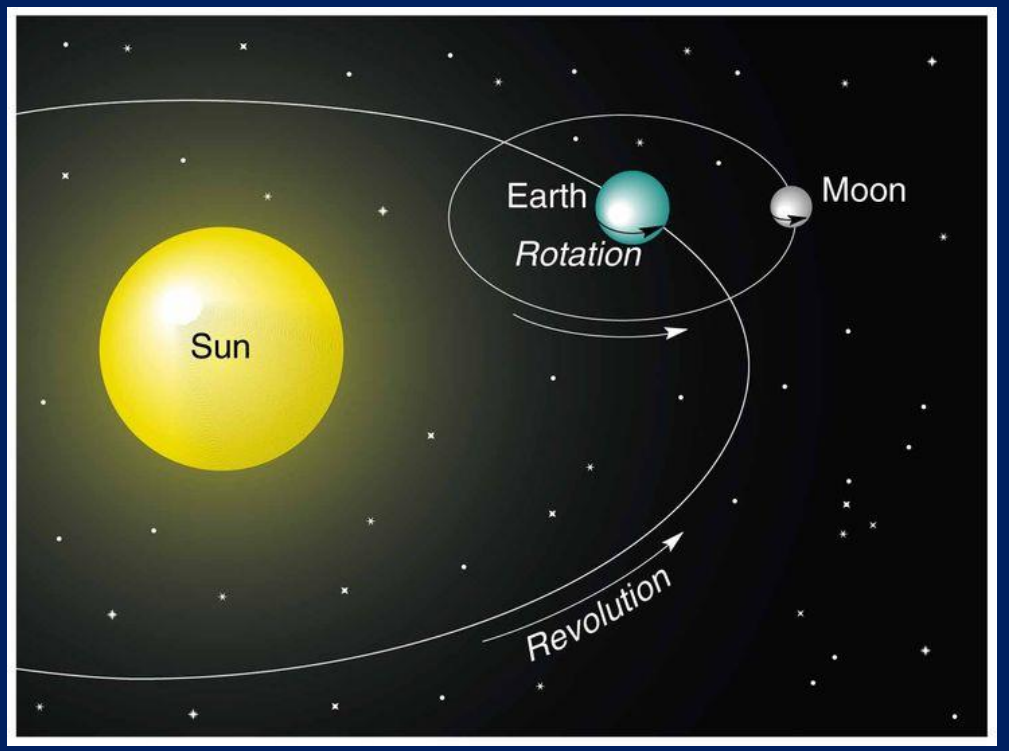
Earth's Rotation and Revolution

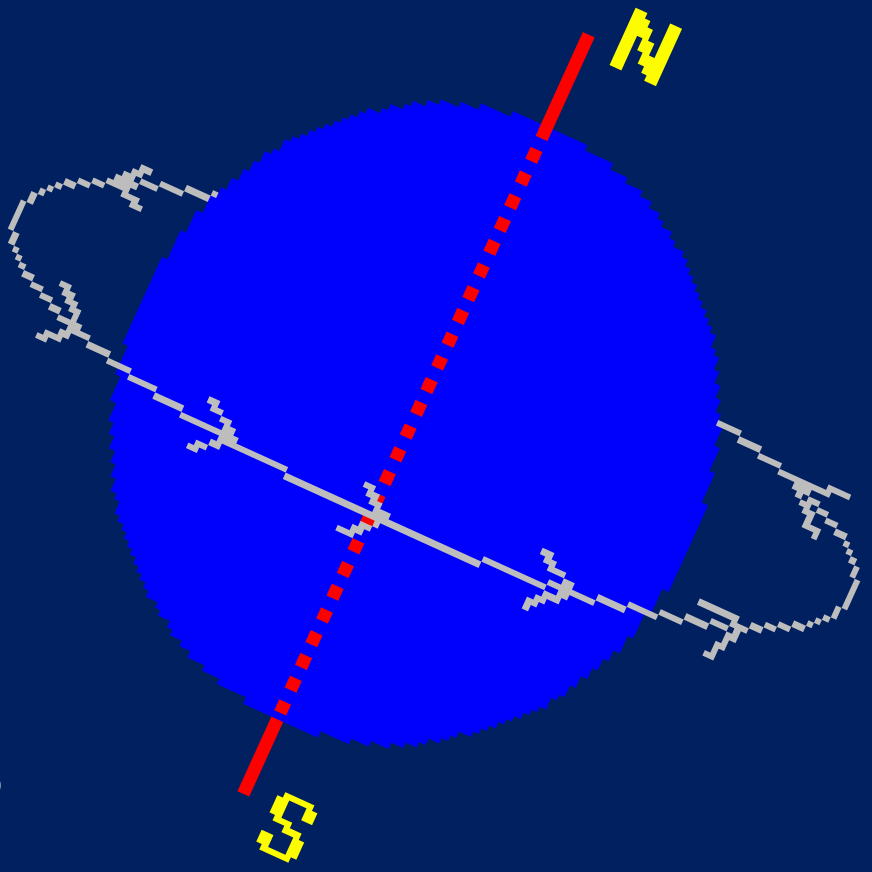
Key Questions:

- How is rotation and revolution different?
- What causes day and night?
- What causes the seasons?
- What is the difference between direct and indirect sunlight?
- How are solstices and equinoxes are different?



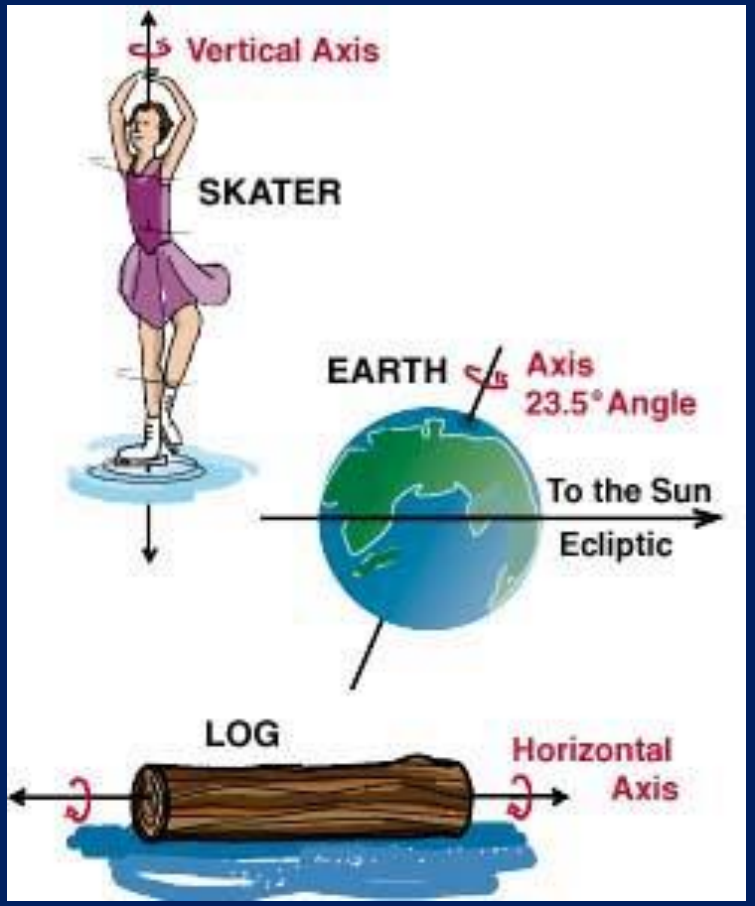
What is rotation?

- Earth spinning on its tilted axis
- It takes 24 hours or 1 day for the Earth to complete one rotation on its axis



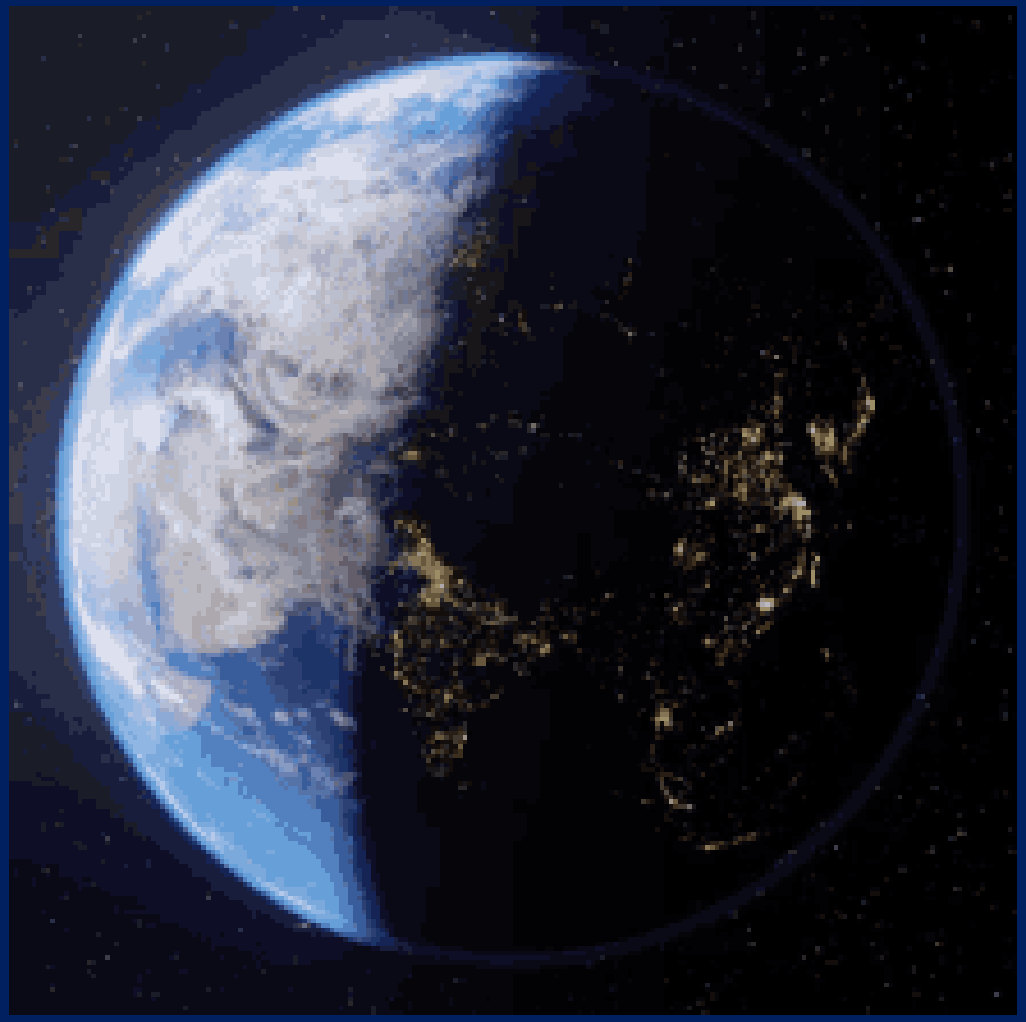
What is an Axis?

- Imaginary line that passes through Earth's center and the North and South poles
- Tilt of the Earth's axis is 23.5 degrees

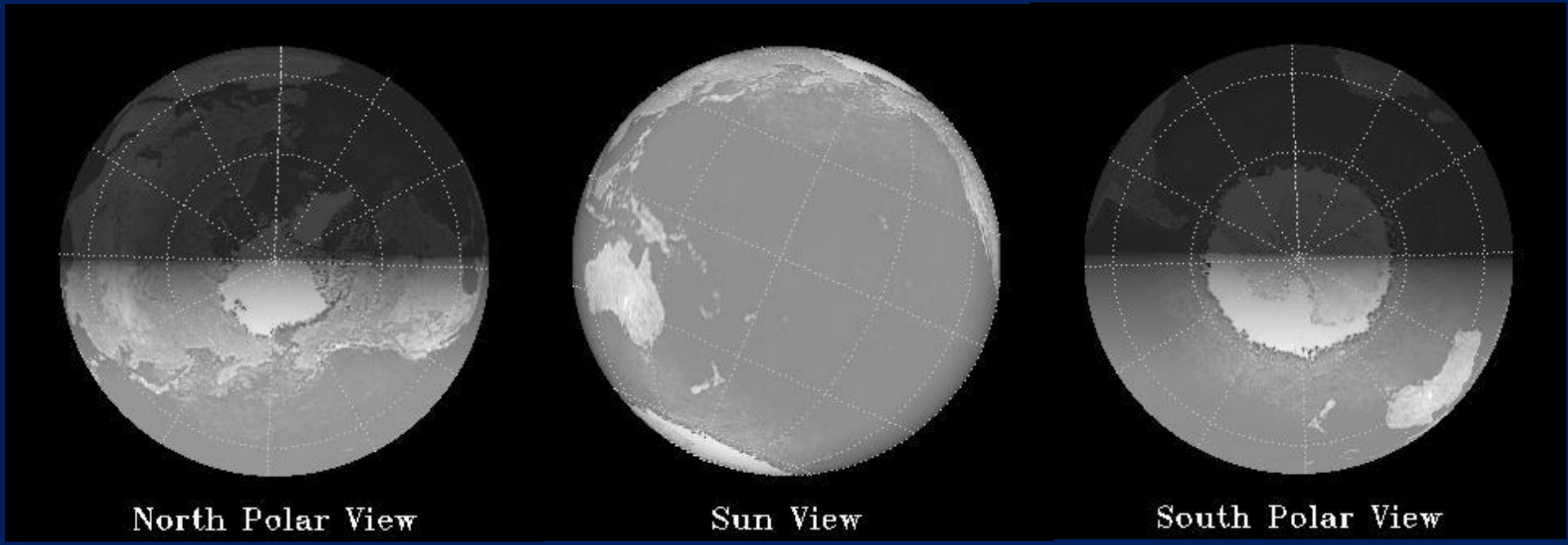


What causes day and night?

- Earth's rotation on its axis causes day and night.

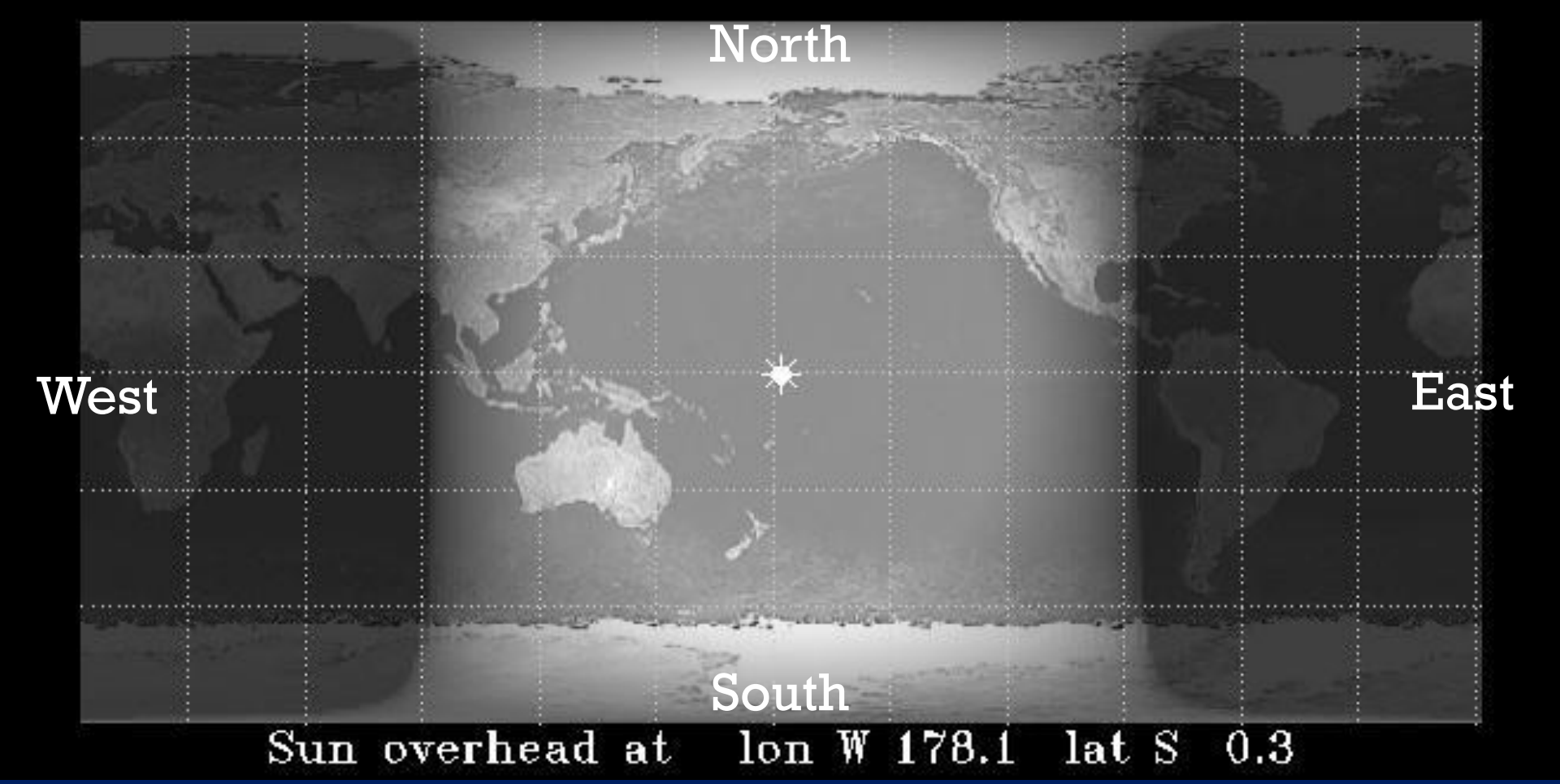


The half of the Earth that is facing the sun is lit up. It is day.

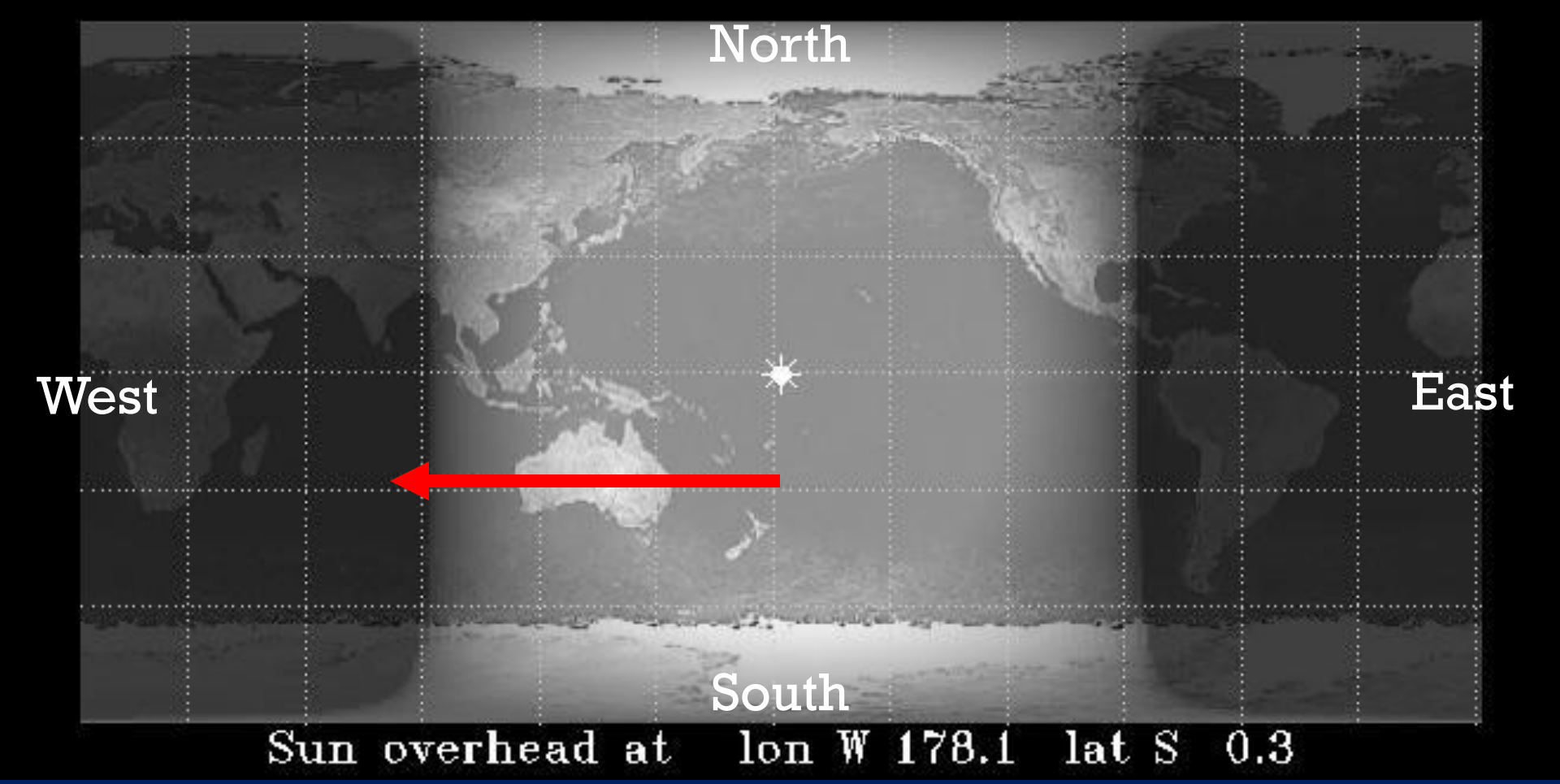


The side of the Earth that is not facing the sun is in darkness. It is night.

The Sun rises in the East and sets in the West.



What direction will the sun appear to be moving from this point? North? South? East? West?



The sun is going to appear to move West in the sky.

What is revolution?

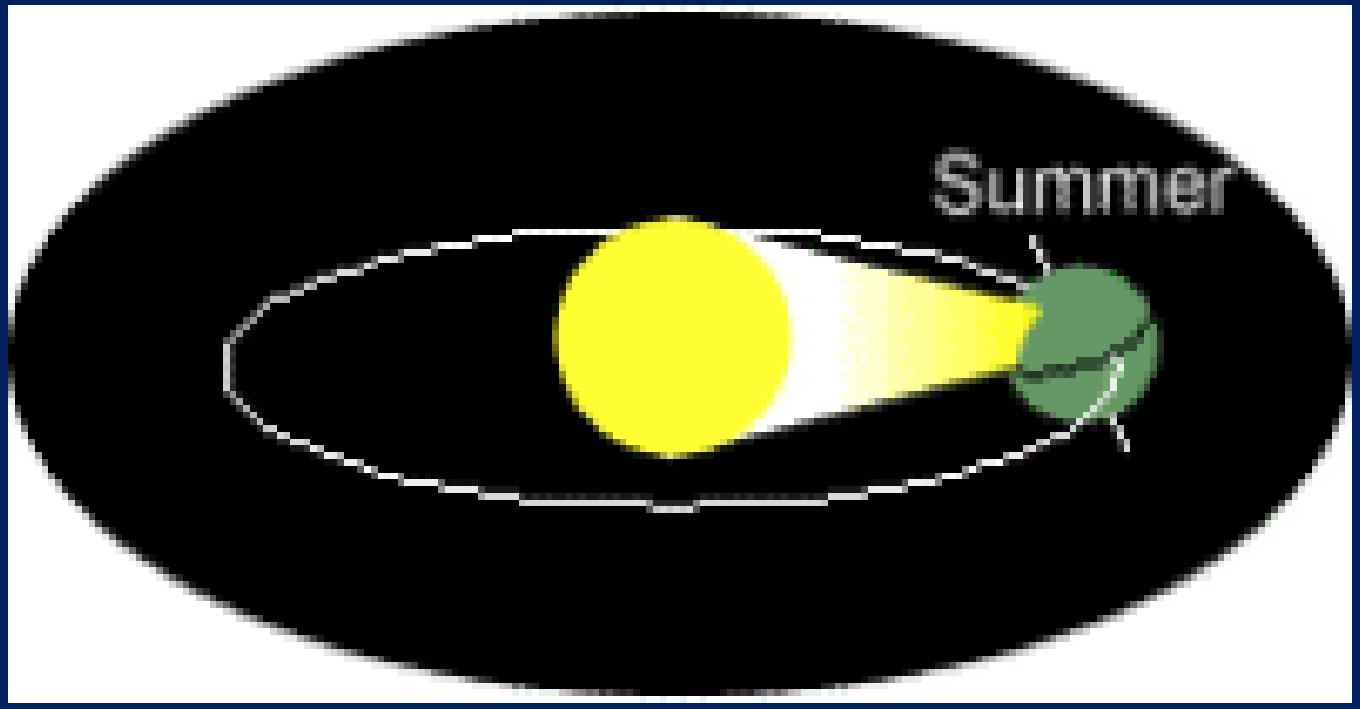
- The movement of Earth in its orbit around the sun
- It takes 365 days or one year for the Earth to revolve around the sun

What is an Orbit?

- Earth's path as it travels around the Sun

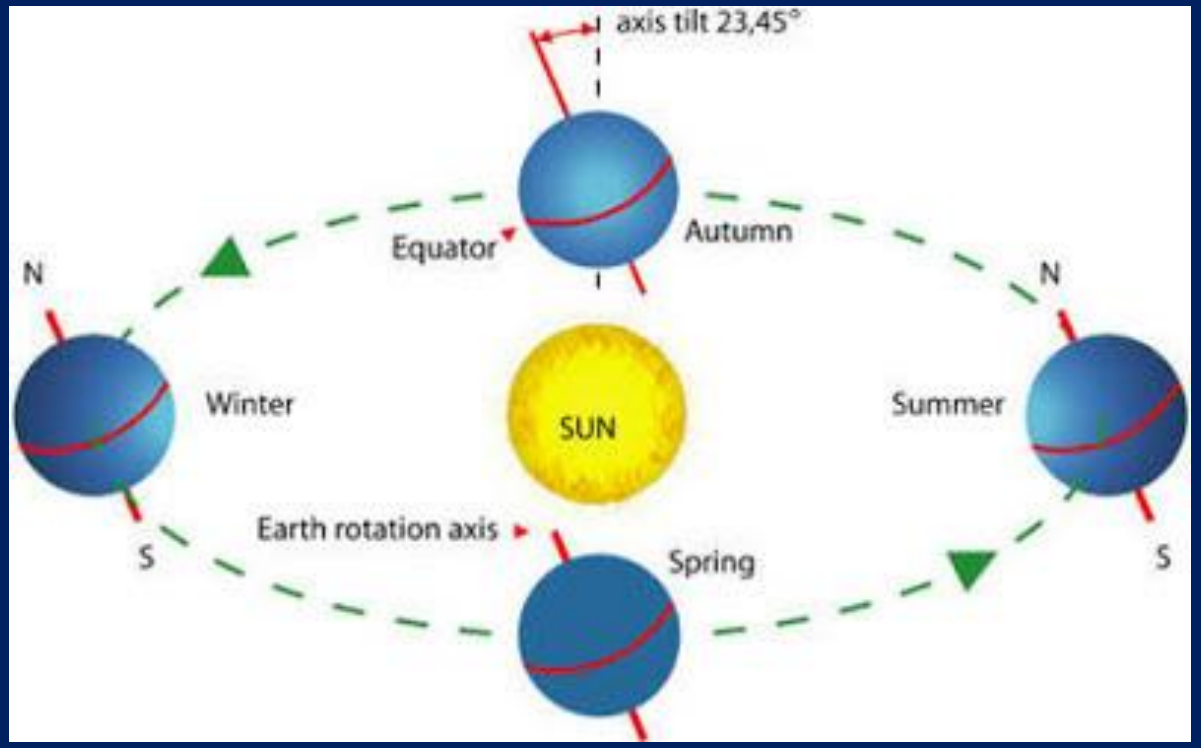
What causes seasons?

- Earth's revolution
- Earth's tilted axis

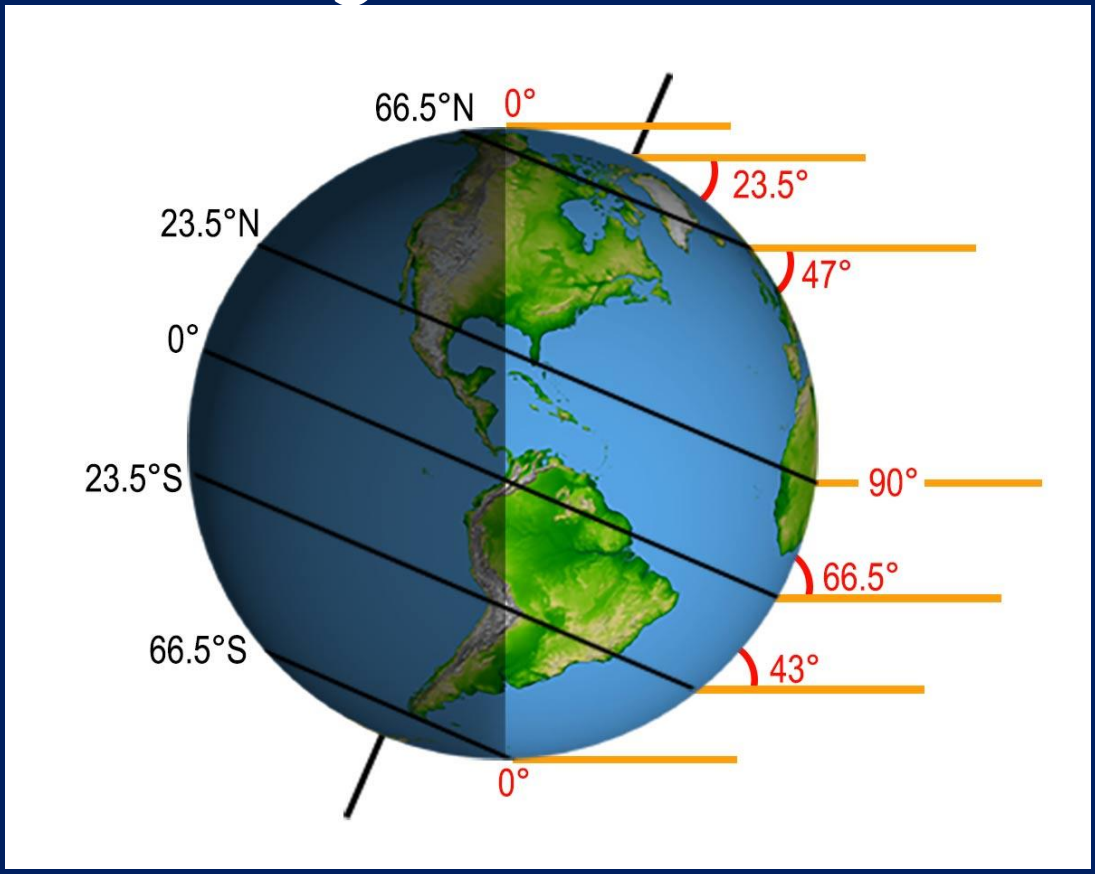


What are the 4 seasons?

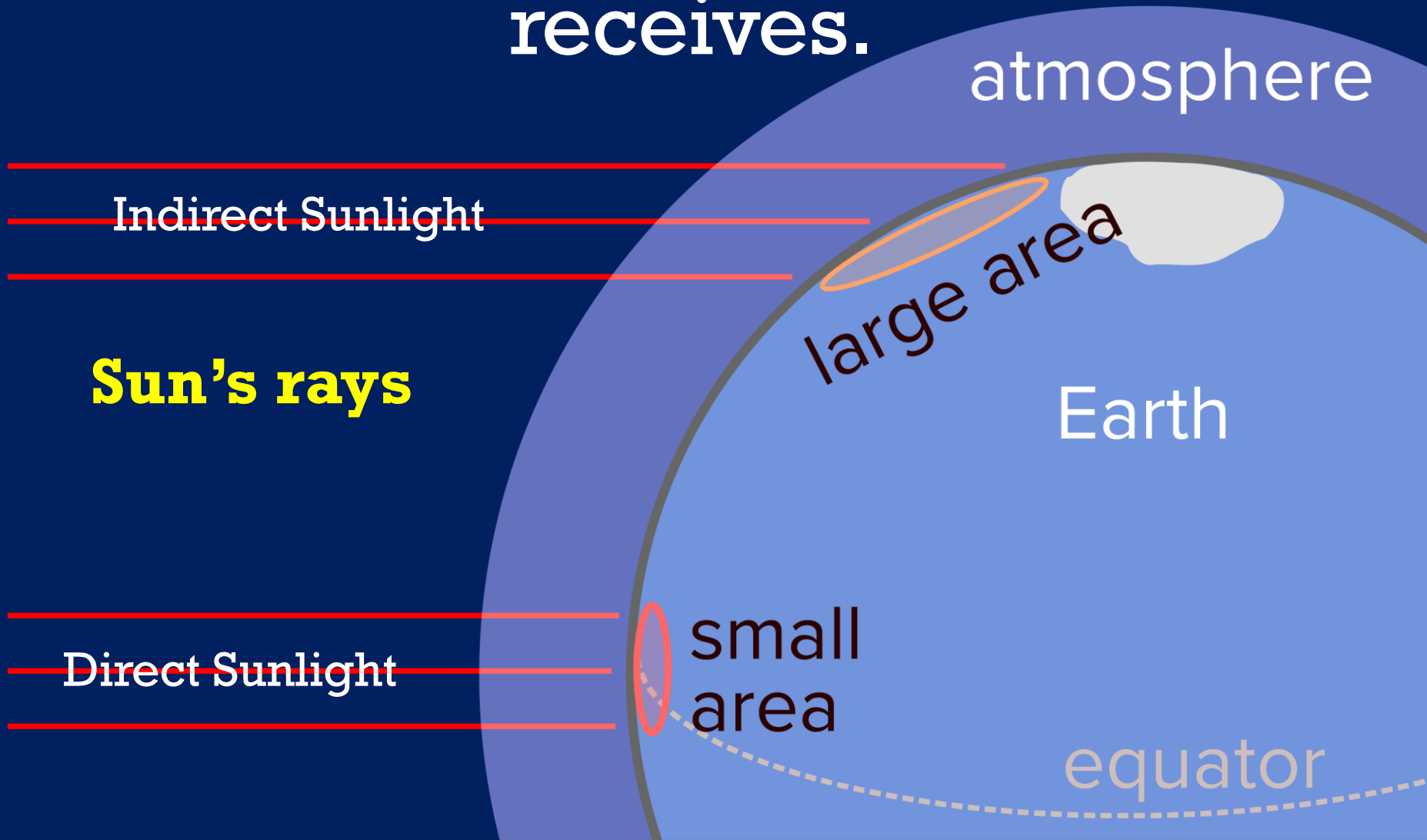
- Spring
- Summer
- Fall
- Winter



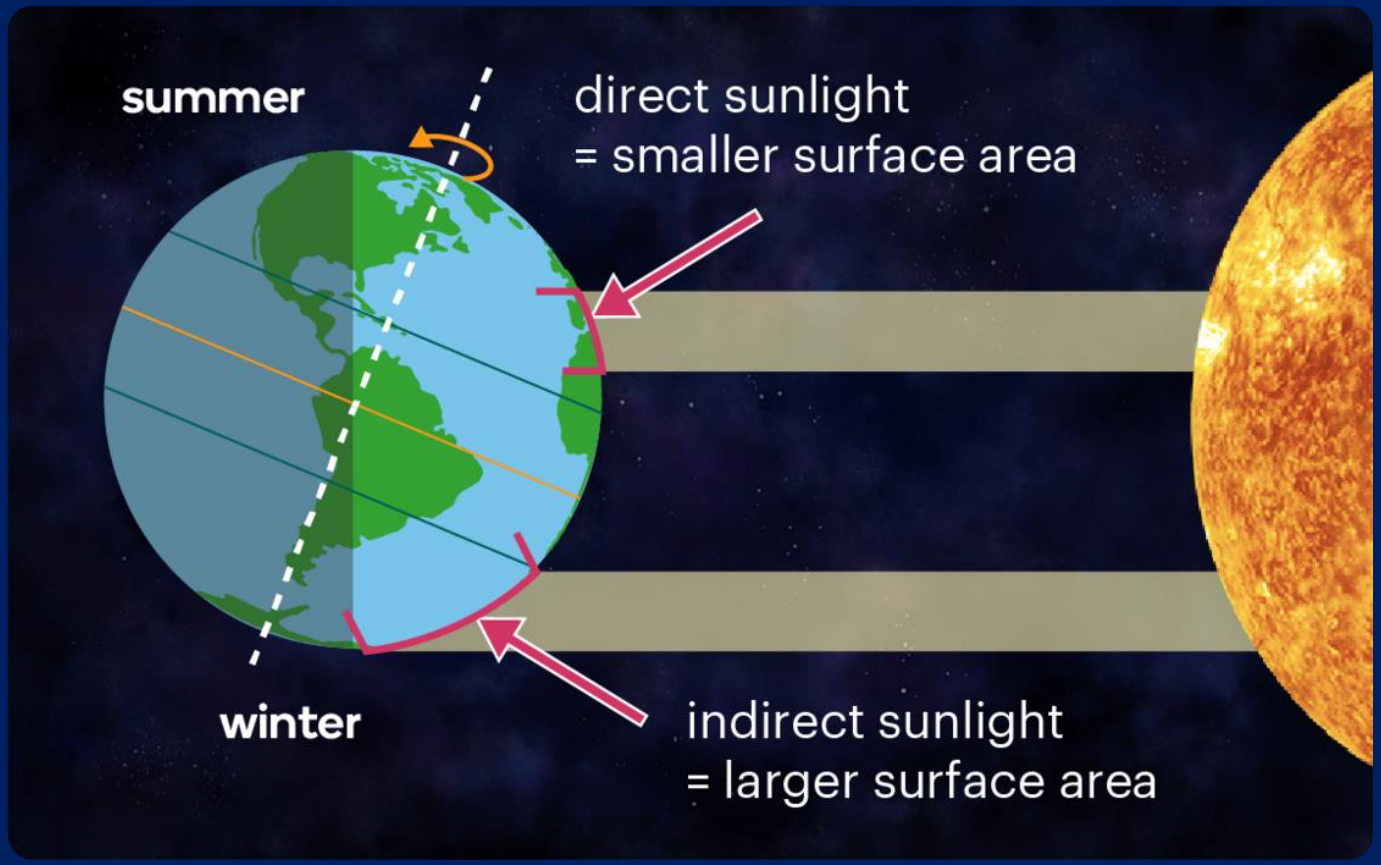
Since our Earth is a sphere, the sun's rays are received in various angles. This causes the Earth's energy to be dispersed unevenly. Some areas receive more direct sunlight than others.



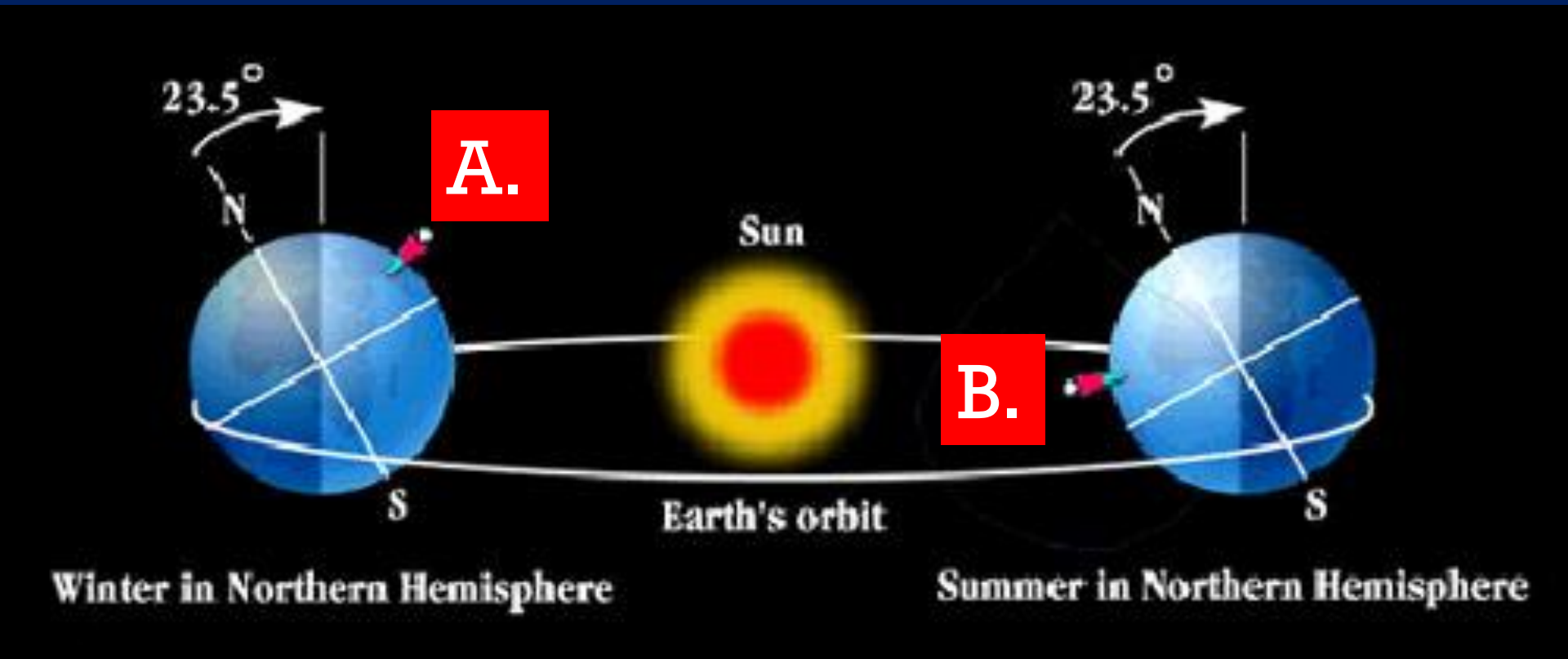
The more direct sunlight an area gets, the more energy it receives.



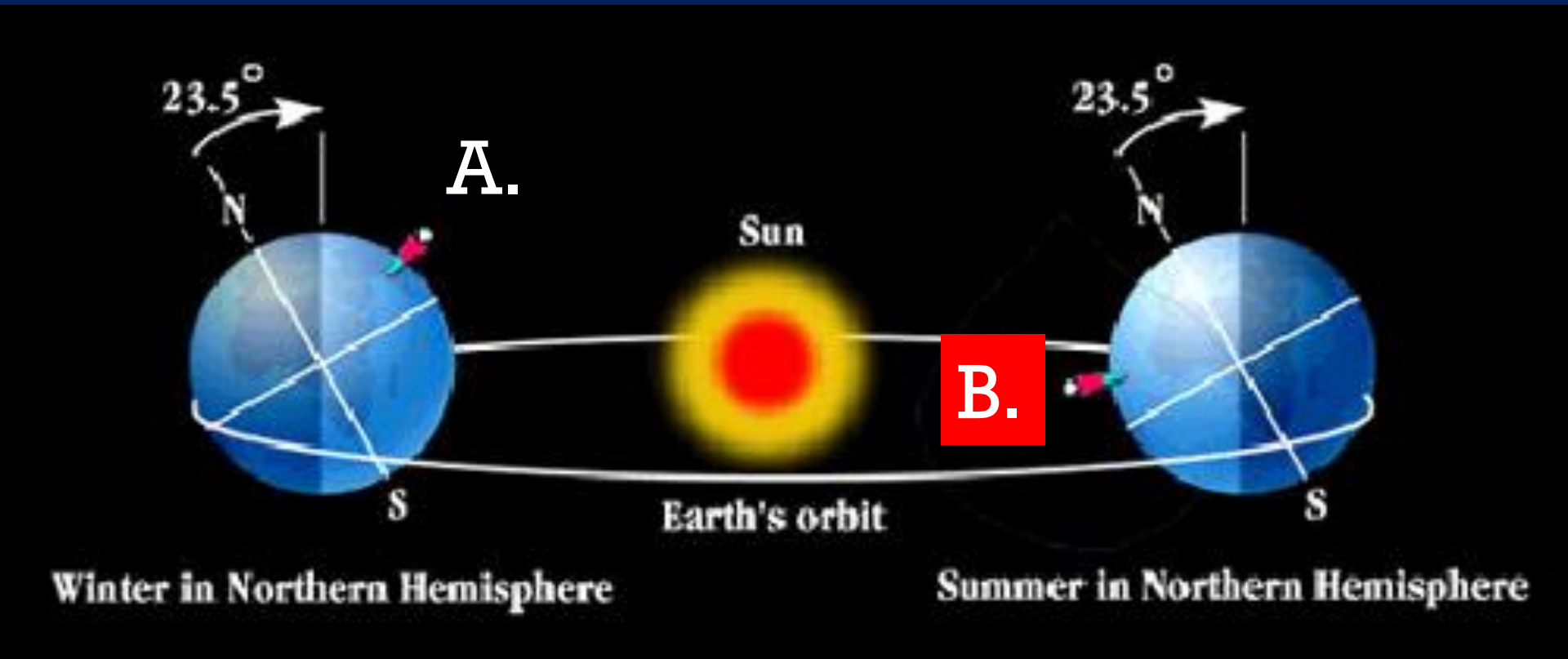
For example, the Northern Hemisphere is experiencing summer when it is tilted towards the sun. Since it is tilted towards the sun, it receives more direct sunlight than the Southern Hemisphere. Hence, more energy.



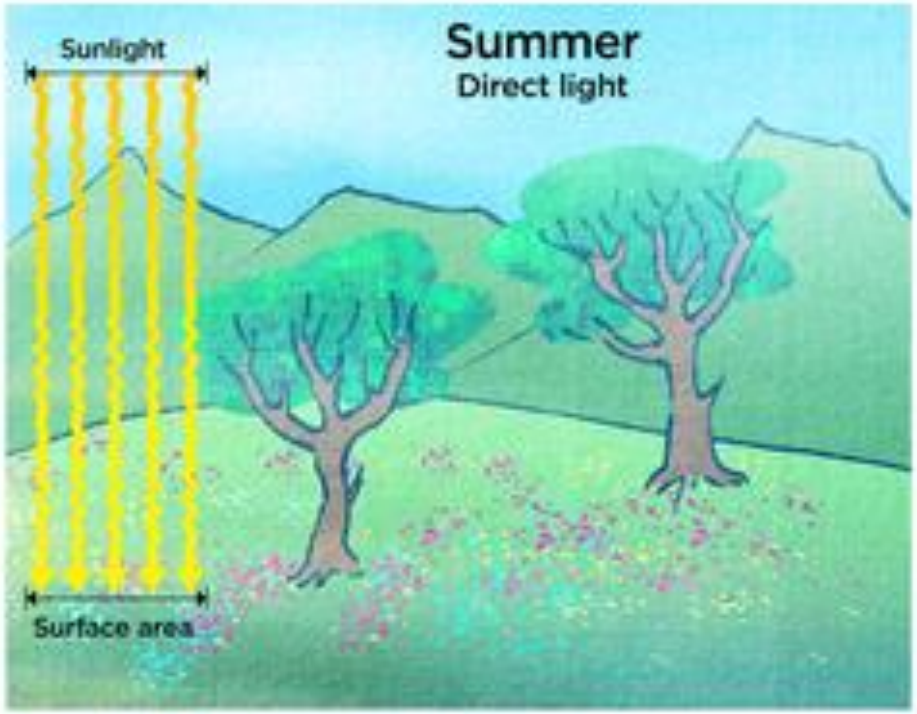
While we are in summer, the Southern Hemisphere is in winter. In the picture, where is the Earth experiencing direct sunlight? A or B?

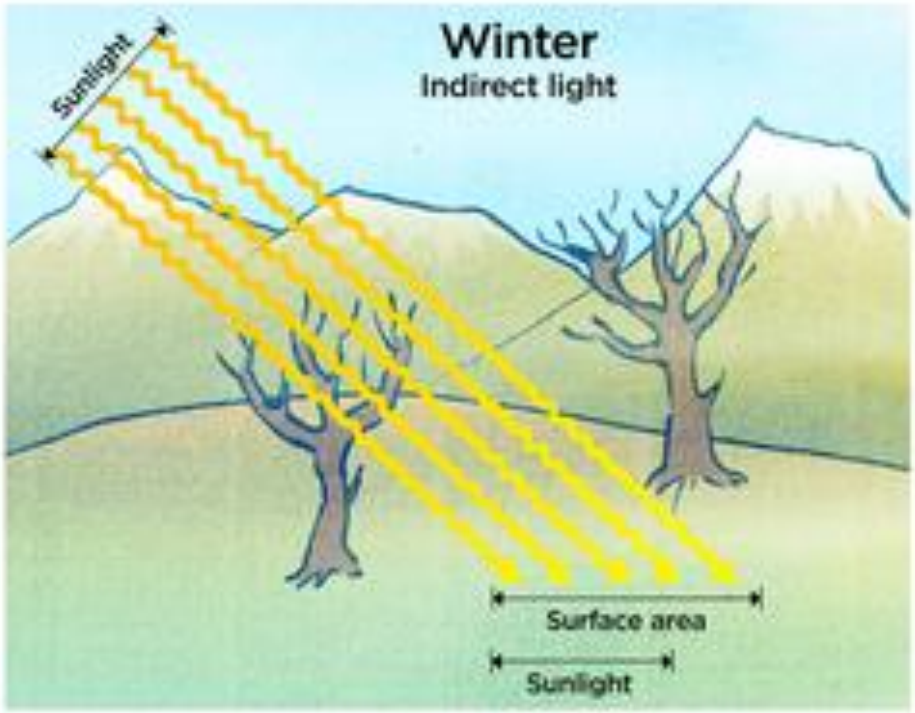


If you said B. That is right. B is experiencing direct sunlight. Notice how the axis is pointing towards the sun. B is in summer and A is in winter.



It may be easier to see in this image how energy is dispersed in direct and indirect light. Notice how the light energy is dispersed over a larger surface area in indirect light. Whereas the energy from the direct light is concentrated in a smaller area.





Another way to explain the difference is like this. Imagine you had a heat lamp. Now think: How would your hand feel if you put it 6 inches directly under the heat lamp? How would your hand feel if you put it 6 inches under the heat lamp and 6 inches to the side?

If you said that your hand would feel hotter when placed 6 inches under the heat lamp rather than placed under and over 6 inches, YOU ARE RIGHT! This is the difference between direct and indirect light. In the summer, we receive more direct light. During the winter, we receive more indirect light.

Direct sunlight is only found in between the Tropic of Cancer, which is 23.5 degrees North, and the Tropic of Capricorn, which is 23.5 degrees South. This is why all tropical locations are found within these lines of latitude.

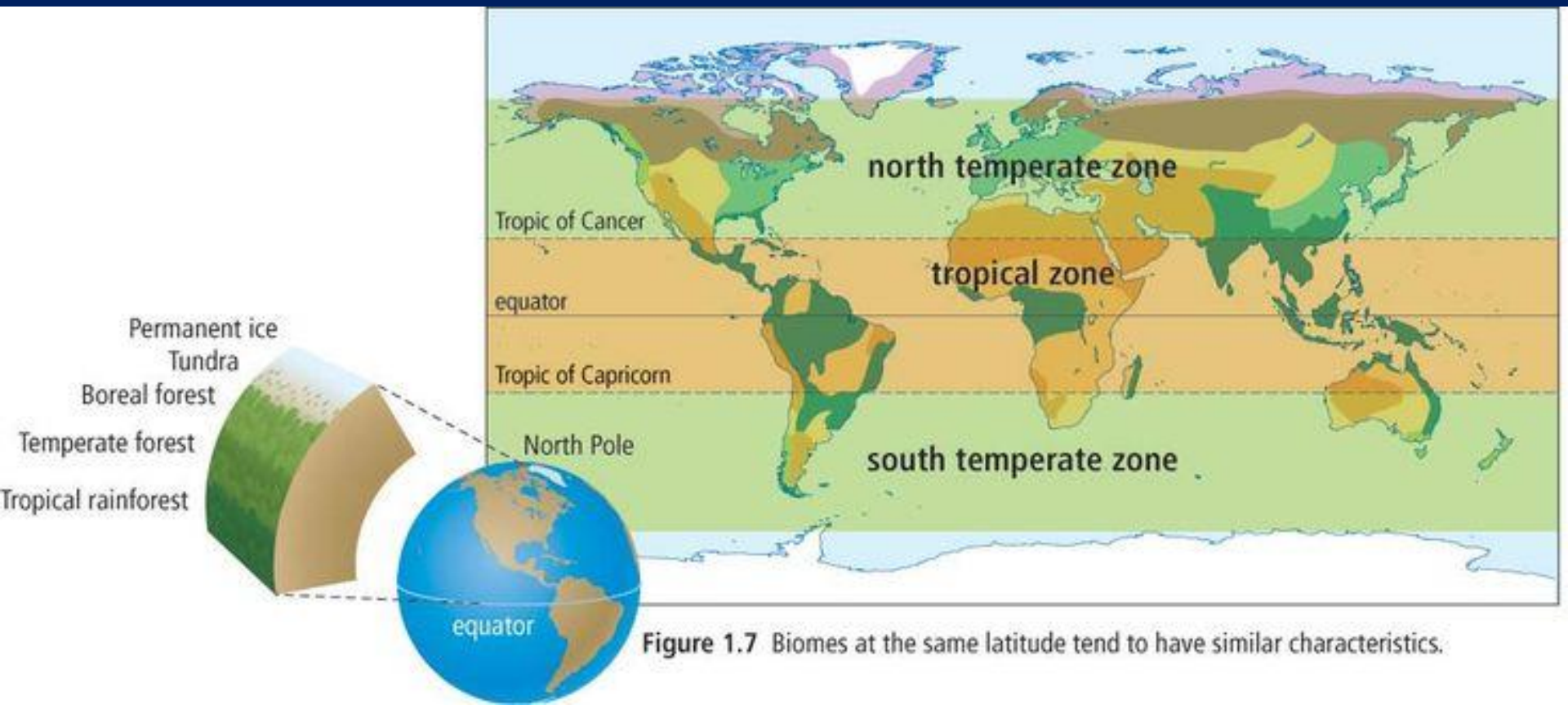
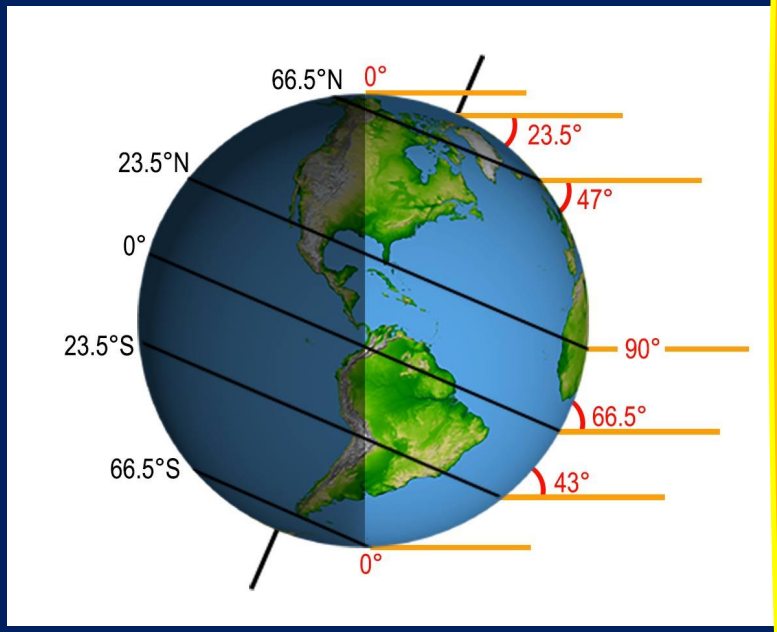


Figure 1.7 Biomes at the same latitude tend to have similar characteristics.

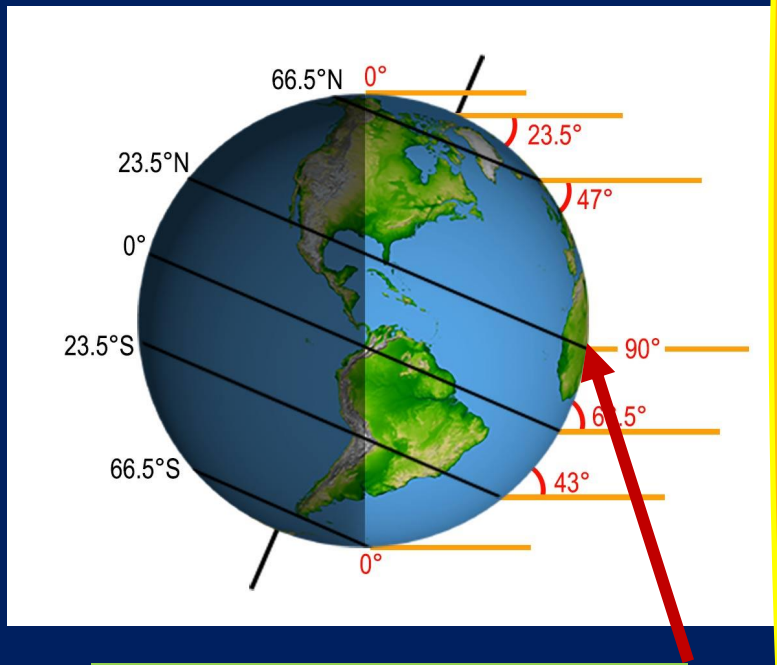
What is a solstice?

- When the noon sun is overhead at either 23.5 degrees South or 23.5 degrees North
- It happens 2 days out of the year



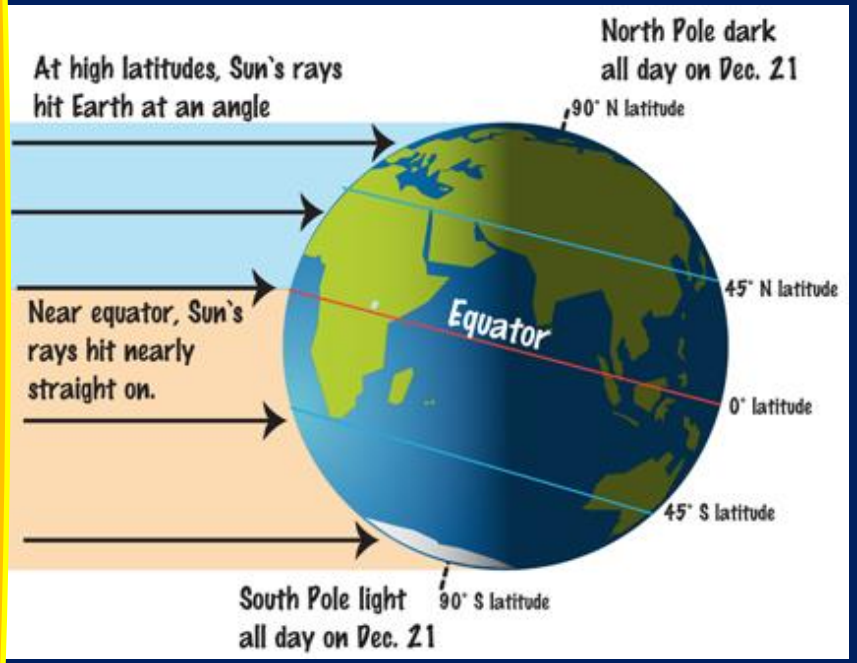
What is the Summer Solstice?

- When the sun is overhead at 23.5 degrees North or also called the Tropic of Cancer
- Also known as June Solstice
- North end of the axis is tilted toward Sun
- It is summer in the Northern Hemisphere and winter in the Southern Hemisphere.



Direct sunlight at 23.5 degrees North

What is the Winter Solstice?



- When the sun is overhead at 23.5 degrees South or also called the Tropic of Capricorn.
- Also known as the December Solstice
- South end of the axis is tilted toward the Sun.
- It is summer in the Southern Hemisphere and winter in the Northern Hemisphere.

What is an Equinox?

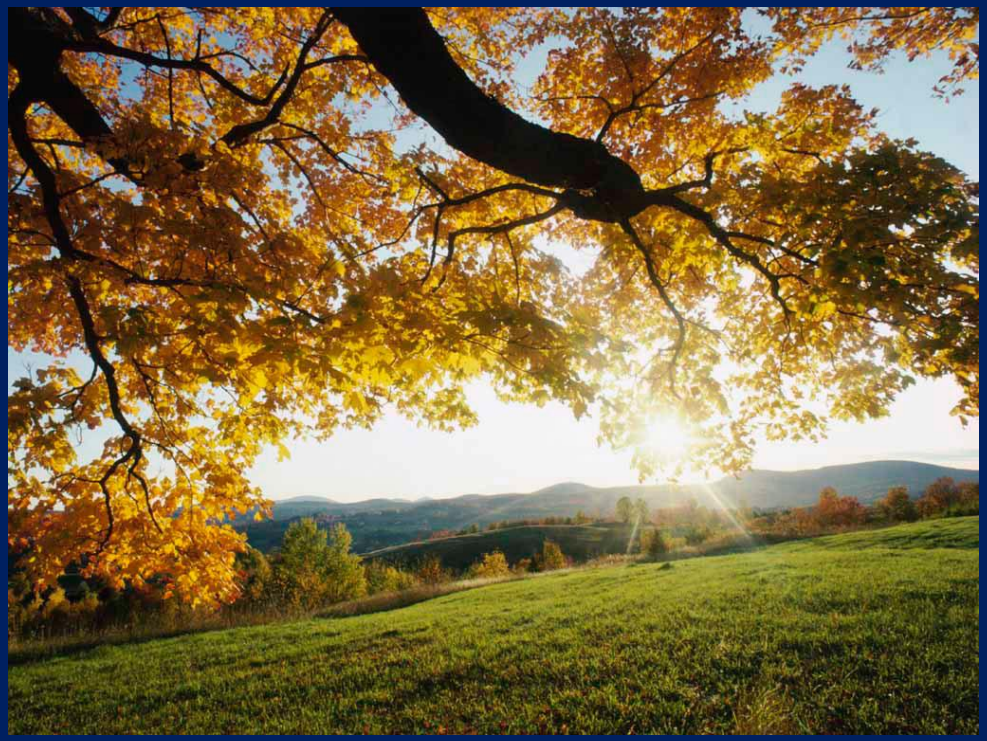
- When the noon sun is directly overhead at the equator .
- This is when neither hemisphere is tilted toward the Sun.
- Equal time of day and night.

What is Vernal Equinox?

- Also known as Spring Equinox
- Occurs around March 21
- Marks the start of Spring in Northern Hemisphere

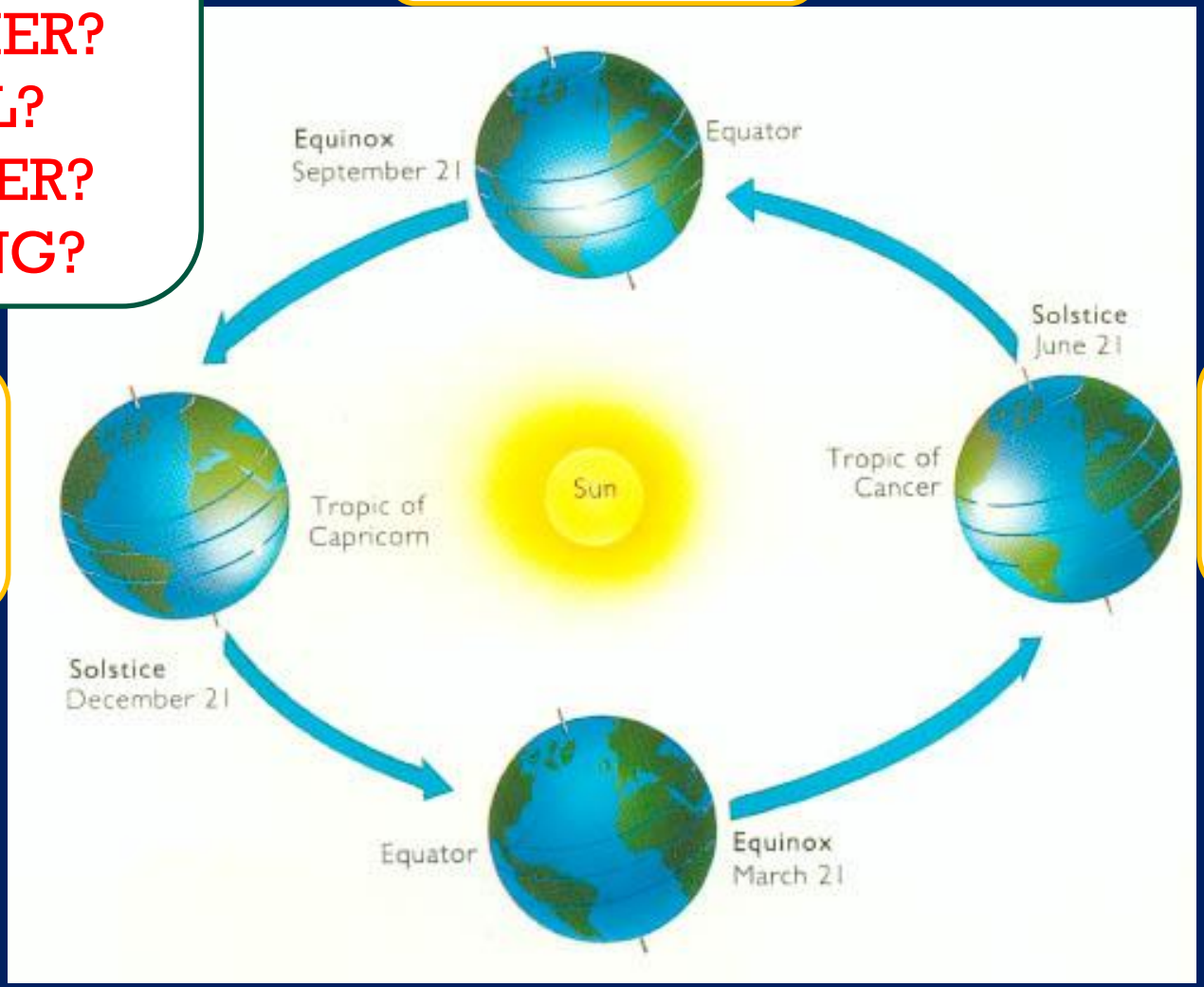
What is Autumnal Equinox?

- Also known as Fall Equinox
- Occurs around September 23
- Marks the start of Fall for the Northern Hemisphere



TRIVIA:
WHERE IS SUMMER?
FALL?
WINTER?
SPRING?

1.) What season am I?



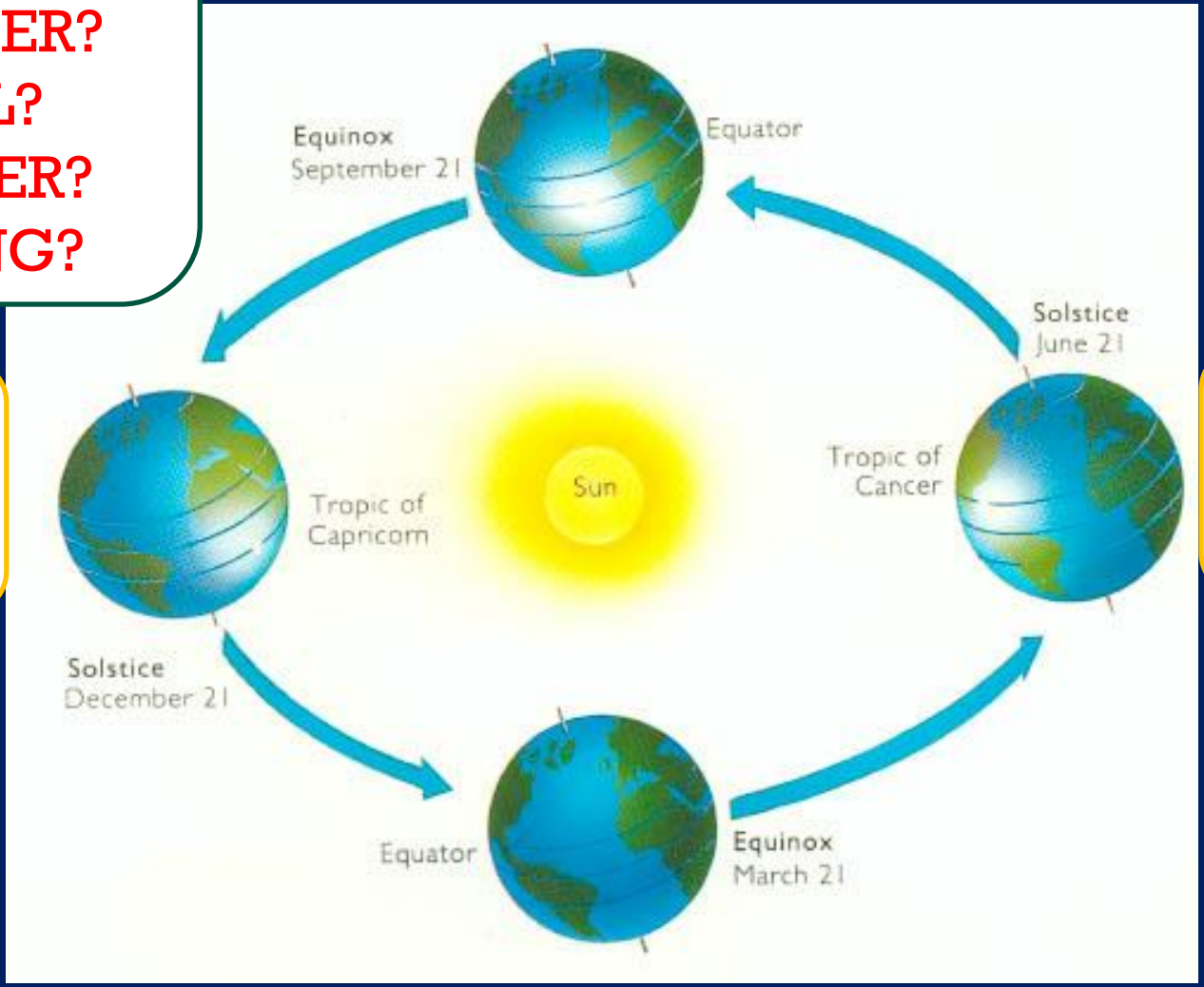
1.) What season am I?

2.) What season am I?

3.) What season am I?

TRIVIA:
WHERE IS SUMMER?
FALL?
WINTER?
SPRING?

Fall for Northern Hemisphere



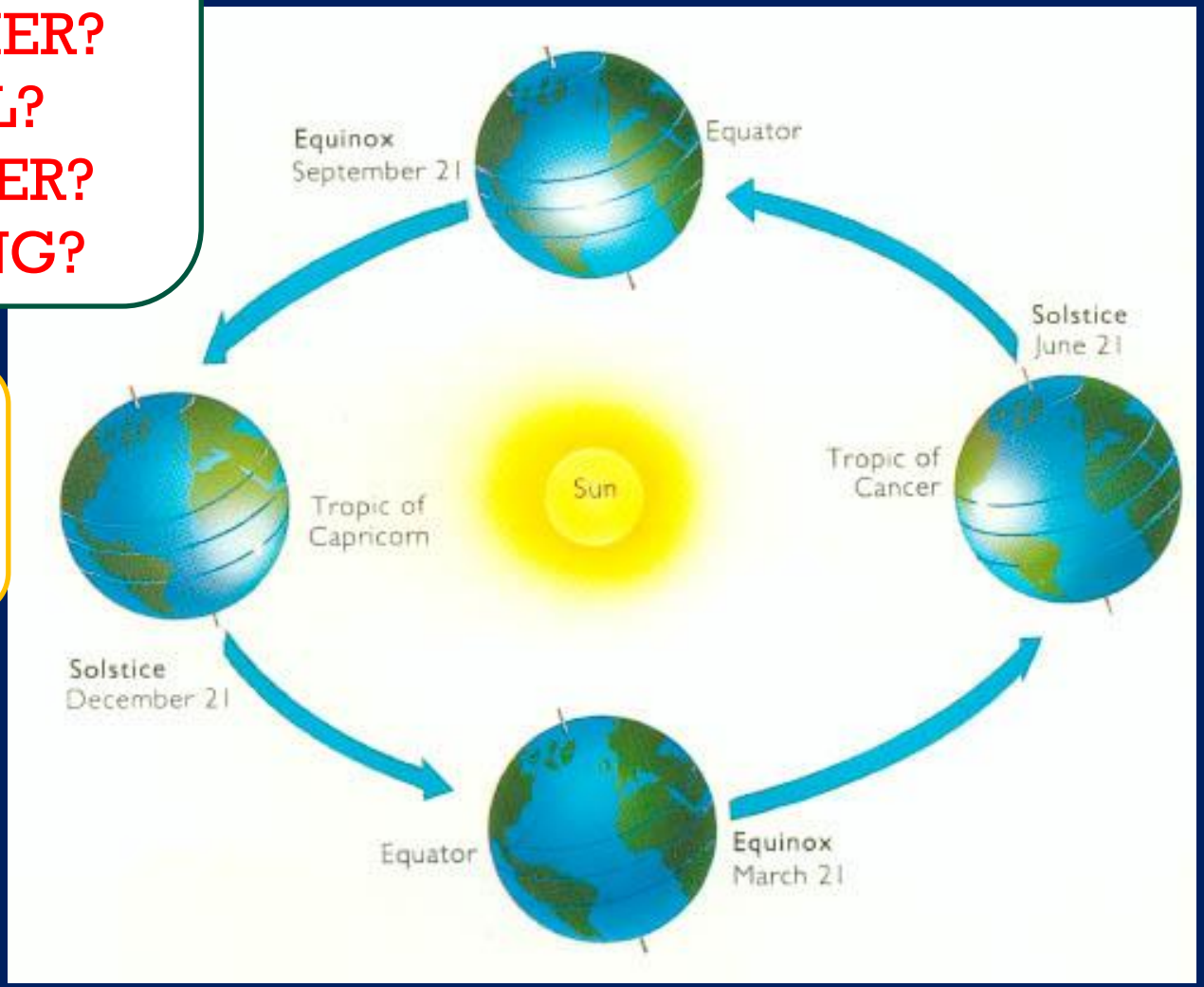
1.) What season am I?

2.) What season am I?

3.) What season am I?

TRIVIA:
WHERE IS SUMMER?
FALL?
WINTER?
SPRING?

Fall for Northern Hemisphere



1.) What season am I?

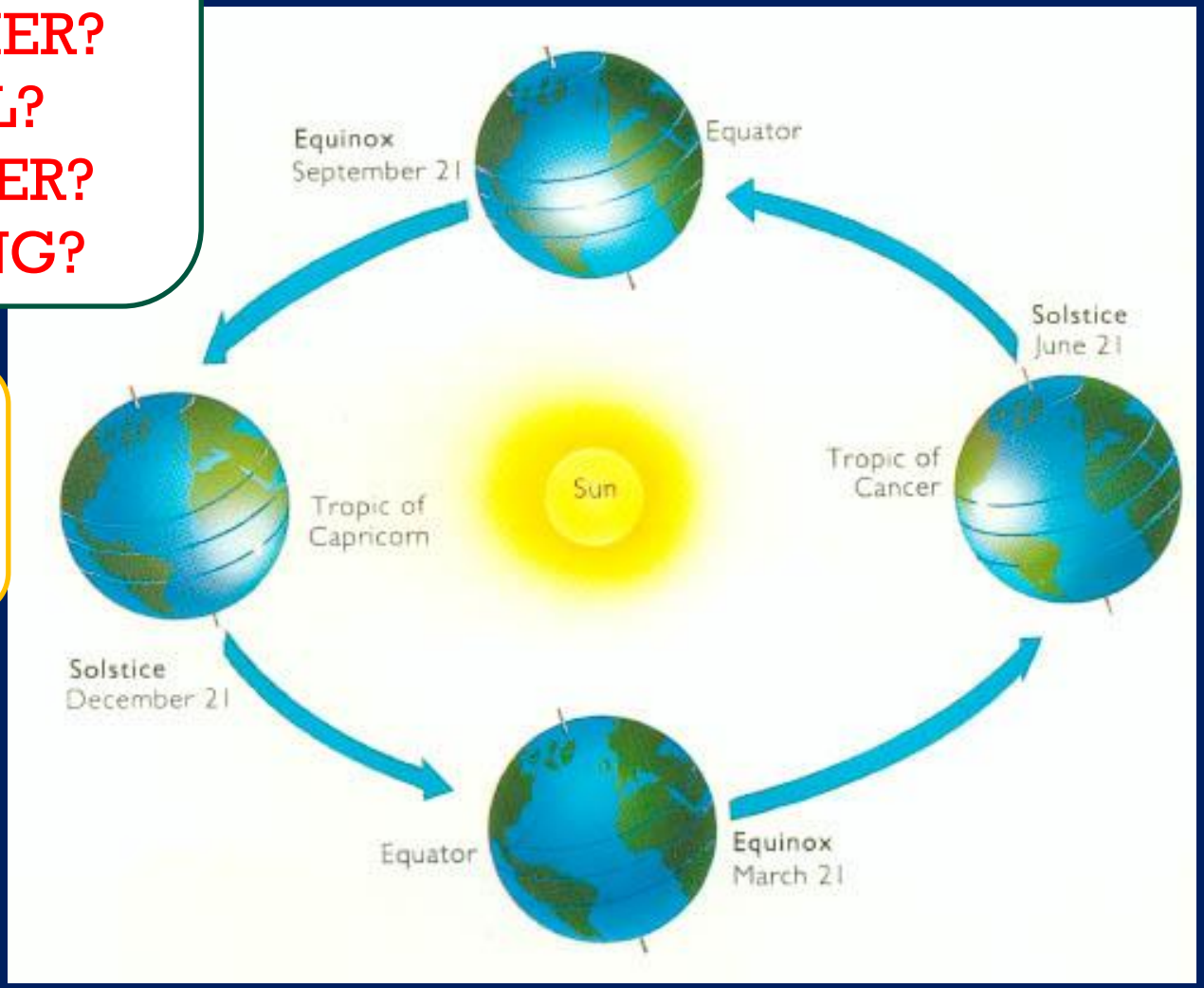
Summer for Northern Hemisphere

3.) What season am I?

TRIVIA:
WHERE IS SUMMER?
FALL?
WINTER?
SPRING?

1.) What season am I?

Fall for Northern Hemisphere

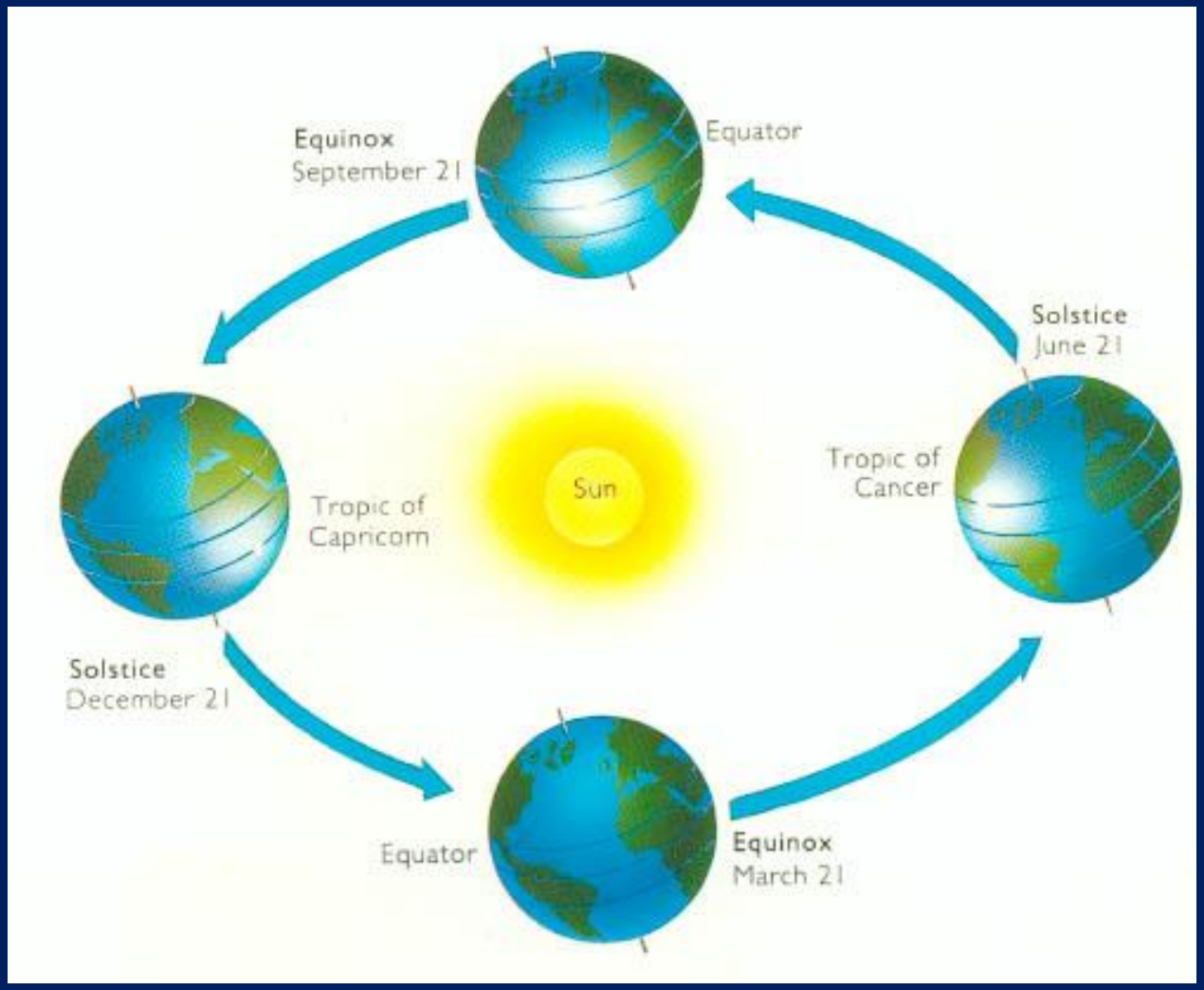


Summer for Northern Hemisphere

Spring for Northern Hemisphere

Fall for Northern Hemisphere

Winter for Northern Hemisphere



Summer for Northern Hemisphere

Spring for Northern Hemisphere

It was you who set all the boundaries of the earth; you made both summer and winter.
Psalms 74: 17

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