38 The time taken for the Earth to orbit the Sun is approximately 365 days.

The average radius of the Earth's orbit around the Sun is 1.5×10^8 km.

What is the average orbital speed of the Earth?

A 30 m/s

B 4.8×10^3 m/s

C 3.0×10^4 m/s

D 4.1×10^{10} m/s

11 Fig. 11.1 represents the Earth in orbit around the Sun.

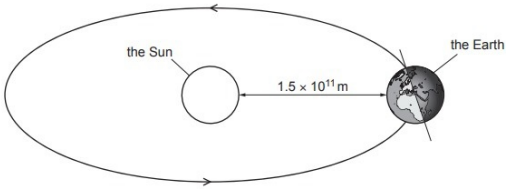


Fig. 11.1 (not to scale)

(a) (i) State the name of the force that keeps the Earth in orbit around the Sun.

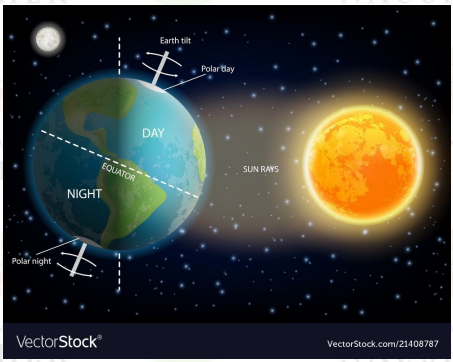
..... [1]

(ii) State the time taken by the Earth to complete **one** orbit of the Sun. Include the unit.

time for **one** orbit = ... [1]

(iii) State the time taken by the Earth to rotate **once** on its axis. Include the unit.

time for **one** rotation = ... [1]



Tilt of the earth changes 2 things:

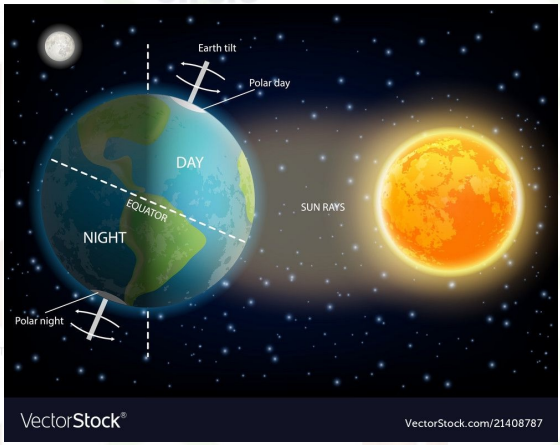
① Direction from which sunlight hits (seasons)

② the length of daytime

Day and Night

Day and night are caused by the earth's rotation on its axis.
One full rotation takes 24 hours which means

- half of the earth's surface facing the sun experiences a day and the other half experiences night.



https://www.youtube.com/watch?v=3Jfb-M4d71g

The apparent daily motion of the sun is also caused because of the earth's rotation on its own axis.
Each day, the sun appears

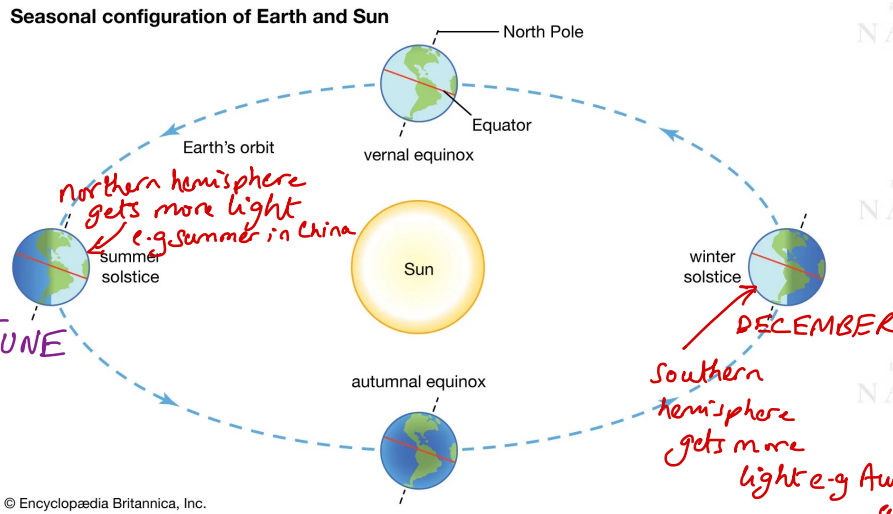
- to rise from east
- to set in the west
- to reach its highest point at noon.

The length of the day is

- no. of hours a location receives sunlight i.e from the time the sun rises to the time the sun sets.
- the same (approximately) 12 hours near equator
- variable in locations north and south of the equator.

SEASONS

https://www.youtube.com/watch?v=vXjFJe5i-1o



northern hemisphere gets more light e.g. summer in China

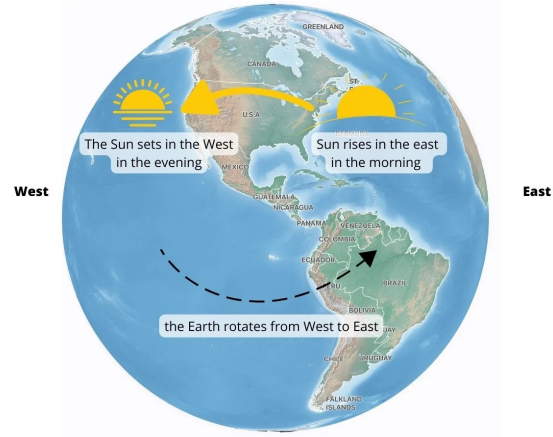
JUNE

DECEMBER

Southern hemisphere gets more light e.g. Australia has summer

During summer, the sun appears to:

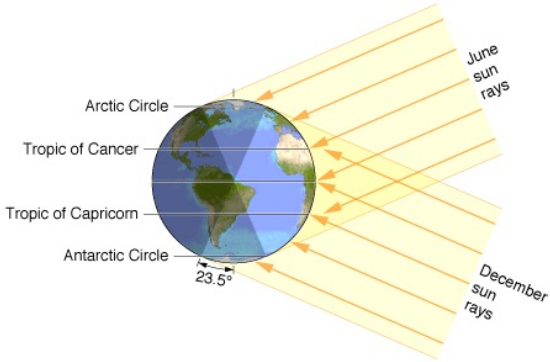
- Rise in the northeast and set in the north west (in the northern hemisphere)
- Rise in the south east and set in the south west
- move higher above the horizon
- reach its greatest height above the horizon, the day when daylight hours are the longest (summer solstice)

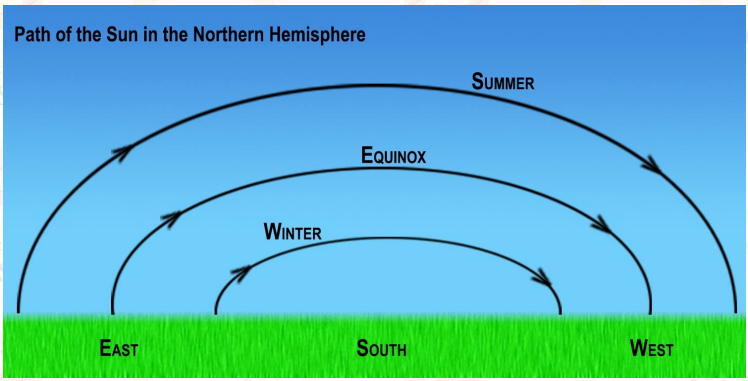


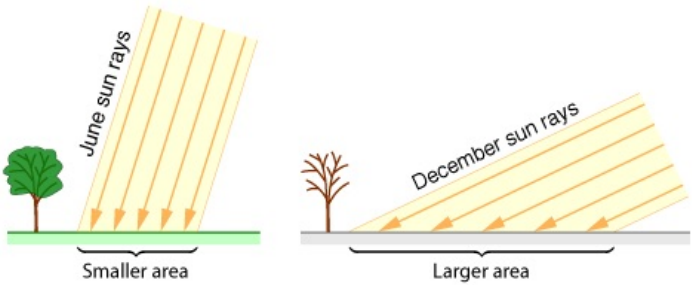
Which season is it in the northern hemisphere?

During winter, the sun appears to:

- rise in the southeast and set in the southwest. (in the northern hemisphere)
- rise in the north east and set in the northwest
- move closer to the horizon
- to reach its lowest height above the horizon, the day when the daylight hours are the shortest. (winter solstice)







During equinoxes in both hemispheres:

- Day and night appear to be equal in length.
- sun appears to rise exactly in the east and set in the west.
- Both hemispheres receive equal amount of sunlight.

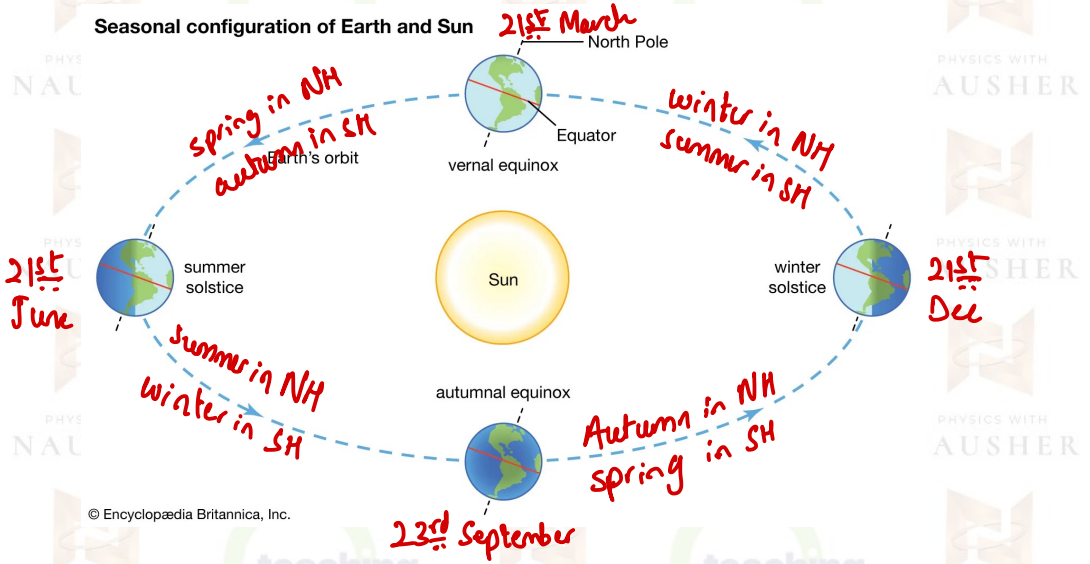
Summary:

The 4 seasons, summer, winter, autumn and spring are caused due to:

1. Earth's orbit around the sun.
2. Earth's tilt angle.

The tilt angle causes:

- one hemisphere to tilt towards the sun and receive more sunlight.
- the other hemisphere to tilt away from the sun and receive less radiation
- 6 months later, hemisphere's tilt in opposite directions.



During summer in NH:

Q1. NH is tilted towards or away from the sun?

Q2. NH receives greater or less light intensity?

Q3. Is the sun at its lowest point or highest point above the horizon on summer solstice?

During winter in NH?

Q1. NH is tilted towards or away from the sun?

Q2. NH receives greater or less light intensity?

Q3. Is the sun at its lowest point or highest point above the horizon on winter solstice?

Q. Why does it feel hot in summer?

A. Sun is too close to earth.

B. tilt angle of the earth.

38 It is summer in the northern hemisphere of the Earth in June.

Which statement explains why?

A The Earth is closer to the Sun in June.

B The Earth spins on its axis in the opposite direction to that in which it rotates around the Sun.

C The Moon is full in June.

D The north pole of the axis of the Earth's rotation is tilted towards the Sun in June.

When	NH	Daylight hours	SH	Daylight hours
21st June	summer solstice	Longest hours of daylight	winter solstice	shortest hours of daylight
June, July, August	summer	days are longer than nights hours of daylight decrease	winter	days are shorter than nights, hours of daylight increase
23rd sept	autumn equinox	equal hours of day and night	spring equinox	equal hours of day and night
Sept, Oct, Nov	autumn	days are shorter than nights, hours of daylight decrease	spring	days are longer than nights, hours of day light increase.
21st Dec	winter solstice	shortest hours of daylight	summer solstice	longest hours of day light.
Dec, Jan, Feb	winter	days are shorter than nights, hours of daylight increase	summer	days are longer than nights, hours of day light decrease
21st March	spring equinox	equal hours of day and night	autumn equinox	equal hours of day and night
March, April, May	spring	days are longer than nights. Day light increases	autumn	days are shorter than nights. Day light decreases