

## Change in the Position of Sunset

**Description:** Record the changing position of sunset over the course of the semester.

**Materials needed:** compass, ruler, calculator, large sheet of sketch paper

**Resources:**

Sunset Calendar

Tips from Last Semester

**Instructions:**

- (1) Find a relatively unobscured view of the Western horizon. Choose the location carefully so that you will be able to see the sun setting while standing in the **exact same spot** over the course of the entire semester. To be safe, I'd say that you need an unobstructed view of about 45 degrees on either side of due west. Choose your spot carefully so that it is free of foreground obstacles but has a recognizable background against which you'll be able to distinguish the location of sunset (a completely flat, featureless horizon, for example, will not do, while a mountain ridgeline is ideal). You'll also want to pick a recognizable and reproducible landmark on the ground where you can place your feet each time you do the observation.
- (2) CAREFULLY sketch the horizon for about 45 degrees on either side of due West (which should be in the middle of your drawing). Find due west using a compass and mark its exact location clearly on your sketch. Then mark out azimuth angles in five degree increments on either side of West (so mark 5, 10, 15, 20, 25, 30, 35, 40 and 45 degrees north of west and the same to the south) using a ruler held at arm's length and the fist and finger method to calibrate (remember that a fist at arm's length is about ten degrees). You need to be very careful to have a constant horizontal scale, so take some time doing this. Check the accuracy of your sketch and azimuth labels by measuring the distance between landmarks on the horizon with the fist and finger method and then checking it against what you've labeled on your sketch. *You will be making all of your observations on this single sketch, so take the time to do it carefully before your first observation. To be safe, go out at least 30 minutes before sunset your first time observing so that you have plenty of time to find a good spot and sketch the horizon.*
- (3) Go out again once every week or so and record the location of sunset on the same sketch. Make sure to record the date and time of sunset each time you make an observation. Keep in mind that sunset times will change significantly over the course of the semester – from ~7:00pm in September to closer to 5:00pm in December. In order to complete this lab, you will need to be free to complete an observation during this interval approximately once per week all semester long.

*Note: You may also choose to photograph the sun each time. This can be a good backup to tweak your sketch when you've collected all of your data and also a good visual aid for your presentation. Make sure to always be standing in the same spot and to always have the camera on the same zoom!*

**Data:**

- (1) Sketch or composite photograph showing the changing location of sunset.
- (2) Table with date, position (in degrees North or South of West), and time of sunset

**Questions to Address in Your Poster's Data Analysis Section:**

- (1) Did the sun ever set directly west during the course of your observations? If so, when? If not, how close (in degrees) did it get?
- (2) How many total degrees did the sun move along the horizon during the course of your observations?
- (3) Calculate the rate of movement along the horizon between each of your observations (number of degrees moved along the horizon divided by time between two observations) and present it in a table. Explain the pattern in this measurement over the course of the semester. Does the pattern correspond at all to the dates of the equinox and solstice?
- (4) Is there a relationship between the time of sunset and its position on the horizon? If so, what is it?
- (5) Describe the general pattern exhibited by the location of sunset over the course of the year and why it follows this pattern. Is the pattern correlated with any other solar observables, such as the length of the day, the altitude of the noon sun, etc?