

# The Cycle of the Seasons 2: Daylight Graph

## Part 2: Graphing Daylight Data

Rather than work with data sets with 365 elements, we will collect the data for sunrise and sunset once each week. You can find the sunrise/sunset data from the U. S. Naval Observatory web site, but you will need to convert the hours and minutes to decimal hours.

Your Assignment:

1. Enter a location on the [U. S. Naval Observatory](#) web site and collect the sunrise/sunset data for every seventh day of the year.
2. Make a spreadsheet of the data, as follows. Please do NOT convert any times to Daylight Savings Time. Include a running tally of the "Day #" in the second column, that is, how many days since the start of the year.

2012 Sunrise and Sunset, Hartford, CT (all times EST)				
Date	Day #	Sunrise	Sunset	Hours of Daylight
Jan.1	1			
Jan. 8	8			
Jan. 15	15			
Jan. 22	22			
Jan. 29	29			

3. Enter a formula in column 5 to compute the number of hours of daylight for each entry. (Hint: Sunset time minus Sunrise time.)
4. Make a scatter plot of this data. (Extend the graph for a 2-year time period). Be sure to graph the "Date" (or "Day #") as the x-value and "daylight Hours" as the y-value.

### Part 3: Comparing Daylight Hours and Temperature

Your next assignment is to compare your two graphs (Temperature, from Part 1 and Daylight Hours from Part 2) and analyze your results. Write a summary analysis of your results. Be sure to include answers to the following questions, and any others which come to mind.

- How do the graphs compare? (Be specific!)
- Compare each to the fundamental sine and cosine graphs: how are the **Cycle of the Seasons** graphs transformed from the fundamental sine and cosine graphs?
- Does the amount of daylight hours seem to affect the average temperatures?
- Are there other factors involved?

### Final Report: Time and Temperature

Write a complete report summarizing all of your findings from all the **Cycle of the Seasons** assignments. The overall focus for the report is to present your findings about the connection between Daylight Hours and Average Temperature:

- Is the amount of daylight hours a periodic function?
- Is the average temperature a periodic function?
- If so, are these two functions related? (ie. Is Temperature a function of the amount of Daylight Hours?)

Your report should include the following sections:

1. Introduction: an overview of the contents of the report including a description of the question(s) being investigated.
2. Process: a detailed description of the various investigations and analyses you conducted. This section should include charts and graphs, as needed, to report your findings. Charts and graphs may be included as part of the body of your text (ie. imported into your document) or appendicized at the end of the report.

*Important note:* As part of this report, you should review all the questions raised in each assignment, and your answers to those questions. Report on any questions which you would answer differently, or explain why you were wrong. (For example, compare your predictions for the day of equal daylight/night time to the actual date, and analyze what led to any difference.)

3. Conclusion: the results of your findings. (Basically, this should present your conclusions from Part 3, above.)