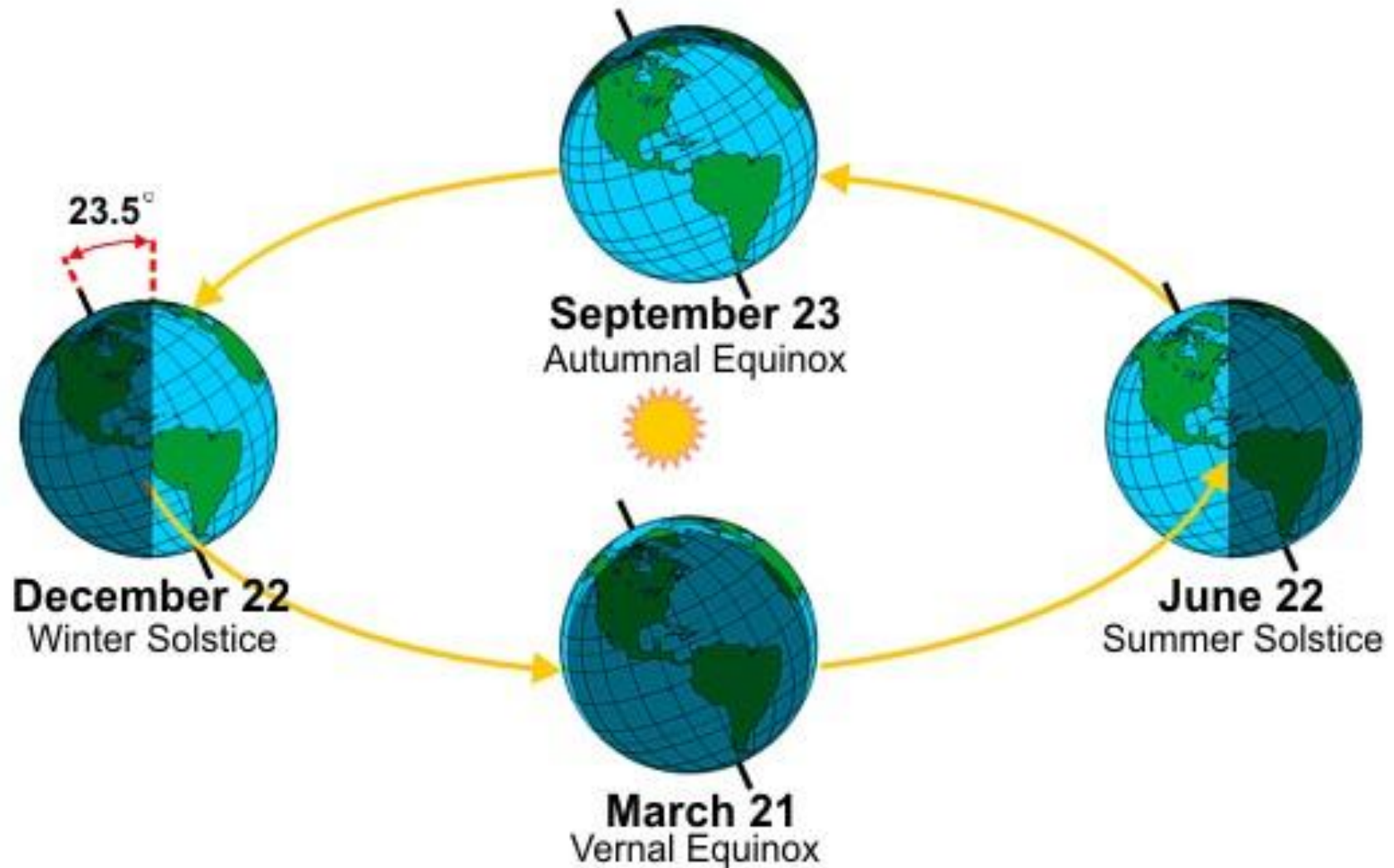




A Trip Around The Sun

Objective: To identify the position of Earth during the solstices and the equinoxes.

Earth's Seasons



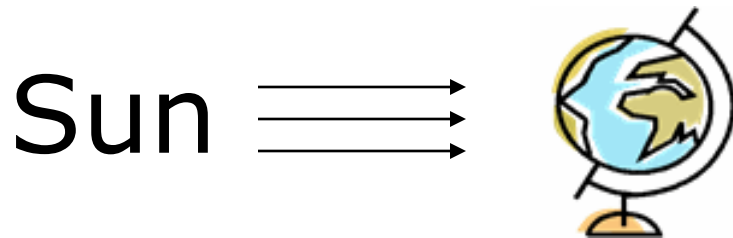


Research

- Winter Solstice: day when Earth's axis, tilted 23.5° , is pointing away from sun. Shortest day.
- Tropic of Capricorn: latitude 23.5° south of equator. Direct rays of sun hit here on the Winter Solstice.
- Vernal Equinox: Spring. Equal hours of day and night. Direct rays of sun hit the equator.

The Tilt

Winter in the Northern Hemisphere:
Axis is tilted 23.5 degrees away from sun.



Indirect (slanted) rays of
light are not as hot.

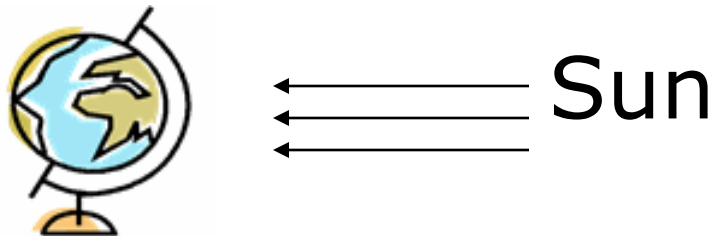


Research

- Summer Solstice: day when Earth's axis, tilted 23.5° , is pointing at the sun. Longest day.
- Tropic of Cancer: latitude 23.5° north of equator. Direct rays of sun hit here on the Summer Solstice.
- Autumnal Equinox: Fall. Equal hours of day and night. Direct rays of sun hit the equator.

The Tilt

Summer in the Northern Hemisphere:
Axis is tilted 23.5 degrees toward the sun.



Direct rays of light are very hot.



Conclusions

- During the winter solstice, which of the Earth's poles is in darkness 24 hours a day? Which one is in darkness 24 hours a day during the summer solstice?
- Winter Solstice = North Pole
- Summer Solstice = South Pole



Conclusions

- Why do people experience equal hours of day and night during the equinoxes?
- Because the sun is direct on the equator.



Conclusions

- During a complete year or trip around the sun what area on Earth would receive the most sun?
- Between the tropics or the equator



Reasons for Seasons

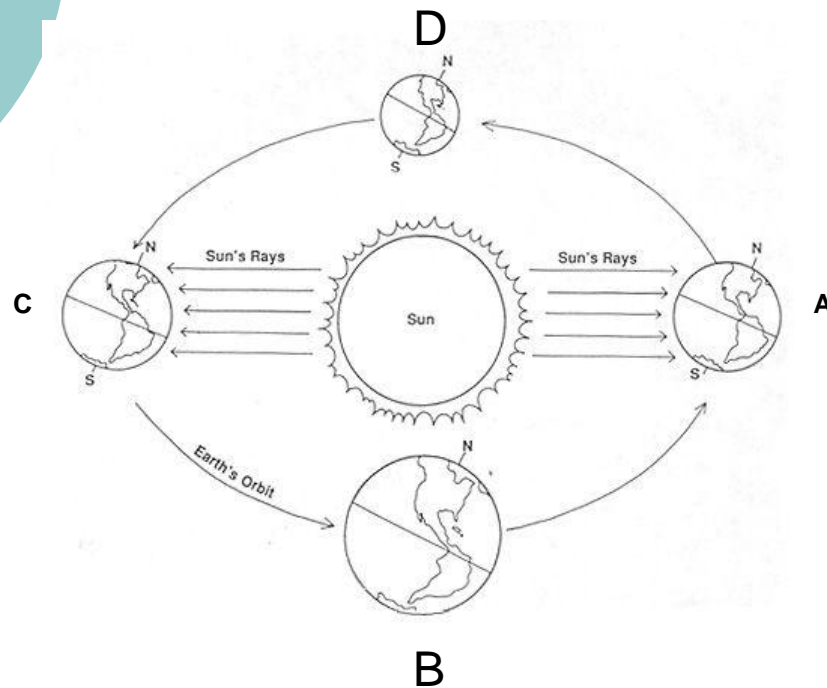
Earth, Sun, and Moon Relationships



Objective

- Use a simulations to collect data from different locations to show how season work due to Earth's tilt

Processing

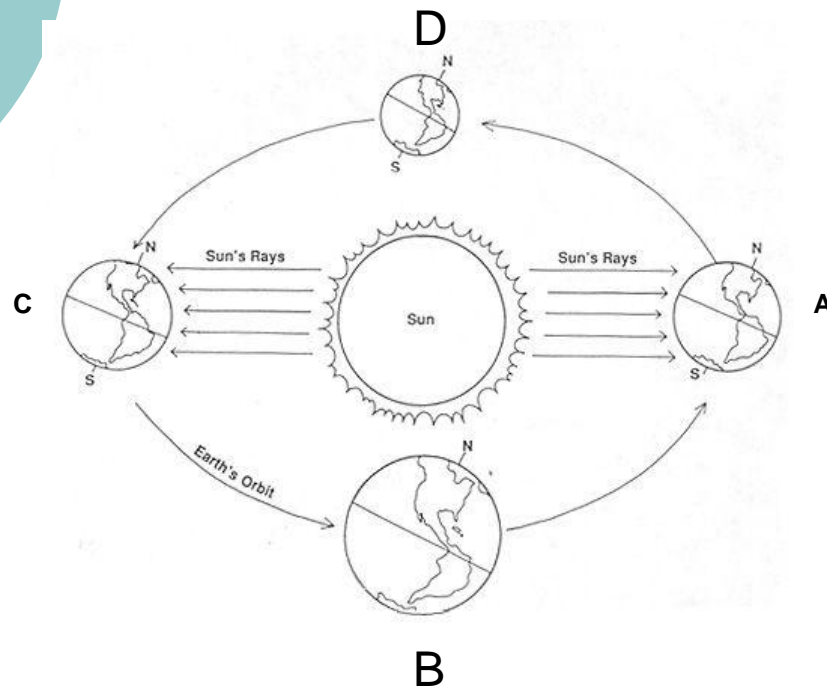


- In position A, the Southern Hemisphere is receiving more direct sunlight as compared to the Northern Hemisphere. The Southern Hemisphere is in their

season, and the Northern Hemisphere is in their

season.

Processing

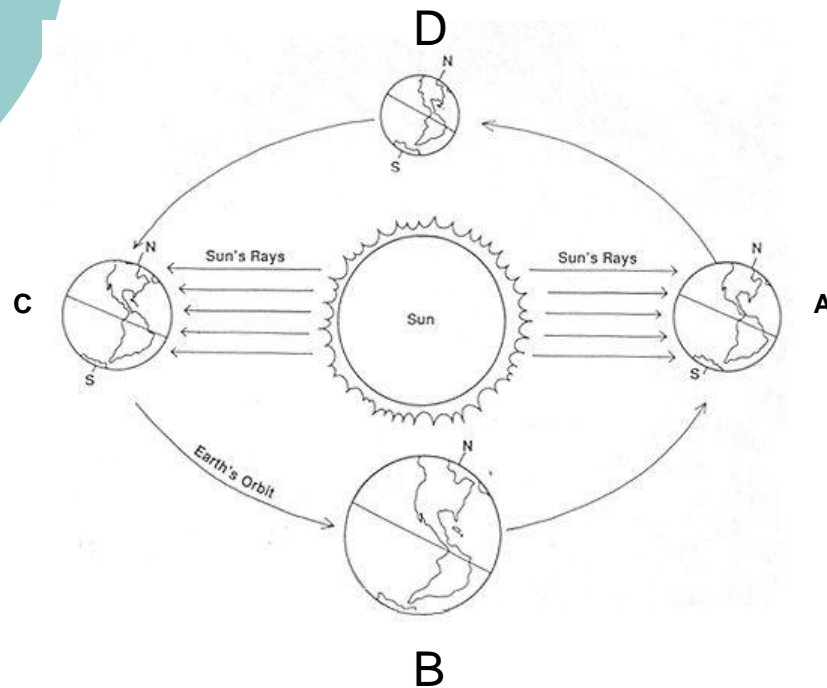


- In position C, the Northern Hemisphere is receiving more direct sunlight as compared to the Southern Hemisphere. The Northern Hemisphere is in their

season, and the Southern Hemisphere is in their

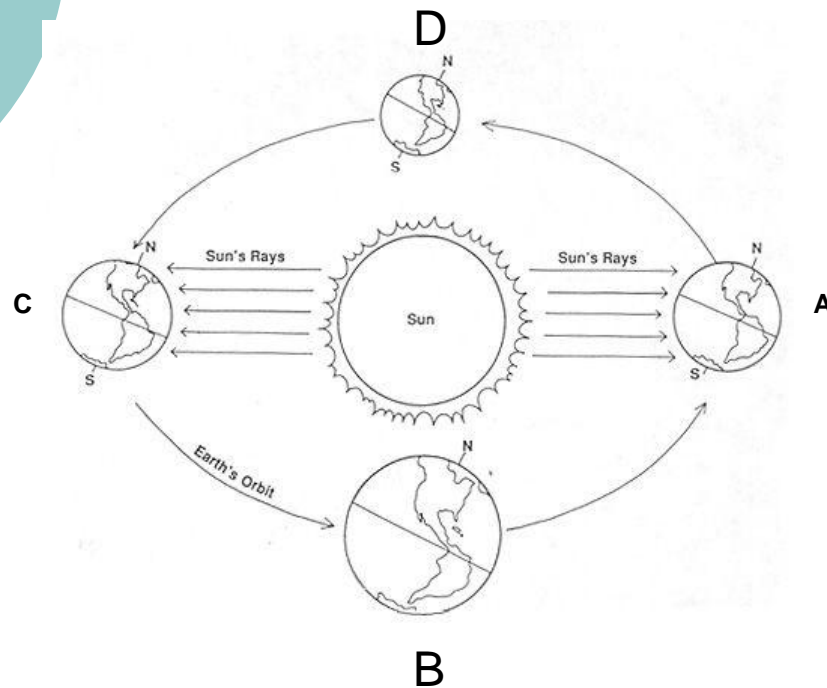
season.

Processing



- In position B, the Northern Hemisphere and Southern Hemisphere receive equals amount of sunlight. At this position, the Sun's rays are starting to move more to the Northern Hemisphere. The Northern Hemisphere is in their season, and the Southern

Processing

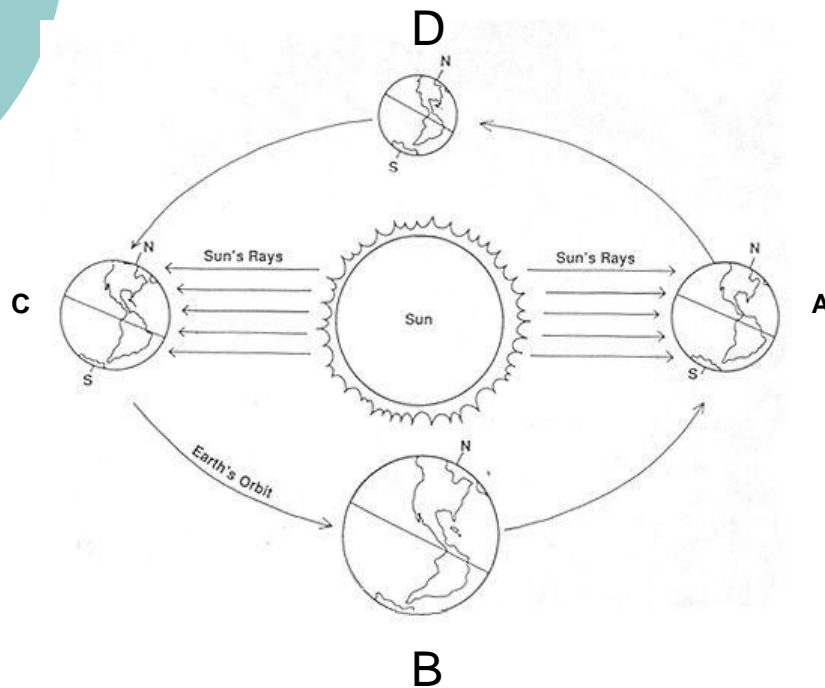


- In position D, the Northern Hemisphere and Southern Hemisphere receive equal amount of sunlight. At this position, the Sun's rays are starting to move more to the Southern Hemisphere. The Northern Hemisphere is in their

season, and the Southern Hemisphere is in their

season.

Processing



- What line of latitude is the Sun's rays directly pointing at the following positions in Earth's orbit around the Sun?

- Position A:

- Position B:

- Position C:

- Position D:

Key Concepts

- Earth's **axis tilt** causes the seasons on Earth.
- Earth's axis **tilts** away from perpendicular to the ecliptic plane, which is Earth's orbit around the Sun, by **23.5°**.
- Currently, Earth's axis **tilts** to the North Star also known as **Polaris**.

Key Concepts

- Earth's **axis tilt** affects **day length**, **Temperature**, and **Light intensity**, which causes differences in seasons.
- During the **summer**, the portion of the Earth leans **towards** the Sun in its **revolution**.
- There are more **daylight hours**, and the Sun's angle is more **perpendicular** than at other times of year.
- **Longer days** and more **concentrated** sunlight result in more heating.



Key Concepts

- During **winter**, the other portion of Earth leans **away** from the Sun.
- There are **fewer** daylight hours, and the Sun hits us at an **angle**; this makes it appear **lower** in the sky.
- There is **less** heating because the angled Sun's rays are "**spread out**" rather than direct.

Key Concepts

- During the **spring** and **fall**, the Earth **leans** neither **toward** nor **away** from the Sun.
- **Daylight** and **nighttime** hours are **equal** and temperatures are **moderate**.
- Around the **equator**, the **length** of days and the **directness** of sunlight don't change as much.
- The **further** you get from the **equator**, the more **dramatic** the seasonal changes.



Key Concepts

- Because of Earth's **axis tilt**, the Northern Hemisphere and southern hemispheres always experience the **opposite** season.
- For example, when the Northern Hemisphere experiences **summer**, the Southern Hemisphere experiences **winter**.