Aphelion

Source: IE

Why in News?

Recently, on **5th July 2024 , Earth reached the farthest point in its elliptical orbit** around the sun called **aphelion**. Earth moves around the sun in elliptical orbit and thus its distance from the sun fluctuates slightly throughout the year.

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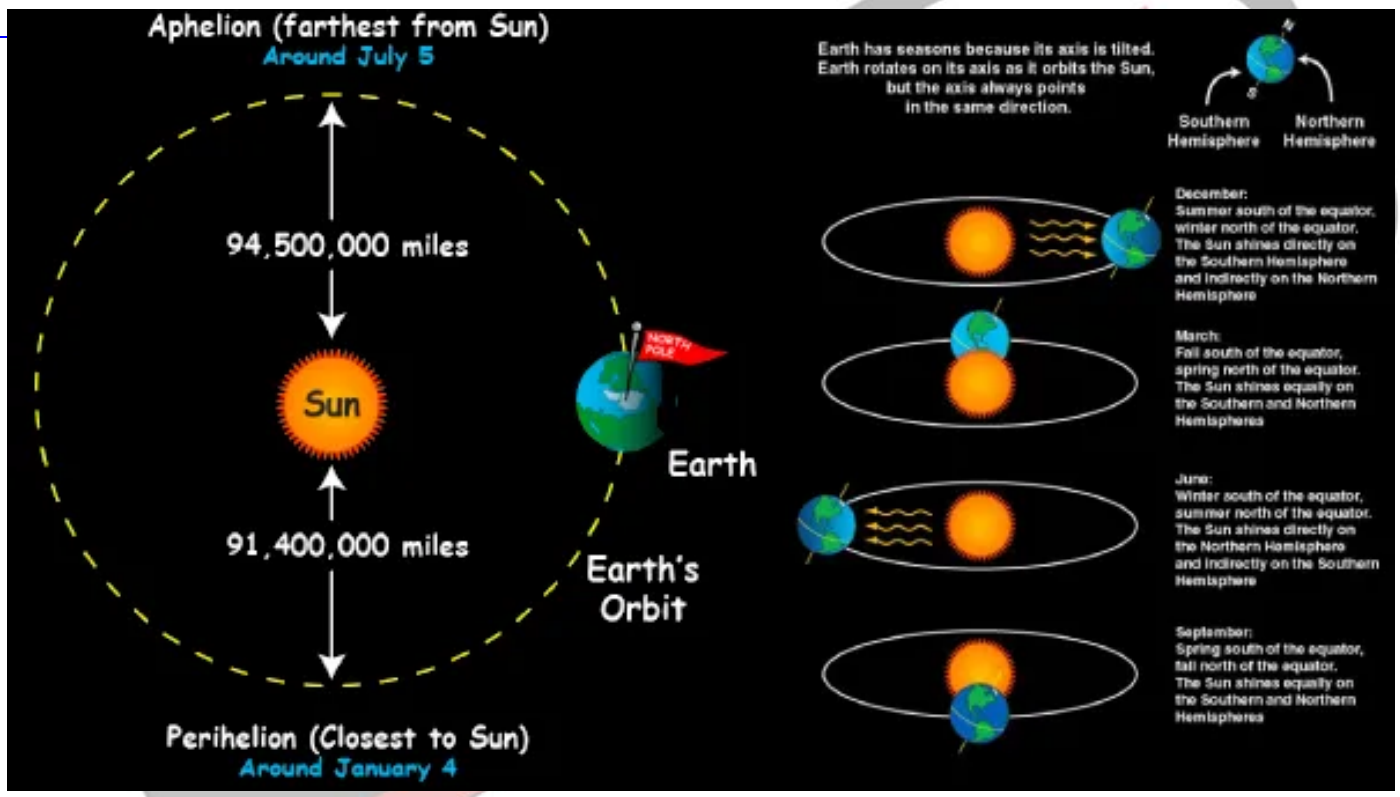


What is Aphelion?

- **About: Aphelion refers to the point in Earth's orbit when it is farthest from the Sun, occurring around 3 to 6th July each year (According to NCERT, Aphelion is on 4th July).**
  - The Earth's perihelion and aphelion **dates are not fixed** due to v**ariations in its orbit eccentricity**.

Event	Year	Date/Time	Distance(in AU)
Aphelion	2015	Jul 6/1940 UT	1.0166
Perihelion	2016	Jan 2/22:49 UT	0.9833
Aphelion	2016	Jul 4/16:24 UT	1.0168
Perihelion	2017	Jan 4/14:18 UT	0.9833
Aphelion	2017	Jul 3/20:11 UT	1.0167
Perihelion	2018	Jan 3/5:35 UT	0.9832
Aphelion	2018	Jul 6/16:47 UT	1.0167
Perihelion	2019	Jan 3/5:20 UT	0.9833
Aphelion	2019	Jul 4/22:11 UT	1.0168
Perihelion	2020	Jan 5/7:48UT	0.9832
Aphelion	2020	Jul 4/11:35 UT	1.0167

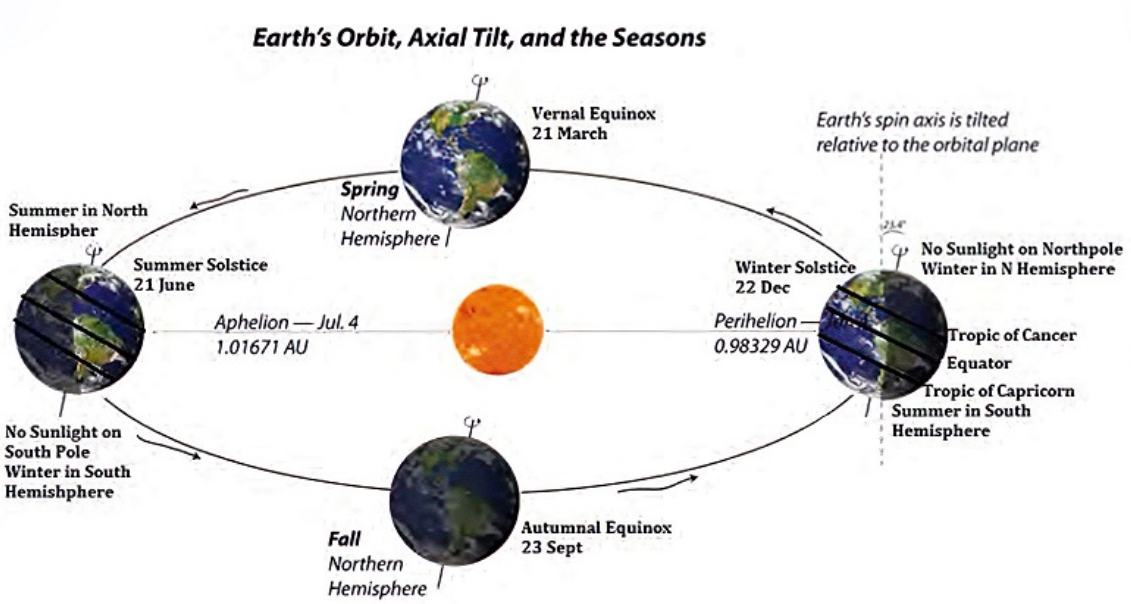
    - At this juncture, the distance between Earth and the Sun extends to approximately **152.5 million kilometres**.
    - **Perihelion: At Perihelion, Earth is closest to the Sun, occurring around January 3 annually, with a distance of approximately 147.5 million kilometres.**

- Significance of Aphelion:

    - **Variation in Solar Radiation:** During early July, Earth's aphelion slightly reduces the sunlight reaching India, but this has a **minor impact on temperatures.**
        - **Seasonal changes**, due to Earth's tilt, are much more important. The **difference in solar radiation** caused by Earth's elliptical orbit is only about **3%**, showing that seasonal factors are the main influence on India's temperatures, even at aphelion.
    - **Stability of the Orbit: The aphelion is a natural consequence of Earth's elliptical orbit, which is a result of the gravitational interactions between the planets. Maintaining this slightly elliptical orbit is crucial for the long-term stability of the Earth's climate and habitability.**

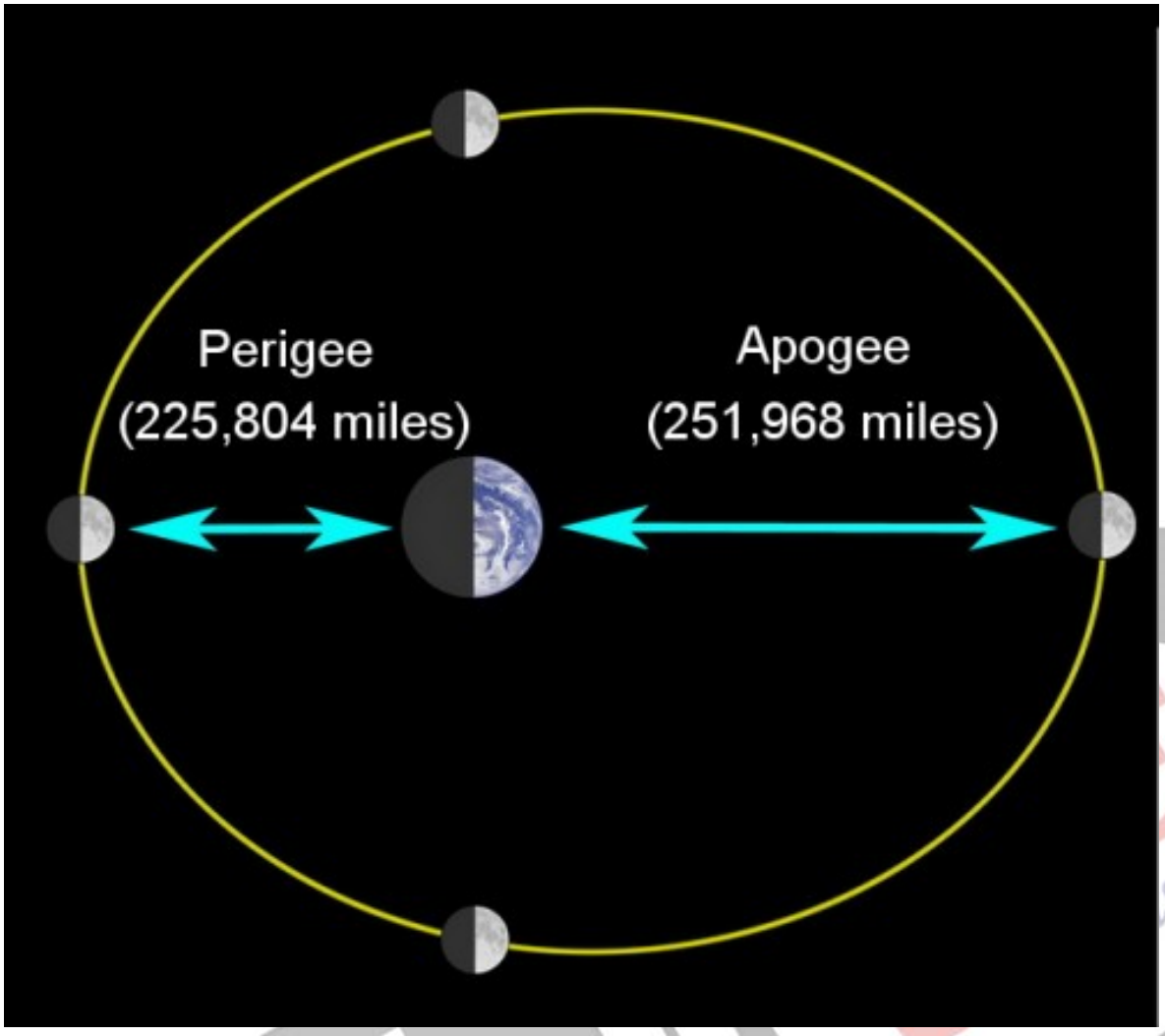
Note

- The **Earth's seasons are primarily determined by the tilt of the Earth's axis**, not the distance from the Sun.
- The **Earth's tilt causes the uneven distribution of solar radiation,** leading to the four seasons: **spring, summer, fall (autumn),** and **winter**.



Perigee and Apogee

- **Perigee** is the point in the **moon's elliptical orbit** that is **closest to the Earth.** At perigee, the moon is at its **smallest apparent size** and its **gravitational pull on the Earth is strongest**.
- Apogee is the point in the moon's elliptical orbit that is **farthest from the Earth**. At apogee, the **moon is at its largest apparent size** and its **gravitational pull on the Earth is weakest**.



Read More: [Types of Orbit]

UPSC Civil Services, Previous Years Questions (PYQ)

Q. On 21st June, the Sun (2019)

(a) does not set below the horizon at the Arctic Circle
(b) does not set below the horizon at Antarctic Circle
(c) shines vertically overhead at noon on the Equator
(d) shines vertically overhead at the Tropic of Capricorn

Ans: (a)