



Harvard LTER Schoolyard Program

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

- **Presentation Title:** *Belchertown HS...lots goin' on*
- **Description of Presentation:** *Graphing exercise as torture; We won a \$10,000 Toyota Tapestry grant!! And more!*
- **Teacher/Author:** Louise Levy
- **School:** Belchertown High School
- **Level:** 12th Grade- Environmental Studies
- **Date:** April 13, 2011

Belchertown HS ... lots goin'on

- Buds, Leaves and Global Warming gets the students outside
- Graphing exercise as torture
- Digital STEM at UMass is developing a new tool ... ADI
- Target and Big Yellow School Bus grants help Woodland Ecology get to Drumlin Farm (MA Audubon)
- We won a \$10,000 Toyota Tapestry grant!!



They're outside

And boy, they're excited about their trees



Capturing an image

We may be able to enhance our data collection by using these images to measure our buds and leaves.



Now that we have the images

We can start imagining ways of using them to keep track of our branches and collecting data

It's probably best
to break the
graphing
instructions into
smaller steps for
my math-
challenged
students.

This exercise was a
bit of torture for
them.

BLG: What can we say about the length of the growing season at BHS?

1-BLG Leaf Drop at BHS

a)Graph your tree's leaves fallen vs date for Fall '08

(tree 5 will skip '08, as no data was collected that year)

(Oaks will graph tree color instead of leaves fallen, as the leaves don't generally drop)

Steps

1-convert the calendar dates into Julian dates using the Day-of-the-Year table

2-set up the x-axis from Julian dates: 250-350

3-set up the y-axis from leaves fallen: 0-12 (Oak, use Tree color: 0-4)

4-Graph all data points for your tree and connect the dots

b)circle the point at which your line crosses 6 leaves fallen (oak, tree color 2)

c)determine the date of 50% leaf drop (the spot you circled!), record this on your graph, and record the tree and date on the Summary Data Table (see Ms.Levy)

d)Repeat this for Fall '09

e)Complete transferring the Fall '10 data from the Field Data sheets inside your tree envelopes to the Tree-Level data sheet on the outside of the envelope. Trouble-shoot any oddities in the data (aka ... double-check to be sure the data is accurate)

f)Once both teams A and B have completed the transfer and Quality Control from Step 5, add the number of leaves fallen from both A and B for each date of data collection.

g)Graph this years (Fall '10) leaves fallen vs date and determine the date of 50% Leaf drop

2-BHS: End of Growing Season

a)Graph the date of 50% Leaf drop vs year

Steps

1-Set up the x-axis with '08, '09 and '10 evenly spaced
(except for Tree 5: just '09 and '10)

2-Set up the y-axis with Julian dates 250-350

3-Graph all 3 data points for 50% Leaf drop, decide to present it as a bar or line graph

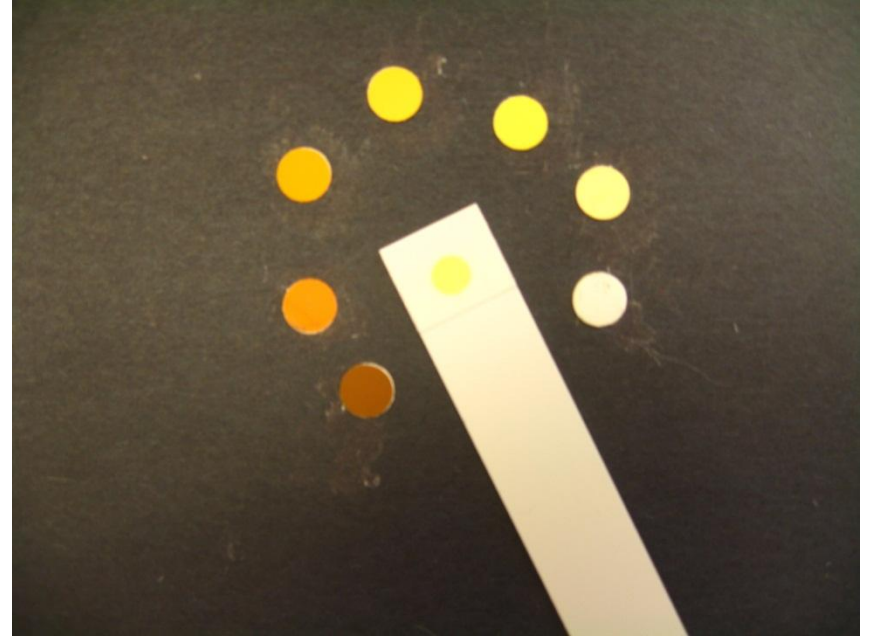
b)Prepare to present your Tree's pattern this Fall and its' history over the last 3 years

ADI

Analyzing Digital Images is a
computer program currently being
developed by the folks at Umass
Digital STEM

I'm on the wait list for the summer
seminar

ADI can Analyze color



This Digital STEM project is about developing a protocol for analysis of water and other substances for levels of Arsenic (photo at right) – especially relevant in South Asia – using digital analysis to improve the accuracy and decrease the price of the test. It also involves teachers helping write ADI lessons for their classes.

ADI can measure area



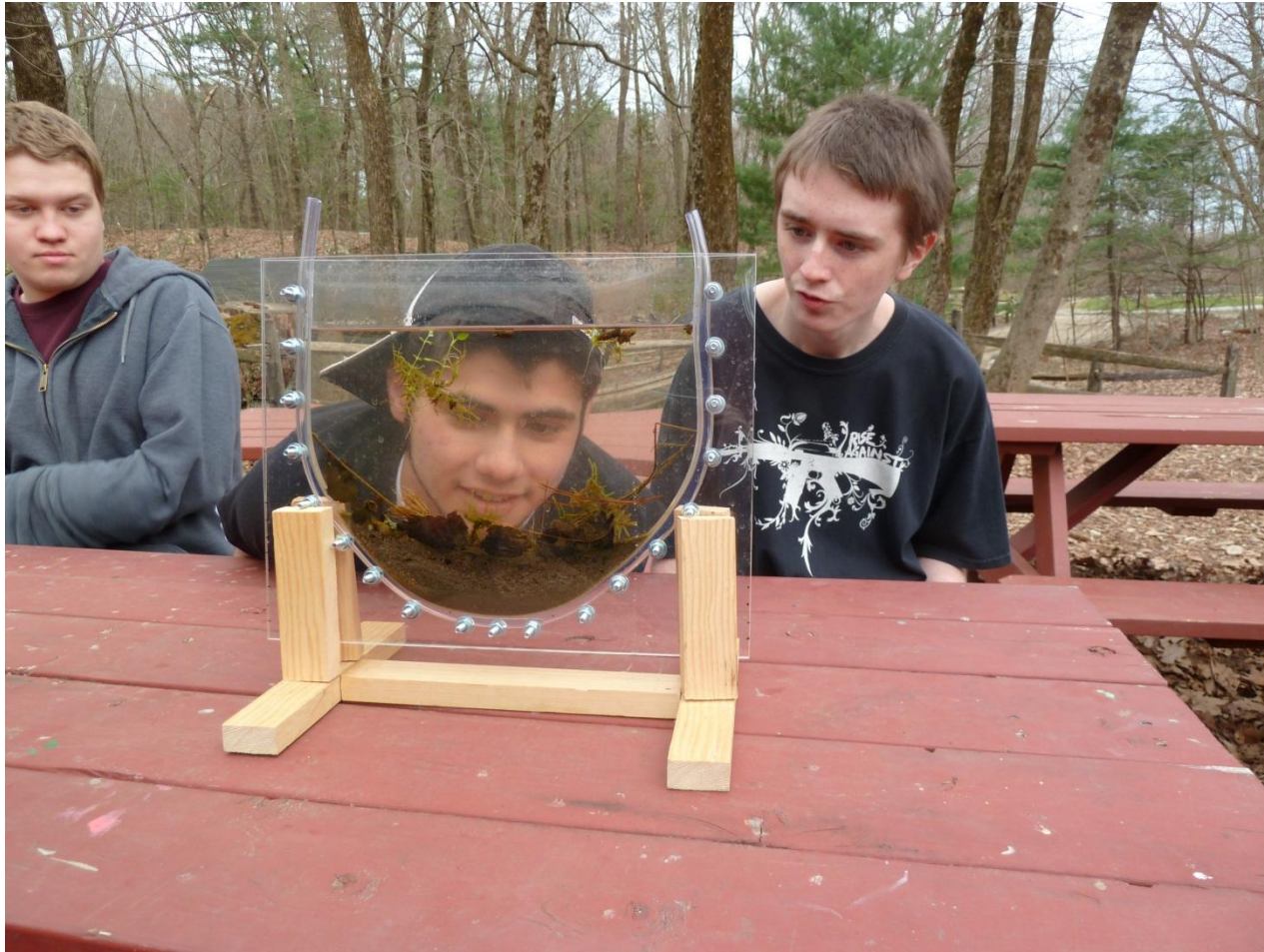
By analyzing the color of the leaf, the program can select only the portions of the image that match the chosen color profile. Once the blade of the leaf has been isolated, the program gives a readout of the area.

Images of leaves from our trees will form the basis of an inquiry project next year ... sun vs shade, outer vs interior, mature vs young trees, etc.

Trip to Drumlin Farm – Native New England Wildlife



A great way to view pond life. He volunteered to build one for us.



It took about 1 hour of writing to secure the Target (\$700) and Big Yellow School Bus (\$200) and get the cost of the trip under \$10/student



Belchertown Biodiversity

\$10,000 will fund ...

- a project to start cataloging the trees and pond life at Lake Wallace =
- Measuring and sampling equipment and netbooks
- Transportation for the PreK-K and Middle Schoolers (the rest of us will walk)
- Professional development for teachers PreK-12 to write curriculum that integrates outdoor experiences and a trip to Lake Wallace with their compelling math and English target goals

(It took more than an hour to write this grant)

(and way more than one hour to calm myself down after I heard that I won!)

Teaming up kids and teens, as well as
Elementary with MS/HS teachers ... we're
hoping everyone starts getting more excited
about doing science

