

SUNSET OBSERVATION PROJECT

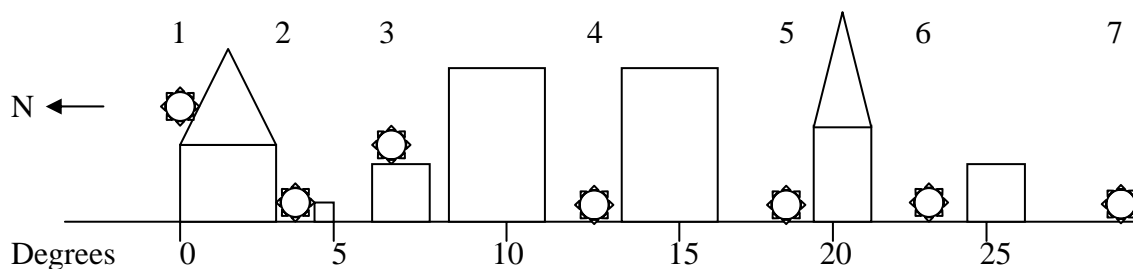
Physics 2021

There are many fundamental aspects of astronomy that can be observed and studied on your own with little or no optical equipment. Many of these phenomena are so common you may have taken them for granted. By making these observations, you will see with your own eyes some of the most basic and important motions of astronomy, around which our very lives are organized. The purpose of this program is to observe the variation in the sunset position along the horizon and to interpret this variation in terms of its effects on the seasons.

The spirit of this observation is captured by Henry Beston in his book *The Outermost House*.

All these autumn weeks I have watched the great disk going south along the horizon of moorlands beyond the marsh, now sinking behind this field, now behind this sedgy hillock dappled with snow. We lose a great deal I think, when we lose this sense of feeling for the Sun. When all has been said, the adventure of the Sun is the great natural drama by which we live...

To follow the seasonal motion of the Sun in this way, it is necessary that you pick a good observational site -- one that gives a fairly clear view to the West in the evening (or East in the morning). Parking lot structures and rooftops are usually good locations. Use a digital camera to photograph the sunset position with respect to ground features (wait until the Sun is low enough to do this accurately and safely). Your observations are of the Sun setting in different places along the horizon as the season progresses, as is indicated in the following hypothetical figure.



In addition to photographing the sunsets, make a sketch of them and estimate the number of degrees the Sun has moved from a fixed landmark. Your “ruler” is your fist, held out at arm’s length, which, for most people, is about 10 degrees wide. The zero point is an arbitrarily chosen ground feature, such as the edge of a tall building.

You must observe and photograph the sunset from the same location throughout the semester. Your observations should be compiled in some sort of notebook – you will regret not recording your data as you obtain them. For every entry you should record (1) the date, (2) the time, (3) the number of degrees the Sun has moved from the reference point, (4) your place of observation, (5) the condition of the sky, and (6) any other pertinent information. Other comments about the weather, unusual conditions, etc., might turn out to be very valuable later. Observations should be conducted on the average of once per week. **Get one observation during August, at least two observations each during September and October, and at least one during November.**

Example Entries from an Observations Notebook

Aug 30, 2004	8:03 pm EST	12 deg S	Tech Tower	Clear
Sep 8, 2004	7:32 pm EST	21 deg S	Tech Tower	Light Haze
Sep 19, 2004	7:05 pm EST	30 deg S	Tech Tower	Clear

Required Questions

1. Which way was the Sun moving along the horizon? Was its motion uniform or did the rate of motion change with time? Explain.
2. From your observations what can you say about (a) where the Sun rises or sets and (b) the length of the day?
3. From your observations, what can you infer about the position of the Sun at noon during the semester?
4. How does the altitude of the Sun affect the seasons? Was this affect evident during the semester (e.g., temperature, weather, etc.)?
5. What surprised or impressed you the most as you performed this observational project?

Your report must be typed and well presented. Do not plagiarize, fabricate data, or cheat in any manner. Your report must include a description of the observing program, the table of observations, your photographs of the sunset positions, and the questions (with answers) from above.

Final Comment

Lest you forget, the spirit of the exercise is to learn something about the Solar System and the Universe by using your own eyes and logic, not by depending on the textbook. The questions herein are meant to guide you toward an awareness of what you are observing and what it means. These questions should be addressed directly. That is, it is not expected that you turn in a page with questions 1, 2, 3, etc., followed by their answers. Also, do not think that the questions cover all that is in your data. Your instructor will certainly appreciate deeper insight on your part! Do not be intimidated by making your own observations and including them in your notebook/report. This observing program barely touches the surface of what you can see, if only you were to look! Meteors, comets, auroras, lunar eclipses, the Milky Way, open star clusters, variable stars, and even a galaxy over 2 million light years away – are all within the realm of your naked-eye Universe!

Note: This observing project and its description is taken from the University of Michigan Introductory Astronomy Lab Manual.