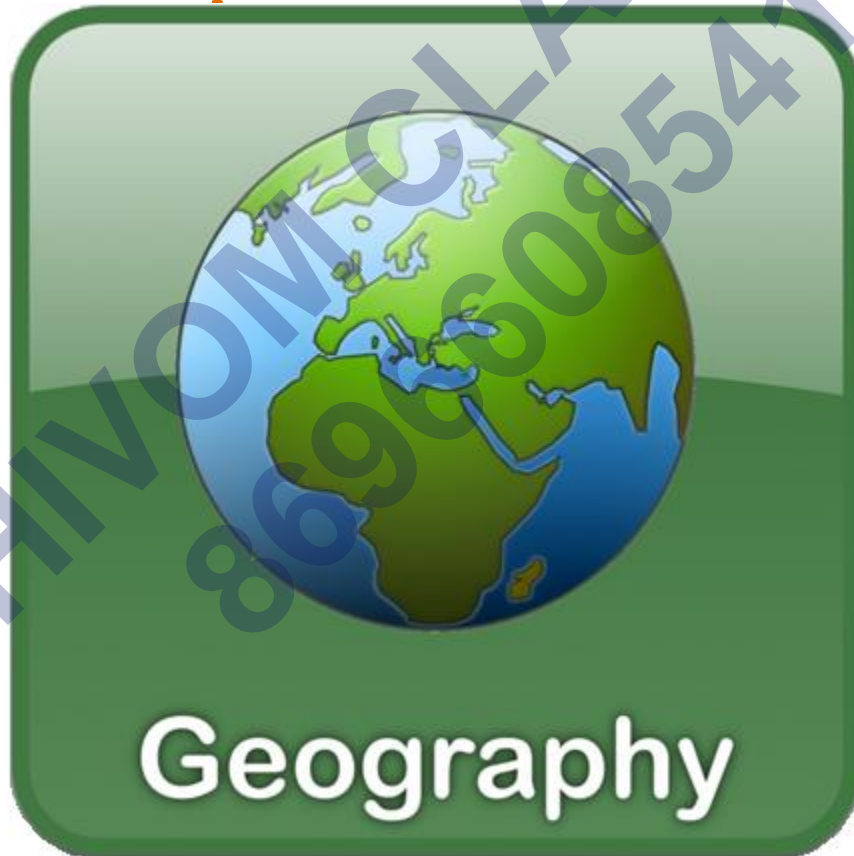


# GEOGRAPHY

## Chapter 3: Motions of the Earth



## Motions of the Earth

### Rotation and Revolution of the Earth

Rotation and revolution are two types of motions of the Earth.

#### Rotation of the Earth

The spinning of the Earth on its axis is called **rotation**. The Earth takes about 24 hours to complete one rotation. This is called the **Earth day**.

The Earth receives light from the Sun. As the Earth is spherical in shape, only half of the Earth gets sunlight at a time. The half of the Earth which faces the Sun experiences day while the other half which is away from the Sun experiences night.

The circle which divides day and night on the globe is called the circle of illumination.

If the Earth does not rotate, then:

- The part of the Earth facing the Sun would always experience day. This will lead to a constant increase in the temperature.
- The other half of the Earth would always remain in darkness. This will result in a continuous decrease in the temperature.
- In both the conditions, survival of any life form will not be possible.



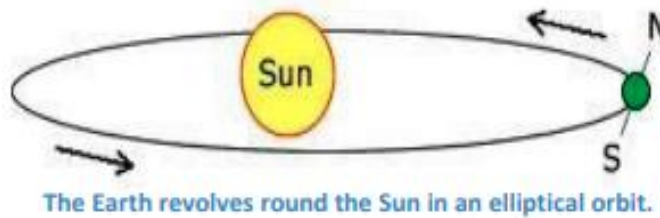
**The imaginary line of the circle which divides day and night on the globe is called the circle of illumination.**

#### Revolution of the Earth

When the Earth moves around the Sun in its orbit, its motion is called **revolution**. The Earth takes  $365\frac{1}{4}$  days to complete one revolution around the Sun. We consider only 365 days in a year and add up six hours ( $\frac{1}{4}$ <sup>th</sup> day) over a period of four years. This one extra day is added to the month of February in the fourth year. Therefore, in every four years, the month of February has 29 days. The year with 366 days is known as a leap year.

The Earth revolves around the Sun in an elliptical orbit.

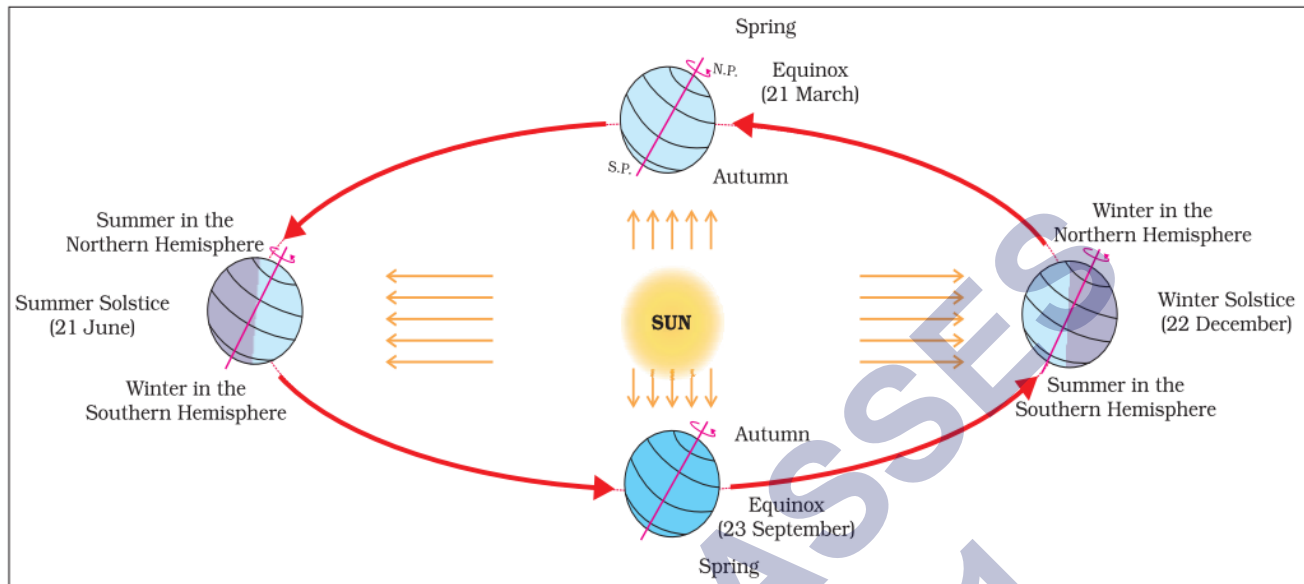
Revolution of the Earth causes the changes in the seasons.



## Summer and Winter Solstices

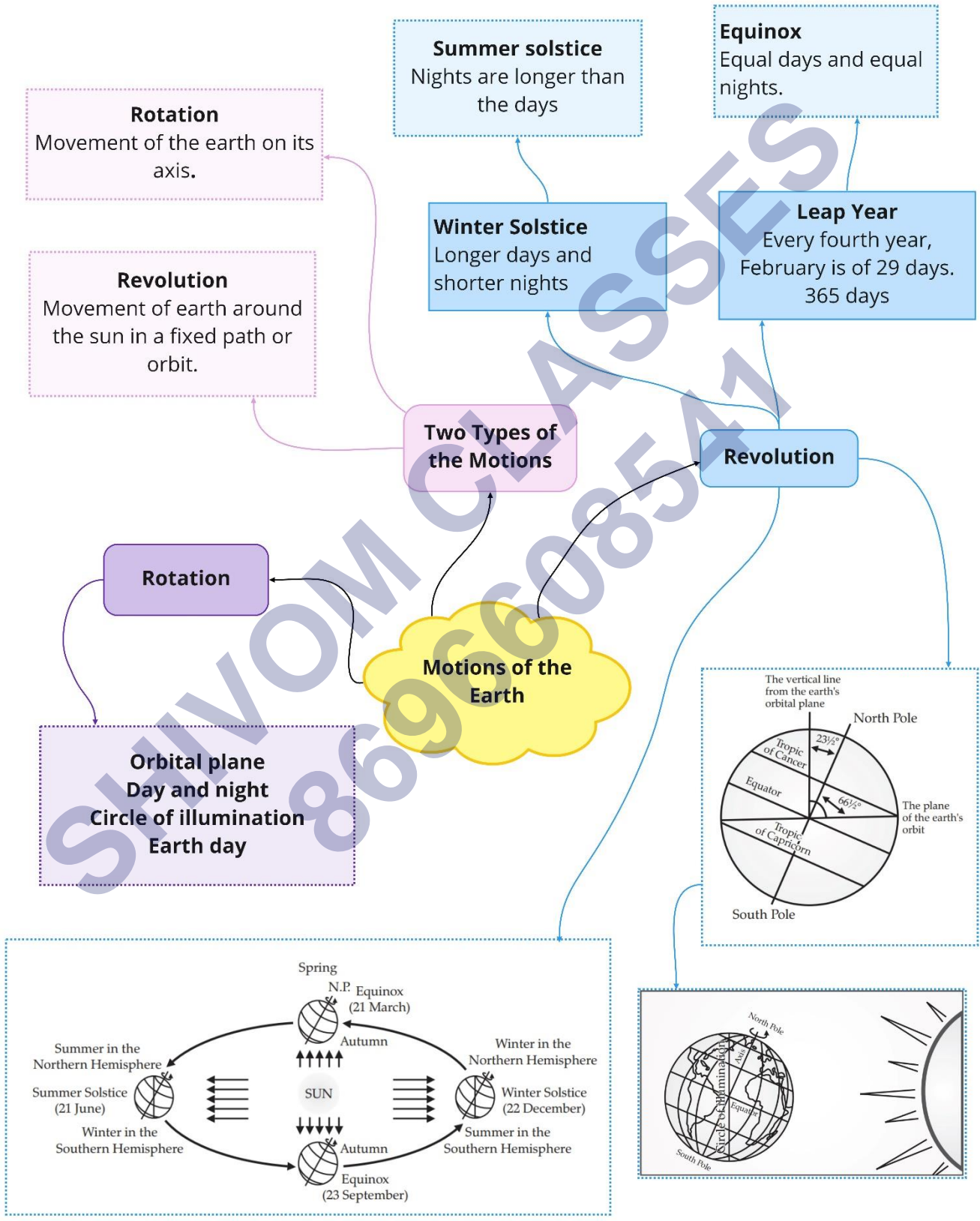
- For six months, (21 March to September 23) the Northern Hemisphere is tilted towards the Sun. The Sun's rays fall directly over the Tropic of Cancer resulting in summer season in the Northern Hemisphere.
- The summer season is characterised by longer days and shorter nights.
- At this time, the Southern Hemisphere is away from the Sun and receives the slanting rays of the Sun, thus experiencing the winter season.
- The winter season is characterised by shorter days and longer nights.
- A solstice is a day, when the Sun shines vertically over a Tropic (Cancer or Capricorn) in the afternoon, and the day is longest in that hemisphere.
- The Southern Hemisphere faces the Sun from 21 June to 22 December. During this time it experiences summers. This is the reason why Australia which lies in the Southern Hemisphere celebrates Christmas in the summer.
- On 22 December, the rays of the Sun fall directly over the Tropic of Capricorn. This is the longest day in the Southern Hemisphere (as it is the summer season) while in the Northern Hemisphere, it is the shortest day (as it is winter season). This is known as the **winter solstice**.
- On 21 June, sunlight falls vertically over the Tropic of Cancer. This is the longest day in the Northern Hemisphere and hence it is known as the **summer solstice**.
- On 21 March and 21 September, the Sun's rays fall directly over the equator. On both these days, the lengths of day and night are equal on all places on the Earth's surface. This is called **equinox**. This occurs as neither of the two poles is tilted towards the Sun.
- On 21 March, it is autumn in the Southern Hemisphere and spring in the Northern

Hemisphere. On 23 September, it is autumn in the Northern Hemisphere and spring in the Southern Hemisphere.



**Diagrammatic representation of summer solstice, winter solstice and equinox**

Class : 6th Social Studies (The Earth Our Habit)  
Chapter - 3 : Motions of the Earth



## Important Questions

### ➤ Multiple Choice Questions:

Question 1. In Australia Christmas is celebrated in the season:

- (a) Winter
- (b) Summer
- (c) Spring
- (d) Autumn

Question 2. In the revolution, motion of the Earth around the Sun in its orbit completed in:

- (a) 365 days
- (b) 366 days
- (c)  $365 \frac{1}{4}$  days
- (d) 367 days

Question 3. The axis of Earth is inclined:

- (a)  $23 \frac{1}{2}^\circ$
- (b)  $66 \frac{1}{2}^\circ$
- (c)  $22 \frac{1}{2}^\circ$
- (d)  $10^\circ$

Question 4. In the leap year excess one day is added in the month of:

- (a) January
- (b) February
- (c) March
- (d) April

Question 5. Direct rays of the Sun fall on the equator on:

- (a) 21 March
- (b) 21 June
- (c) 22 December
- (d) 21 September

Question 6. An equinox happens each year

- (a) Thrice

- (b) Four times
- (c) Twice
- (d) Once

Question 7. The sun's rays fall vertically on the \_\_\_\_\_ on 21st. June

- (a) Arctic Circle
- (b) Tropic of Cancer
- (c) Tropic of Capricorn
- (d) Antarctic Circle

Question 8. In perihelion, Helios means

- (a) Hydrogen
- (b) Light
- (c) Hemisphere
- (d) Sun

Question 9. How much time does the earth take time to complete its rotation?

- (a) 22
- (b) 23
- (c) 24
- (d) 20

Question 10. Earth receive light from the

- (a) Moon
- (b) Mars
- (c) Sun
- (d) Venus

Question 11. In leap year, the month of February has

- (a) 31 days
- (b) 29 days
- (c) 30 days
- (d) 28 days

Question 12. Earth's movement around sun is called

- (a) Rotation

- (b) Revolution
- (c) Solstice
- (d) Equinox

Question 13. The earth takes \_\_\_\_\_ to complete one revolution

- (a) 365 days and 9 hours
- (b) 365 days and 8 hours
- (c) 365 days and 7 hours
- (d) 365 days and 6 hours

Question 14. How many Solstices are there in every year

- (a) 2
- (b) 3
- (c) 5
- (d) 4

Question 15. The sun rays are vertical over the \_\_\_\_\_ during \_\_\_\_\_

- (a) Tropic of Capricorn, equinox
- (b) Tropic of cancer, winter solstice
- (c) Tropic of Capricorn, summer solstice
- (d) Tropic of cancer, summer solstice

➤ **Fill in the blanks:**

1. The earth receives light from \_\_\_\_\_.
2. The earth takes about \_\_\_\_\_ to complete one rotation around its axis.
3. The period of rotation is known as the \_\_\_\_\_.
4. On 23rd September, it is \_\_\_\_\_ season in the Northern Hemisphere and \_\_\_\_\_ season in the Southern Hemisphere.
5. The portion facing the sun experiences \_\_\_\_\_ while the other half away from the sun experiences \_\_\_\_\_.
6. The axis of the earth makes an angle of \_\_\_\_\_ degree with its orbital plane.
7. Australia lies in \_\_\_\_\_ Hemisphere.
8. The longest day and the shortest night at these places occur on \_\_\_\_\_.

➤ **Write true (T) or false (F):**



1. Axis of the earth is an imaginary line about which the earth rotates.
2. Earth takes exactly 365 days to revolve around the sun.
3. Day and Night on the Earth occurs due to rotation of the Earth.
4. On 21st march, the Tropic of Capricorn receives direct rays of the sun as the South Pole tilts towards it.
5. Every fourth year, February is of 29 days instead of 28 days.
6. When there is spring in the Northern Hemisphere and summer in the Southern Hemisphere.

### ➤ Very Short Questions:

1. When Christmas is celebrated in Australia?
2. Which motion of the earth causes change in seasons?
3. What is the shape of the Earth?
4. How long does it take the earth to complete one rotation around its axis?
5. When do the sun rays fall directly on the equator?
6. Why areas near the poles receive less heat?
7. What causes change in seasons?
8. Why do seasons occur?
9. Why days and nights are not of equal length?
10. Define rotation and revolution of the Earth.

### ➤ Short Questions:

1. How is the rotation of the Earth responsible for causing day and night?
2. Why the southern hemisphere celebrates Christmas in summers?
3. What are the effects of the earth's revolution?
4. What do you understand by the term autumn equinox?
5. What is winter Solstice?

### ➤ Long Questions:

1. Why do the poles experience about six months day and six month night?
2. Why both hemispheres experience different winter and summer solstice?
3. What is a leap year?
4. Distinguish between summer solstice and winter solstice?

5. Explain the following terms.

### ANSWER KEY –

#### ➤ Multiple Choice Answer:

1. (b) Summer
2. (c) 365  $\frac{1}{4}$ days
3. (b) 66  $\frac{1}{2}$ °
4. (b) February
5. (b) 21 June
6. (c) Twice
7. (b) Tropic of Cancer
8. (d) Sun
9. (c) 24
10. (c) Sun
11. (b) 29 days
12. (b) Revolution
13. (d) 365 days and 6 hours
14. (a) 2
15. (d) Tropic of cancer, summer solstice

#### ➤ Fill in the blanks:

1. the sun
2. 24 hours
3. earth day
4. autumn, spring
5. day, night
6. 66 $\frac{1}{2}$
7. Southern
8. 21st June

➤ Write true (T) or false (F):

1. True
2. False
3. True
4. False
5. True
6. False

➤ Very Short Answer:

1. Christmas is celebrated in Australia in the summer season.
2. Revolution of the earth causes change in seasons.
3. Earth is spherical in shape.
4. The earth takes about 24 hours to complete one rotation around its axis.
5. On 21st March and September 23rd, direct rays of the sun fall on the equator.
6. The areas near the poles receive less heat as the rays of the sun are slanting.
7. Seasons change due to the change in the position of the earth around the sun.
8. The seasons are caused by the tilt of the Earth's rotational axis away or toward the sun as it travels around the sun in its orbit.
9. Days and nights are not equal length because of the inclined axis of the earth. As earth is tilted at an angle of  $23.4^\circ$ , days are longer in summers than in winters.
10. **Rotation:** Movement of the Earth on its axis in nearly 24 hours is termed as rotation. It is also called the daily movement of the earth.

➤ Short Answer:

1. The Earth rotates on its axis from West to East and completes it in 24 hours. When the Earth rotates, the half portion facing the sun causes day and the other half remains in darkness causing night. Thus, day and night is a continuous phenomenon because of the rotation.
2. On 22nd December, the Tropic of Capricorn receives direct sun rays due to the tilt of South Pole towards it. As the sun rays are vertical on it, hence it has summers. Therefore, Christmas which falls on 25th December is celebrated in summers in the Southern hemisphere.
3. **Results of the Earth revolution are:**

- The phenomenon of seasons is caused.
  - It causes variation in the length of day and night.
  - It also causes variation in the distribution of heat over the surface of the earth.
4. On September 22nd or 23rd in the northern hemisphere, when night and day are nearly of the same length and Sun crosses the equator moving southward. And in the southern hemisphere on 20th or 21st March, Sun crosses the equator moving northward it is known as autumn equinox.
  5. The position of the earth when it is winter season in Northern Hemisphere and summer season in Southern Hemisphere is called Winter Solstice.

### ➤ Long Answer:

1. The axis of the earth remains inclined permanently in the same position. Because of this reason the sun continuously either shines or cannot be visible for a long time near the poles. The earth rotates causing day and night at other places but remain either dark or lighted for much longer time due to the tilt. Due to this reason, the areas near the poles experience six months day and six months night.
2. During May, June and July, the northern hemisphere is exposed to more direct sunlight because the hemisphere faces the sun. The same is true of the southern hemisphere in November, December and January. This is due to the tilt of the Earth. So June, July and August are the hottest months in the northern hemisphere and December, January and February are the hottest months in the southern hemisphere.
3. The earth 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 convenience. These six hours saved every year are added to make one day i.e. 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.
- 4.

Summer solstice	Winter solstice
On 21st June, the Northern Hemisphere is tilted towards the sun.	On 22nd December, the Tropic of Capricorn receives direct rays of the sun as the South Pole tilts towards it.
Sun shines vertically on the Tropic of cancer.	Sun shines vertically on the Tropic of Capricorn

North pole is inclined towards the sun and the south pole is away from it.	South pole is inclined towards the sun and the north pole is away from it.
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5. **Rotation:** Rotation is the movement of the earth on its axis.

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

**Orbital Plane:** The plane formed by the orbit is known as orbital plane.

**Circle of illumination:** 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.

**Leap year:** A year with 366 days is called a leap year.

**Equinox:** 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.

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