Exoplanet Name_____

Observing Assignment #2

Due on Wednesday, October 3 in class

All of your observations should be recorded on the INSIDE of the hemisphere to reduce smudging.

For this assignment, you will map the sun's path across the sky throughout the day and will take advantage of our proximity to the autumnal equinox to locate the cardinal directions on the horizon. You will do the same observation a bit later in the semester.

Each observation is short, however you need to complete a number of them throughout the day, namely:

1) Within 2 hours of sunrise (right at sunrise, which happens around 6:30am, is best if you can manage)
2) Sometime mid-morning (9:30-10:30am)
3) Within 5 min of noon
4) Sometime mid-afternoon (2-4pm)
5) Right at or just before sunset (around 6:50pm)

Keep in mind that sunrise will happen a little later and sunset a little later if there are mountains on the horizon.

Your measurements will be best if you complete them all on the same day and from the same location on campus, and I recommend doing them on the day of the equinox (September 21) if you can, however you can do them up to a couple of days apart without significantly impacting your measurement and you can do them from different locations on campus if you are very careful to line up the hemisphere correctly with your compass each time.

Instructions for individual measurements are below.

If you are using a compass and completing the observations from different locations on campus:

1) Carefully line up the "N" on your hemisphere with North according to your compass. . Even if you decide later on that North is actually a different direction, you should still orient your paper and hemisphere in the direction that your compass says is North

If you are completing the observations from the same location on campus each time (the recommended route):

1) Line up the "N" on your planisphere with your best guess as to where North lies (use a compass on your phone or a map to get close). Find a marker on the ground that you can come back to as a location to set your hemisphere and a precise marker on the horizon (or an orientation relative to your marker on the ground) to remember precisely where to set North every time. Even if you decide later on that North is actually a

different direction, you should still orient your paper and hemisphere in the original direction that you thought was North

Regardless of which way you've used to line up North on your hemisphere:

2) Place the "Hemisphere Base Diagram" on the ground underneath the Hemisphere with the letter "N" on the diagram pointing the same way as the N on your hemisphere. Center the dome of the Hemisphere over the shaded circle on the Hemisphere Base Diagram.
3) Hold your grease pen just above the surface of the planisphere and move it around ***until the shadow of the tip lines up precisely with the intersection of the cardinal directions at the very center of the Hemisphere Base Diagram***. Make a mark on the outside of your hemisphere. This is the location of the sun in the sky.
4) Make a mark at the same spot on the INSIDE of your hemisphere (where it's less likely to get smudged) and label it with the time and date ***on the hemisphere***.

When you've completed all the observations, answer the following questions, to be handed in with your sun tracking hemisphere and compass in class on October 3.

1. Complete the table below

Observation No	Date	Time	Location	Notes
1				
2				
3				
4				
5				

2. On the hemisphere, connect your actual observations (there should be 5 of them) with a straight "best fit" line that extends all the way to the base of the hemisphere. How far off was the path you predicted in class relative to the actual path of the sun that you observed? Describe how they were different in terms of rising and setting location along the horizon and the height of the sun on the meridian at noon.
   Note: If your observations don't lie along a straight line, it means something went wrong in your observing strategy. Don't panic, and don't modify your observations. Draw your best guess for the actual path of the sun from your observations and make sure to speculate about what the sources of error may have been.

3. Since we observed the sun within a few days of the equinox, we can assume that it rose due east and set due west. Label the points where the actual trajectory of the sun intersects the horizon with “TE” and “TW” for “True East” and “True West”. Do the same for True North and South (90 deg from TE and TW). How accurate was your measurement of North using the compass? You should give the accuracy in degrees by estimating the distance in degrees between your original North label and true North, keeping in mind that there are 360deg in a full circle. Describe how you made your estimate in words and/or with a picture.

4. Draw the meridian on your hemishphere by connecting True North and True South with a line that passes through the zenith of your hemisphere and label it. Then answer the following questions:
    a. Was the sun right on the meridian for your noon observation? Give your best explanation for why or why not. *Hint: Consider how time is defined relative to your location on earth.*

    b. How far from the zenith was the sun at noon on the day of your observation? Use the fact that there are 90deg between the horizon and zenith along the curve of your hemisphere to make your estimate. Describe how you made your estimate in words and/or with a picture.

5. In 2-3 sentences, describe the most difficult and/or surprising thing about your observation?

MAKE SURE YOUR NAME IS ON THE HEMISPHERE AND ALL OBSERVATIONS ARE MARKED ON THE INTERIOR OF THE HEMISPHERE BEFORE YOU HAND IT IN.