

Grade VI

Lesson 3. Motions of the Earth.

Objective Type Questions

I. Multiple Choice Questions

1. The movement of the earth around the sun is known as
a. Rotation b. Revolution c. Inclination d. None of these
2. Direct rays of the sun fall on the equator on
a. 21st March b. 21st June c. 22nd December d. none of these
3. A leap year has _____ days.
a. 341 b. 407 c. 366 d. none of these
4. The leap year occurs in a span of _____ years.
a. 4 b. 5 c. 3.5 d. none of these
5. On 22nd December the rays of sun fall _____ on tropic of Capricorn.
a. directly b. horizontally c. vertically d. none of these
6. On 23rd September the Northern hemisphere has _____.
a. winter b. Autumn c. summer d. none of these

1. b	2. a	3. c	4. a	5. c	6. b
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II. Multiple Choice Questions

1. The axis of the earth is a/an
a. imaginary b. straight line c. curved line d. real line.
2. The earth receives light from the
a. Moon b. Stars c. Meteors d. Sun
3. The time taken by the earth to complete one rotation around its axis is
a. 24 hours b. 12 hours c. 36 hours d. 18 hours
4. The earth completes one revolution in
a. 366 days b. 370 days c. $365 \frac{1}{4}$ days d. $366 \frac{1}{4}$ days



5. It is spring in the Northern Hemisphere and autumn in the Southern Hemisphere
On
a. 23rd September b. 21st March c. 22nd December d. 21st June

1. a	2. d	3. a	4. c	5. b
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III. Multiple Choice Questions

- Motion of the earth on its axis in about 24 hours is called
a. revolution b. rotation c. both a and b d. none of these
- Motion of the earth around the sun is known as
a. revolution b. rotation c. both a and b d. none of these
- What is orbital plane?
a. Plane formed by the axis b. plane formed by the orbit
c. Both a and b d. None of these
- Which one of the divides the globe into day and night is called
a. The moon b. The sun c. The satellite d. The space
- The circle that divides the globe into day and night is called
a. circle of darkness
- The period of one rotation of the earth is known as
a. The sun day b. the moon day c. the earth day d. none of these
- What would have happened if the earth did not rotate?
a. Cold conditions on earth's half portion
b. Warm conditions on earth's another half portion
c. No life possible in such extreme conditions
d. All of these
- A year with 366 days is called
a. leap year b. normal year c. both a and b d. none of these
- Why do season change on the earth?
a. Due to change in the position of the earth around the sun
b. Due to change in the earth's position
c. Both a and b
d. None of the above
- When do the longest day and the shortest night occur in the northern hemisphere?
a. June 21 b. September 23 c. December 22 d. March 21
- In which season Christmas is celebrated in Australia?
a. Winter season b. summer season c. Autumn season d. Spring season

12. When do equinoxes occur on the earth?
 a. March 21 b. September 23 c. Both a and b d. None of these
13. Days and nights occur on earth due to
 a. rotation b. revolution c. both a and b d. none of these
14. Change of seasons occur on earth due to
 a. rotation b. revolution c. both a and b d. none of these

1. b	2. a	3. b	4. b	5. c
6. c	7. d	8. a	9. a	10. a
11. b	12. c	13. a	14. b	

I. Fill in the blanks

- A leap year has _____ number of days.
- The daily motion of the earth is _____.
- The earth travels around the sun in _____ orbit.
- The sun's rays fall vertically on the Tropic of _____ on 21st June.
- Days are shorter during _____ season.
- The two types of motions that the earth has are _____ and _____.
- The earth takes about _____ to complete one rotation around its axis.

1. 366	2. rotation	3. elliptical	4. Cancer
5. winter	6. rotation and revolution	7. 24 hours	

II. Fill in the blanks

- Days and nights occur due to _____ of the earth.
- Only half of the earth gets light from the sun at a time due to its _____ shape.
- The period of rotation is known as the _____.
- The sun's rays fall vertically at the Tropic of _____ on 22nd December.
- On _____, it is autumn season in the Northern Hemisphere.

1. rotation	2. spherical	3. Earth day	4. Capricorn	5. 23 rd September
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III. Fill in the blanks

1. A leap year has _____ number of days.
2. The daily motion of the earth is _____.
3. The earth travels around the sun in _____ orbit.
4. The sun's rays fall vertically on the Tropic of _____ on 21st June.
5. Days are shorter during _____ season.

1. 366	2. Rotation	3. Elliptical	4. Cancer	5. Winter
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I. Match the following

1. Winter Solstic	a. Earth day
2. Summer Solstice	b. 21 st March
3. Equinox	c. 21 st June
4. Period of Rotation	d. 22 nd December

1. d	2. c	3. b	4. a
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II. Match the following

1. Summer solstice	a. Movement of the earth on its axis
2. Winter solstice	b. 23 rd September
3. Equinox	c. Fixed path
4. Orbit	d. 22 nd
5. Rotation	e. 21 st June

1. e	2. d	3. b	4. c	5. a
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I. True or False

1. When nights are longer than days in Southern hemisphere this position of earth is called as winter solstice.
2. The sun goes around the earth in an elliptical orbit.
3. During summer solstice the season in the north hemisphere is winter.
4. On 21st March and 23rd September the whole earth experiences equal days and nights.
5. Rotation is movement of earth on its axis.

1. False	2. True	3. False	4. True	5. True
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II. True or False

1. The axis of the earth makes an angle of $23\frac{1}{2}$ with its orbital plane.
2. Every five year, February is of 29 days instead of 28 days.
3. Season changes due to the change in the position of the earth around the sun.
4. When there is summer in the Northern Hemisphere, it is spring in the Southern Hemisphere.
5. Life is not possible in extreme conditions.

1. False	2. False	3. True	4. False	5. True
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Very Short Answer Type Questions

1. **What is the angle of inclination of the earth's axis with its orbital plane?**

The angle of inclination of the earth's axis is $66\frac{1}{2}$ with its orbital plane.

2. **Define leap year?**

Rotation is the movement of earth on its axis. Revolution is the movement of the earth around the sun on a fixed orbit.

3. **What is a leap year?**

The earth rotates around the sun for 365 days and 6 hours. For our convenience, we count only 365 days. So after every 4 years, when 24 hours get completed we add the time as additional day in February which is of 29 days. Thus every fourth year is known as leap year.

4. What is an equinox?

On 21st March and 23rd September, direct rays of sun fall on the equator. During this position, neither of the poles is tilted towards the sun due to which the whole earth experiences equal days and equal nights. This is known as an equinox.

5. What is circle of illumination?

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

6. What is axis?

The imaginary line which passes from the centre of the earth and joins the two poles namely North Pole and South Pole is known as axis.

Short Answer Type Questions

1. Differentiate between summer and Winter solstice.

Summer Solstice	Winter Solstice
1. It occurs 21 st June	i. It occurs on 22 nd December
2. In this, Northern Hemisphere tilts towards the sun	ii. In this, Southern Hemisphere tilts towards the sun
3. In this, sun rays fall directly on the Tropic of Cancer	iii. In this, sun rays fall directly on Tropic of Capricorn.

2. Why do the poles experience about six months day and six months night?

- (i) During summer solstice, North Pole is inclined towards the sun and the places beyond the Arctic Circle face continuous daylight for six months.
- (ii) During the same time, the South Pole moves away from the sun and places above the Arctic Circle face continuous daylight for six months.
- (iii) During winter solstice, the situation is reversed. South Pole comes in light while North Pole goes in dark.

3. How does rotation affect the earth?

- (i) It is because of the rotation that days and nights take place.
- (ii) Half of the earth receiving sunlight experiences day and the other half night.
- (iii) This alternate day and night phenomenon keeps going on over time. These days and night are not equal in all parts of the world.
- (iv) It is attributed to the inclination of the earth that day and night is of equal

length at the equator and unequal as we move towards the pole.

- (v) Again, here we can refer to the fact that the earth is inclined to the plane of its orbit ($66\frac{1}{2}^\circ$) which makes one of the hemispheres to lean against the sun for a greater period, let's say six months.

4. How does earth's revolution take place?

- (i) Another type of movement is earth's revolution around the sun.
(ii) This movement is called revolution.
(iii) The path followed by earth to make one revolution round the sun is called orbit of the Earth.
(iv) The Earth revolves round the sun in an elliptical orbit and hence takes about 365 days and 6 hours for completing one revolution.
(v) In this way, we can say that earth has two kinds of motions: one is rotation (on its axis) and another is revolution (around the sun).

5. What would happen if the Earth did not rotate?

- (i) The portion of the earth facing the sun would always experience day, thus bringing continuous warmth to the region.
(ii) The other half world remain in darkness and be freezing cold all the time.
(iii) Life would not have been possible in such extreme conditions.

Long Answer Type Questions

1. Why does the Southern Hemisphere experience winter and Summer Solstice in different times than that of the Northern Hemisphere?

While the earth revolves around the sun, one hemisphere tilts towards the sun while the other moves away from the sun. Thus on 22nd December, Southern Hemisphere tilts towards the sun and the Northern Hemisphere moves away from it. The situation is reversed on 21st June. The hemisphere tilted towards the sun gets heated up as compared to the hemisphere away from the sun. It is due to this that Southern Hemisphere experiences winter and summer solstice at different time as that of Northern Hemisphere.

2. How is the earth's axis inclined? What is its effect?

The earth's axis is inclined to the earth's orbit at an angle of about $66\frac{1}{2}^\circ$. Also, earth makes an angle of $23\frac{1}{2}^\circ$ from a line perpendicular to the plane of the orbit. It takes about 24 hours for earth to complete one rotation.



The direction of rotation is west to the east. The sun, moon and stars rise from the east and set in the west.

At any given point of time half of the earth faces the sun while half remains in dark or away from the sun. That illuminated part is called "Circle of Illumination"

3. How does elliptical orbit of the earth affect it?

- (i) On 21st June, the northern hemisphere is tilted towards the sun.
- (ii) The rays of the sun fall directly on the Tropic of Cancer. As a result, we receive heat. So they experience summer.
- (iii) At the same time in the Southern Hemisphere, all these conditions are reversed. It is winter season there.
- (iv) The nights are longer than the days here.
- (v) So, 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.

4. How does the earth's one revolution affect months and seasons?

- (i) The Earth takes about 365 days and 6 hours to complete one revolution.
- (ii) In order to avoid the confusion and problem arising out of the fraction it was decided that a day would be added to the calendar every year in the month of February and for this every fourth year is called " Leap year".
- (iii) This time taken by the earth for completing a revolution, actually determines the length of the seasons, let's say summer, autumn, winter and spring seasons.

5. Examine the concept of summer solstice.

The line which separates the darkened portion and the illuminated one is called "Circle of Illumination".

On June 21, the northern half of the earth is inclined towards the sun and southern half is away from it. The sun rays fall vertically on the Tropic of Cancer ($23\frac{1}{2}^{\circ} N$) due to which the Northern Hemisphere becomes extremely hot and warm. There is high temperature condition in the Northern Hemisphere and it is due to the two facts. Firstly, inclination of earth's axis and secondly direct angle of sun rays at the Tropic of Cancer.

It is summer season and the days are longer and nights are shorter in the north of the equator. Whereas in the south, the sun rays can reach up to only Antarctica circle ($66\frac{1}{2}^{\circ} S$), after that there is complete darkness for six months.

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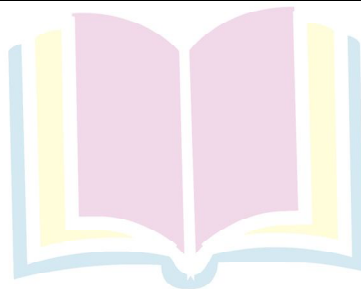
6. Examine the concept of winter solstice.

On December 22, (slight variation in date from year to year) due to inclination southern half of the earth faces the sun. This is the situation just opposite to that of the summer solstice. More area of the Southern Hemisphere is facing the sun hence it is summer season and less area of the northern hemisphere is exposed to the sun so it is winter season. These sun rays are vertical at Tropic of Capricorn ($66\frac{1}{2}^{\circ}S$), due to which maximum heating takes place over that region ($66\frac{1}{2}^{\circ}N$) only after that its complete darkness or night for six months. Now the days are longer and nights are shorter in this hemisphere and vice versa for Northern Hemisphere where sun's rays can reach up to Arctic Circle only.

7. How are day and nights caused by the rotation of the earth?

Days and nights are caused by the rotation of the earth on its axis which is tilted at about $66\frac{1}{2}^{\circ}$ to the plane of the ecliptic or orbit. Due to this inclination the whole world experiences the unequal length of days and nights. From March 21 to June 21 the days are longer in the northern hemisphere and vice-versa in the south of the Equator.

From June 21 to September 23, the phenomena starts reversing, that is, day starts becoming shorter in Northern Hemisphere and longer in the Southern Hemisphere. On September 23, day and night become equal and after this date till 22nd December, the day length in northern hemisphere goes on decreasing and in southern hemisphere, it goes on increasing. In this way again the pattern is reversed. After December 22, the day length starts increasing with the approaching of spring equinox.



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