

Harvard Forest Schoolyard Ecology Buds and Leaves: Analyzing our Leaf Data- Calculating Growing Season Length

Teacher: Lise Letellier, Holyoke Catholic High School

February, 2016

In order to graph your data for the Buds, Leaves and Global Warming study:

Go to the following Harvard Forest Link, Schoolyard LTER Database

http://harvardforest2.fas.harvard.edu/asp/hf/php/k12/k12_project.php

Or click on the link on the class website:

Click **Graph Data**

- Go to project drop down menu and choose "Spring Phenology." Click submit
- Go to school drop down menu and choose your school. Click submit
- Do Not enter teacher name (This way we get all trees for our school)
- Enter dates-
 - Choose start date -01/01/first year school started to collect data
 - Choose end date- 06/30/current year Click SUBMIT
- Choose your tree number or a tree of interest. (Later you might compare more than one tree, so remember how to do this)
 - You will make two graphs. For both, you will choose **By Day of Year not by Date**
 - **Percent of buds Open-** click and a graph will download into a new window.
 - Right Click and do a "copy image". Open a word document and paste it into the document. (Do a "Save as" for your Document)
 - Close the graph window and you will be back at the Harvard page.
 - **Leaf Length-** click and a graph will download. And paste this one into the same document. Close the graph window and you will back at the Harvard page.

Now on the select graph page, scroll up and click on **Select a different: project (click)**

- Now Go to project drop down menu and choose "Fall Phenology." Click submit
- Go to school drop down menu and choose your school)." Click submit.
- Do Not enter teacher name (This way we get all trees)
- Enter dates-
 - Choose start date -09/01/first year school started (Same year as you choose for Spring)
 - Choose end date- 12/30/current year Click SUBMIT
- Choose your tree number or a tree of interest. (Later you might compare more than one tree, so remember how to do this)
 - You will make two graphs. For both, you will choose **By Day of Year**
 - Percent of leaves fallen
 - Tree color
 - Right Click and do a "copy image" and paste it into the document.

Each graph represents your data, yet they each tell a slightly different story. Write a result statement for each graph, then answer the following questions.

Did you predict which tree would lose their leaves first and/or which would have the longest growing season when you first started? Let's find out. Think about these, jot down notes. Ask questions.

- Can you tell which year the leaves were first/last to open their buds and first/last to fall off?
- How does your tree's data compare to another tree of the same specie? (Ask a friend of get another graph like you did for yours)

- How does your tree's data compare to another tree of different specie?
- Is there any early trend over the years for spring or fall? (Remember, this is a long term ecological research project. You really need 25 years to fully understand trends.)
- What is the Growing season and how does it compare year to year? See below

Calculate Growing Season Length- directions on next page. (If not doing this, go to next step.)

When done, using the data from all the graphs, summarize / tell the story, of your tree. This should be typed in well written paragraphs, including the purpose of the Buds and Leaves study and the major findings.

You are going to use data from each year we collected data to determine the growing season length for each year, to compare them. We can only do this for trees we have data on, for both Spring and Fall of any given year, so don't be surprised if you can't do all years or can't do your specific tree. We will adjust.

Go the Harvard Forest Schoolyard LTER Database, the link is found on the class website or follow this: http://harvardforest2.fas.harvard.edu/asp/hf/php/k12/k12_project.php

1. Click on DOWNLOAD DATA. Then choose Spring phenology and click SUBMIT
2. Using the drop down menu, choose our School
3. DO NOT choose a Teacher- Leave blank (This way you get all trees for our school)
4. Enter dates-
 - a. Choose start date -01/01/first year school started to collect data
 - b. Choose end date- 06/30/current year
5. Choose 50% budburst dates. This will trigger a temporary Excel file to download. It is called Temp(#).csv. Open this file. **Save this** by doing a "**Save As**" as an **Excel file** and rename the file Harvard Growing Season and your Last Name and save to documents. Make sure it is Excel not csv.
6. Now scroll up and Go to "Select a different -project" click on "Project"
7. Then choose Fall phenology and click SUBMIT
8. Using the drop down menu, choose our School
9. Enter dates-
 - a. Choose start date -08/01/first year school started to collect data
 - b. Choose end date- 12/30/current year
 - c. Click SUBMIT
10. Choose 50% Leaf Fall dates. Again, this will trigger a temporary Excel file to download as a Temp.csv file. Open this file.
11. Select only the columns for year, tree number, tree specie and 50% leaf fall. In the excel document you already started, skip 2 columns on the right side and copy and paste all the fall data.
12. To the right of all the data, create labels header for next five columns using the info below.
 - a. Tree Number and Specie Code
 - b. Year
 - c. 50% leaf Fall
 - d. 50% budburst
 - e. Growing season length
13. Now choose your tree and/or trees of interest.
14. For each year you have data for and for each tree you are interested in, copy the data for the above (a-e). For Tree number and Specie Code use the following format (ex.1-HO)
15. To calculate the growing season, in the cell to the right of the 50% budburst create an excel formula using the following- (don't write words, just click on the cells indicated and it will fill in)

a. $=(50\% \text{ leaf fall cell} - 50\% \text{ budburst cell})$. Now hit enter and it will calculate. Copy formula. The following steps may need to be adjusted based on the version of Excel you are using and if you compare more than one tree. Ask for help if needed.

16. In a few spaces below your calculations, copy the data for each year and the growing season length. Title only the column for the growing season length, not the year. Now, select (highlight) the each year and the growing season lengths (include the growing season length title)
17. Select Insert Chart and choose column chart or other appropriate chart/graph
18. This should produce a graph for with each year. Adjust title and label axis, and any other formats you desire. Make it look good. Cut and Paste it into the Word document.
19. Adjust if you do more than one tree. Now tell your Tree's or Trees' Story.