NAME _____
DATE _____

**Apparent Motion of the Sun Lab**

Gather the following: a clear plastic hemisphere
overhead marker
clear protractor
calculator

1. The Sun appears to move _____ ° / hour because the Earth moves _____ ° / hour.

2. The Earth moves _____°/ hour because there are _____ ° in a complete sphere and we have broken down our day into _____ different hours. (_____ / _____ = _____).

3. The Sun rises in the _____ and sets in the _____ because the Earth rotates from west to east or counter clockwise.

4a The Sun will appear to travel _____ ° across the sky in 12 hours.

b. The Sun will appear to travel _____ ° across the sky in 2 hours.

c. The Sun will appear to travel _____ ° across the sky in 6 hours.

d. 1. Using a protractor, draw a straight line through a piece of the northern skydome on the hemisphere.

2. Using masking tape, cover the line with the tape from the horizon to the top section of the globe.

3. On the tape, measure the distance of the Sun's path for 2, 3 and 5 hours. Label each point carefully with the appropriate time.

4. Pull the tape off carefully without having it stick upon itself and stick to to space below. *Make sure the horizon is label and each measured hour!*

5. a. The flat edge of the hemisphere represents the horizon.
b. On a blank sheet of paper, trace the bottom of the globe.
c. Using a ruler and the protractor, make a perpendicular axis through the center of the circle on the paper.
d. Mark N, S, E, W coordinates on the paper and then transfer the coordinates to the underside of the globe.

6. During the summer solstice, the Sun rises 23.5 ° north of east (because the Sun is on the Tropic of Cancer).
a. Measure. 23.5 ° north of east and put a dot on the underside of the globe.
b. Wolcott is approximately 43.5° N of the equator. Subtract our latitude from the latitude of the Tropic of Cancer. Subtract this number from 90°.
c. Using the protractor, measure from the southern horizon towards the zenith the value calculated. Mark this point with your marker.
d. Connect the three marker points using the protractor and label the line with the date of the summer solstice.

7. During the winter equinox the Sun rises 23.5 °S from due east and sets 23.5 °S of due west.
a. plot these 2 points on the globe.
b. The Sun at this time is directly overhead at the Tropic of Capicorn. Add Wolcott's latitude to this number for the total difference in latitude from Capicorn. Subtract this number from 90 degrees.
b. Using the protractor, measure from the southern horizon towards the zenith the value calculated. Mark this point with your marker.
c. Connect the three points and label the line with the date from the winter solstice.

8. During the equinoxes (Sept 23 and March 21) the Sun rises directly in the east and sets directly in the west.
a. Mark these two points on the globe.
b. The equinox solar noon is equidistant between solar noon from the 2 solstices.
c. Using the protractor, measure 46.5° from the southern horizon towards the zenith. Mark this point with your marker.
d. Connect the three points and label the line with the dates of the equinoxes.

You now have a model of the Sun's apparent motion across the sky in Wolcott during the dates of the equinoxes and solstices.

1. With a different color marker, predict the Sun's apparent path of motion for today _____. Label this line with the date.

2. Will the Sun ever go in an arc smaller than the winter solstice according to an observer in Wolcott? Why or Why not?

3. Why does the Sun never hit zenith at Wolcott?

4. Since the Sun never hits zenith at Wolcott, in which direction must shadows always fall at solar noon?

5. If the observer was farther South at 0 degrees, where would the Sun be at the equinox? On June 21? On September 23? Draw a hemisphere showing these lines.

6. If the observer was farther North at 90 °N, , where would the Sun be at the equinox? On June 21? On September 23? Draw a hemisphere showing these lines.

7. Compare the height of the Sun's arc in England to NYS. Make a general statement about latitude, sun's intensity and length of daytime for the equinoxes and the summer solstice.