels of latitude are unequal in length and all the meridians are of equal length. Thus, it was difficult to number the meridians. Hence, all countries decided that the count should begin from the meridian which passed through Greenwich, where the British Royal Observatory is located.



- This meridian is called the **Prime Meridian**. Its value is 0° longitude and from it we count 180° eastward as well as 180° westward. The Prime Meridian divides the earth into two equal halves, the Eastern Hemisphere and the Western Hemisphere. 180° East and 180° West meridians are on the same line.

Longitude and Time

- The best means of measuring time is by the movement of the earth, the moon and the planets.
- When the Prime Meridian of Greenwich has the sun at the highest point in the sky, all the places along this meridian will have mid-day or noon.
- As the earth rotates from west to east, those places east of Greenwich will be ahead of Greenwich Time and those to the west will be behind it.
- The rate of difference can be calculated as follows. The earth rotates 360° in about 24 hours, which means 15° an hour or 1° in four minutes. Thus, when it is 12 noon at Greenwich, the time at 15° east of Greenwich will be $15 \times 4 = 60$ minutes, i.e., 1 hour ahead of Greenwich Time, which means 1 p.m.

- But at 15° west of Greenwich, the time will be behind Greenwich time by one hour, i.e., it will be 11.00 a.m. Similarly, at 180° , it will be midnight when it is 12 noon at Greenwich.

Need for standard time

- The local time of the places which are on different meridians is bound to differ. For example, it will be difficult to prepare a time-table for trains which cross several longitudes. In India, for instance, there will be a difference of about 1 hour and 45 minutes in the local times of Dwarka in Gujarat and Dibrugarh in Assam.
- It is, therefore, necessary to adopt the local time of some central meridian of a country as the standard time for the country. In India, the longitude of $82\frac{1}{2}^\circ$ E ($82^\circ 30'E$) is treated as the standard meridian. The local time at this meridian is taken as the standard time for the whole country. It is known as the Indian Standard Time (IST).
- Some countries have a great longitudinal extent and so they have adopted more than one standard time. For example, in Russia, there are as many as eleven standard times. The earth has been divided into twenty-four time zones of one hour each. Each zone thus covers 15° of longitude.