3 Motions of the Earth

Lesson at a Glance

- The earth has two types of motions—**rotation** and **revolution.**
- Rotation is the movement of the earth on its axis. In revolution the earth moves around the sun in a fixed path or orbit.
- The **axis** of the earth is an imaginary line.
- The earth receives light from the sun. As the shape of the earth is **spherical,** only half of it gets light from the sun at a time. The other half remains dark. In this way day and night are caused.
- The earth completes one rotation around its axis in about 24 hours. This rotation is the daily motion of the earth.
- The earth takes 365 ¼ days or one year to complete one revolution around the sun.
- There are four seasons in a year—**summer, winter, spring** and **autumn.** Seasons change due to the change in the position of the earth around the sun.
- The rays of sun fall directly on the Tropic of Cancer. Hence, these areas are hot.
- The areas near the poles receive less heat as the rays of the sun are slanting.
- In the Northern Hemisphere the longest day and the shortest night occur on 21st June. In the Southern Hemisphere the shortest day and the longest night occur on this day. This position of the earth is known as the **summer solstice.**
- When there is summer in the Northern Hemisphere, Southern Hemisphere enjoys winter season and vice-versa.
- In the Northern Hemisphere the shortest day and the longest night occur on 22nd December. In the Southern Hemisphere the longest day and the shortest night occur on this day. This position of the earth is known as the **winter solstice.**
- On 21st March and September 23rd the whole earth experiences equal days and equal nights. This is phenomenon is known as **equinox.**
- On 23rd September, it is autumn in the Northern Hemisphere and spring in the Sourthern Hemisphere.
- On 21st March, it is spring in the Northern Hemisphere and autumn in the Sourthern Hemisphere.

- Days and nights occur due to rotation while changes in seasons occur due to revolution.

TEXTBOOK QUESTIONS SOLVED

Q. 1. *Answer the following questions briefly.*

(*a*) *What is the angle of inclination of the earth's axis with its orbital plane?*

(*b*) *Define rotation and revolution.*

(*c*) *What is a leap year?*

(*d*) *Differentiate between the summer solstice and winter solstice.*

(*e*) *What is an equinox?*

(*f*) *Why does the Southern Hemisphere experience winter and summer solstice in different times than that of the Northern Hemisphere?*

(*g*) *Why do the poles experience about six months day and six months night?*

Ans. (*a*) The angle of inclination of the earth's axis with its orbital plane is 66½.

(*b*) **Rotation.** The movement of the earth on its axis is known as rotation.

Revolution. The movement of the earth around the sun in a fixed path or orbit is known as revolution.

(*c*) The year in which February is of 29 days instead of 28 days is called a leap year. Thus a leap year is of 366 days instead of 365 days.

(*d*) Difference between summer solstice and winter solstice

Summer solstice	Winter solstice
• In the Northern Hemisphere the longest day and the shortest night occur on 21st June. At this time in the Southern Hemisphere it occurs the shortest day and the longest night. This position of the earth is called summer solstice.	• In the Northern Hemisphere the shortest day and the longest night occur on 22nd December. At this time in the Southern Hemisphere it occurs the longest day and the shortest night. This position of the earth is known as winter solstice.

(*e*) 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. Therefore, the entire earth experiences equal days and equal nights. This phenomenon is called an equinox.

(*f*) Since it is winter in the Southern Hemisphere when it is summer in the Northern Hemisphere, therefore the position of the earth which is called the Winter Solstice in one Hemisphere is the Summer Solstice in the other, and vice-versa.

(*g*) The axis of the earth is tilted, due to which the sun continuously either shines or cannot be seen for a long time here. Although the earth rotates and day changes into night and night into day at other places, but the poles remain under the same stage for a much longer time due to the tilt.

Q. 2. *Tick the correct answer.*

(*a*) The movement of the earth around the sun is known as

(*i*) Rotation (*ii*) Revolution
(*iii*) Inclination.

(*b*) Direct rays of the sun fall on the equator on

(*i*) 21 March (*ii*) 21 June
(*iii*) 22 December.

(*c*) Christmas is celebrated in summer in

(*i*) Japan (*ii*) India
(*iii*) Australia.

(*d*) Cycle of the seasons is caused due to

(*i*) Rotation (*ii*) Revolution
(*iii*) Gravitation.

Ans. (*a*)—(*ii*), (*b*)—(*i*), (*c*)—(*iii*), (*d*)—(*ii*).

Q. 3. *Fill in the blanks.*

(*a*) *A leap year has ..... number of days.*

(*b*) *The daily motion of the earth is ..... .*

(*c*) *The earth travels around the sun in ..... orbit.*

(*d*) *The sun's rays fall vertically on the Tropice of ..... on 21st June.*

(*e*) *Days are shorter during ..... season.*

Ans. (*a*) 366, (*b*) rotation, (*c*) elliptical, (*d*) cancer, (*e*) winter.

THINGS TO DO

1. *Make a drawing to show the inclination of the earth.*

Ans. The figure given below shows the inclination of the earth.

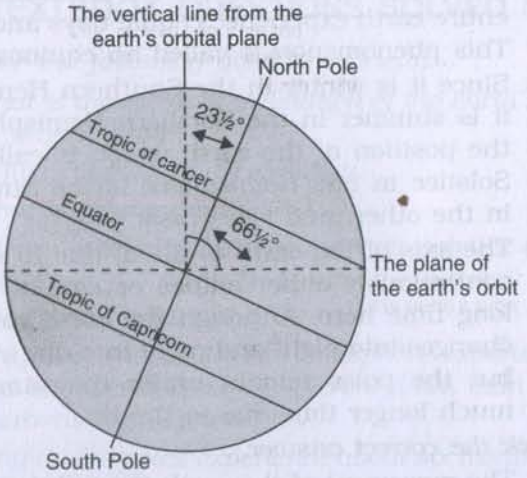

Fig. 3.1.

2. *Record the timings of sunrise and sunset at your place taking help from your local newspaper on the 21st of each month and answer the following:*

(*a*) *In which month are the days the shortest?*

(*b*) *In which months are the days and nights nearly equal?*

Ans. (*a*) December

(*b*) March and September.

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