

Our Changing Forests

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Ecology Team

Big Ideas- Questions for Long Term Study:

- *“How do forests grow and change over time in response to different environments and land use?”*
- *How will forest composition and growth respond to future natural and human-caused disturbances?*
- *Credit: Pamela Snow (Thanks, Pamela!)*



Our Changing Forests: Field Study & Maps @ BHS

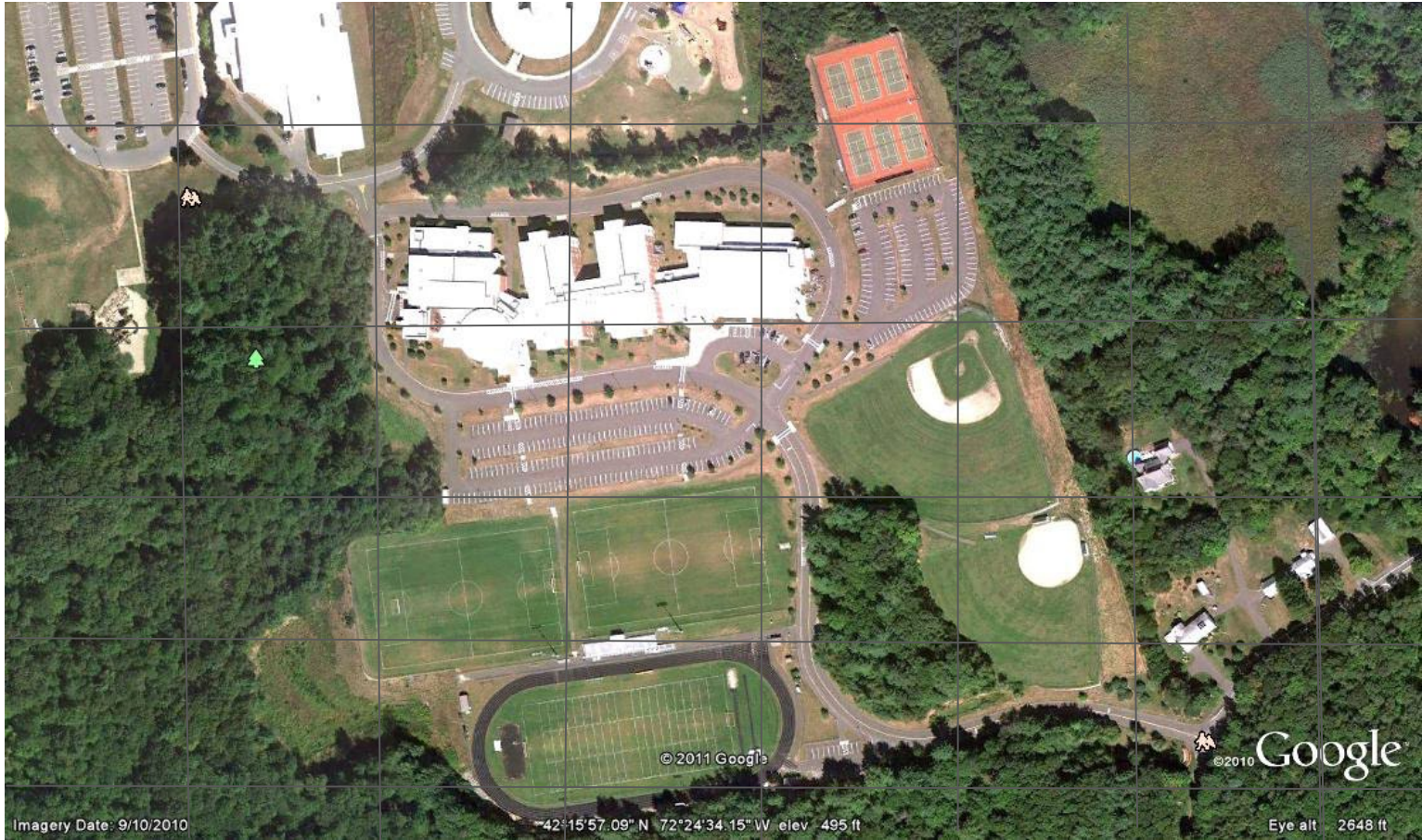
?Maps?

for smart-phone natives ...

when the curriculum doesn't include orienteering?

Build authentic, engaging, kinesthetic experiences

Start from scratch: BHS Campus survey



Land use from the ground and the air: tally

	Tally	Total	% = Total / Grand Total
Boreal/evergreen			
Forest			
Woods			
Meadow			
Plain/grassland			
Landscaped			
Impervious			
Pond/stream			
Bog/swamp/wetlands			
		Grand Total =	

- 1 BHS Ecosystem Survey - 2016
- 2 0-Finish: 4 tally-marks for all grids, A-1 through J-8
- 3 1- Total up your tallies for each category
- 4 2- Add up all Totals for a Grand Total
- 5 3- Divide each Category total by the Grand Total and multiply by 100 to get %'s
- 6 4- Check in with and record the %'s from 2 other groups, to the right of your Grand Total
- 7 5- Report your data to the class data table
- 8 6- On back, brainstorm with your partner(s) 3 reasons why the 3 sets of numbers are different

	T-N-T	D-S	B-A	R-N	K-C	J-D-G	M-S-K	A-A	T-D-A	Ave
11 Boreal/evergreen	0	0	8	8	0	0	25	0	3	4.89
12 Forest	0	0	2	2	0	0	31	0	2	4.11
13 Woods	17.5	19	2	2	20	3	7	16	25	12.39
14 Meadow	5.6	9	4	0.4	1	2	31	0.3	11	7.14
15 Plains/grassland	0	0	0	0	0	0	8	0	0	0.89
16 Landscaped	15.3	28	10	10	26	26	41	32	6	21.59
17 Impervious	61.2	37	75	75	53	30	27	50	51	51.02
18 Pond	0	0	0	0	0	3	41	0	0	4.89
19 Bog/wetlands	0	7	1.6	1.6	0	1	62	0	0	8.13
21 should = 100		100								115.06

Student Objectives

Objectives for Individuals:

Objective # 1: Be aware of your surroundings

Objective # 2: Recognize how human use of resources impacts the stability and resilience of critical ecosystems and their services *

*cleaning the air and water, soil regeneration, growing food/plant products, sequestering Carbon, etc

Objectives for activities: Do, Interact, Incorporate into your knowledge and ethical foundation

HS-ESS3-3. Illustrate relationships among management of natural resources, the sustainability of human populations, and biodiversity.

Boosting map skills: Topo map behind the BHS gym



Creating a topographic map

Objectives:

- You will use simple equipment to measure a small section of the BHS grounds
- You will use your data to draw a map of a cross section of the BHS grounds
- You will combine your data with the rest of the class to produce a topographic map of the area

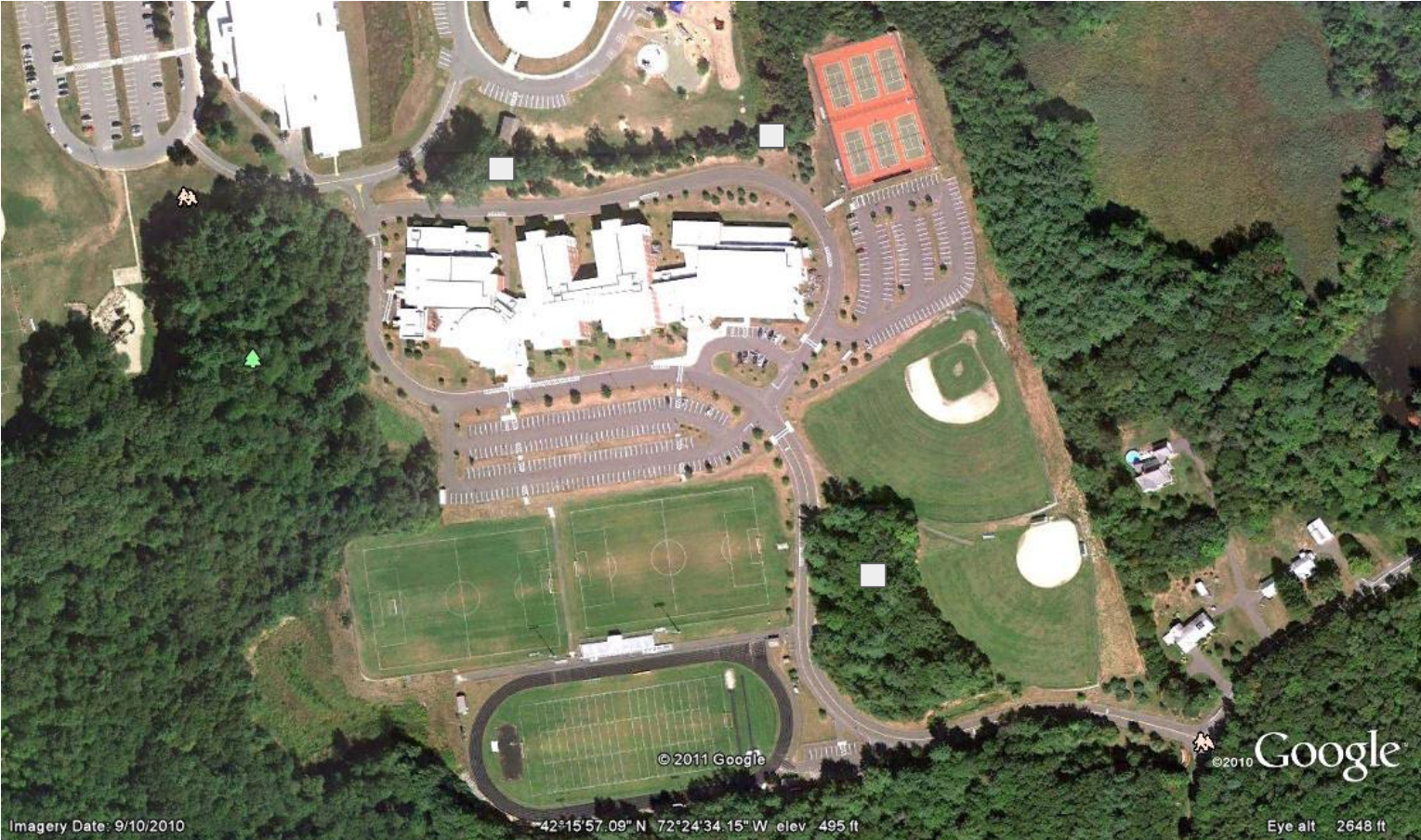
Topography of BHS behind the gym - total elevations

at	0m - KM&SH	5m - JD	10m - G/B/C	15m - NB/DF	20m - BO&KS	25m - n/a
0m	29.5	42.5	68	162	107	
1m	29.5	40.5	63	150	90	
2m	29.5	36.5	55	135	71	
3m	25.5	30.5	46	107	54	
4m	19	21.5	35	76	40	
5m	11.5	14	21	41	23	
6m	7.5	8.5	8	13	6	
7m	4	6.5	0	0	0	
8m	2	4.5	4	10		
9m	0	2.5	6	23		
10m	0	0.5	10	34		
11m			12	44		
12m			15	50		
13m				54		
14m				58		

Learning Leaves



Our Changing Forests at BHS - Sites 1, 2 & 3



Taking ownership



More than happy to be outside ...
contributing and taking pride in his
work

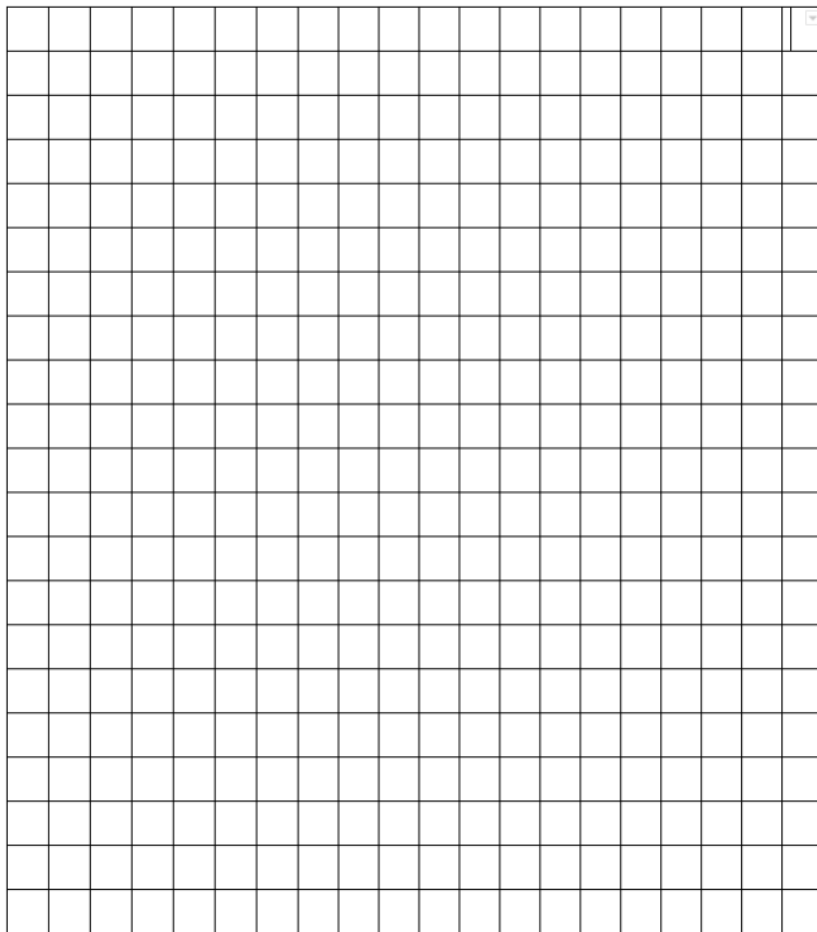
Dividing up the work ...

Changing Forests site study instructions

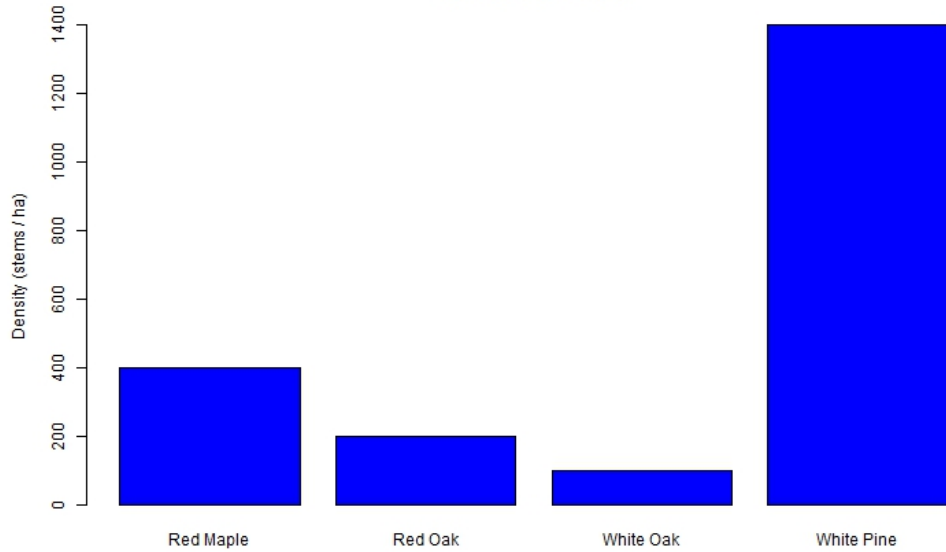
2-Tree dbh team (diameter at breast height = 1.3m above the ground): Student Field Data Sheet, clipboard, dbh tape

- fill in your names on the Student Field Data Sheet; circle the block next to the Plot ID Number
- Choose a tree in your block to start on first ... stay within your block
- record the tree number on the Student Field Data Sheet
- Use the dbh stick to establish the dbh height above the ground. Use the diameter tape to determine the dbh of the tree
- Do the measurement 3 times in order to be sure you have measured correctly. Record, on the Field Data Sheet, the dbh of the tree on the line with the correct number of that tree.
- Continue until you have recorded accurate dbh for every tree over 2.5 cm (1 inch) diameter
- check with the Tree ID team to combine the species and dbh onto one paper

Our Changing Forest: Site ____ block A B C D (circle one) _____
(one grid = 25cm; 4 grids = 1m) names

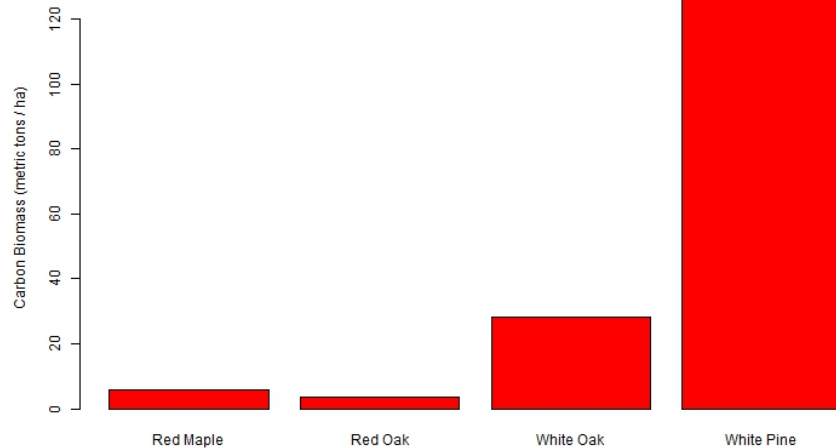


**Belchertown High School
Plot 1 Survey 1 (2015)**



Harvard Forest Schoolyard LTER / Changing Forests Project

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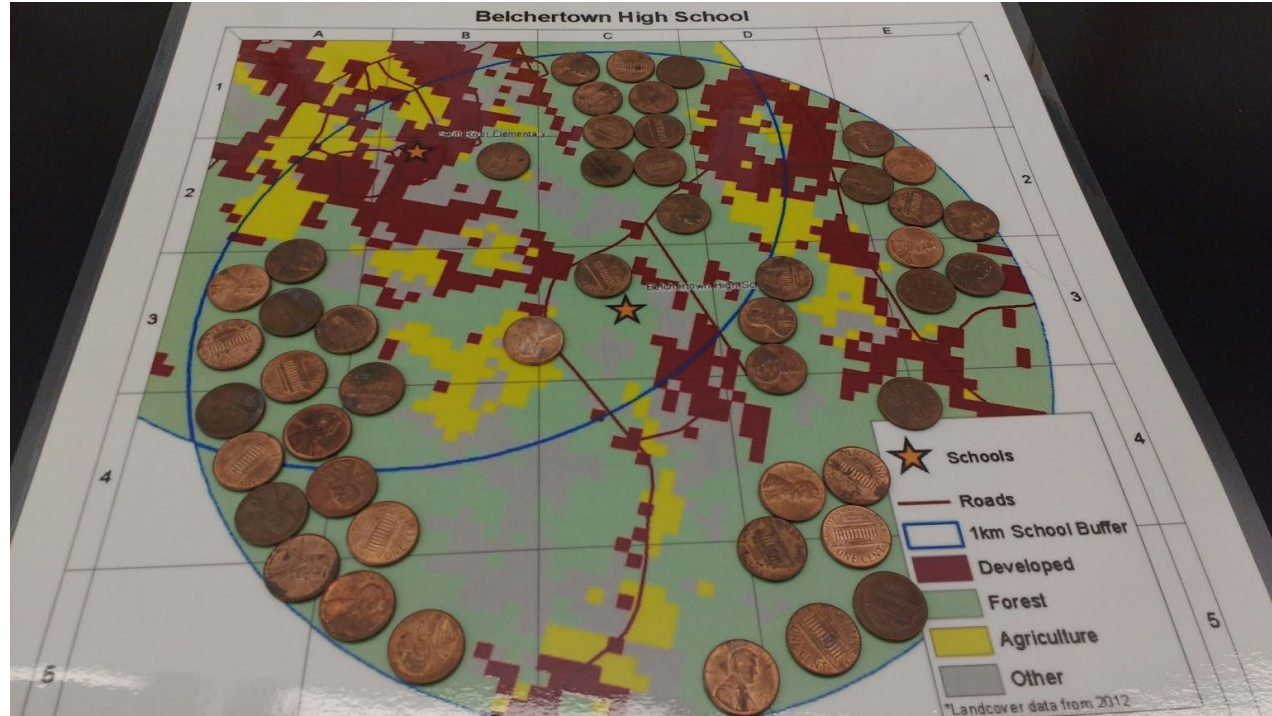
Harvard Forest Schoolyard LTER / Changing Forests Project

Map Jigsaw:

Expert groups make sense of one CF map

With a dry-erase marker, outline any area the size of a penny (~2cm) or larger that shows uninterrupted green

Calculate/Estimate the uninterrupted green area on your map in “pennies” units



Maps Jigsaw: Mixed-map groups convene to share Summaries and to learn from each other



Maps Jigsaw - Last steps

Expert groups reform, sharing insight gleaned from listening to other experts

Rewrite/edit Summary, utilizing feedback, questions and clarification from the mixed-map groups

expert group divides into small teams to write a 5-minute lesson for either a 2nd grade, 5th grade, or adult community land planning group

OCF maps Activity feedback - as a form on Google Classroom

- Name and Map type (look on top of your worksheet)
- Map number Map 1 Map 2 Map 3 Map 4
- What worked?
- What didn't work?
- What information did you need that you did not have?
- Suggest either a re-write or redaction of 1 of the questions. State section and number
- Suggest either a re-write or redaction of one more of the questions
- Tell me something that will help the next group of students more easily make sense of these maps
- Ok, what did I miss?

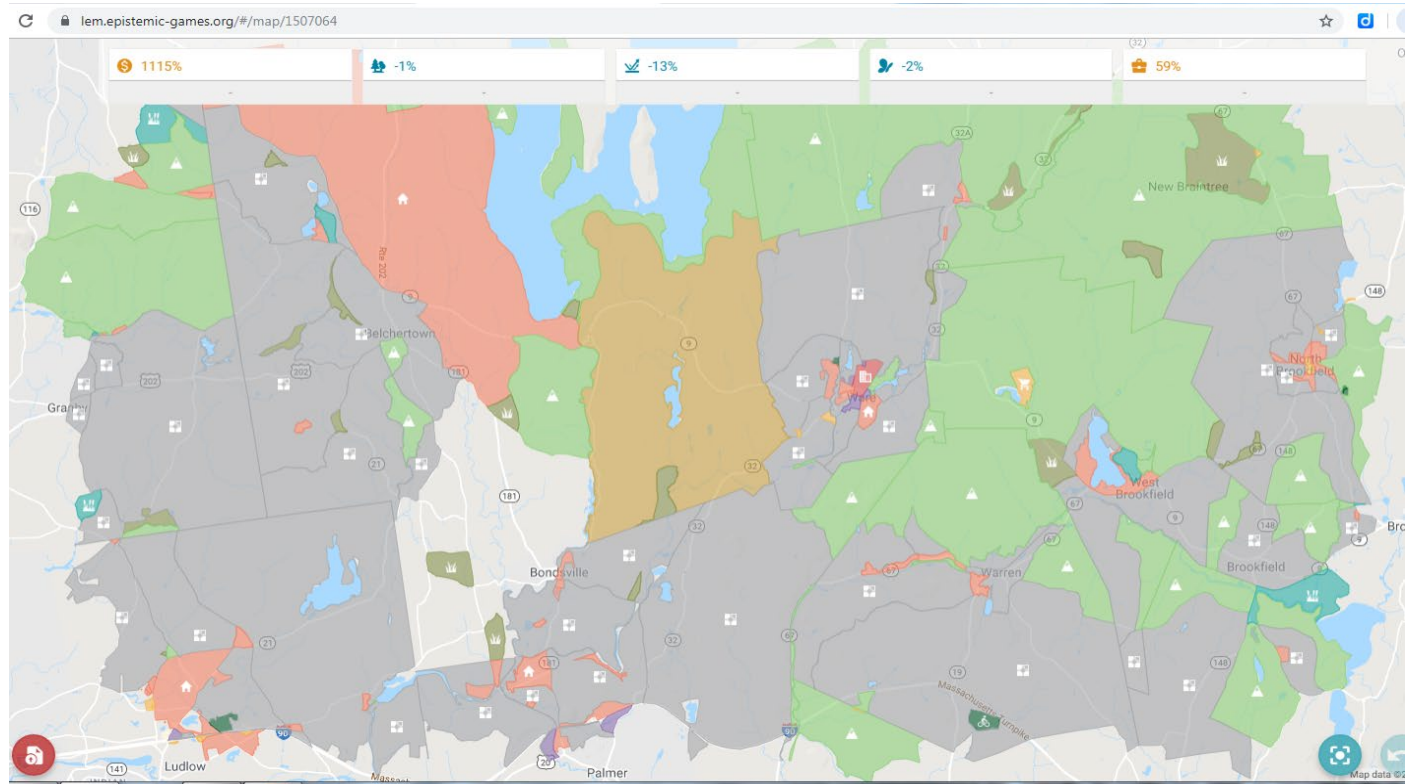
Development Challenges - Humans in our Places:

- Local
- Regional
- Global

A focus on the Watershed and/or Carbon-offset of forests can be especially fruitful

iPlan - Local Environmental Modeling an Epistemic activity

<https://lem.epistemic-games.org>



Chiming in on the development of Carriage Grove





BELCHERTOWN STATE SCHOOL

MASTER-PLAN PROGRAM SUMMARY:

■ CCRC-INDEP. LIVING	148,800sf (144 units)	11.31 acres
■ CCRC-ASSIST. LIVING	55,000sf (83 units)	3.12 acres
■ MIXED / COMMERCIAL	75,000sf	9.59 acres
■ LIGHT INDUSTRIAL	120,000sf	12.93 acres
■ MULTIFAM. RESID.	150,000sf (114 units)	9.83 acres
■ LIVE-WORK	18,000sf (10 units)	3.78 acres
SUB-TOTAL	566,800sf	50.56 acres
■ HIST. ADMIN. BLDG.	15,000sf	
TOTAL	581,800sf	

HISTORICAL MARKERS

1. "Memorial" - Cupola / Plaque on the green
2. "Interpretive" - Kiosk / Signage at the trail head
3. "Reflective" - Bench area / Plaque with views of mountains



LANDSCAPING KEY

- Existing Trees to remain
- Proposed new Trees
- Wetland Areas

© 2014 Google

Google earth

STEM Summit - Nov 2017

Cross-Grade Partnerships in STEM: community connection and deeper conceptual understanding



MABT & PD - March 2018 & 19

Fostering Joy with STEM - bringing joy into the classroom and keeping our passion for STEM teaching **stoked and burning**



Speak truth to power -
be it administrative or
legislative

Never stop sharing the importance of
the work you do to educate
thoughtful, effective people
with grit and agency



*Engage in activities that fuel your passions
for teaching and learning*

Make the content come alive

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With special thanks to Pamela Snow for our collaboration on the
Connecticut Science Educators Annual Conference in November 2018