

## UNIT 1 SEASONS AND TIME

**1.What are the reasons for the different seasons?**

- \*Revolution of the Earth**
- \*Tilt of the Earth's axis**
- \* The parallelism of the Earth's axis**
- \*Apparent movement of the sun**

**2.What is revolution of the Earth?**

**The Earth revolves around the Sun in an elliptical orbit.  
This is known as revolution.**

**3.What is the parallelism of the Earth's axis?**

- \*The axis of the Earth is tilted at an angle of  $66\frac{1}{2}^{\circ}$  from the orbital plane and  $23\frac{1}{2}^{\circ}$  from the vertical plane.**
- \*The Earth maintains this tilt throughout its revolution.  
This is known as parallelism of the Earth's axis.**

**4.What is the apparent movement of the sun?**

**Parallelism is maintained same throughout the revolution.  
So the position of the Sun in relation to the Earth varies apparently between Tropic of Cancer ( $23\frac{1}{2}^{\circ}$  North) and Tropic of Capricorn( $23\frac{1}{2}^{\circ}$  South). This is known as the apparent movement of the Sun.**

**5. Which are the important seasons on earth?**

**Spring, Summer, Autumn and Winter**

**6.Different seasons are get repeated in a cyclic manner.Why?**

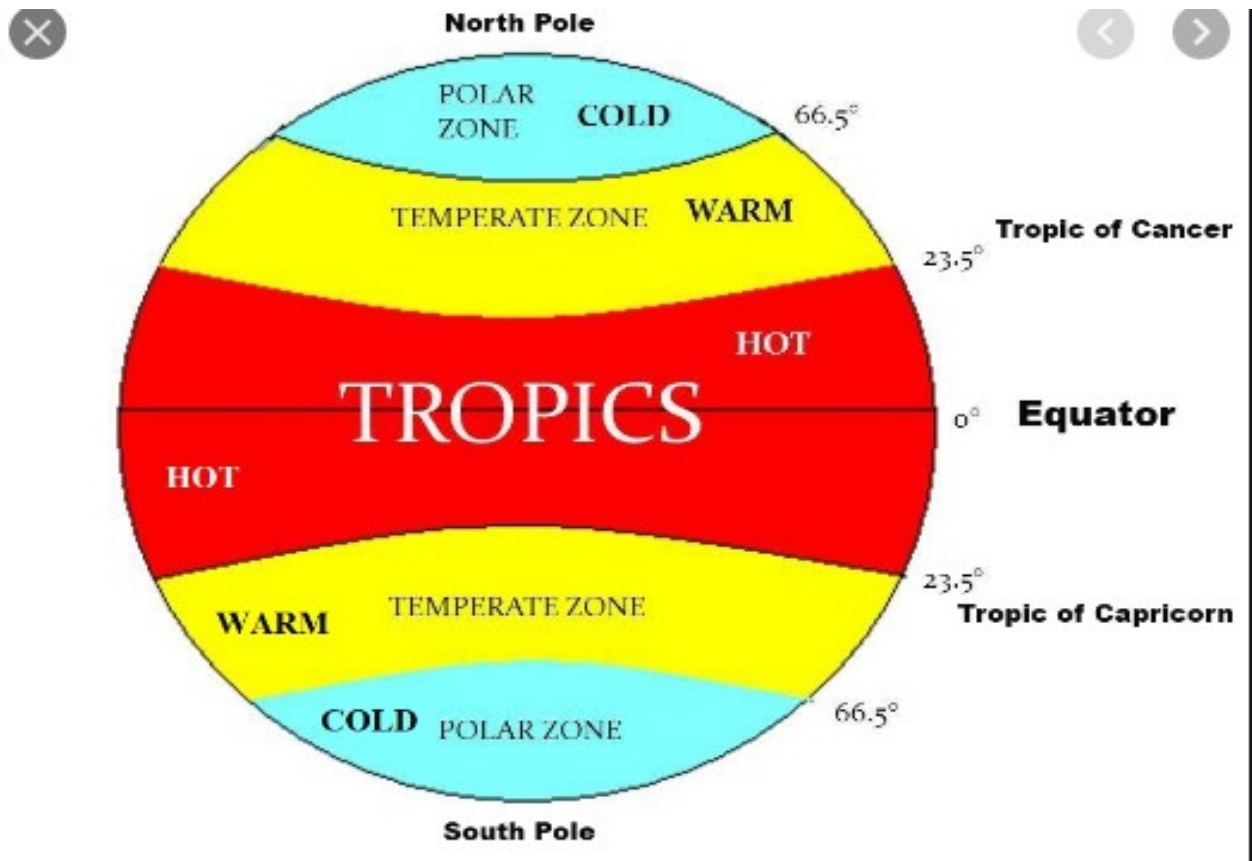
**Because of the apparent movement of the sun between Tropic of Cancer ( $23\frac{1}{2}^{\circ}$ N) and Tropic of Capricorn ( $23\frac{1}{2}^{\circ}$ S)**

**7.Seasonal changes are not very obvious in the tropical regions .Why?**

**Because of the incidence of large amount of Sun's rays throughout the year.**

**8.Seasonal changes are obvious in which zones?**

**In the mid latitudinal or temperate zones.**



**9.Explain equinoxes.**

The apparent position of the Sun during the Earth's revolution will be over the Equator on March 21 and September 23.

Hence the length of day and night will be equal during these days on both the hemispheres .

These days are called equinoxes.

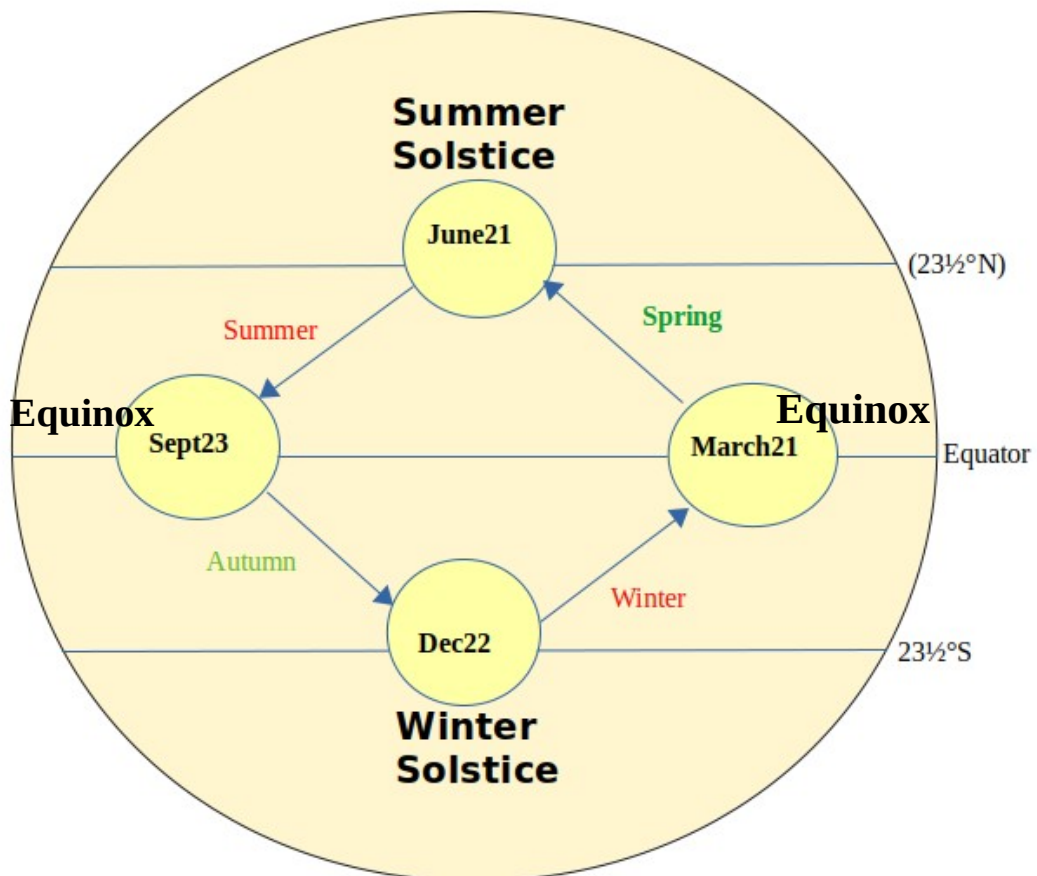
**10.Compare the Summer Solstice and Winter Solstice in the Northern Hemisphere.**

Summer Solstice	Winter Solstice
The Sun vertically over the Tropic of Cancer (23½°N)	The Sun vertically over the Tropic of Capricorn (23½°S)
On June21	On December22
Experiences the longest day and shortest night.	experiences the longest night and shortest day.

**11.Compare the spring season and autumn season .**

<b>spring season</b>	<b>autumn season</b>
<b>between March21 and June21</b>	<b>Between September 23 and December22</b>
<b>the season of transition from winter to summer</b>	<b>the season of transition from summer to winter</b>
<b>the atmospheric temperature increases considerably.</b>	<b>the atmospheric temperature decreases considerably.</b>
<b>There is lengthening of day and shortening of night</b>	<b>There is shortening of day and lengthening of night</b>
<b>Sprouting of plants , blooming of mango trees and bearing buds on jackfruit trees</b>	<b>Trees shed their leaves.</b>

**12.Diagram that shows the apparent movement of the sun and Seasons**



Months	The apparent movement of the sun	Seasons	
		Northern hemisphere	Southern hemisphere
From March 21 to June 21	From the Equator to Tropic of Cancer	Spring	Autumn
From June 21 to September 23	From Tropic of Cancer to the Equator	Summer	Winter
From September 23 to December 22	From the Equator to Tropic of Capricorn	Autumn	Spring
From December 22 to March 21	From Tropic of Capricorn to the Equator	Winter	Summer

**13.What is Utharayanam?**

**The northward apparent movement of the Sun from Tropic of Capricorn to Tropic of Cancer is termed as 'Utharayanam'. The duration of day in the northern hemisphere gradually increases during this period.**

**14.What is 'Dakshinayanam'?**

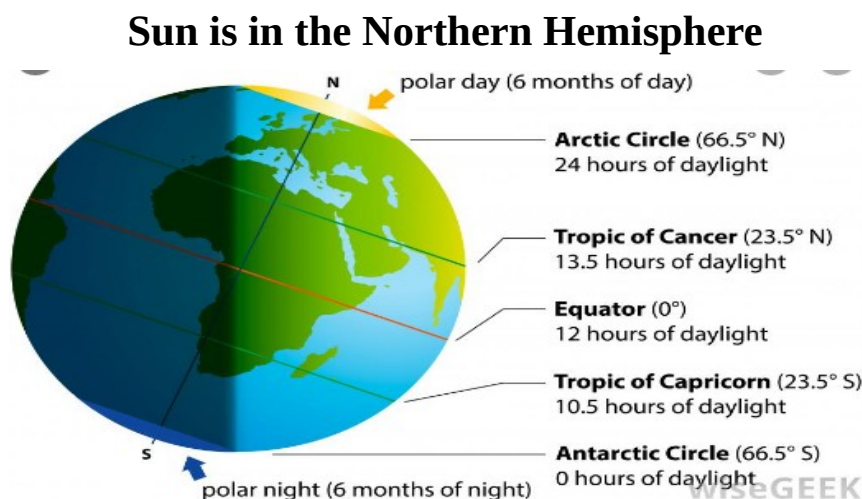
**The southward apparent movement of the Sun from Tropic of Cancer to Tropic of Capricorn is termed as 'Dakshinayanam'. The duration of day in the southern hemisphere gradually increases during this period.**

**15.What is the duration of day and night in the south polar regions, when the Sun is respectively over the Northern Hemisphere and Southern Hemisphere?**

**When the Sun is in the Northern Hemisphere, the south polar regions experience continuous night for six months.**

**When the Sun is in the Southern Hemisphere, the south polar regions experience continuous daylight for six months.**

**16.**



17.The people of which Indian State can see the Sun rise first?

\*Arunachal Pradesh

18.Local time

\*The time estimated at each place based on the position of the sun is Local time.

19.How is time calculated?

The angular distance of the Earth is= $360^\circ$

The time required to complete the  $360^\circ$  rotation= $24$  hrs

= $24 \times 60$ minutes

= $1440$ minutes

Therefore the time required for the Earth

to complete the rotation of  $1^\circ$  longitude

= $1440 \div 360$

= $4$ minutes

So in 4 minutes the Earth completes  $1^\circ$  rotation.

Therefore in 60 minutes the Earth completes  $15^\circ$  rotation.

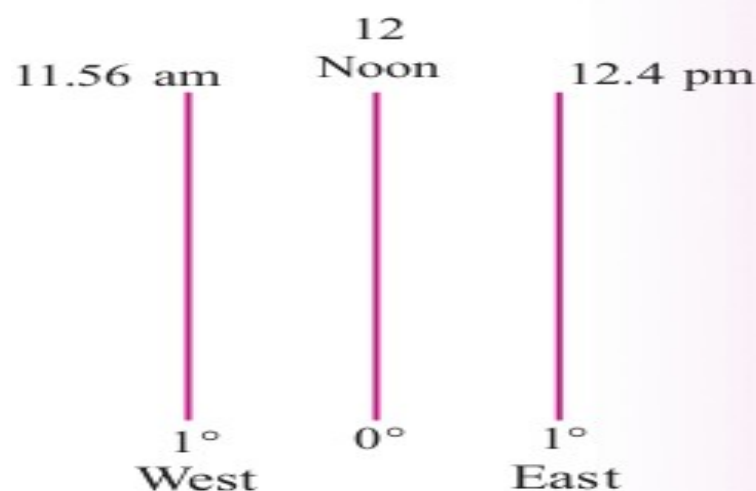
That is,with 1hour,the Earth rotates  $15^\circ$ .

So for every  $15^\circ$  changes ,the time change is 1 hour.

20.As the Earth rotates from West to East time advances towards the east and recedes towards the west.

When  $1^\circ$  change towards the East the time increases by 4 minutes.

When  $1^\circ$  change towards the west the time decreases by 4 minutes.



**21.Greenwich time (GMT)**

- \*The zero degree longitude.
- \*Time is calculated worldwide based on this longitude.
- \*Hence this line is also known as the prime meridian.
- \*The local time at the prime meridian is known as the Greenwich Mean Time (GMT).

**26.Time zones**

- \*Based on the Greenwich Meridian, the world is divided into 24 zones, each with a time difference of one hour. These are known as time zones.

**27.Standard time**

- \*Each country considers the longitude that passes through its middle as the standard meridian.
- \*The local time at the standard meridian is the standard time of that country.

**27.Indian Standard Time (IST)**

- \*The  $82\frac{1}{2}^{\circ}\text{E}$  longitude is the standard meridian of India.
- \*The local time along this longitude is the Indian Standard time.

**28.International Date Line**

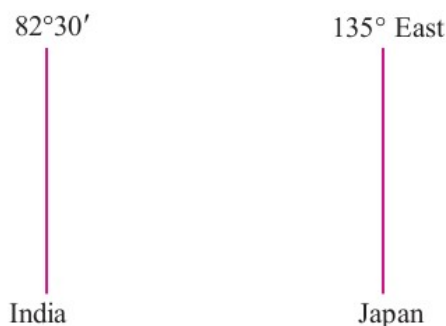
- \* $180^{\circ}$  longitude
- \*Used to determine day
- \*Not a straight line
- \*passes through sea.(Bering - strait in Pacific Ocean )

**29. The travellers who cross International Date Line from the east calculate the time by advancing it by one day and those who cross the line from the west deduct one day.**

**While crossing from the east,time will be a day ahead.**

**While crossing from the west,time will be a day behind.**

**30.What will be the time in Japan ( $135^{\circ}$  East) when it is 11 pm on Monday in India?**



- The longitudinal difference between India and Japan =  $135^{\circ} - 82^{\circ}30'$   
=  $52^{\circ}30'$
- Time difference for  $1^{\circ}$  longitude is 4 minutes.
- Time difference for  $52^{\circ}30'$  longitude =  $52\frac{1}{2} \times 4$   
= 210 minutes  
= 3 hours 30 minutes
- As Japan is situated at the east of India, the time in Japan would be 3 hours and 30 minutes ahead of that time in India.
- When it is 11 pm on Monday in India, the time in Japan = 11 pm Monday + 3 hours 30 minutes = Tuesday 2.30 am

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Position of the Sun on June 21 =

