

# CHAPTER 3: MOTIONS OF THE EARTH(पृथ्वी की गतियाँ )

## TOPICS

ROTATION OF EARTH & ITS IMPACT

पृथ्वी का घूर्णन और इसका प्रभाव

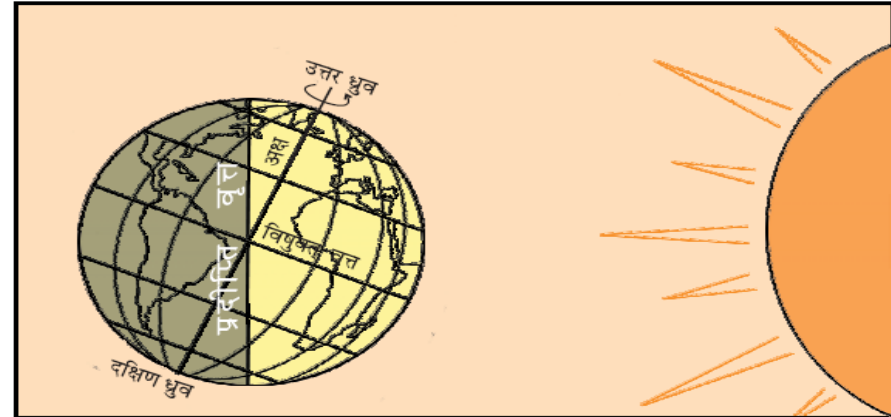
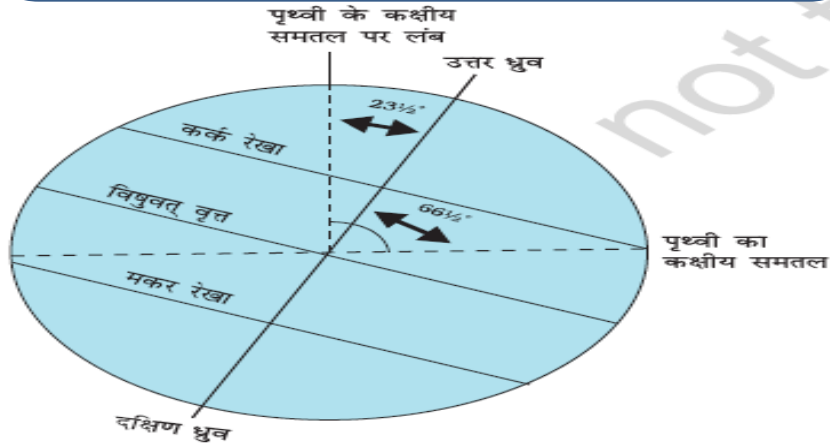
REVOLUTION OF EARTH & ITS IMPACT

पृथ्वी का परिक्रमण और इसका प्रभाव

## FIRST THINGS FIRST

The axis (अक्ष) of the earth which is an imaginary line, makes an angle of  $66\frac{1}{2}^\circ$  with its orbital plane (कक्षीय समतल).

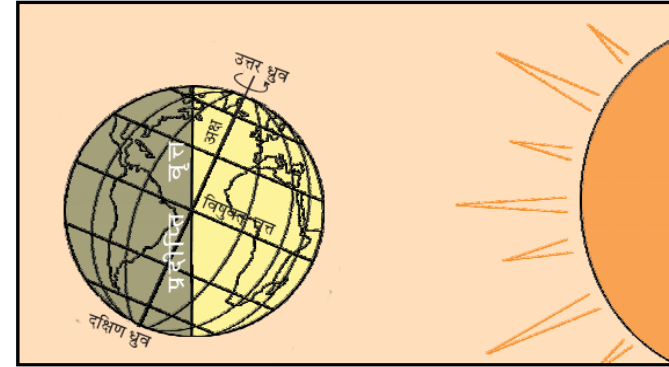
Due to the spherical shape of the earth, only half of it gets light from the sun at a time, The portion facing the sun experiences day while the other half away from the sun experiences night, The circle that divides the day from night on the globe is called the circle of illumination (प्रदीप्ति वृत्त). This circle does not coincide with the axis (अक्ष).



# ROTATION OF EARTH & ITS IMPACT

## पृथ्वी का घूर्णन और इसका प्रभाव

The earth takes about 24 hours to complete one rotation around its axis. The period of rotation is known as the earthday(पृथ्वी दिन). This is the daily motion of the earth



What would happen if the earth did not rotate? The portion of the earth facing the sun would always experience day, thus bringing continuous warmth to the region. The other half would remain in darkness and be freezing cold all the time. Life would not have been possible in such extreme conditions.

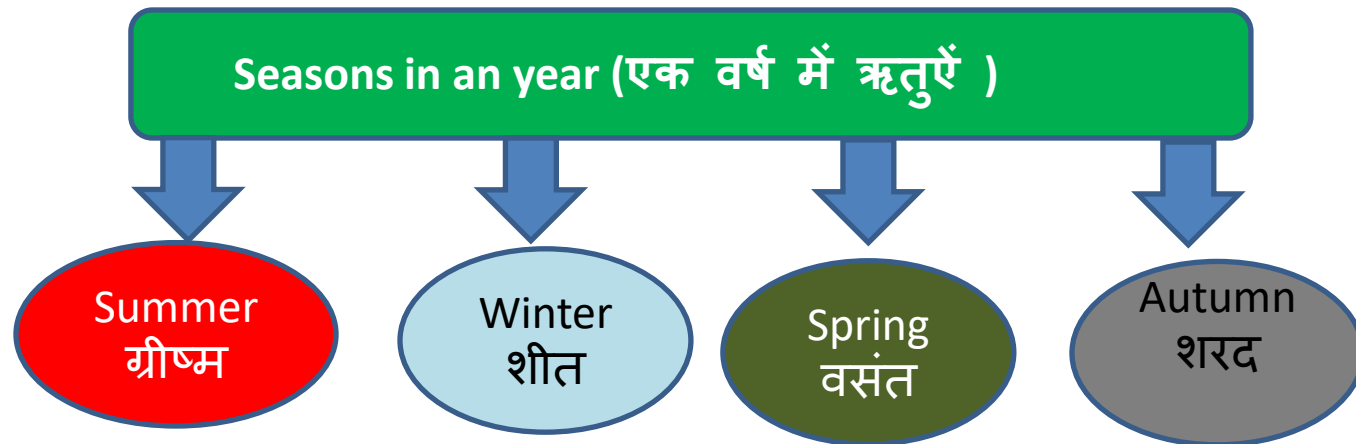
# REVOLUTION OF EARTH & ITS IMPACT

## पृथ्वी का परिक्रमण और इसका प्रभाव

The motion of the earth around the sun in its orbit is called revolution(परिक्रमण). It takes  $365\frac{1}{4}$  days (one year) to revolve around the sun.

Earth revolves around the sun in an elliptical orbit(दीर्घ वृत्ताकार कच्छ ).

Due to the change in the position of the earth around the sun , there is change in the season (ऋतु) on the earth.



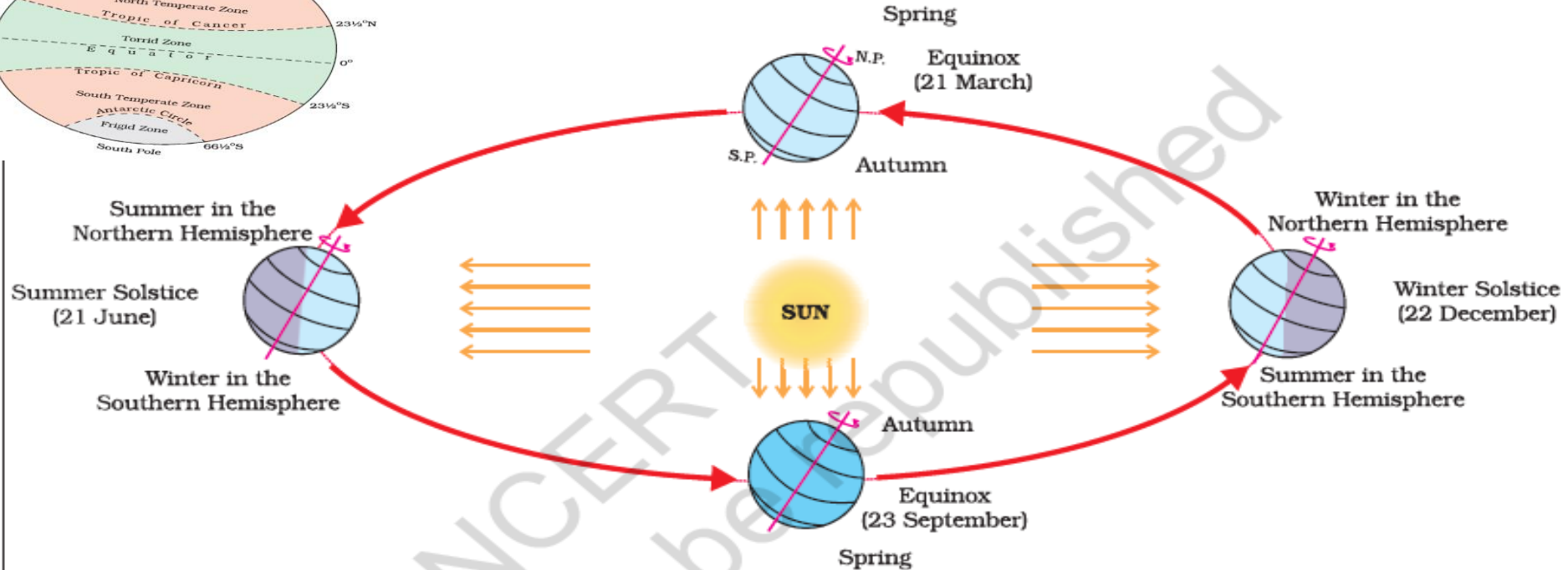
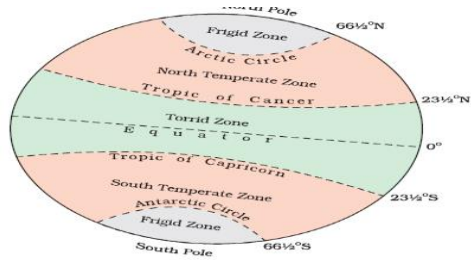
## Position of the Earth & resultant seasons

21<sup>st</sup> june : summer solstice (उत्तर अयनांत )

22<sup>nd</sup> december : winter solstice (दक्षिण अयनांत )

21<sup>st</sup> march: equinox(विषुव )

23<sup>rd</sup> september: equinox(विषुव )



## 21<sup>st</sup> June : summer solstice (उत्तर अयनांत )

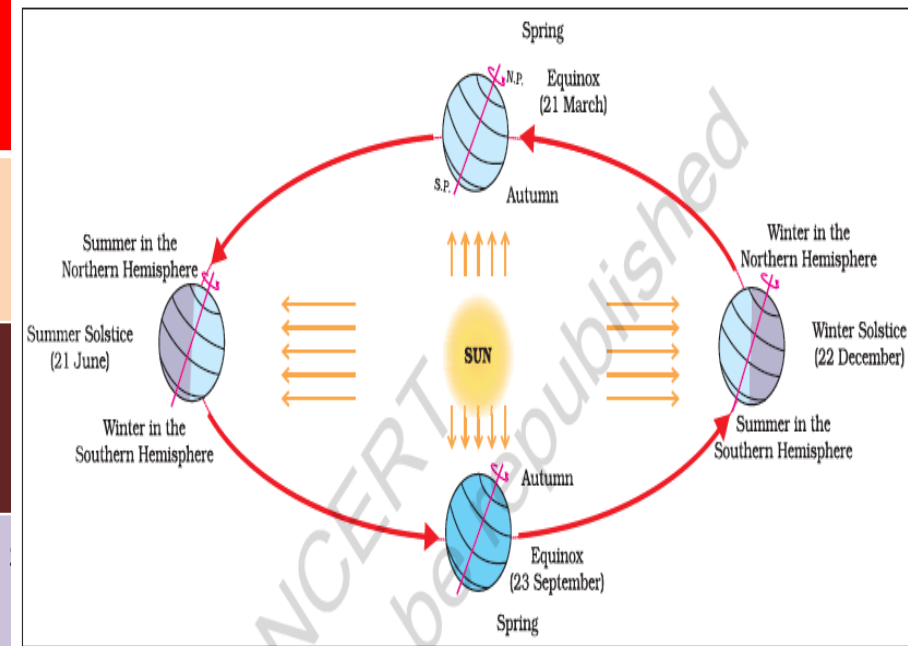
on 21<sup>st</sup> June, the Northern Hemisphere (उत्तरी गोलार्ध) is tilted towards the sun

The rays of the sun fall directly on the Tropic of Cancer(कर्क रेखा) . As a result, these areas receive more heat

The North Pole(उत्तरी ध्रुव ) is inclined towards the places beyond the Arctic Circle (उत्तरी ध्रुव वृत्त ) experience Continuous daylight for about six months

Since a large portion of the Northern Hemisphere is getting light from the sun, it is summer(ग्रीष्म) in the regions north of the equator(विषुवत वृत्त से उत्तर के क्षेत्र )

At this time in the Southern Hemisphere all these conditions are reversed. It is winter season there. The nights are longer than the days



**22<sup>nd</sup> december (दक्षिण अयनांत )**

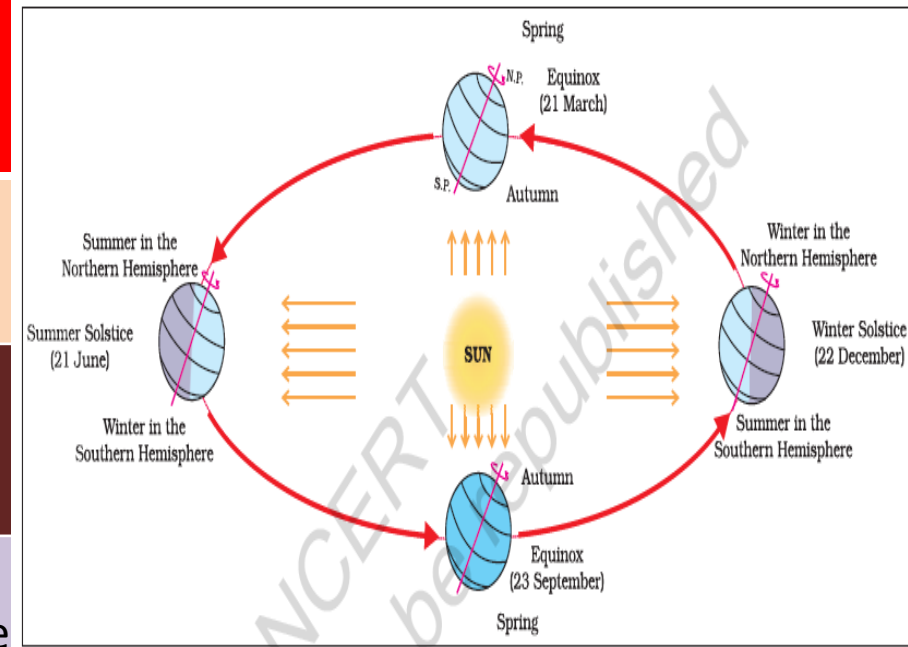
on 22<sup>nd</sup> december, the Southern Hemisphere (उत्तरी गोलार्ध) is tilted towards the sun

The rays of the sun fall directly on the Tropic of Capricorn(मकर रेखा ) . As a result, these areas receive more heat

The south pole (दक्षिणी ध्रुव ) is inclined towards the sun and the places beyond the Antarctic Circle (दक्षिणी ध्रुव वृत्त ) experience Continuous daylight for about six months

Since a large portion of the Southern Hemisphere is getting light from the sun, it is summer(ग्रीष्म) in the regions south of the equator(विषुवत वृत्त से दक्षिण के क्षेत्र )

At this time in the Northern Hemisphere all these conditions are reversed. It is winter season there. The nights are longer than the days

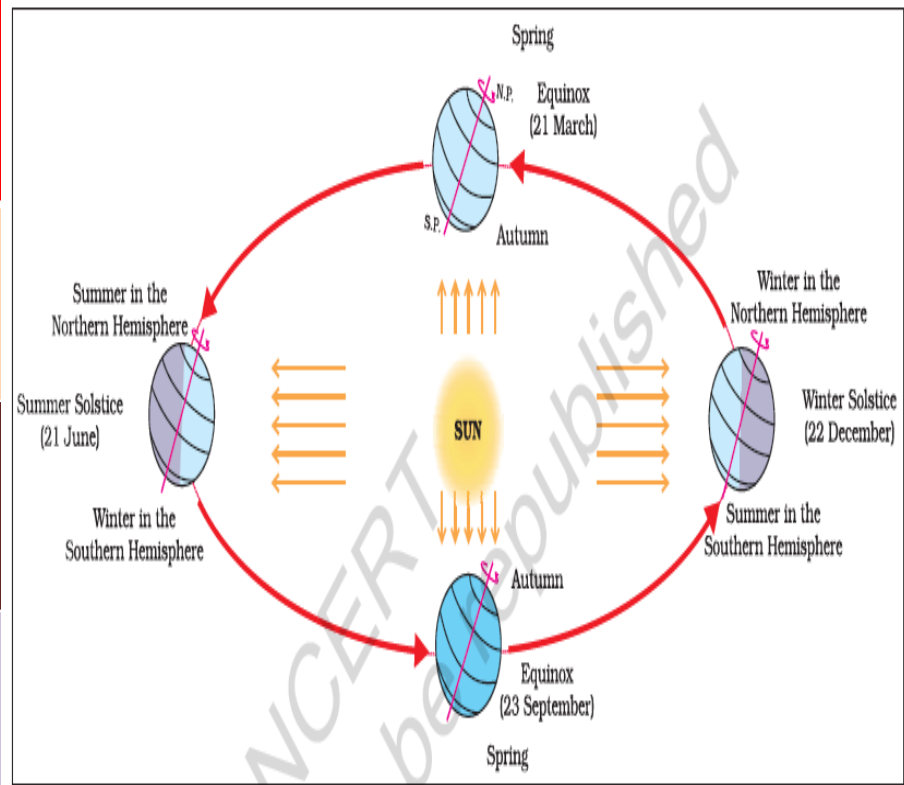


# Equinox(विषुव )

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 (विषुव )



On 23rd September, it is autumn season(शरद) in the Northern Hemisphere and spring season (वसंत) in the Southern Hemisphere. The opposite is the case on 21st March, when it is spring in the Northern Hemisphere and autumn in the Southern Hemisphere.