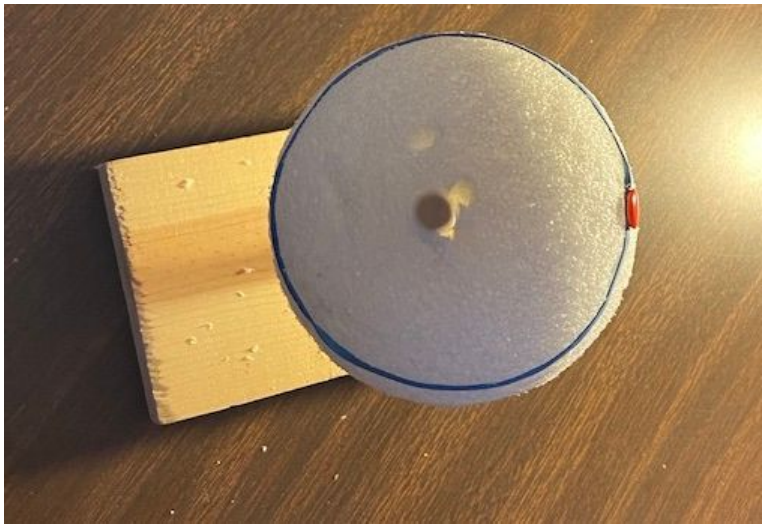
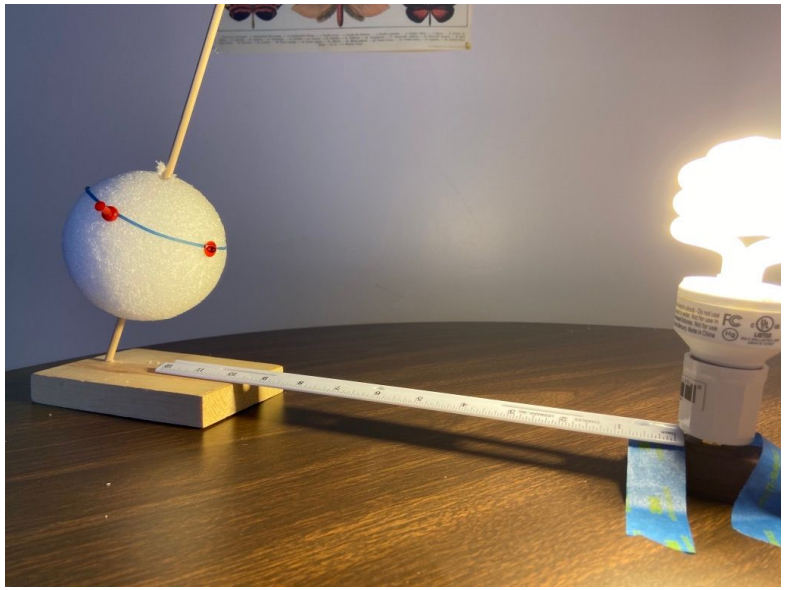
Name: _____ Date: _____

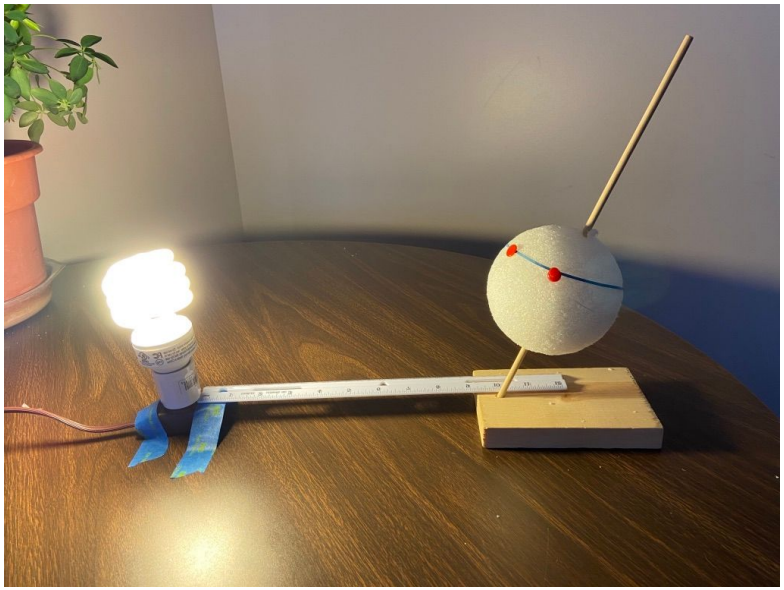
Modeling the Earth-Sun System

1. Each group will need a 4-inch sphere, 2 pushpins, 1 thumbtack, a bare-bulb lamp, a fabric tape measure, a dowel and stand, a twist tie, a rubber band, a Sharpie marker, and a ruler.
2. Draw an eyeball on your thumbtack with a Sharpie marker. Insert the dowel through the center of the foam sphere and place the dowel in the stand. Put the thumbtack on your approximate location on the foam Earth. Wrap the twist tie around the thumbtack to represent an arm that you can point toward the lamp Sun. Then slip a rubber band over the sphere to indicate the path of the observer thumbtack over the surface of the Earth as the Earth spins. Make sure that when you look down at the top of your sphere, the North Pole is at the center of the circle created by the rubber band.

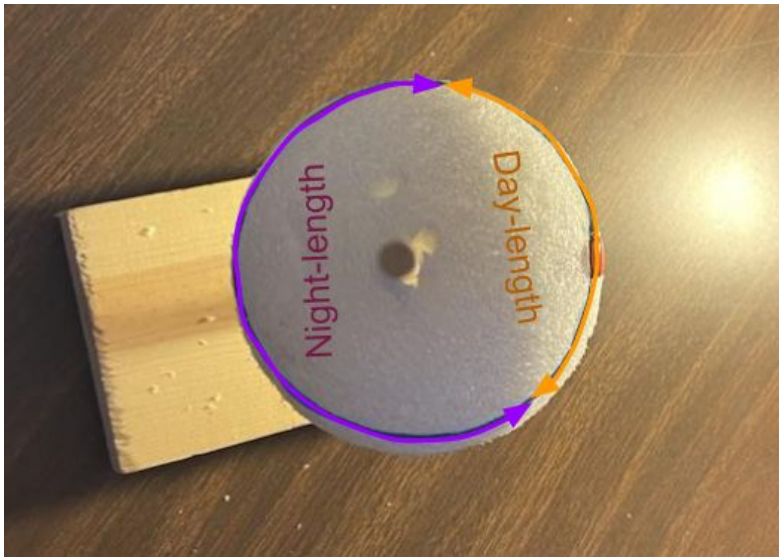


3. One group member should move the foam Earth slowly around the lamp Sun while keeping the dowel axis pointed at the image of Polaris on the slide at the front of the room. Keep the observer looking at the Sun. Pause at each of the positions illustrated in the diagram above. At each position, another group member uses two pushpins to indicate sunrise and sunset. The images below correspond to positions 3 and 1, respectively.





4. For each position, record in the data table the length of the path for the observer. Measure between the two pushpins in inches, rounding to the nearest half-inch. Remember that this represents the length of a day for this observer. The shorter the measurement, the less time the observer spends in the light and the more time the observer spends in the dark.



5. Do the following task for each of the four positions of the foam Earth. Imagine standing on the rubber band in the middle of the day, looking at the lightbulb. Orient the thumbtack to that location. Point the twist-tie arm at the lamp Sun to indicate a pointing arm. Would you have to look up high above you to see the lightbulb? Or would it appear closer to the ground? Approximate how high the Sun appears in the sky for this observer using the twist tie to help you picture how high in the sky you would have to point. Then draw what you predict the shape of the Sun's apparent path would be on the corresponding Stellarium background in the table.
6. With your group, make an educated guess about which season you think each position represents. Write your guesses in the last row of the table. Make sure that each member of the group is ready to defend that choice if asked.

	Position 1	Position 2	Position 3	Position 4
Length of observer's path through daylight (inches)				
Approximate path of the Sun in the sky from the observer's perspective				
Northern Hemisphere season (winter, spring, summer, or fall)				