Harvard LTER Schoolyard Program

Teacher Developed Lessons and Documents that integrate Harvard Forest Schoolyard Ecology Themes into curriculum.

- Lesson Title:

   Exploring the Harvard Forest Data Base

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- School: The Williston Northampton School

- Level: Middle School-7th Grade

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Exploring the Harvard Forest Data Base

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Curiosity Questions from Fall data Conclusions

- Our leaves fell off very fast. Is that natural for our tree?

- I think we should compare our data with other years.

- Ours is only one tree. We need to collect data from many more trees.

- The next step I would be interested in taking would be to observe our trees as they grow in the Spring.

- What is a normal growing season on our campus?

- Do the leaves on my species of tree all fall at the same time?

Easing into the database

▶ Explore our own data from all of the trees in our research site in one season

▶ Explore the greater Harvard Forest Database for this season for a specific species of tree

▶ Explore the Harvard Forest database over several seasons

▶ The Test: Asking and answering your own question

Making Sense of Data   Name _____

Exploring Harvard Forest Tree Study Data Base   Date _____

Buds, Leaves, and Global Warming: http://harvardforest.fas.harvard.edu/research-projects

Congratulations! Your fall tree data has been published on the Harvard Forest website, available for other students and scientists to use.

Part 1: Exploring data from our campus

Use the questions below to help you interpret the large amount of data we collected this fall from all of our trees.
To look at our campus data only, go to the **Harvard Forest link above**. Click on our specific project: Buds, Leaves and Global Warming>Data>Fall Phenology, Download Data> Fall Phenology. In the text boxes, select Williston Northampton School, Lucia, Start Date: 9/1/2013, End date: 12/31/2013

Use the sort functions to order by <u>Date</u>, <u>Tree ID</u> or <u>Species</u>. Then interpret the data to answer the following questions.

- Which of our tree species started to turn color first? _____

- Which tree species turned 76%-100% colored first? _____

- Which tree species turned full color last? _____

- Which date is the most common for 50% leaf drop? _____

- Which species lost most of its leaves last? _____

- How does the end of your tree's growing season compare to that for the other trees?

- What does the data suggest about the relationship between the timing of leaf color change and leaf drop?

- Write another curiosity question you have from looking at the data.

Part 2: Exploring data from All Schools

Go back to the download data menu and select *All Schools*. Input the same Start and End dates for the fall season (9/1/2013, 12/31/2013). Sort by **Species**. Find all of the trees that are the same species as your tree. Record the information in the following chart to help you answer the question:

How does the data I collected for my tree species' "end of the growing season" compare with others' data for the same species?

Note: For each tree of the species, you will record only one row of data; the one that shows the end of the growing season for that tree (50% leaf drop).
My tree species is _____
HF code: _____

Fall 2013 data for this species
 around Massachusetts

School code	Tree #	Date of End of Growing season (50% leaf drop)	Leaf total	# of leaves fallen	Color Change

What conclusions can you make about the timing of the end of this year's growing season for your tree species? (Is the "end of the growing season" date the same for each of the trees? If not, how different are the dates?)

You can learn more about the timing of your tree species by finding out where the other schools are located.
At the top of the data chart, **click on "school code"** in the list following the words "order by". Where are the schools located that have recorded data for your tree species?

Use the addresses to locate the schools on Google Earth. Have fun learning what you can about where the trees are growing. Make some inferences as to why the leaf drop dates are similar or different. I think you will find this link to an interactive school map also very helpful.
http://maps.google.com/maps/ms?vps=2&hl=en&ie=UTF8&oe=UTF8&msa=0&msid=202559132595606621364.0004ce11874400c01d4c6

Part 3: Exploring data from Spring Phenology and from past years
What is the length of the growing season for your research tree?

What additional information do you need to calculate **the length of the growing season** for your tree?

Use your experience so far with the database to find the spring data for our research trees. Once you find the data set, it will help you to know that the operational definition for the "beginning of the growing season" is when 50% of the buds are open. (Do you recognize a pattern?!)

Use the sort function to help you make meaning of this data set. Record the date for the start of your tree's growing season in the chart. Fill in the remaining information you need to calculate the length of the growing season. (Find a Julian calendar at: http://www-air.larc.nasa.gov/tools/jday.htm)

Tree Species:		
Calendar date	Julian Day	Calculate the length of the growing season
Start of the season		
End of the season		

Part 4: The test!

If you have successfully completed the three sections, you have found meaning in a large set of data!

Write two more curiosity questions that you think could be answered by sorting and interpreting the data in this data base. Choose one of your questions as your test question. Use the data base and the links included in this activity to answer your question. Show how you arrive at your answer by making a chart and writing a paragraph.

Student Revelations

- Always check your answer by sorting a second way

- More than one person's insight into the data is valuable. (There is more than one way to think about what the data is telling you)

- "Collecting the data seemed pretty simple. It seems to mean more when all our data is put together."