

## 6<sup>th</sup> – Geography- Motions of The Earth



- The Earth has two types of motions, namely rotation and revolution. **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  $66\frac{1}{2}$  with its orbital plane. The plane formed by the orbit is known as the **orbital plane**. The earth receives light from the sun. Due to the spherical shape of the earth, only half of it gets light from the sun at a time. The portion facing the sun experiences day while the other half away from the sun experiences night.
- The circle that divides the day from night on the globe is called the **circle of illumination**. This circle does not coincide with the axis. 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.
- **Rotation:** -The earth spins on its axis from west to east. This spinning of the Earth around its own axis is known as rotation. The Earth around takes about 24 hours to complete one rotation. One rotation makes an earth day. It is also called **solar day**.

**Effects of the Earth's rotation:** The rotation of the Earth causes:

- Day and night
- Bulging of the earth at the equator, and flattening at the poles.
- The deflection (pushing away from the straight path) of winds and ocean currents.
- Tides (the alternate rise and fall of the oceans due to the gravity of the Moon and the Sun, and the rotation of the earth).
- The apparent movement of all the heavenly bodies from east to the west.

**What do you think will happen if the Earth fails to rotate?**

It will be disastrous if the earth fail to rotate.....

- While the side of the earth facing the Sun will always be lighted. The other side will always remain dark.
- The lighted side of the Earth will become extremely hot and the dark side will be freezing cold.
- Life forms would not be able to exist in such extreme conditions.

**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.

**Effects of the Earth's revolution**

The revolution of the Earth, along with the tilt in the Earth's axis, causes:

- Varying lengths of day and night
- changing seasons

If the Earth's axis were straight and not titled, there would be no seasons, since every point on the Earth would receive the same amount of light each day of the year. Nor would there have been any variation in the lengths of day and night--they would last 12 hours each.

**Varying lengths of day and night:** The lengths of days and nights can be very different, even at the same time of year. This variation is due to the inclination of the earth's axis. For half the year, the Northern Hemisphere faces the Sun, while



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for the next six months; the Southern Hemisphere faces the Sun. A larger part of the hemisphere that faces the Sun gets longer days and shorter nights. At the equator, the days and nights are of equal length.

- 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**. The earth goes around the sun in an **elliptical orbit** throughout its orbit, the earth remains inclined in the same direction.

**The changing Seasons:** 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.

- **On 21<sup>st</sup> 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 shortest night at these places occur on 21<sup>st</sup> June. At this time in the southern Hemisphere all these conditions are reversed. It is winter season there.

- The nights are longer than the days. This position of the Earth is called the summer solstice. **On 22<sup>nd</sup> 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, a larger portion of 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 21<sup>st</sup> march and September 23<sup>rd</sup>**, 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 23<sup>rd</sup> September**, it is autumn season in the Northern Hemisphere and spring season in the Southern Hemisphere. The opposite is the case on 21<sup>st</sup> 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.