Harvard LTER Schoolyard Program

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

Lesson Title: <u>Micro-directions for Buds, Leaves, Global Warming Related Activities</u>

Project: Buds, Leaves, Global Warming
Teacher: Louise Levy
School: Belchertown H.S.
Level: High School
Date: April 9, 2015

Following directions …

Working around inertia with microdirections
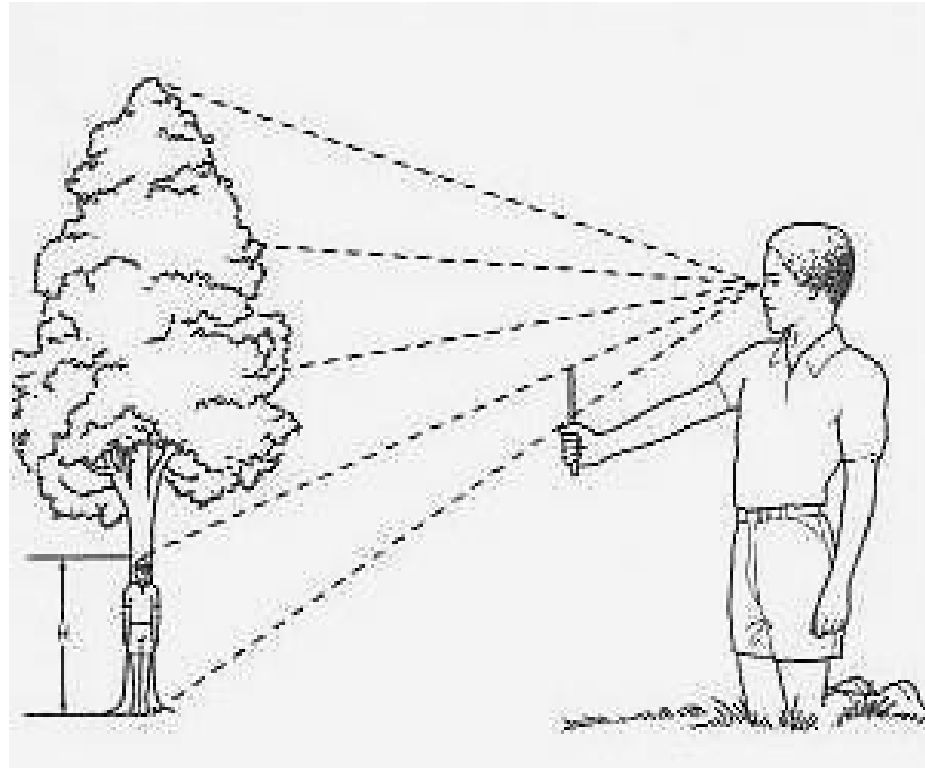
Louise Levy, BHS Science

Estimating Tree Height

Artists' Thumb Directions, delivered verbally

- With a partner standing at the base of your tree, walk backwards until your thumb is the same "size" as your partner

- Measure the height of trees in thumbs

- Multiply by the height of your partner

Model and practice Artists Thumb

Now, let them know they'll have to teach this method to a group of 20 7 year olds

Same instructions in microdirections form

Artists' Thumb (or pencil) method

- choose a volunteer, The Thumb, and have them stand at the base of your tree

- move back into the field & deliver these instructions:

- "extend your arm (elbow locked) with thumb up

- looking with one eye, walk back or forwards until the volunteer standing at the base of the tree is the same height as your thumb

- Count how many Thumbs it takes to match the size of the tree"

- Average the thumbs reports, measure the height of the volunteer (in inches), multiply the average thumbs by the volunteer's height, then divide by 12 to convert to feet. Repeat with another volunteer of a different height

BHS BLG Quadrat Study
Tree # _____   Group Leader _____
Recorder(s) _____

Study Plot duty roster names	Task	Results				Species observed … list
	Mark the plot perimeter					
	Plot map/Overhead sketch					
	Vertical map/Landscape sketch					
	Age (dbh) class analysis	sap		pole	saw	
	Air and soil temperatures	air		soil		
	Relative humidity					
	Canopy cover					
	Light intensity					
	Wind speed					
	Ground cover density					
	Sawtimber dbh and height					

Prepping a large group for different tasks

| Study Plot duty roster names	Task	Results
	Measure plot perimeter	

Mark the plot perimeter: sticks, flagging

Set sticks - 10' to a side - around your plot area by attaching a short piece of flagging to sticks with your tree close to the corner, and being sure to include the grassy/bare edge of the wooded area

Measure plot perimeter: sticks, string
- Set the sticks 10' apart in the area marked off in the classroom, tie the string to your sticks, leaving one corner open.
- Set up your plot area by inserting the sticks into the ground, with your study tree no closer than 3 feet from one corner (3 feet from that one stick), and being sure to include the edge of the wooded area

Turning all data (Red Maple #2) ...
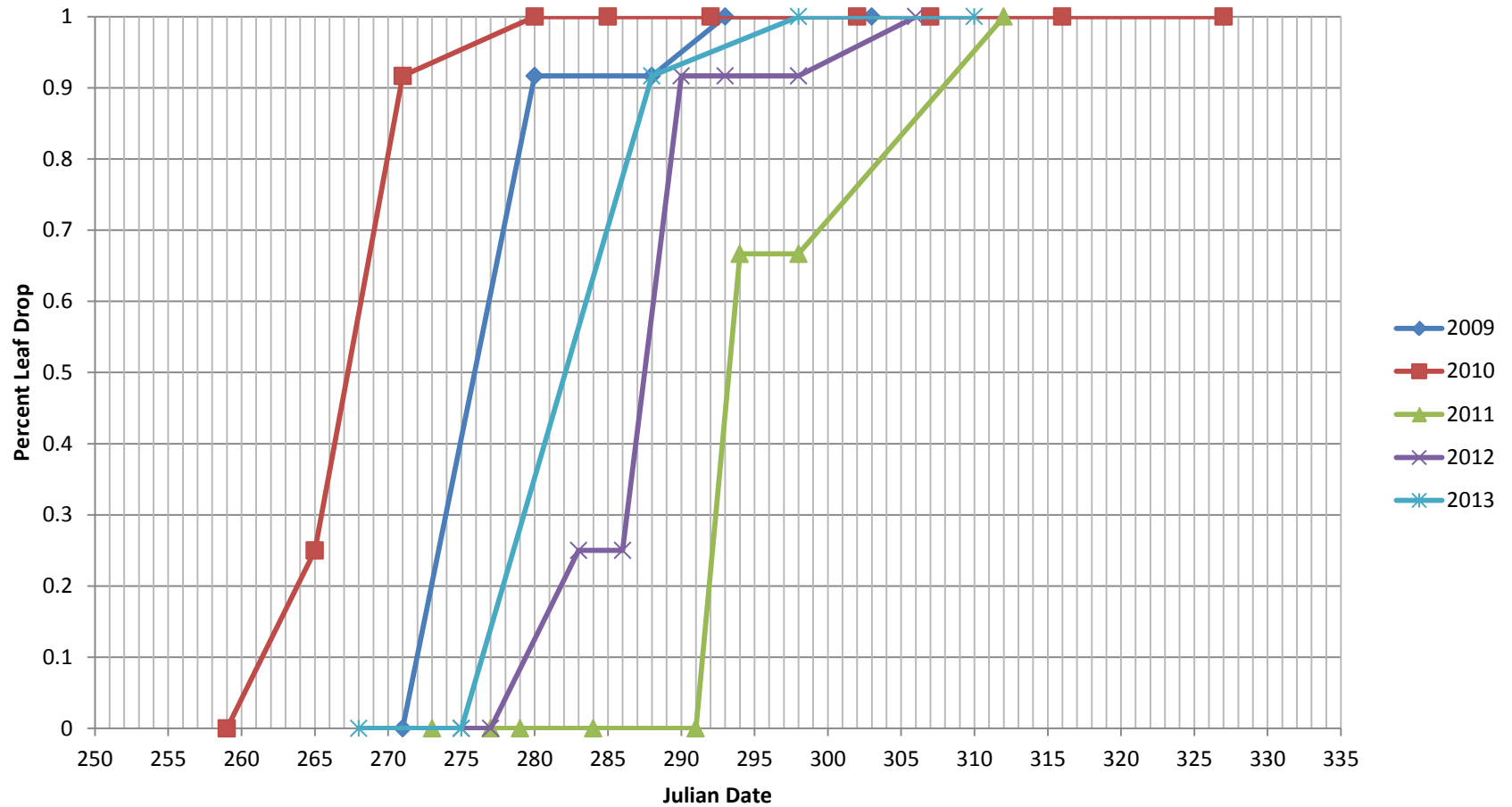
Directions for Excel Graphs

HvSS for Excel   _____

_____

1. Open an excel workbook

2. Label the first column Height (inches) and the second Shoe Size (mens or womens, as appropriate) … an initials column is optional

3. Convert the heights to inches by multiplying the feet by 12 and adding the inches. Convert any fractions to decimals ¼ = .25   ½ = .50 ¾ = .75   Enter the data, one person to one line.

4. Enter the shoe sizes, double-checking to be sure that you've matched up the height and shoe size correctly for each person

5. Select – "highlight" - all of the height and shoe size data

6. On the top menu bar, select "Insert"

7. Choose "Scatter" … a graph with the data points should appear on your screen.

8. Is the graph big enough? If not, grab the corner and make it bigger.

9. Go to Insert again and choose "Text box" (just right of center). Enter the data ranges for the y and x axes. Ex: y-range 0-16, x-range = 60-72

10. In Chart Tools, choose "Layout"

11. Choose Chart Title, and type in "Height vs Shoe Size – and your names"
12. Choose Axis Titles, choose Primary Horizontal Axis Title and enter "Height (inches)"
13. Choose Axis Titles again, choose Primary Vertical Axis Title and enter "Shoe size (womens or mens, whichever your class used to collect the data)"
14. Still in Chart Tools, choose "Trendline" and choose "Linear Trendline"
15. Again in Trendline, choose "More Trendline Options" and select both "Display Equation on Chart" and "Display R-squared value on chart". If it shows up in the middle of your data, pick it up and move it off the graph area, to the right side of the graph window.
16. If you're super-fancy and know this program well, feel free to change colors, insert vertical gridlines, or even go the beginning to sort males and females to separate data sets and graph 2 separate "series"
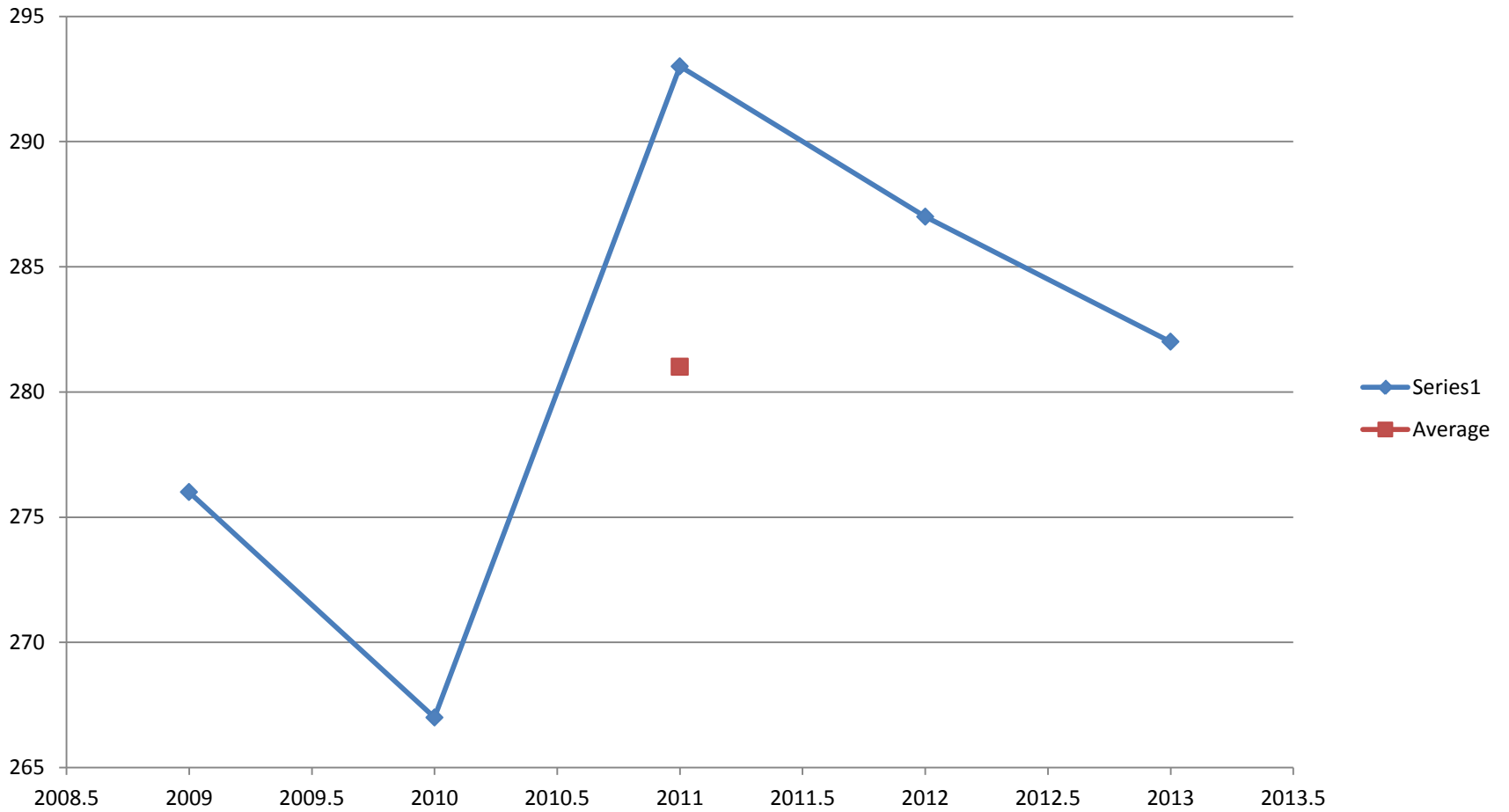17. Email it to MsLevy   llevy@belchertown.org

Feedback:
How well did these instructions work for you and your partner(s)?

How many times did you find yourself asking MsLevy for clarification? On which steps/procedure(s)?
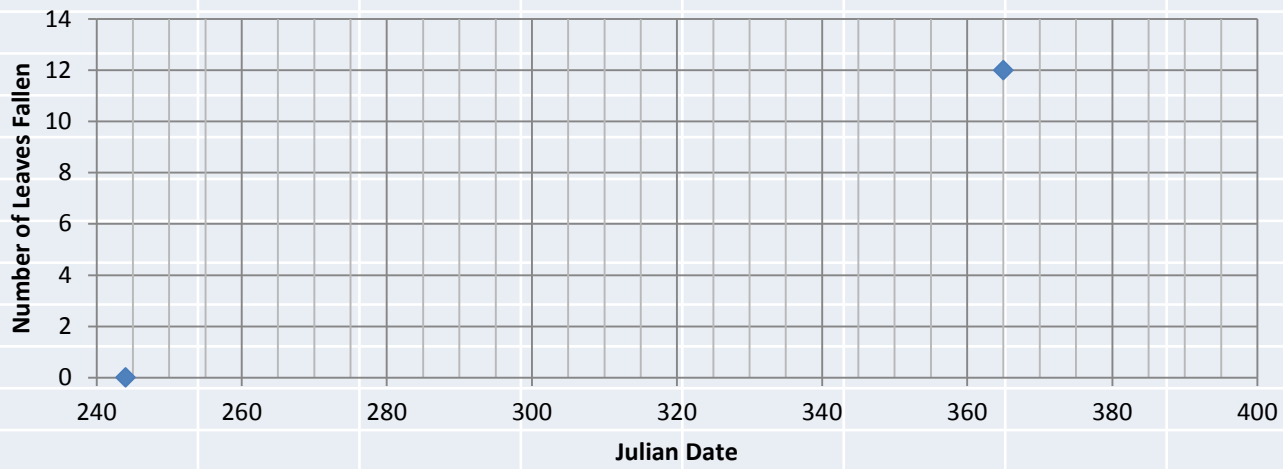
Comments:

... into trend data

Branch (circle) - A   B   Names - _____

BLG Data analysis - _____(tree sp) #____
Fall _____ (year) ended on _____ (date)

BLG Fall data analysis - mule

Cal-date	J-date	Lfallen		Given the trend in the data above, we estimate that
1-Sep	244	0		50% Leaf Fall happened on Julian date _____ ,
31-Dec	365	12		marking the end of the growing season for Tree # ___

Hand Graph Instructions

1-Using your Tree level data table, Record the Calendar dates of our BLG observations in the data table below

2-Convert the Calendar(Cal) dates to Julian(J) dates

3-Add the number of leaves fallen from both the A and B branches and record below

4-Graph Julian date vs Leaves fallen, connect the data points

5- Mark the point on the graph where the line crosses 6 (=50%)

6-Check with the other branch team to confirm

7- Convert to Calendar date and record in the title of your graph

Cal-date   J-date   L-fallen