Science Research and Explorations
Adapted from microsoft.com/education

Name _____
Date _____ Period _____

Graphing Real Data with Excel:
Investigating annual daylight patterns

Objectives

- Students will collect real data of sunrise and sunset times for their hometown.
- Students will learn how to use excel to construct a graph.
- Students will use their graph to answer questions about daylight patterns

Introduction

Daylight has a powerful affect on all life on this planet, including our human lives. How much do you know about this powerful natural phenomenon that affects our lives every day? To the best of your knowledge answer the following questions below:

1. Do you know at what time the sun rose today? Yes No

2. What time did it rise (Make a guess if you answered no above)? _____

3. Does the sun always set and rise at the same time every day? Yes No

4. Does it rise and set at different times in the winter and summer? Yes No

5. What do you think determines the amount of daylight we have each day?

_____

_____

6. If the earth turns all the way around its axis every 24 hours, then why are some days longer than others?

_____

_____

7. How do you think these changes in daylight are related to the seasons?

_____

_____

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In Step 1, of this lesson you are going to look at actual sunrise and sunset times for your hometown to see if you can find a pattern in the amount of daylight during the year. You will collect your data in an Office Excel 2007 spreadsheet and create a chart to help you identify the pattern. You will then write an explanation of why you think the amount of daylight varies throughout the year.
In Step 2, you will work to understand scientifically why there is a pattern in the amount of daylight over the course of the year. For example, if the earth always turns one rotation every 24 hours, then why does the amount of daylight vary? You will view an online demonstration that explains how and why the amount of daylight changes from season to season and then write an explanation in your own words.

Procedure

1. Open Web Browser and go to http://aa.usno.navy.mil/data/docs/RS_OneDay.html.
2. Download a copy of the Excel workbook Daylight Template from http://www.californiascienceteacher.com/files/xls/SRE/daylight-template-los-angeles.xls. Open the template.
3. Using the data from the Navy Web site, record the sunrise and sunset data for the first day of each month for the year 2009 for the city of Los Angeles, California.

   Notes

   - When you enter the time, be sure to use this format: 7:05 AM, 5:08 PM.
   - The amount of daylight will automatically be calculated for you in column D.
   - January 1st, 2009 has been done for you.

4. Check to make sure all your data is in the right format.
5. When you have finished entering the data, use Office Excel 2007 to create a bar graph of the daylight column (column D). Make sure to label all axis and title your graph appropriately.
6. Save your Excel workbook as yourname-daylight.xls. Ask Mr. Fazio to transfer your workbook to his usb drive.
7. Answer the following questions based on your data and the graph you made.

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Questions

1. What is the pattern for the amount of daylight during the course of a year for Los Angeles?

_____

_____

_____

2. Why do you think some days have more daylight than others?

_____

_____

_____

3. What roles do you think the earth and sun play in determining the amount of daylight?

_____

_____

_____

4. What do you think the daylight pattern is for the North Pole?

_____

_____

_____

5. What do you think the daylight pattern is for the South Pole?

_____

_____

_____

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6. What do you think the daylight pattern is for a location near the equator?

_____

_____

_____

7. How do you think the Winter and Summer Solstice are related to the daylight pattern in Los Angeles and other parts of the country?

_____

_____

_____

- Open your web browser and go to http://www.amnh.org/education/resources/rfl/web/antarctica/seasonal.html. View the online demonstration and read the information on the Web site. Revise any answers to the questions above.
- Open your web browser and go to http://www.webexhibits.org/daylightsaving/. Read the information on the Web site. Revise any answers to the questions above.