

MOTIONS OF THE EARTH

Rotation is the movement of the earth on its axis.

The movement of the earth around the sun in a fixed path or orbit is called **Revolution**.

The axis of the earth which is an imaginary line, makes an angle of $66\frac{1}{2}^{\circ}$ with its **orbital plane**.

The plane formed by the orbit is known as the orbital plane. The earth receives light from the sun.

The circle that divides the day from night on the globe is called the **circle of illumination**.

Rotation

- The earth takes about 24 hours to complete one rotation around its axis. The period of rotation is known as the *earth day*.
- This is the daily motion of the earth. The portion of the earth facing the sun would always experience day, thus bringing continuous warmth to the region.
- The other half would remain in darkness and be freezing cold all the time. Life would not have been possible in such extreme conditions.

on 21st June, the Northern Hemisphere is tilted towards the sun. The rays of the sun fall directly on the Tropic of Cancer. As a result, these areas receive more heat. The areas near the poles receive less heat as the rays of the sun are slanting. The North Pole is inclined towards the sun and the places beyond the Arctic Circle experience continuous daylight for about six months.

Since a large portion of the Northern Hemisphere is getting light from the sun, it is summer in the regions north of the equator.

The longest day and the shortest night at these places occur on 21st June. At this time in the Southern Hemisphere all these conditions are reversed. It is winter season there.

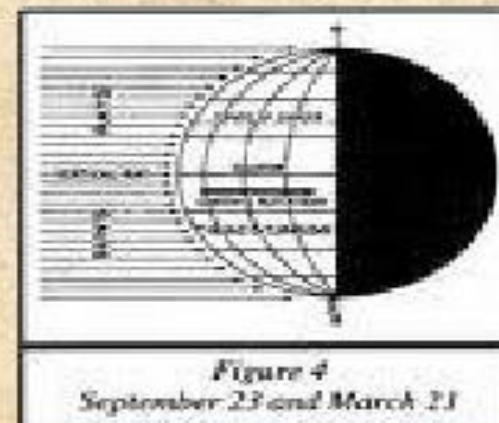
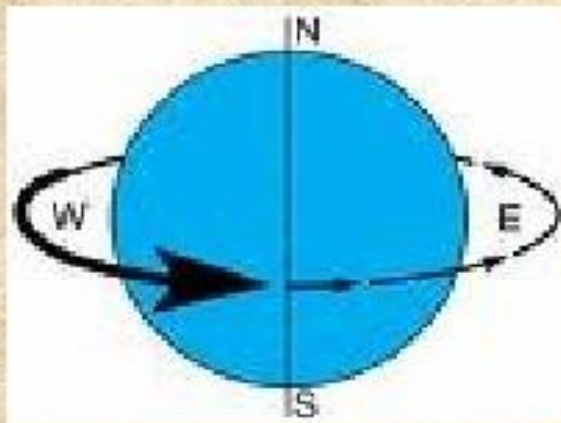
Rotation of the Earth



The motion of the earth about its axis is known as rotation.

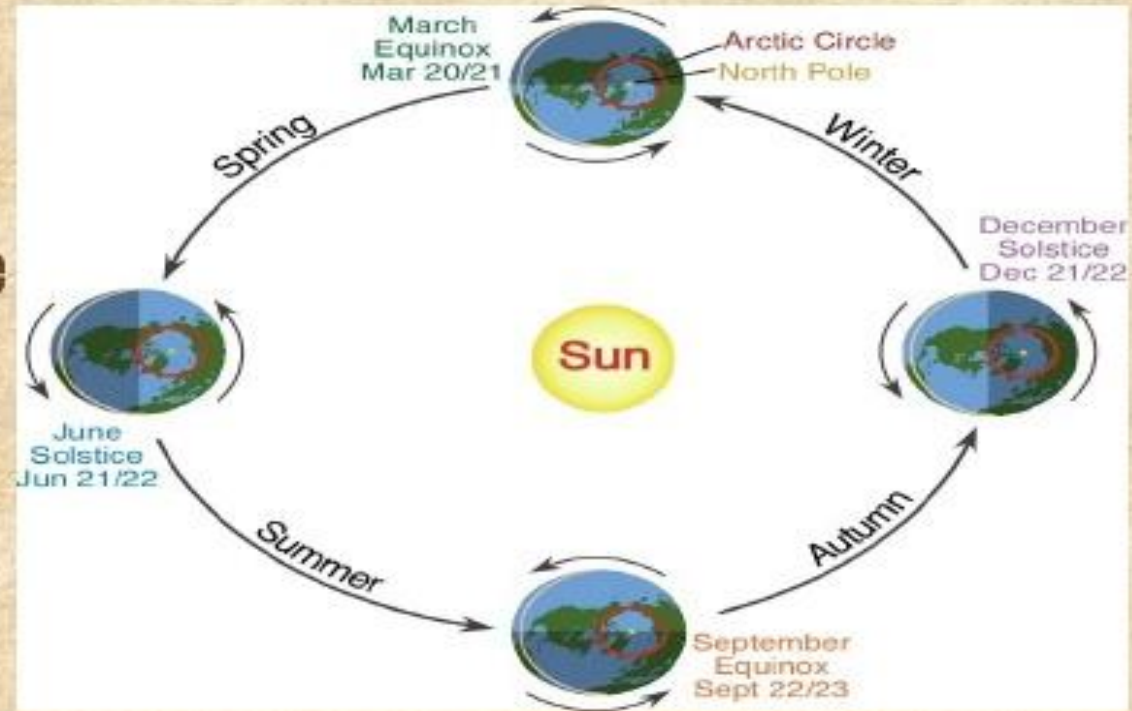
Rotation of the Earth

- The Earth rotates once in twenty-four hours.
- The Earth's rotation is responsible for the daily cycles of day and night.
- At any one moment in time, one half of the Earth is in sunlight, while the other half is in darkness. When the earth rotates we get day and night.
- The edge dividing the daylight from night is called the circle of illumination.



Revolution of the Earth

- ❑ It takes 365 days and 6 hours to complete one revolution.
- ❑ The distance between the earth and the sun changes due to revolution.
- ❑ This change of distance also causes change in seasons.



Revolution

- The second motion of the earth around the sun in its orbit is called **revolution**. It takes $365\frac{1}{4}$ days (one year) to revolve around the sun. We consider a year as consisting of 365 days only and ignore six hours for the sake of convenience. Six hours saved every year are added to make one day (24 hours) over a span of four years.
- This surplus day is added to the month of February. Thus every fourth year, February is of 29 days instead of 28 days. Such a year with 366 days is called a **leap year**. Earth goes around the sun in an **elliptical orbit**.
- A year is usually divided into summer, winter, spring and autumn seasons. Seasons change due to the change in the position of the earth around the sun.

The nights are longer than the days. This position of the earth is called the **Summer Solstice**.

On 22nd December, the Tropic of Capricorn receives direct rays of the sun as the South Pole tilts towards it. As the sun's rays fall vertically at the Tropic of Capricorn ($23\frac{1}{2}^{\circ}$ S), a larger portion of the Southern Hemisphere gets light. Therefore, it is summer in the Southern Hemisphere with longer days and shorter nights. The reverse happens in the Northern Hemisphere. This position of the earth is called the **Winter Solstice**.

On 21st March and September 23rd, direct rays of the sun fall on the equator. At this position, neither of the poles is tilted towards the sun; so, the whole earth experiences equal days and equal nights. This is called an **equinox**.

On 23rd September, it is autumn season in the Northern Hemisphere and spring season in the Southern Hemisphere. The opposite is the case on 21st March, when it is spring in the Northern Hemisphere and autumn in the Southern Hemisphere.

Thus, you find that there are days and nights and changes in the seasons because of the rotation and revolution of the earth respectively.



Thank You!