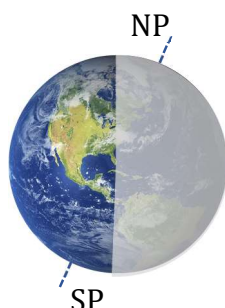


NCERT QUESTIONS WITH SOLUTIONS

1. In figure how many hours of sunlight do the North Pole and the South Pole receive during one rotation of the Earth?



Solution

In the figure, the North Pole is in darkness, showing that it is winter in the Northern Hemisphere. During this time, the North Pole gets 0 hours of sunlight in one rotation of the Earth.

The South Pole is tilted towards the Sun, so it receives 24 hours of sunlight.

This happens because the Earth's axis is tilted, making one pole face the Sun while the other remains away.

2. Fill in the blanks

- (i) Stars rise in the _____ and set in the _____ (East, West)

Solution

Due to the Earth's rotation from west to east, celestial bodies like the Sun, Moon, and stars appear to rise in the east and set in the west.

- (ii) Day and night are caused by the Earth's _____ (Rotation)

Solution

The Earth rotates on its axis once every 24 hours. The side facing the Sun experiences day, while the side away from the Sun experiences night.

- (iii) When the Moon fully covers the Sun from our view, it is called a _____ solar eclipse. (Total)

Solution

A total solar eclipse occurs when the Moon comes directly between the Earth and the Sun and completely blocks the Sun from view for a short time.

3. State whether True or False
(i) Lunar eclipse occurs when the Sun comes between the Earth and the Moon.

Solution

False

A lunar eclipse happens when the Earth comes between the Sun and the Moon, and the Earth's shadow falls on the Moon.

- (ii) Sunrise happens earlier in Gujarat than in Jharkhand.

Solution

False

Jharkhand is in the eastern part of India, while Gujarat is in the west. Since the Sun rises in the east first, sunrise occurs earlier in Jharkhand.

- (iii) In Chennai, the longest day occurs on the summer solstice.

Solution

True

On the summer solstice (around June 21), the Northern Hemisphere is tilted towards the Sun. Thus, all places in the Northern Hemisphere, including Chennai, have their longest day.

- (iv) We should watch the solar eclipse directly with our naked eye.

Solution

False

Looking at the Sun directly during an eclipse can damage the eyes permanently. It should be viewed only with special filters or safe projection methods.

- (v) Seasons occur due to the tilt of Earth's axis of rotation and its spherical shape.

Solution

False

Seasons occur due to the tilt of the Earth's axis (23.5°) and its revolution around the Sun, not because of its spherical shape.

- (vi) The Earth's revolution around the Sun causes day and night.

Solution

False

Day and night are caused by the rotation of the Earth on its axis, not by its revolution. The revolution of the Earth causes seasons.

4. Padmashree saw the Orion constellation nearly overhead at 8 pm yesterday. When will she see Orion overhead today?

Solution

Yesterday, Padmashree observed the Orion constellation nearly overhead at 8:00 pm. Due to the Earth's revolution around the Sun, the night sky does not remain the same each day. As the Earth moves a little in its orbit daily, the stars and constellations appear about 4 minutes earlier each night. This means that if Orion was overhead at 8:00 pm yesterday, it will be overhead at about 7:56 pm today. Thus, Padmashree will see Orion overhead slightly earlier each night, and over the weeks, this shift will cause Orion to gradually change its position and eventually disappear from the night sky.

5. Nandhini saw a group of stars rising at midnight on 21 June. When will she see the same group of stars rising at midnight next year?

Solution

Stars rise about 4 minutes earlier each night. Over ~365 days that totals ~24 hours, so the same group will rise at midnight one calendar day earlier next year.

6. Abhay noticed that when it was daytime in India, his uncle who was in the USA was generally sleeping as it was night-time there. What is the reason behind this difference?

Solution

The reason for this difference is the rotation of the Earth on its axis. The Earth is nearly spherical in shape and rotates from west to east, so sunlight falls only on one half of the Earth at a time. The part of the Earth facing the Sun experiences daytime, while the opposite part that does not receive sunlight experiences night-time. Since India and the USA are located on almost opposite sides of the Earth, when it is daytime in India, it is night time in the USA. That is why Abhay notices his uncle in the USA sleeping when it is day in India.

7. Four friends used the following ways to see the solar eclipse. Who among them was being careless?

- (i) Ravikiran used a solar eclipse goggle.
- (ii) Jyothi used a mirror to project the Sun's image.
- (iii) Adithya saw the Sun directly with his eyes.
- (iv) Aruna attended a programme arranged by a planetarium.

Solution

- (i) Ravikiran used a solar eclipse goggle:

This is the safe method, because solar eclipse goggles are specially designed to filter harmful rays of the Sun.

- (ii) Jyothi used a mirror to project the Sun's image:

This is also safe, since she is not looking directly at the Sun. She is viewing only the projected image.

- (iii) Adithya saw the Sun directly with his eyes:

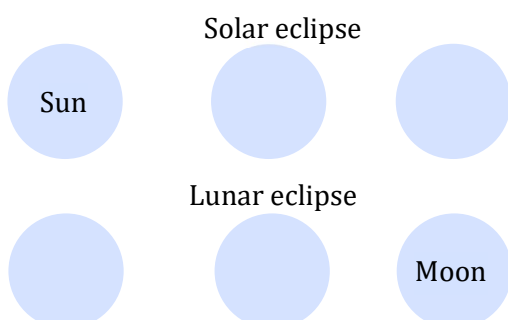
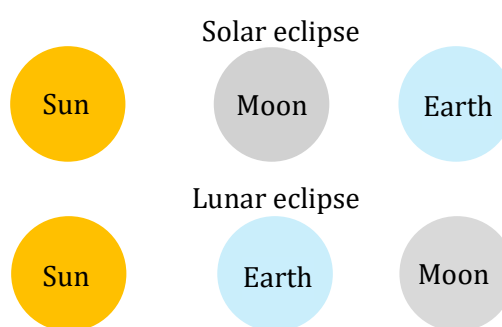
This is careless and dangerous, because directly looking at the Sun during an eclipse can permanently damage the eyes or even cause blindness.

- (iv) Aruna attended a programme arranged by a planetarium:

This is also a safe method, because planetariums use proper scientific arrangements to show eclipses without harming the eyes.

Conclusion: Among the four, Adithya was being careless because he looked at the Sun directly.

8. Fill in the circles in the given figure appropriately with one of the following: Sun, Moon, Earth


Solution

Solar Eclipse

- (i) The Moon comes between the Sun and the Earth.
- (ii) The Moon blocks the sunlight and its shadow falls on the Earth.
- (iii) This makes the Sun look dark for a short time during the day.

Lunar Eclipse

- (i) The Earth comes between the Sun and the Moon.
 - (ii) The Earth blocks sunlight from reaching the Moon.
 - (iii) The shadow of the Earth falls on the Moon, making it look dark or reddish.
9. The Moon is much smaller than the Sun, yet it can block the Sun completely from our view during a total solar eclipse. Why is it possible?

Solution

Although the Sun is very large, it is also very far away from the Earth. The Moon, on the other hand, is much smaller but much closer to the Earth. Because of this difference in distance, the Sun and the Moon appear to be almost the same size in the sky. That is why the Moon can completely cover the Sun during a total solar eclipse.

10.The Indian cricket team matches in Australia are often held in December. Should they pack winter or summer clothes for their trip?

Solution

They should pack summer clothes for their trip. This is because Australia lies in the Southern Hemisphere, where the seasons are opposite to those in India. In December, it is winter in India but summer in Australia. Therefore, the players will need summer clothing during their matches there.

11.Why do you think lunar eclipses can be seen from a large part of the Earth when they happen, but total solar eclipse can be seen by only a small part of the Earth?

Solution

A lunar eclipse can be seen from a large part of the Earth because the Earth's shadow is very big compared to the Moon. When the Earth blocks sunlight, the shadow covers the Moon for a long time. Therefore, everyone on the night side of the Earth can see the eclipse.

In contrast, during a total solar eclipse, the Moon's shadow is very small compared to the Earth. This shadow falls on only a narrow region of the Earth's surface. As the Moon moves in its orbit and the Earth rotates, this small shadow moves quickly, so the eclipse is visible only for a short time and from a limited area.

12.If the Earth's axis were not tilted with respect to the axis of revolution, explain what would be the effect on seasons?

Solution

If the Earth's axis were not tilted, there would be no seasons on Earth. Every place would get almost the same amount of sunlight throughout the year. This means the weather would remain nearly the same all year — there would be no summer, winter, spring, or autumn. Also, the length of day and night would stay almost equal every day.