

SEASONS

Session 1: Space-Based Perspectives

I. Draw a space-based diagram that shows **why** we experience day and night on Earth.

Make sure that you:

- Include all objects** that you think are important to show your reasoning.
- Label** the key parts of your diagram.
- Shade** your diagram to show the unlit (nighttime) part.
- Draw a triangle** on a location (a city) that is currently experiencing daytime.
- Draw an X** on a location (a city) that is currently experiencing nighttime.
- Think about how a city like Boston experiences a day-night cycle. **Add arrows** to your diagram to show the movement of the Earth that explains **why** Boston experiences a day-night cycle. Think carefully about *which direction* things should move.

Name: _____

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Session 2 - 3: Apparent Path of the Sun in the Sky

A. Make a prediction:

I think the Sun's apparent path in the sky each day is _____ throughout the year.
< the same / different >

If you think it is the same, explain *why* it is the same.

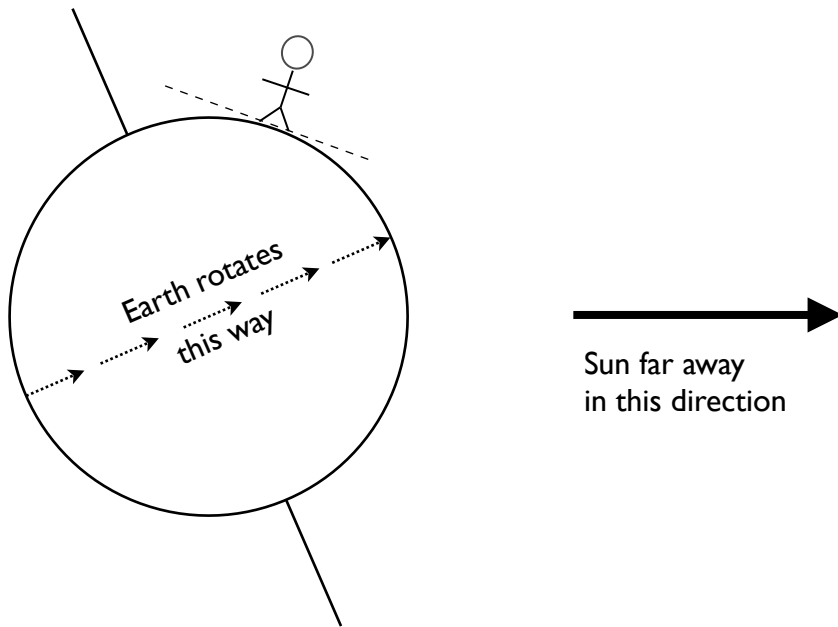
If you think it is different, describe *how* it is different.

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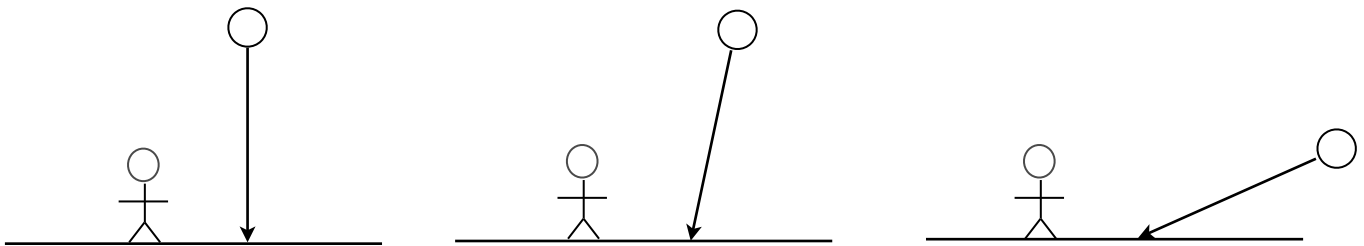
Session 6: Tilted Axis and Sun Angle

A. Interpret This Diagram:

Diagram **NOT** to scale.



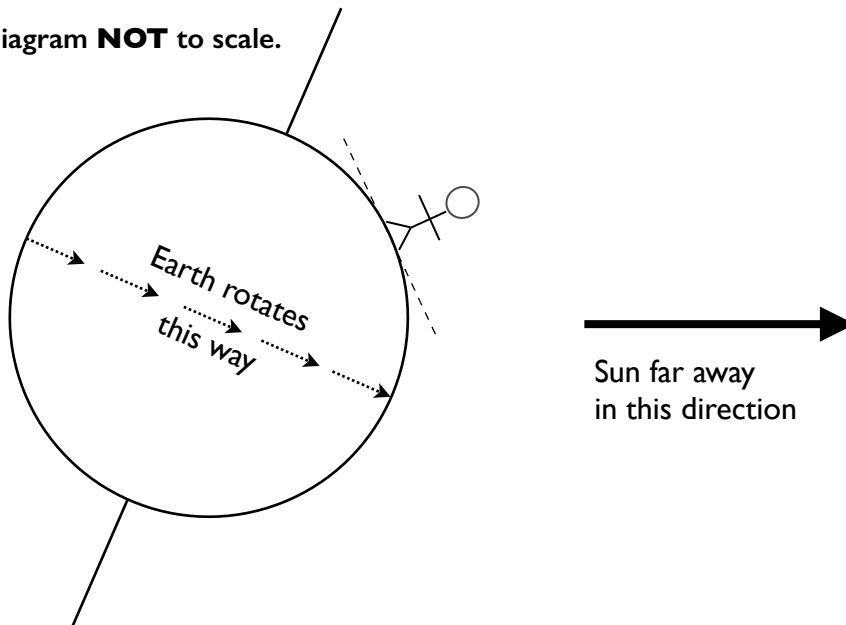
1. The Northern Hemisphere is tilted _____ the Sun.
< towards / away from >
2. Sketch in **five light rays** from the Sun, to show how you think sunlight reaches Earth.
3. Shade the diagram to show which part of Earth is **dark**.
4. What time of day do you think it is for the stick person above? _____
< sunrise / midday / sunset / midnight >
5. Circle which of the three figures below you think best represents the angle of sunlight hitting the person's ground at the moment shown above. The angle of sunlight is the same as the Sun Angle.



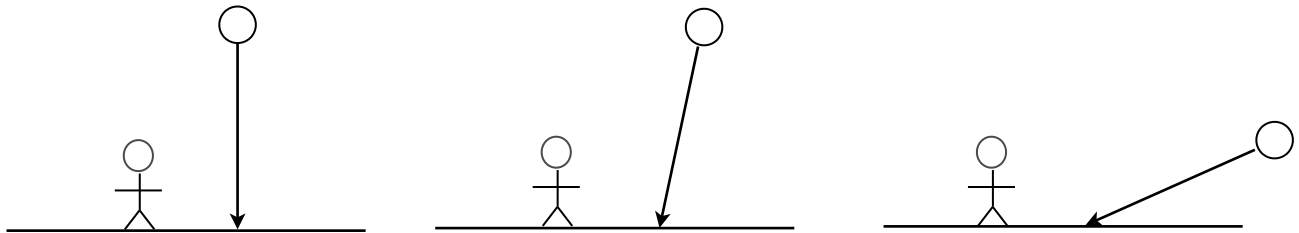
6. What season do you think it is for the stick person? _____
< summer / winter >

B. Interpret this diagram:

Diagram **NOT** to scale.



1. The Northern Hemisphere is tilted _____ the Sun.
< towards / away from >
2. Sketch in **five light rays** from the Sun, to show how you think sunlight reaches Earth.
3. Shade the diagram to show which part of Earth is **dark**.
4. What time of day do you think it is for the stick person above? _____
< sunrise / midday / sunset / midnight >
5. Circle the figure that you think best represents the angle of sunlight hitting the person's ground (and therefore, the Sun in the person's sky) at the moment shown above.




6. What season do you think it is for the person? _____
< summer / winter >

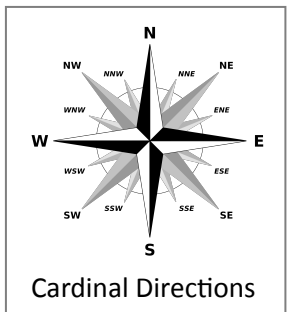
C. Compare:

When the Northern Hemisphere is tilted **towards** the Sun, the Sun is _____ in the sky at midday. This is _____.
< high / low >
< summer / winter >

When the Northern Hemisphere is tilted **away from** the Sun, the Sun is _____ in the sky at midday. This is _____.
< high / low >
< summer / winter >

SEASONS KEY TERMS

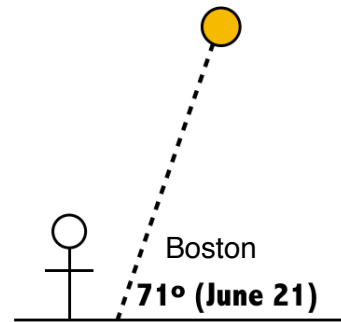
<u>Rotation:</u>	turning or spinning on an axis; Earth's rotation is the reason we experience night/day .
<u>Revolution/ Orbit:</u>	movement or path around another object; Earth's revolution around the sun takes one Earth year (365 days).
<u>Axis:</u>	an imaginary line around which the Earth spins or rotates
<u>Sunrise:</u>	when a given point on Earth rotates from the unlit half to the lit half; "daytime" begins.
<u>Sunset:</u>	when a given point on Earth rotates from the lit half to the unlit half; "nighttime" begins.
<u>Cardinal Directions:</u>	Directions of north, east, south, and west. (See diagram to right).
<u>Horizon:</u>	An imaginary line where the sky and the ground appear to meet. (Has a sky angle of 0 degrees.)
<u>Directly Overhead:</u>	The point in the sky that is straight above. (Has a sky angle of 90 degrees.) Unless you live within 23.5° latitude of the equator, the sun is NEVER directly overhead.
<u>Sky Angle:</u>	Measure (in degrees) of how high above the horizon an object is in the sky.
<u>Sun Angle:</u>	Sky angle of the Sun.
<u>Equinox:</u>	2 days of the year when we experience equal hours of daylight and night time (12 hours each) - March 21 and Sept 21
<u>Tilted Axis:</u>	Earth's axis is tilted at 23.5 degrees and is always pointed toward the North Star, Polaris. 



SEASONS KEY IDEAS

Summer - Hot

- Higher sun angle at midday
 - Light concentrated over a small area -> more intense -> warmer
- Longer sun path -> Longer hours of daylight
 - More time to heat up the ground



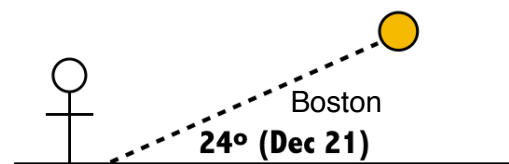
High Sun Angle → More Intense Light → Summer

Fall/Spring - In between

- Medium height sun angle at midday
- Medium length sun path -> medium hours of daylight
- Equinoxes: September 21/March 21 - Equal hours of day/night - 12 hours each

Winter - Cold

- Lower sun angle at midday
 - Light spread out over a larger area -> less intense -> cooler
- Shorter sun path -> Fewer hours of daylight
 - Less time to heat up the ground



Low Sun Angle → Less Intense Light → Winter