

The slide features a white central area with a red border. In the corners, there are decorative elements: a black square in the top-left, a light beige square in the top-right, a red square in the bottom-left, and a yellow square in the bottom-right. Thin black lines connect some of these squares to the corners of the white area.

Earth's Placement

Apparent Motion

Since stars and planets move in a pattern so obviously we are in the center of the solar system, right?!?



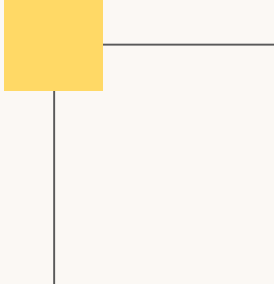
Apparent Motion

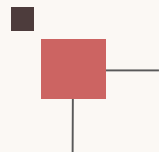


If you look up at the sky during night, you will see the Moon and the stars are moving.

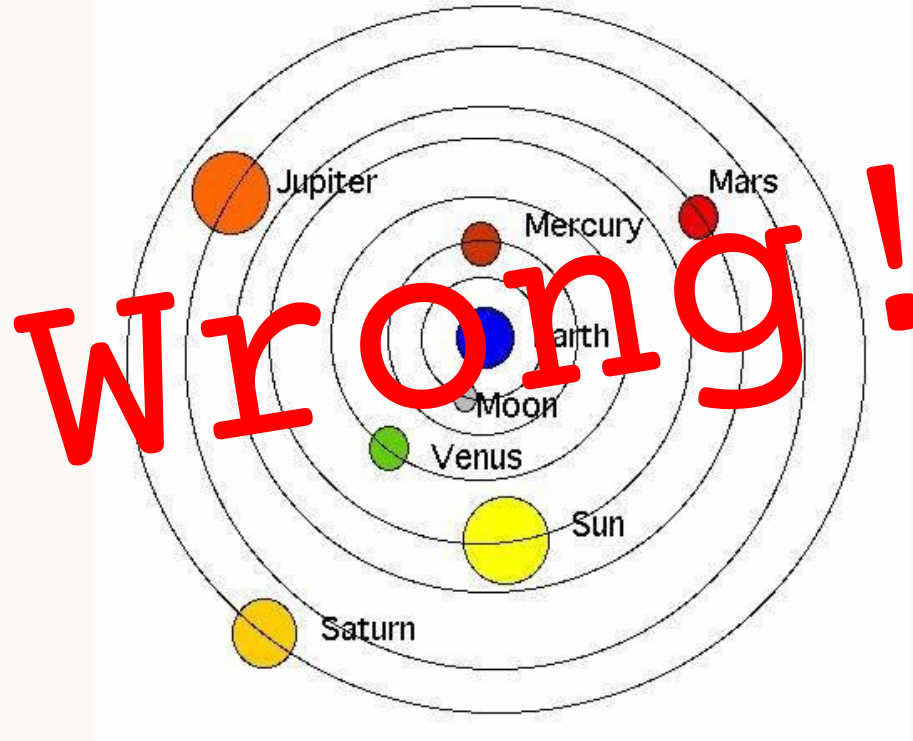
This is called Apparent Motion.

Which lead to the idea that everything is moving around Earth (geocentric).

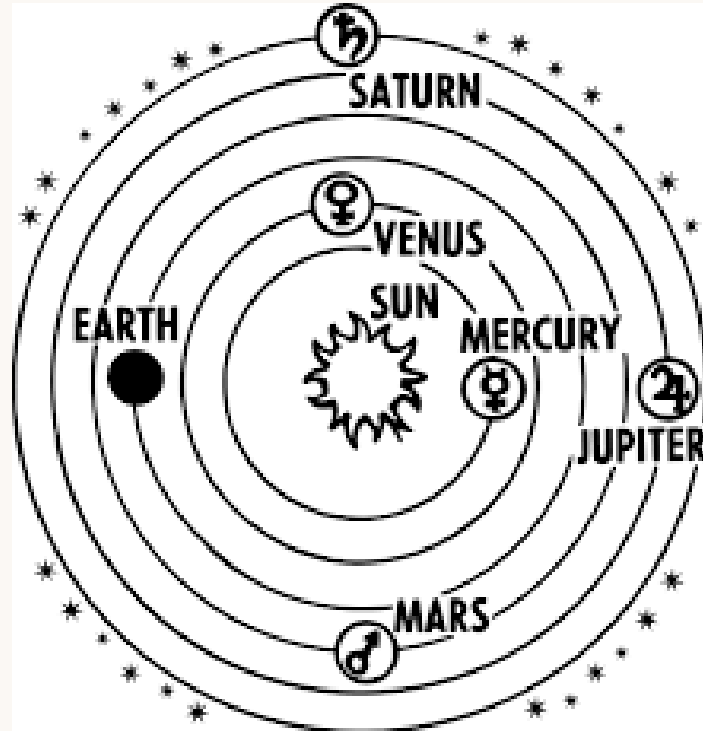




Geocentric



Heliocentric





**What is the difference
between geocentric
and heliocentric?**



Geocentric vs Heliocentric



Geocentric


The Earth is located in the center of the solar system with the Sun and planets revolving around it.




Heliocentric

The Sun is located in the center of the solar system with the planets revolving around it.





Geocentric vs Heliocentric:
The solar system with the Earth in the center verses with the Sun in the center

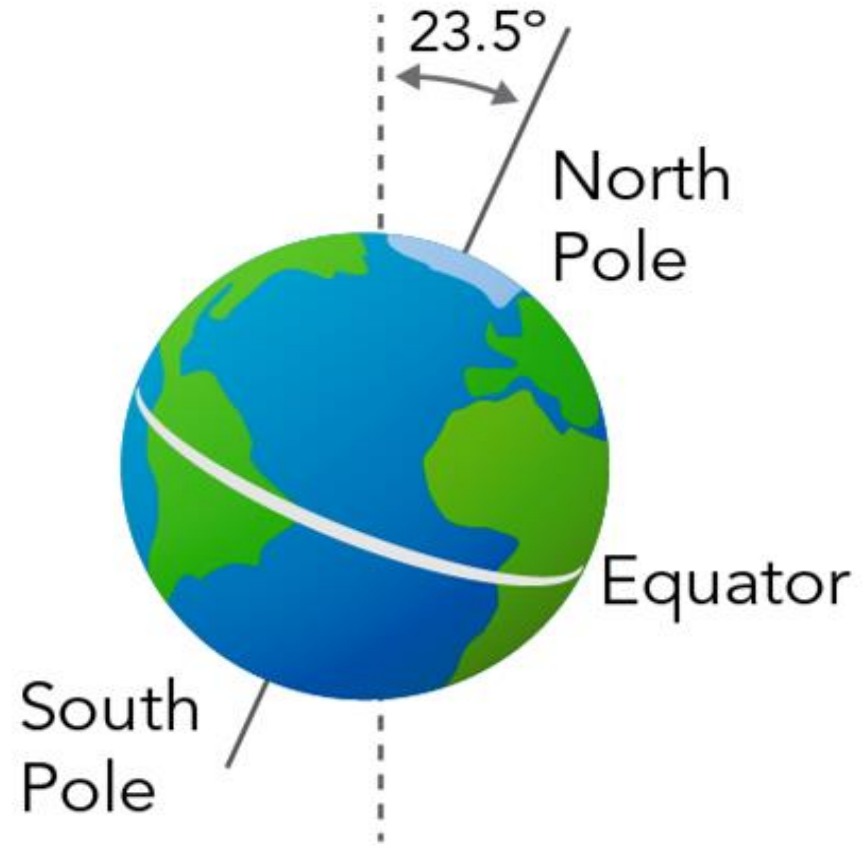


What about Earth's tilt?



The Tilt of the Earth

Earth is tilted at
23.5 degrees and
that is important
for...



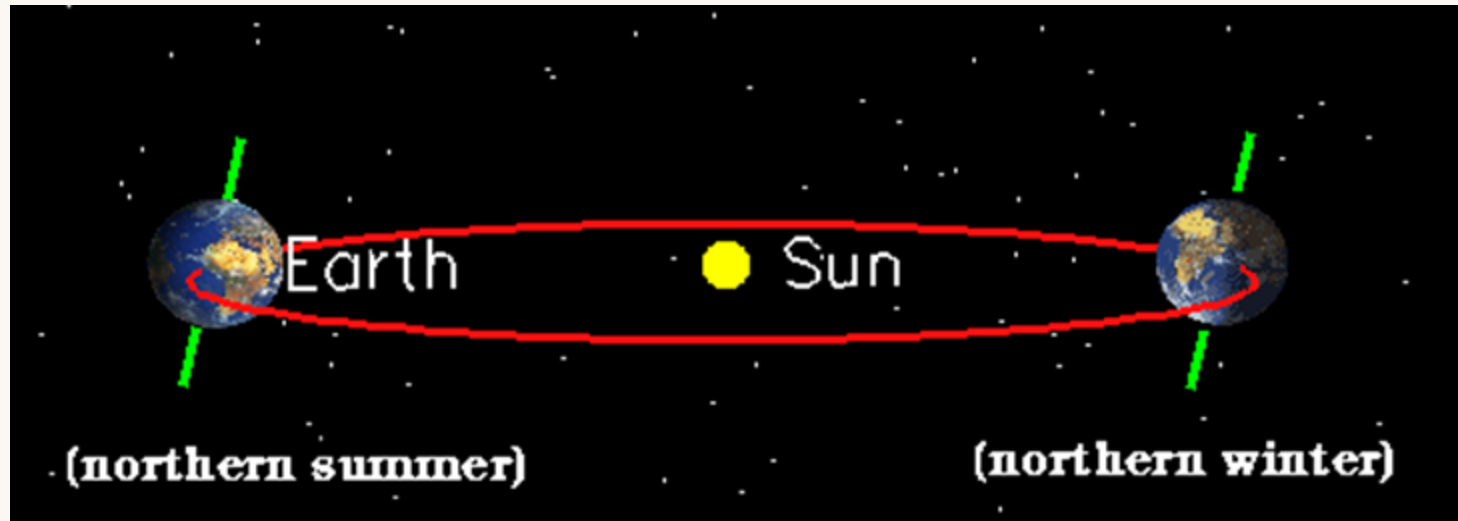






Reason for the Seasons: The 23.5° tilt of the Earth creates areas of direct sunlight and indirect sunlight.







What causes the seasons?

Simulation



Look at [this](#) and [this](#) simulation.

Describe why the tilt of the Earth is so important to having seasons.

Extra thought: Do other planets have seasons?



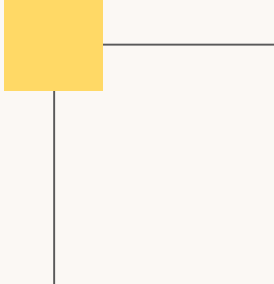
Seasons

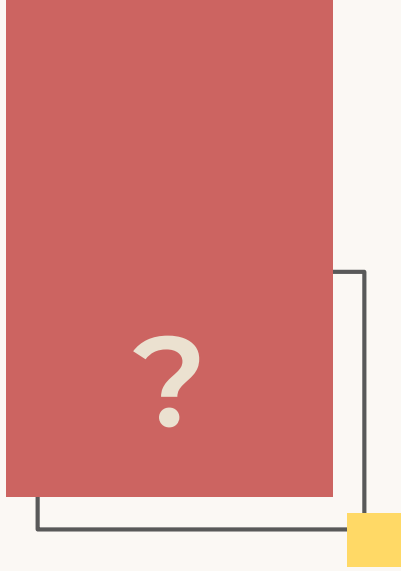


Play around with these games and simulations to explore more about seasons!

- <https://spaceplace.nasa.gov/seasons/en/>
- https://sepuplhs.org/middle/iaes/students/simulations/sepup_seasons5.html
- http://astro.unl.edu/naap/motion1/animations/seasons_ecliptic.html
- https://d3tt741pwxqwm0.cloudfront.net/WGBH/npls13/npls13_int_seasons/index.html
- <https://www.earthspacelab.com/app/seasons/>

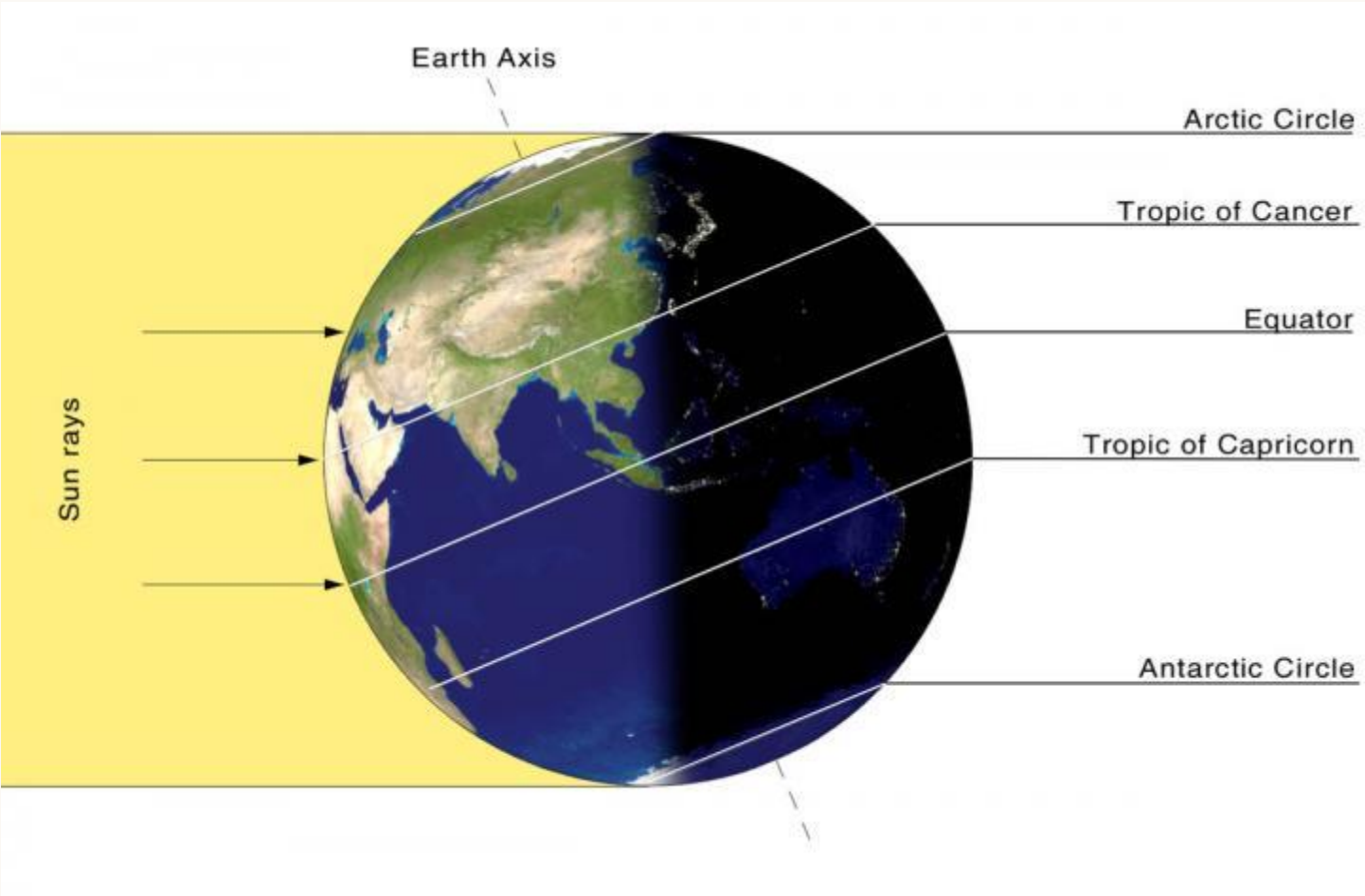
Done early? Check out an extra lesson here https://app.thepocketlab.com/lab-report/pCnKv_U10001qsCB?ro=1&ref=%2Fresources or research into if other planet have seasons as well! (For example: <https://pbslm-contrib.s3.amazonaws.com/WGBH/buac18/buac18-int-seasonsearthmars/index.html> and https://www.nasa.gov/audience/foreducators/postsecondary/features/F_Planet_Seasons.html)





Why does Earth have seasons?

Answer the Google Classroom question using the simulations and interactives as resources.



Earth Axis

Arctic Circle


Tropic of Cancer

Equator


Tropic of Capricorn

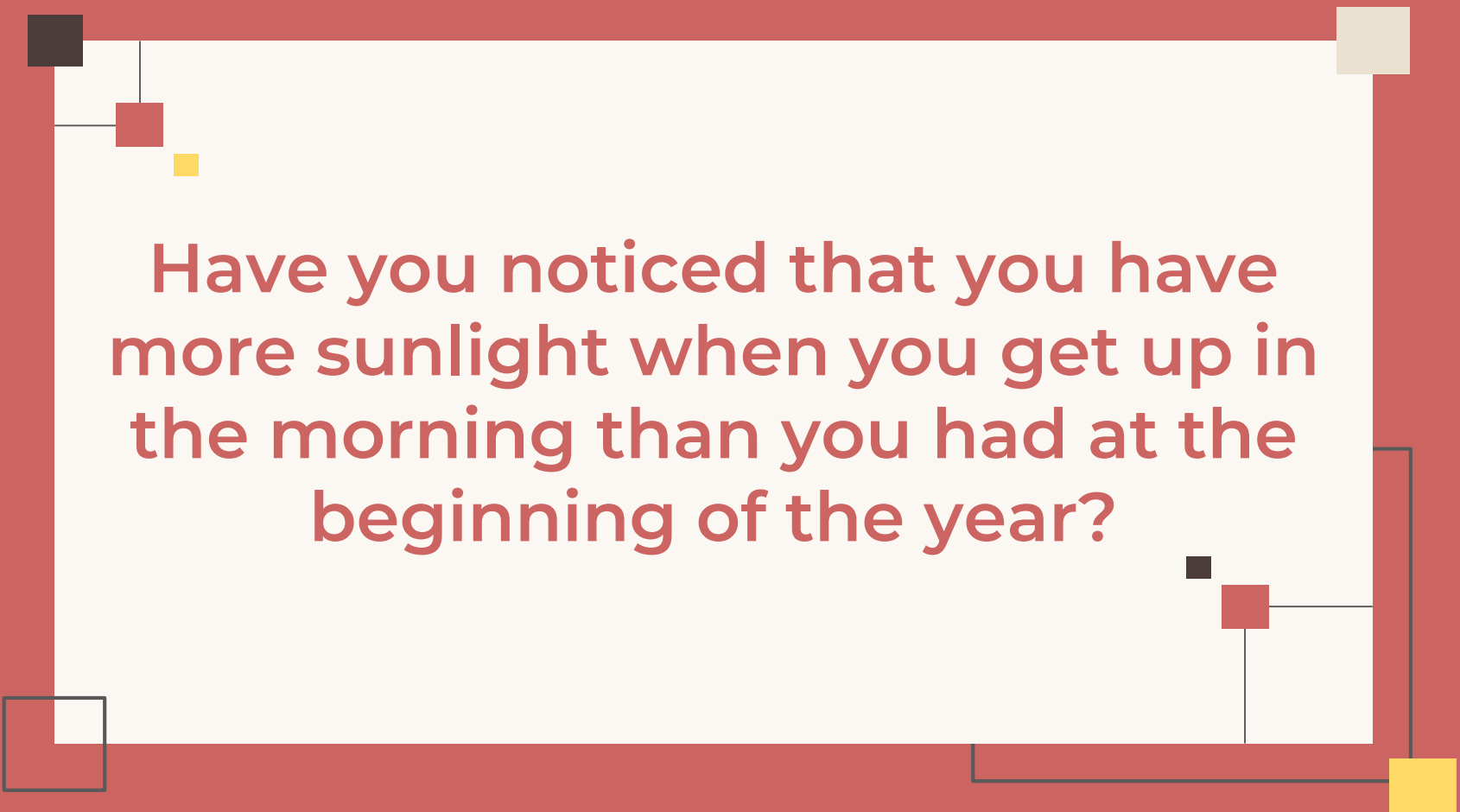
Antarctic Circle

Sun rays



**How else does the tilt
affect life on Earth?**

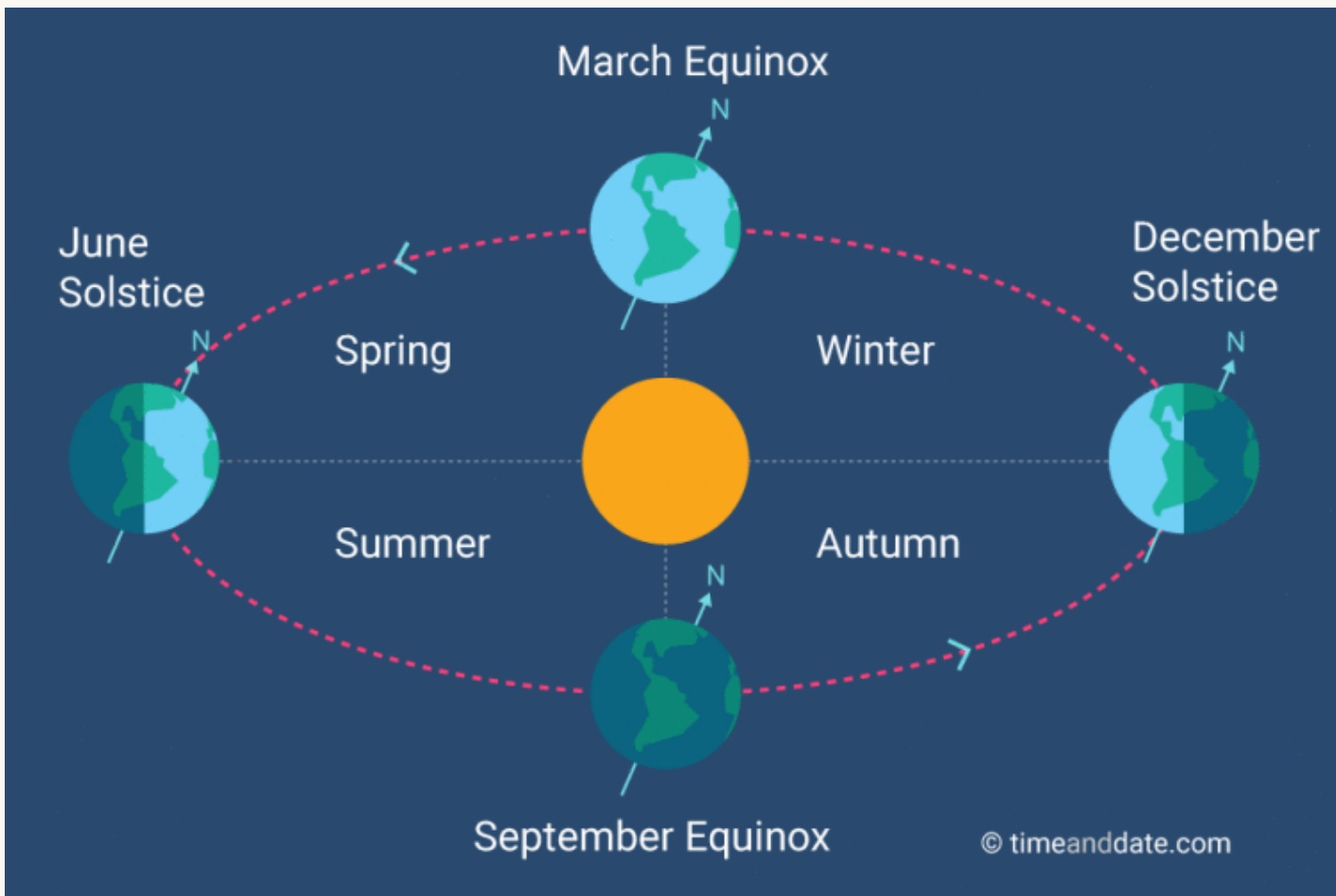


A decorative border surrounds the central text area. It consists of several geometric shapes: a black square in the top-left corner, a light beige square in the top-right corner, a red square in the bottom-left corner, and a yellow square in the bottom-right corner. Additionally, there are smaller red and black squares connected by thin black lines, forming a partial grid-like structure in the top-left and bottom-right areas.

Have you noticed that you have more sunlight when you get up in the morning than you had at the beginning of the year?

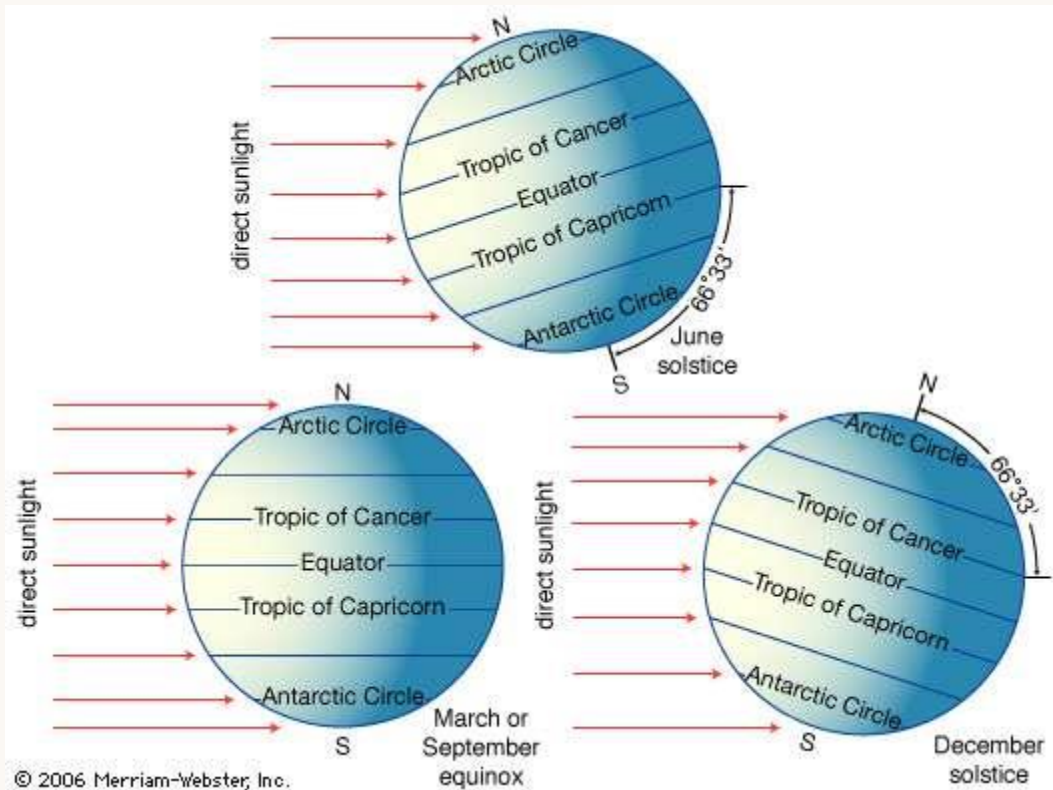
SOLSTICE
&
EQUINOX





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Seasons Info and Vocab

Reason for Seasons

The 23.5° tilt of the Earth leads to different regions having direct or indirect sunlight.

Solstice

When the Earth receives the maximum or minimum amount of sunlight leading to the year's longest or shortest day.

Equinox

The Earth experiences equal amounts of daytime and nighttime.



Celebrations!



Out of all the celebrations you read about, which celebration did you like the most? Why?



Explore More!



Links

- Information: <https://www.weather.gov/cle/seasons>
- Culture of the solstice: <https://www.nationalgeographic.org/encyclopedia/solstice/>
- Culture of the equinox: <https://www.nationalgeographic.org/encyclopedia/equinox/>
- Video on the difference: <https://www.britannica.com/video/217727/Demystified-what-is-the-difference-between-solstice-and-equinox>
- Top down view: <https://www.skymarvels.com/infopages/vids/EquinoxesSolstices.htm>
- Make a model: <http://solar-center.stanford.edu/AO/Sun-Track-Model.pdf>
- Path of the Sun seen on Earth:
<http://astro.unl.edu/classaction/animations/coordsmotion/sunpaths.html>
- Future dates and times: https://www.weather.gov/dvn/Climate_Astronomical_Seasons
- Seasons review: <https://www.nationalgeographic.org/encyclopedia/season/>

**What is the difference
between the equinox
and the solstice?**

