Sunrise
Sunset
Length of Day

Introduction: Length of day is a cyclic change.

Questions to Consider

1. Why is length of day considered cyclic? What occurs near June 20 and December 20 of each year?
2. The length of day is how long near March 20 and September 20? Is that true for all latitudes?
3. How does the range of daylight vary with latitude? Where is there the largest difference?
4. Do all latitudes have common point(s), and if so when?
5. Compare the length of day in different hemispheres for the same latitude.

Materials: You will be assigned a latitude from the Northern or Southern Hemisphere. Each team will be given a data sheet that will include a year's worth of sunrises and sunsets. You will create a spreadsheet and graphs to help with your analysis.

Using Excel

Problem: Length of day is a cyclic change. Keeping this idea in mind, explore these changes using the results of your lab. Compare your results with as many of your classmates as possible.

Materials: You will be assigned a latitude from the Northern or Southern Hemisphere. Each team will be given a data sheet that will include a year's worth of sunrises and sunsets. You will create a spreadsheet and graphs to help with your analysis.

Graph 1 will be Sunrise and Sunset for Latitude _____°

Graph 2 will be Length of Day for Latitude _____°

Spreadsheet Information:

Create three columns.

Column A label Date
Column B label Sunrise
Column C label Sunset

Place cursor on the letter B and C
Highlight both columns
Format: Cell –Number- then time
Pick " 15:20" and hit enter
Place cursor on Letter A-
Highlight column Format-cell - Date 1/15 form
After formatting, enter the data

1. Data in 10/1 form
2. Sunrise in 6: 40 form
3. Sunset in 17:40 form (Military Time)

To Graph

1. Delete the word Date from Column A
2. Highlight the 3columns A,B,C
3. Chart –Line graph– next-next-next
4. Save as a **new sheet**
5. Finish
6. Clear gray background to white
7. Format x- axis – right click – go to scale- **Major unit** change to 12 click – ok
8. Right click axis again- check date 3 / 4
9. Change alignment to –90 ok
10. Right click y-axis format-Scale 0 to 1- **Major** .041666666… (1/24 of a day) ---Number-time 13:30 -ok
11. Format the y –axis scale minimum is 0
12. **Chart** – Chart options— Labels Chart Title- Sunrise for Latitude 70°N --X-axis Date---Y-axis Time, Etc.

Return to your chart.
Develop an equation that will find the difference between the sunrise time and sunset time.

1. Copy column A onto column D
2. Label column E Length of Day
3. This is the place for your equation.

- 70° **Remember** if you put 24:00 the computer will change it to 0:00. This is not accurate so you need to use 23:59 in place of 24:00.

4. Graph this Data on a separate graph.

Southern Hemisphere and Northern Hemisphere Dates

Dates to include:
January 2,6,10,14,18,22,26,30
February 3,7,11,15,19,23,27
March 3,7,11,15,19,23,27,31
April 4,8,12,16,20,24,28
May 2,6,10,14,18,22,26,30
May 2,6,10,14,18,2226,30
June 3,7,11,15,19,23,27
July 1,5,9,13,17,21,25,29
August 2,6,10,14,18,22,26,30
September 3,7,11,15,19,23,27
October 1,5,9,13,17,21,23,29
November 2,6,10,14,18,22,26,30
December 4,8,12,16,20,24,28

Writing the Paper

This is only an outline to help you write a well-organized paper.
The paper must be typed and double-spaced. Make sure to correct any spelling and grammatical mistakes.

Introduction:
Describe a city in your latitude. Describe the average yearly temperature. Include any interesting facts such as population, industry, agriculture (produce for the region), length of growing season and transportation.

Body:

1. Describe the change of sunrise/sunset at your location. Discuss the type of change and why you think it occurs.
2. What is the significant about the date June 20 and December 20 on your graph? Does your graph show a maximum /minimum?
3. Is there any time when the length of day is equal? How long would the daylight hours be?
4. Compare your answer to the other latitudes be specific.
5. What is the range of daylight at your latitude:
6. How does the range of daylight vary with the latitude?
7. Are there any common points that all latitudes share--- if so when?
8. Compare length of day in different hemispheres for the same latitude.

The Body should include the following parts:

Try to explain why the city in your latitude functions the way it does, based on its relation to the sunlight. The conclusion should have a **three-part structure**, the **claim**, the **evidence**, and the **warrant**. The **claim** should state the findings and answer the questions raised in the introduction. The **evidence** should be used to support the claim. The **evidence** justifies your claim. The **warrant** explains how the **evidence** proves the **claim**. The conclusion should be no fewer than four paragraphs.

To see how this three-part structure works, relate it to the Mass VS. Volume project. In the project, the **claim** is that there is a relationship between mass and volume. The relationship is that mass and volume are directly connected, and the equation mass = density * volume describes it. The **evidence** is the spreadsheet and the graphs. The **warrant** is the explanation of how the slope of the graph shows the rate of change and the meaning of density with respect to the molecular spacing.

Internet Portion

How on the day you chose does daylight change as it goes from the South Pole to the North Pole. Is this the same for every day of the year?