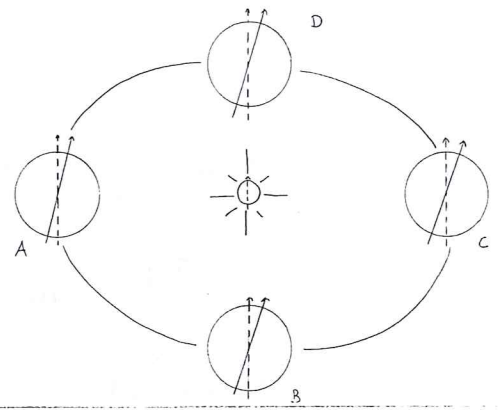


## INST 2403 Activity

# The Seasons

Most questions deal with the figure above (handed out as a separate sheet), showing the Earth orbiting around the Sun while rotating around its axis. Note that the Earth's axis always points in the same (absolute) direction, which means it's sometimes pointing somewhat toward the Sun, and sometimes away from it. There is another axis: the one that signifies the rotation of the Earth around the Sun. The two are tilted 23.5 degrees with respect to one another.



1. Where do the solid arrows point to? What do they represent?

To CNP. They represent the Earth's (rotational) axis.

2. Where do the dashed arrows point to? What do they represent?

To the pole of the ecliptic. Represents the Earth's orbital motion.

3. Draw in the Earth's equator in positions A-D in the figure on the separate sheet.
4. Draw in an observer's horizon and zenith in positions A-D in that figure. Assume the observer is at 45 degrees northern latitude. see figure.
5. Where in the sky would an observer see the Sun at noon in positions A-D? Rank positions A-D in order of closeness of the Sun to the zenith starting from closest.

A - (B & D) - C

6. If the Sun is lower at noon, will it rise earlier or later than when it's higher at noon?

It will rise later (b/c it has a shorter way to go)

7. If the Sun is lower at noon, will it set earlier or later than when it's higher at noon?

Earlier (shorter way to go)

8. If the Sun is lower at noon, will it stay up longer above the horizon or a shorter time than when it's higher at noon?

Shorter time

9. When a beam of sunlight hits the Earth, it spreads out over more or less area, depending on how high above the horizon it stands. Obviously, the same is true for the shadows it casts if objects are in its way. When the sun is lower, is the area the sunlight spreads over larger or smaller than when the sun is higher?

lower sun → larger spread

10. A sunbeam has a certain amount of energy. What happens if it spreads out over a larger area?

It "thins out" - gets diluted

11. Fill out the following table with words like "longest", "highest", "biggest", their negatives, and neutral terms. Assume the observer is in the northern hemisphere.

	Sun's position at noon	Length of Day	Sunbeam Spread	Temperature in Area
A	highest	longest	smallest	highest
B	middle	middle	middle	middle
C	lowest	shortest	biggest	lowest
D	middle	middle	middle	middle

12. In which direction is the Earth moving? Is it  $A \rightarrow B \rightarrow C \rightarrow D$  or  $A \rightarrow D \rightarrow C \rightarrow B$ ? Can you tell?

Cannot tell from figure!

13. The Earth is moving counterclockwise around the Sun when viewed from above the plane of the orbit. Draw in the correct direction of motion.

see figure

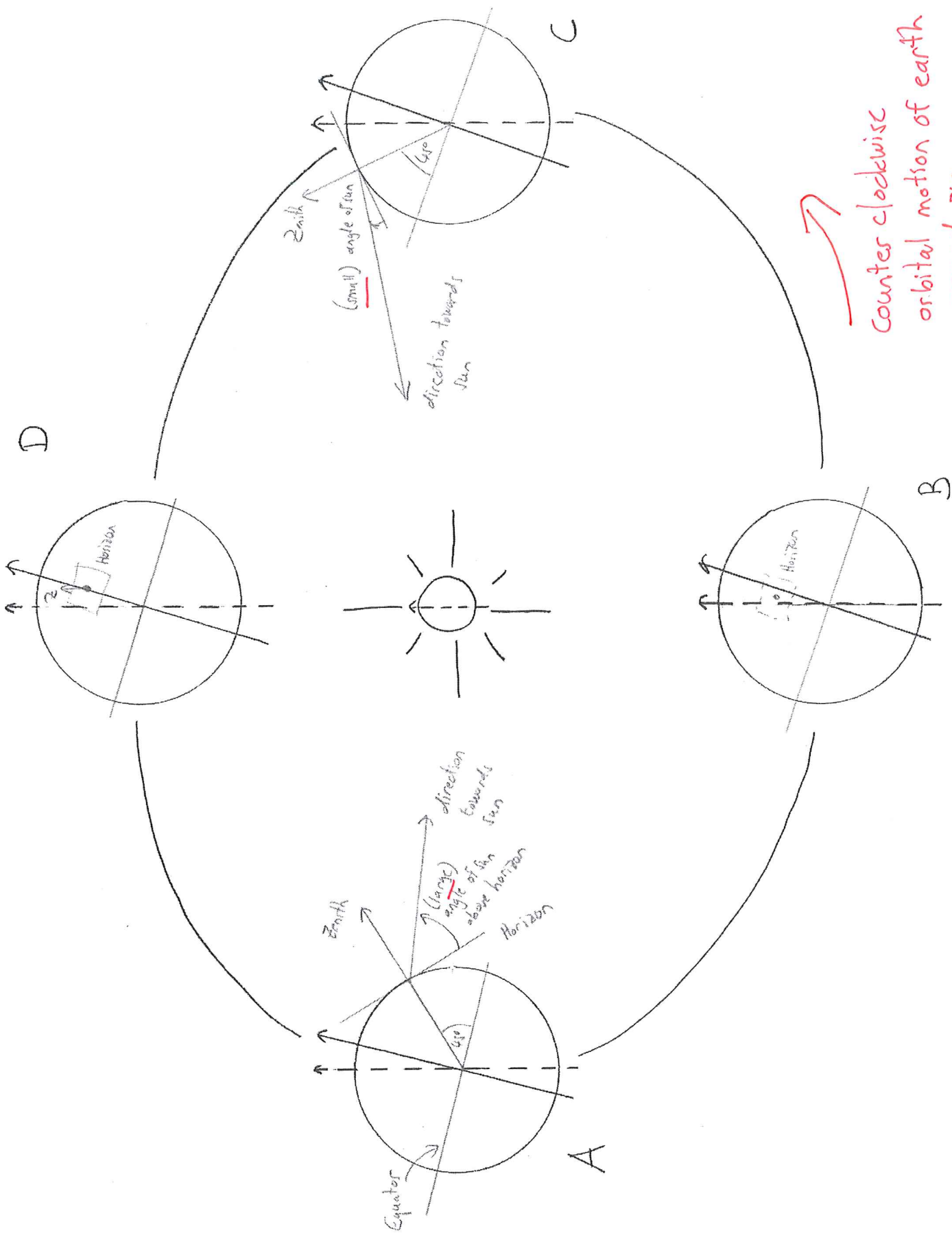
14. Match the four seasons in the Northern hemisphere with the letters A-D.

A - summer, B - fall, C - winter, D - spring

15. Match the four seasons in the Southern hemisphere with the letters A-D.

A - winter, B - spring, C - summer, D - fall

16. At the December solstice Earth is farthest from the Sun: TRUE FALSE



Counterclockwise  
orbital motion of earth  
around sun

