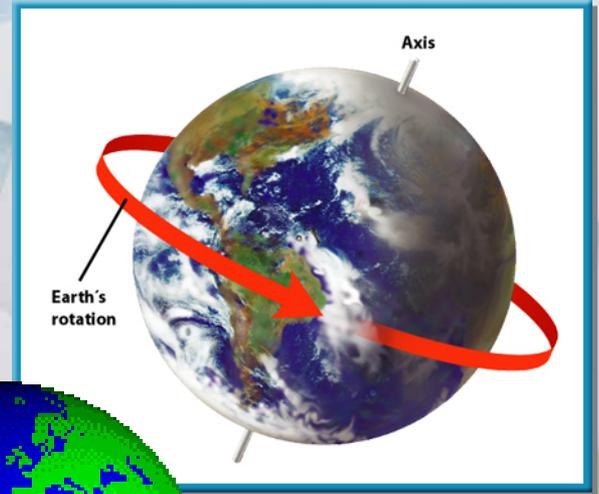




Why do we  
have  
seasons?

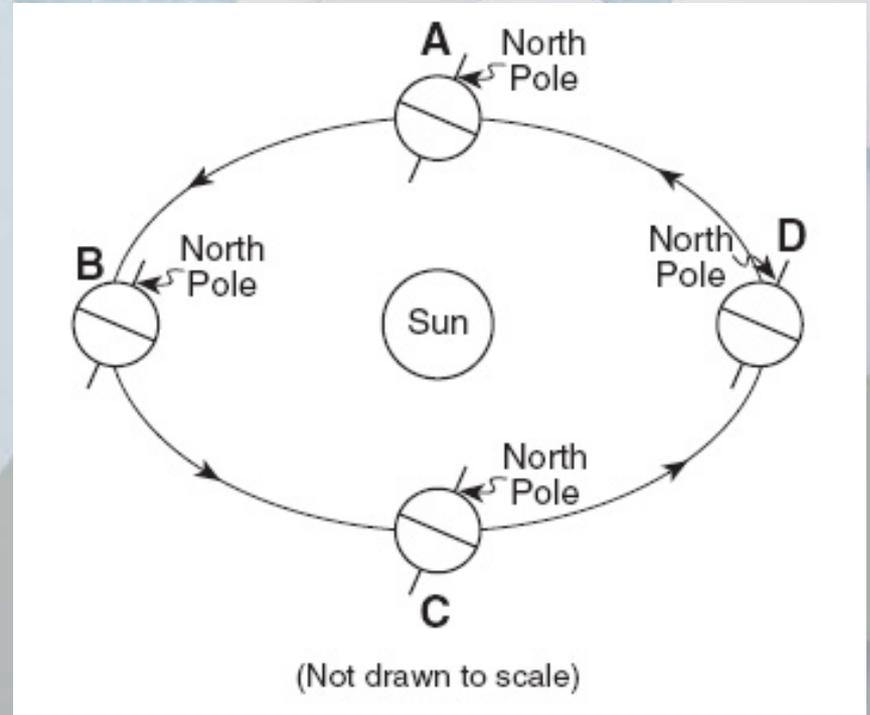
# Earth's rotation

- The Earth rotates on its axis (imaginary vertical line around which Earth spins) every 23 hours & 56 minutes.
- One day on Earth is one rotation of the Earth.
- Day on Earth is when our side of the Earth faces the sun.
- Night on Earth is when the side of Earth we are on faces away from the sun.



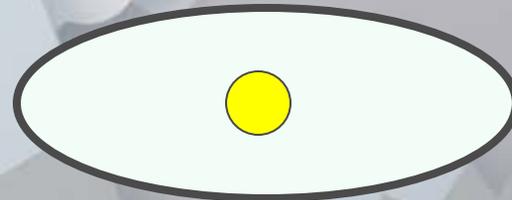
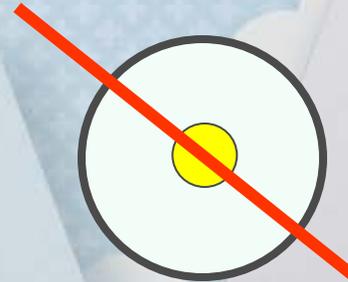
# Earth's revolution

- It takes the Earth 365 days (or rotations) to travel or revolve around the Sun once.
- This is called a year.



# Why do we have seasons?

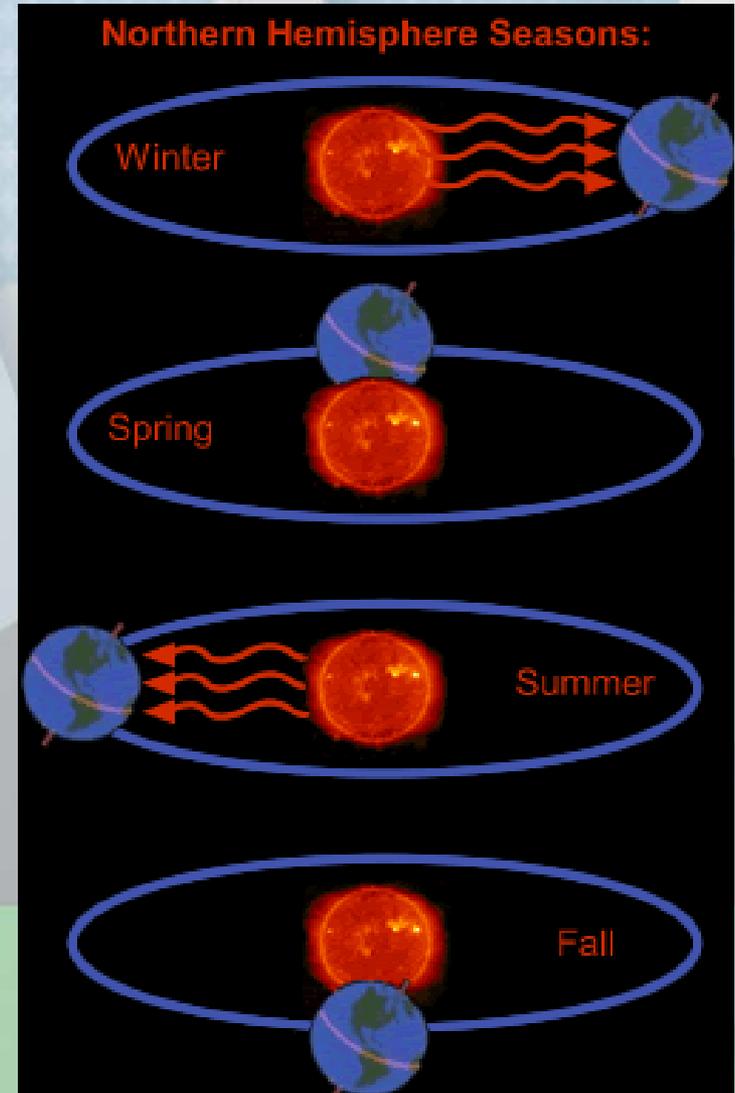
- The Earth's orbit around the sun is NOT a perfect circle. It is an ellipse.
- Seasons are not caused by how close the Earth is to the sun.
- In fact, the Earth is closest to the sun around January 3 and farthest away from the sun around July 4.



Ellipse

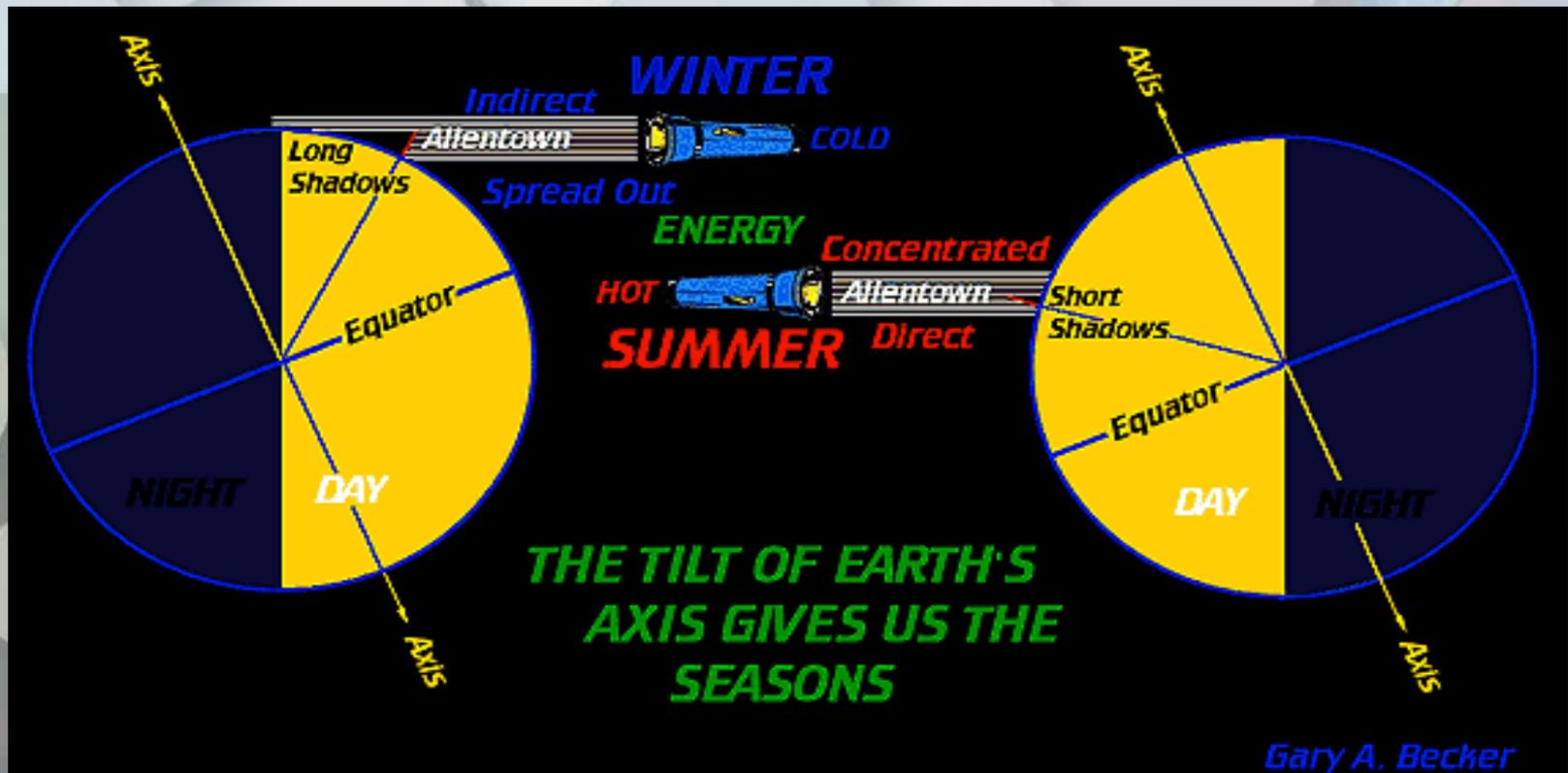
# Why do we have seasons?

- Seasons are the result of the tilt of the Earth's axis.
- Earth's axis is tilted  $23.5^\circ$ .
- This tilting is why we have SEASONS like fall, winter, spring, summer.
- The number of daylight hours is greater for the hemisphere, or half of Earth, that is tilted toward the Sun.



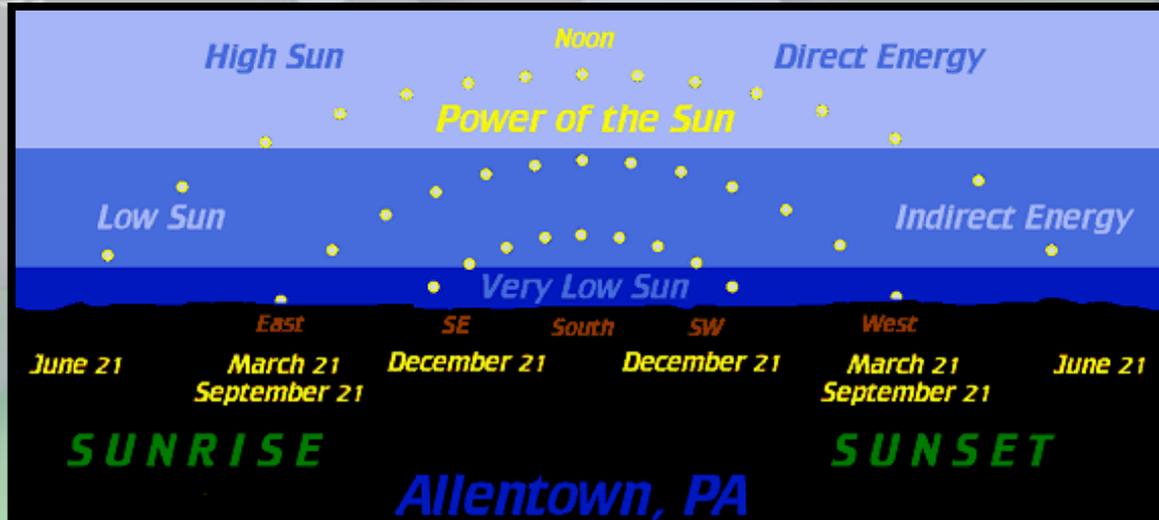
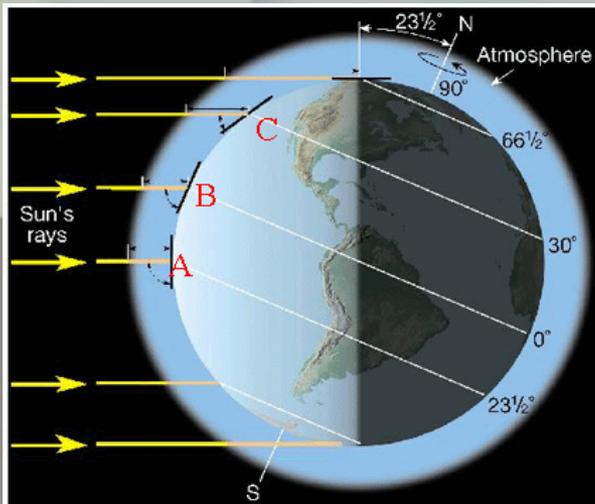
# Why do we have seasons?

- Summer is warmer than winter (in each hemisphere) because the Sun's rays hit the Earth at a more direct angle during summer than during winter

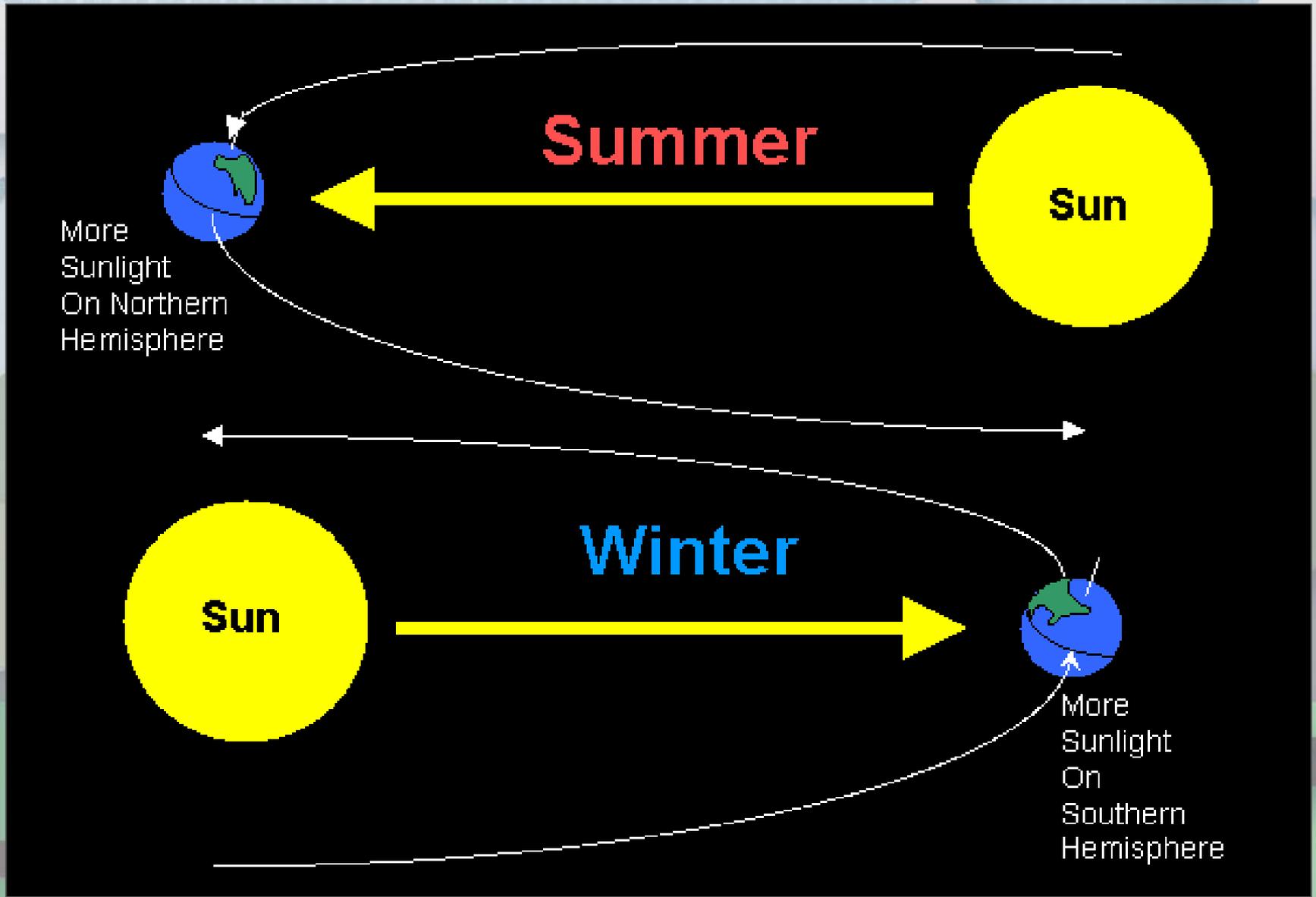


# Why do we have seasons?

- Also the days are much longer than the nights during the summer.
- During the winter, the Sun's rays hit the Earth at an extreme angle, and the days are very short. These effects are due to the tilt of the Earth's axis.



# Seasons...in a nut shell



# Solstices

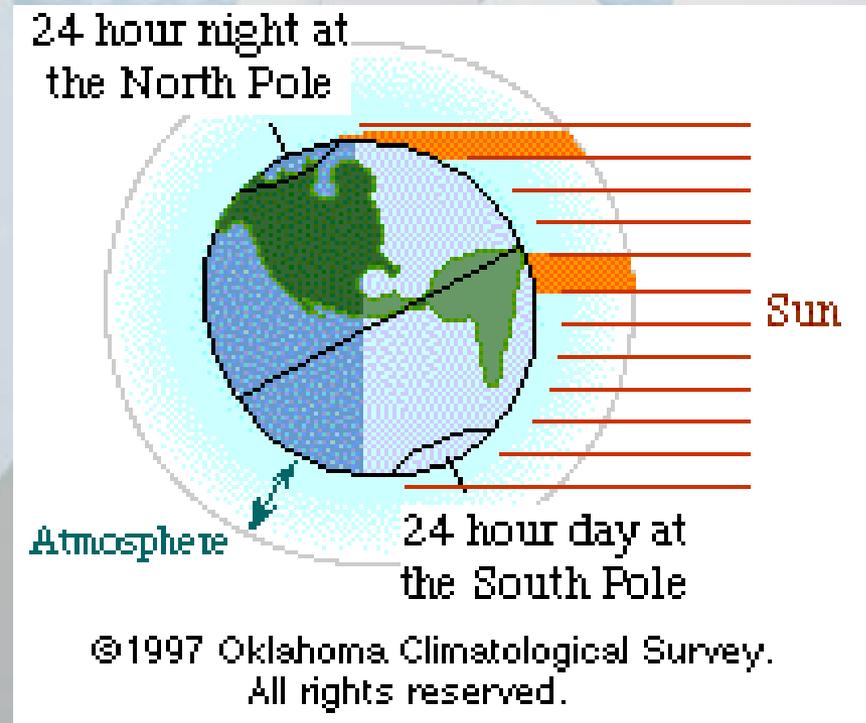
- **Solstices** occur twice a year, when the tilt of the Earth's axis is oriented directly towards or away from the Sun, causing the Sun to appear to reach its northernmost and southernmost extremes.
- Winter solstice is the shortest day of the year. In the Northern Hemisphere. It occurs on December 21 and marks the beginning of winter.
- The Summer Solstice is the longest day of the year. It occurs on June 21 and marks the beginning of summer.



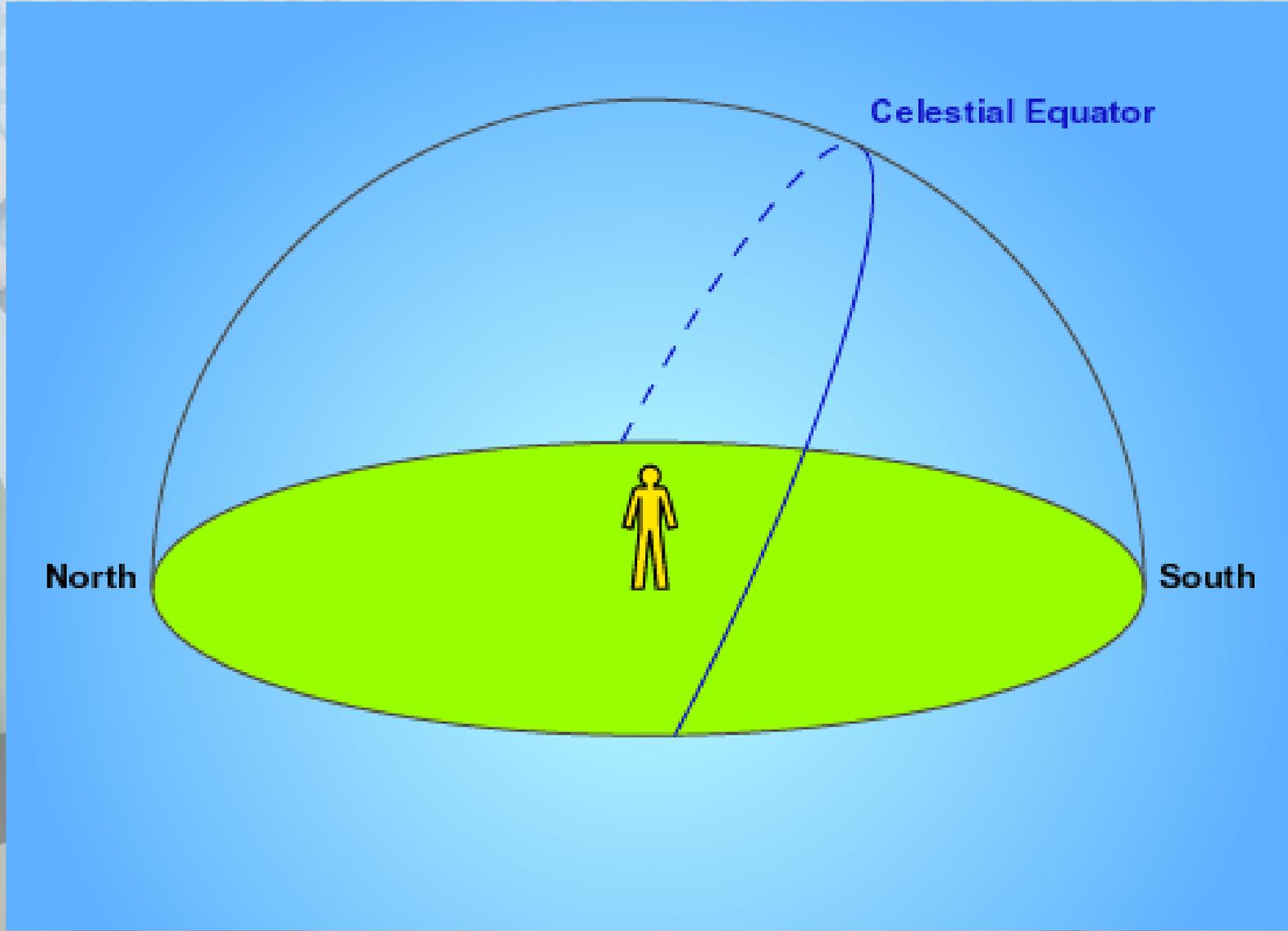
Tyrrhenian Sea and Solstice Sky  
Credit & Copyright: Danilo Pivato

# SOLSTICE

- During the winter the Northern Hemisphere day lasts fewer than 12 hours and the Southern Hemisphere day lasts more than 12 hours.
- During the winter solstice, the North Pole has a 24-hour night and the South Pole has a 24-hour day.
- Sunlight strikes the earth most directly at the Tropic of Capricorn.

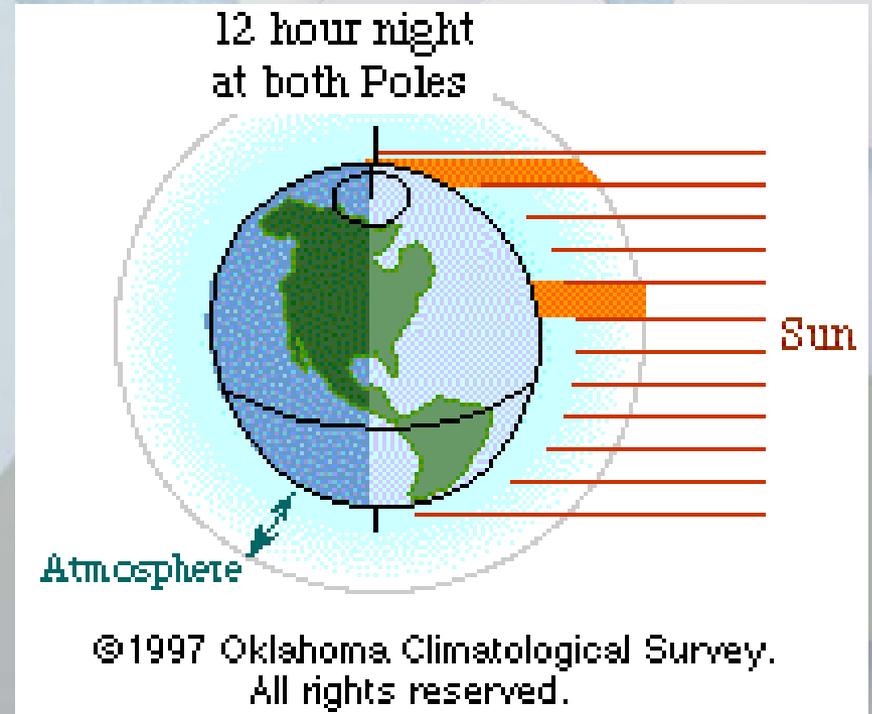


<http://k12.ocs.ou.edu/teachers/reference/solstice.gif>



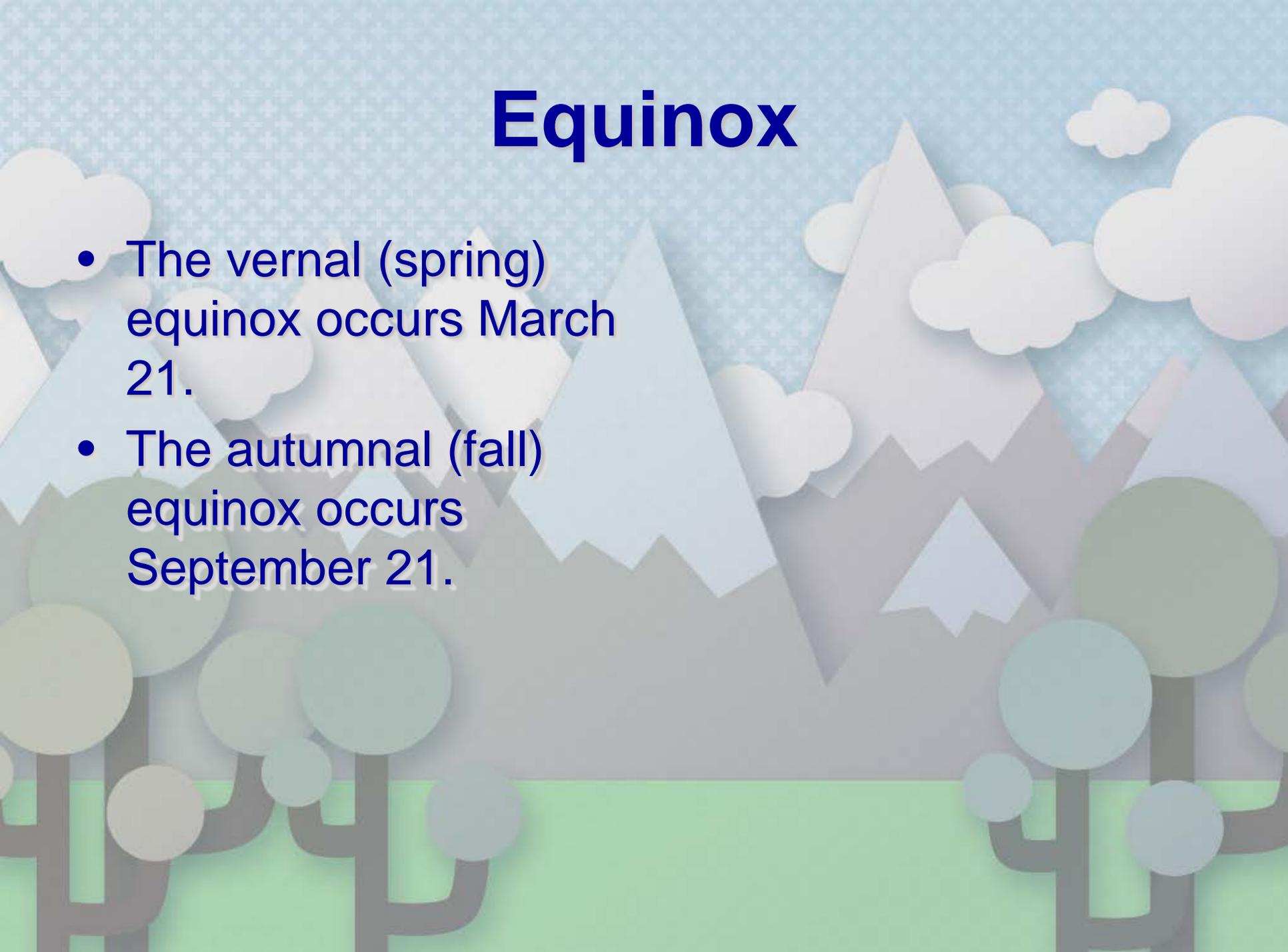
# Equinoxes

- A day lasts 12 hours and a night lasts 12 hours at all latitudes.
- Equinox literally means "equal night".
- Sunlight strikes the earth most directly at the equator.
- This occurs twice a year.



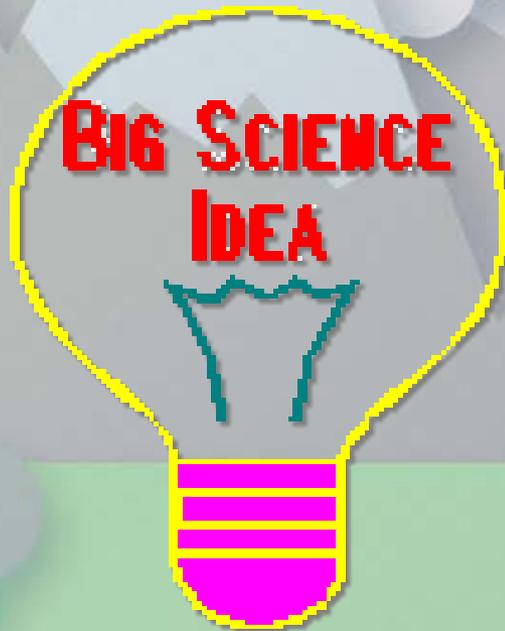
<http://k12.ocs.ou.edu/teachers/reference/equinox.gif>

# Equinox



- The vernal (spring) equinox occurs March 21.
- The autumnal (fall) equinox occurs September 21.

The Earth's seasons are not caused by the differences in the distance from the Sun throughout the year.





The seasons are the result of the tilt of the Earth's axis.

I know this is a repeat, but it is important that you understand this idea. Many Americans, including Harvard graduates, do not know what causes seasons!

# Review

Look closely at where the Sun is hitting the Earth during each season:

