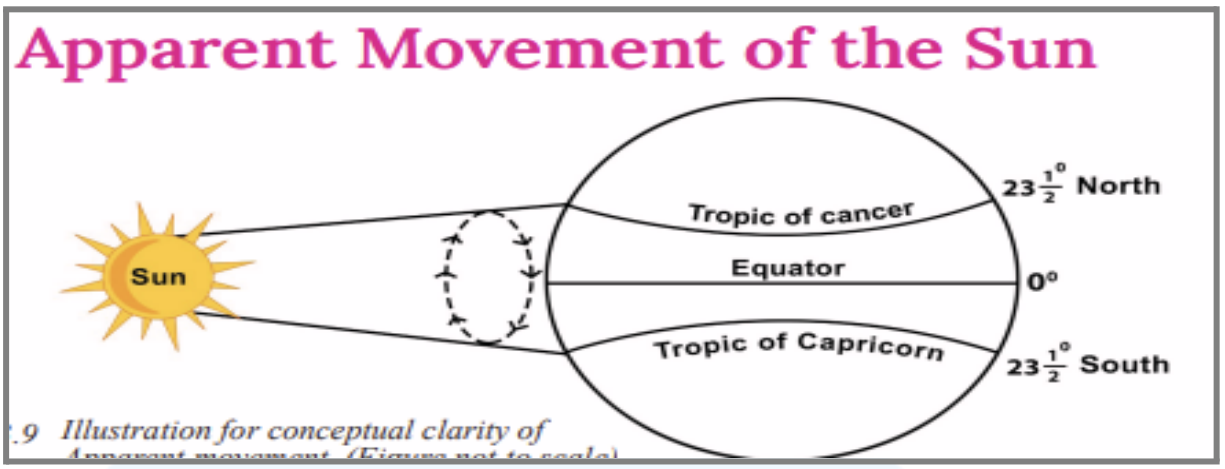
Seasons

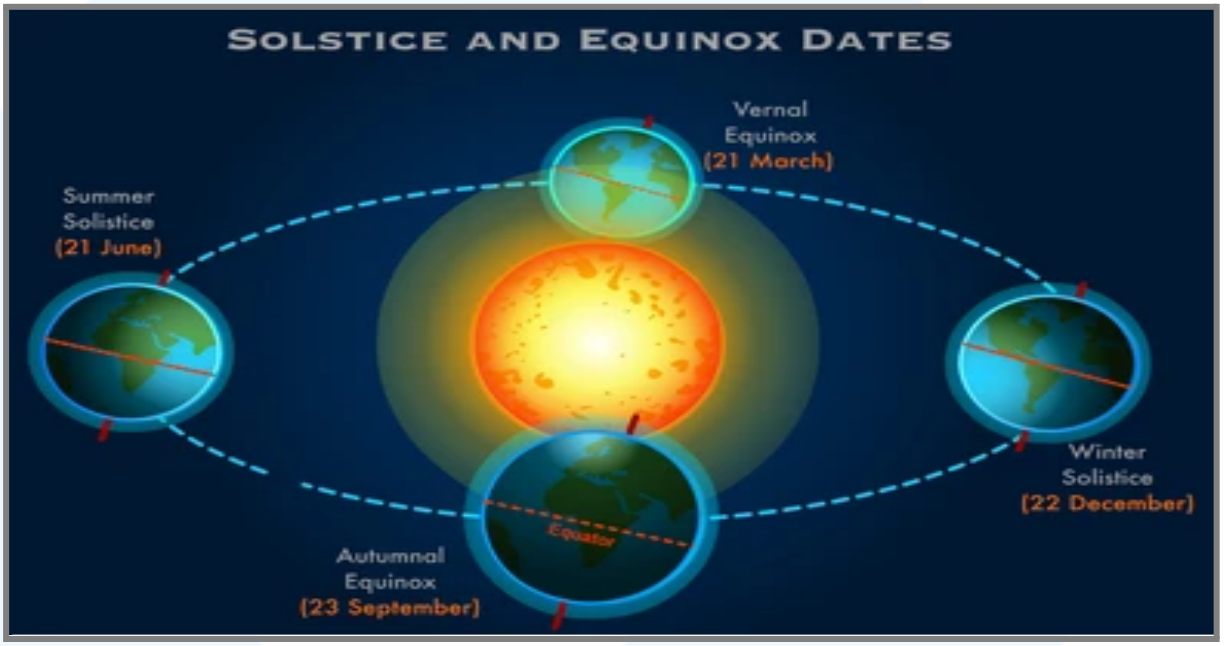
Bibin Mathews

- Reasons for the formation of seasons,
    1) Axial tilt of the earth
    2) Revolution
    3) Apparent movement of sun
- Four Major seasons are
    1) Summer
    2) Winter
    3) Spring
    4) Autumn

Apparent movement of sun

- Since the tilt of the earth's axis is maintained at an angle of 23½ degree throughout the revolution, the Sun's apparent position moves northward and southward between the Tropic of Cancer and the Tropic of Capricorn.
- This apparent shift in the Sun's position is called the apparent movement of the Sun.
- For this reason, the duration of day and night also changes.





Equinoxes

- During the Revolution, on 21st March and 23rd September, the sun's rays fall vertically on the equator.
- The duration of day and night will be equal on both hemispheres on these days.
- These days are called equinoxes.
- 21st March is known as Spring Equinox and 23rd September is Autumnal Equinox.

Summer Solstice

- In the northern hemisphere, the Sun's apparent position shifts towards north from the Equator to the Tropic of Cancer from 21st March to 21st June.
- As a result of this on 21st June, the northern hemisphere experiences the longest day and the shortest night. This day is known as summer solstice.
- From March to September for around six months, the Sun's apparent position is in the northern hemisphere.
- During this period in the northern polar region, there will be continuous daylight for six months.

Latitude	*Length of day*
90° North	24 hours
66½° North	24 hours
23½° North	13 hours 27 minutes
0°	12 hours
23½° South	10 hours 33 minutes
66½° South	Nil
90° South	Nil

Winter Solstice

- In the southern hemisphere the Sun's apparent position shifts from the equator to the Tropic of Capricorn during the period from 23rd September to 22nd December.
- As a result of this, on 22nd December, the southern hemisphere experiences the longest day and the shortest night.
- This day is known as the Winter Solstice .
- For six months, from September to March, the Sun's apparent position will be in the southern hemisphere.
- During this period, in the northern polar region, there will be continuous darkness for six months.

Latitude	*Length of day*
90⁰ North	Nil
66½⁰ North	Nil
23½⁰ North	10 hours 33 minutes
0⁰	12 hours
23½⁰ South	13 hours 27 minutes
66½⁰ South	24 hours
90⁰ South	24 hours

Apparent Movement of the Sun (Uttarayana and Dakshinayana)

- Following the winter solstice (December 22) the apparent movement of the Sun from Tropic of Capricorn (23½

South) to Tropic of Cancer (23½ North) is known as the apparent movement of the Sun towards North (Uttarayanam).

- The shift in the apparent position of the Sun after the Summer Solstice (June 21) from the Tropic of Cancer (23½ North) to Tropic of Capricorn (23½ South) is known as the apparent movement of the Sun towards South (Dakshinayanam).

2020	20th Mar	21st Jun	22nd Sep	21st Dec
2021	20th Mar	21st Jun	23rd Sep	21st Dec
2022	20th Mar	21st Jun	23rd Sep	22nd Dec
2023	21st Mar	21st Jun	23rd Sep	22nd Dec
2024	20th Mar	21st Jun	22nd Sep	21st Dec
2025	20th Mar	21st Jun	22nd Sep	21st Dec
2026	20th Mar	21st Jun	23rd Sep	22nd Dec
2027	21st Mar	21st Jun	23rd Sep	22nd Dec
2028	20th Mar	21st Jun	22nd Sep	21st Dec

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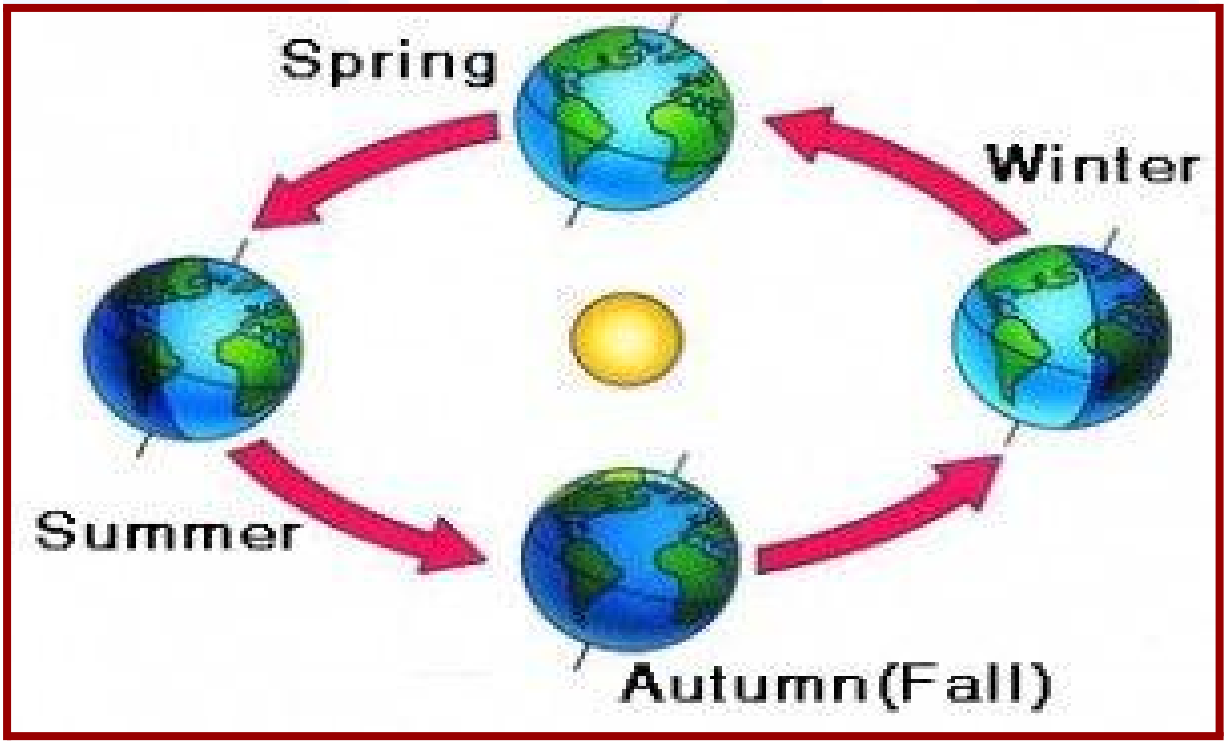
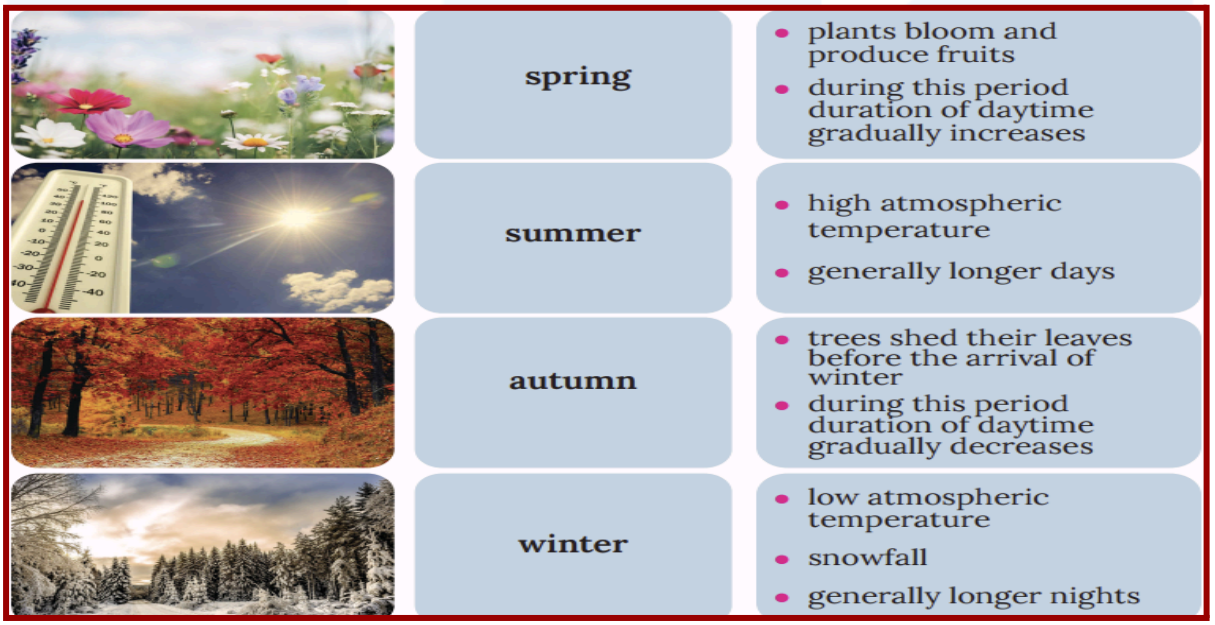
2024	March Equinox	March 20, 2024 at 8:36 AM GMT+5:30
2024	June Solstice	June 21, 2024 at 2:20 AM GMT+5:30
2024	September Equinox	September 22, 2024 at 6:13 PM GMT+5:30
2024	December Solstice	December 21, 2024 at 2:50 PM GMT+5:30
2025	March Equinox	March 20, 2025 at 2:31 PM GMT+5:30
2025	June Solstice	June 21, 2025 at 8:12 AM GMT+5:30
2025	September Equinox	September 22, 2025 at 11:49 PM GMT+5:30
2025	December Solstice	December 21, 2025 at 8:33 PM GMT+5:30
2026	March Equinox	March 20, 2026 at 8:15 PM GMT+5:30
2026	June Solstice	June 21, 2026 at 1:55 PM GMT+5:30
2026	September Equinox	September 23, 2026 at 5:35 AM GMT+5:30



Months	Relative movement of Sun	Seasons	
		Nor. Hem	Sou. Hem
March 21 - June 21	Equator to Tropic of cancer	Spring	Autumn
June 21 - September 23	Tropic of cancer to Equator	Summer	Winter
September 23 - December 22	Equator to Tropic of capricorn	Autumn	Spring
December 22 - march 21	Tropic of capricorn to equator	Winter	Summer



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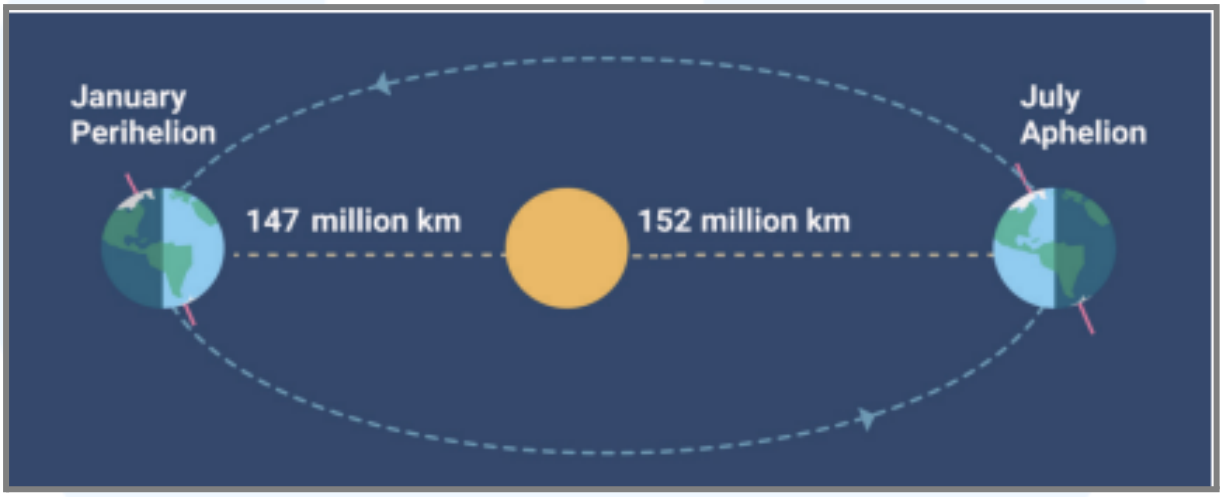
Perihelion and Aphelion

- Since the Earth's orbit is elliptical, there will be a difference in the distance between the Earth and the Sun.
- The day on which the Earth comes closest to the Sun during revolution (147 million kilometres) is known as Perihelion.
- This happens in the month of January (around 3rd January).
- The distance between the Sun and the Earth will be at a maximum (152 million kilometres) in the month of July (around 4th July). This is called Aphelion.



THANK YOU