stelar
STEM LEARNING AND RESEARCH CENTER

Plenary

ITEST PROJECT FLASH TALKS

NSF

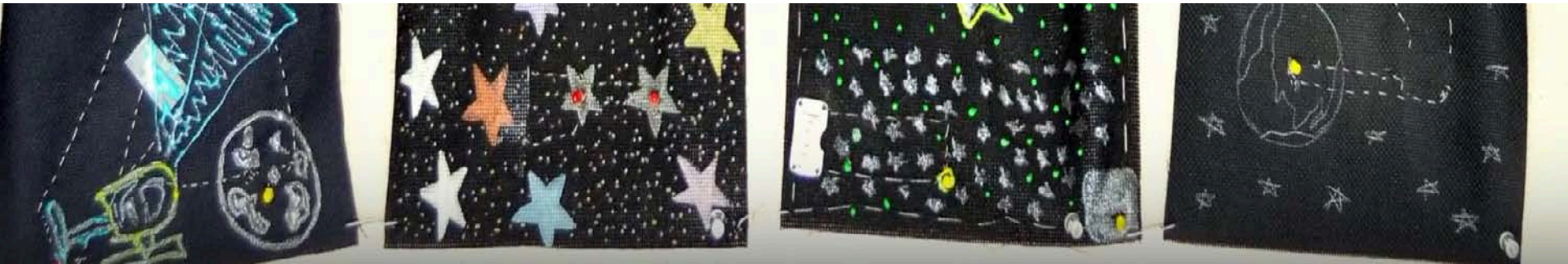
EDC Learning transforms lives.

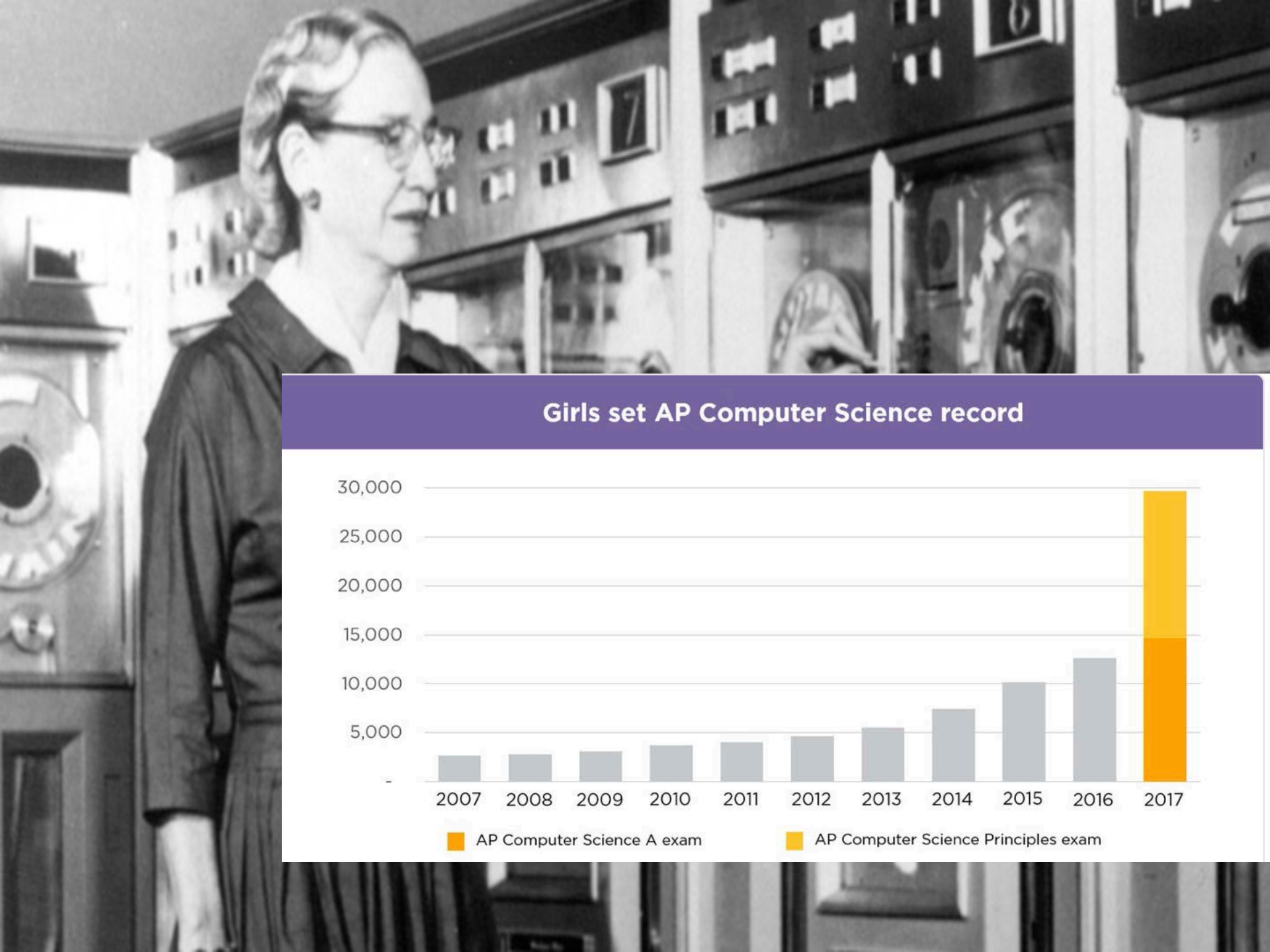
Flash Talk Round 1:

- Changing the Faces of Computing, One Stitch in Time
  - Yasmin B. Kafai, University of Pennsylvania
- Using Spatial Narratives to Link Community Engagement and Awareness of STEM Careers
  - Beth Schlemper, University of Toledo
- The Tuskegee BUILDERS Academy
  - Martha Escobar, Oakland University

Changing the Face of Computing One Stitch a Time

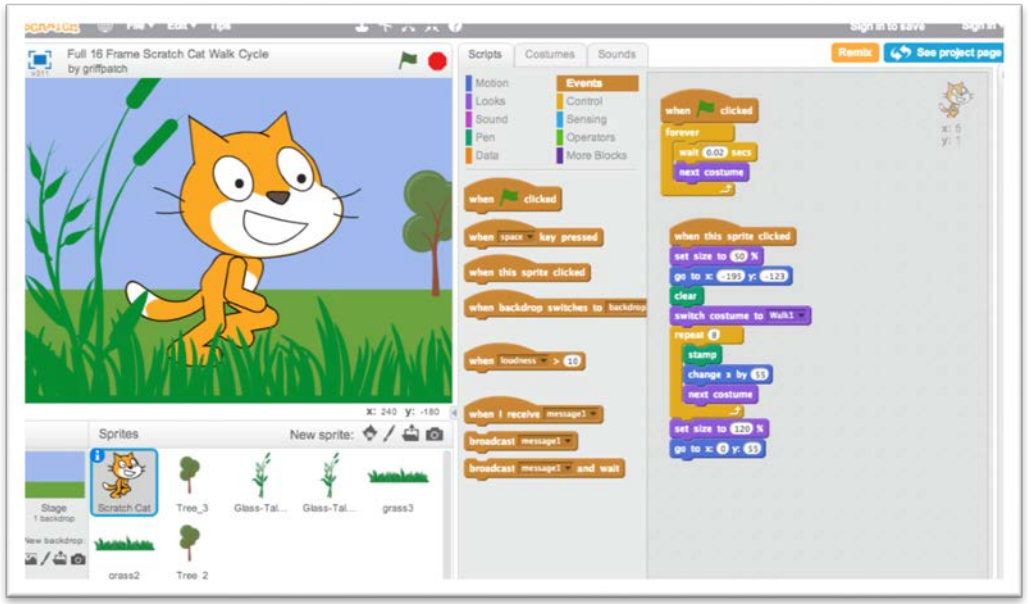
Yasmin B. Kafai University of Pennsylvania

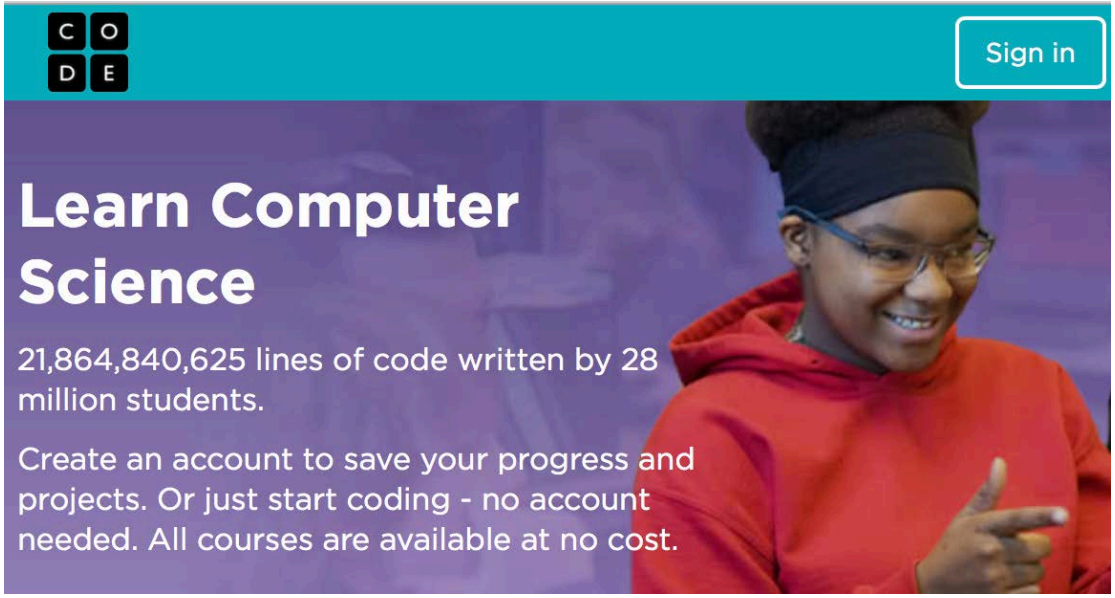



Girls set AP Computer Science record
30,000
25,000
20,000
15,000
10,000
5,000
-
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
AP Computer Science A exam
AP Computer Science Principles exam

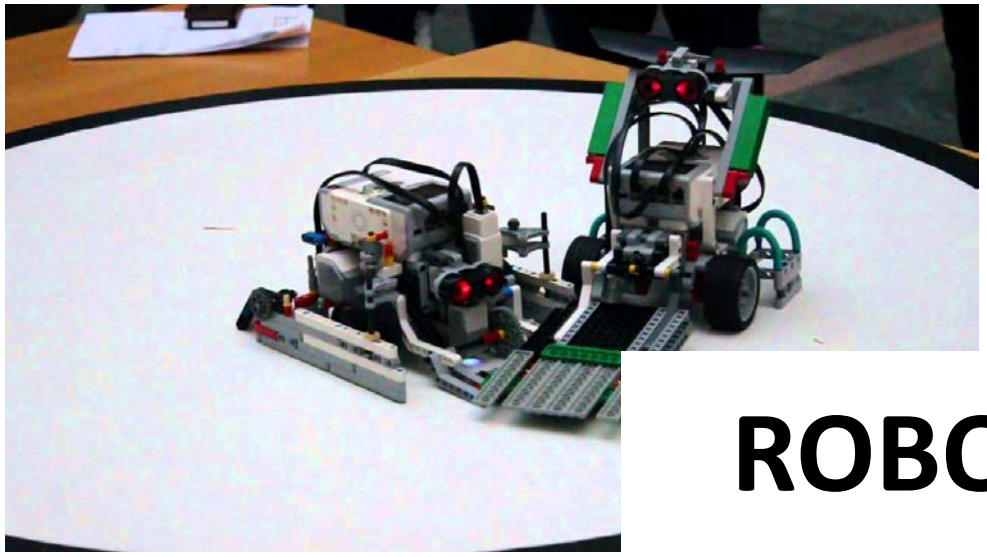
In Wyoming not one Student from an Underrepresented Group took the AP Computer Science Exam last year.

black girls CODE
imagine. build. create.


Full 16 Frame Scratch Cat Walk Cycle
by griffpatch
Scripts
Costumes
Sounds
Remix
See project page
Motion
Looks
Sound
Pen
Data
Events
Control
Sensing
Operators
More Blocks
when clicked
forever
wait 0.02 secs
next costume
when space key pressed
when this sprite clicked
when backdrop switches to backdrop
when loudness > 10
when I receive message1
broadcast message1
broadcast message1 and wait
set size to 50 %
go to x: -195 y: -123
clear
switch costume to Walk1
repeat 4
stamp
change x by 55
set size to 120 %
go to x: 0 y: 55
Sprites
New sprite:
Stage
1 backdrop
New backdrop
Scratch Cat
Tree_3
Glass-Tal...
Glass-Tal...
grass3
grass2
Tree 2

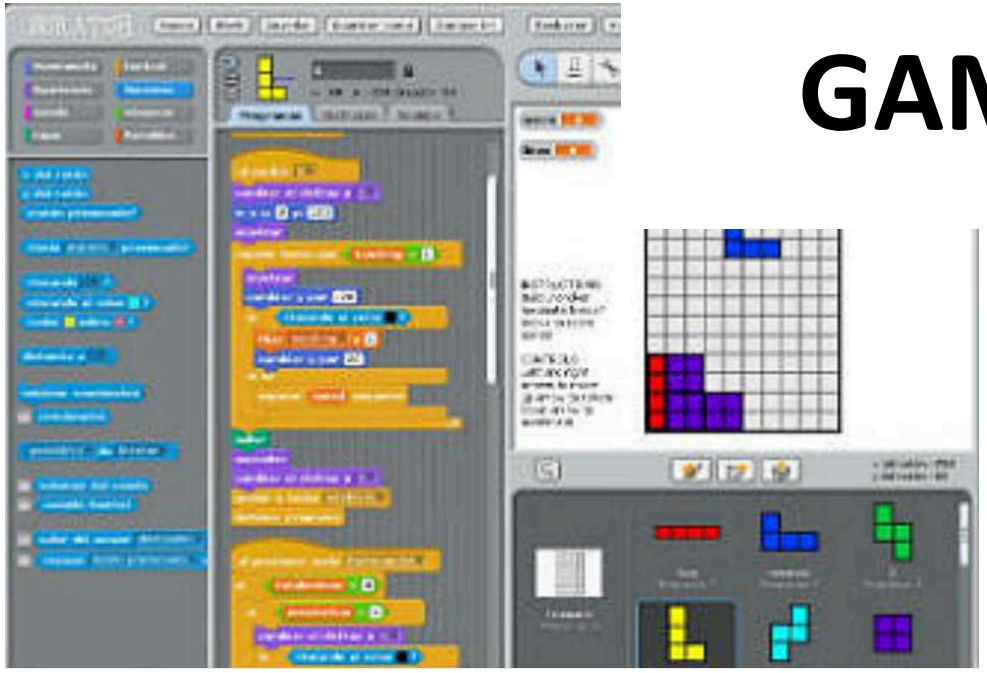

C O
D E
Sign in
Learn Computer Science
21,864,840,625 lines of code written by 28 million students.
Create an account to save your progress and projects. Or just start coding - no account needed. All courses are available at no cost.

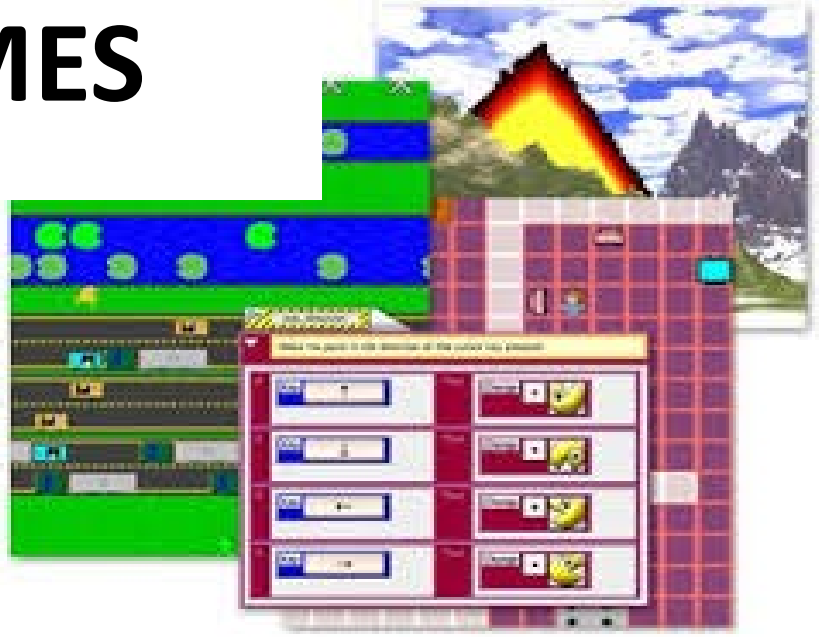
girls who
code

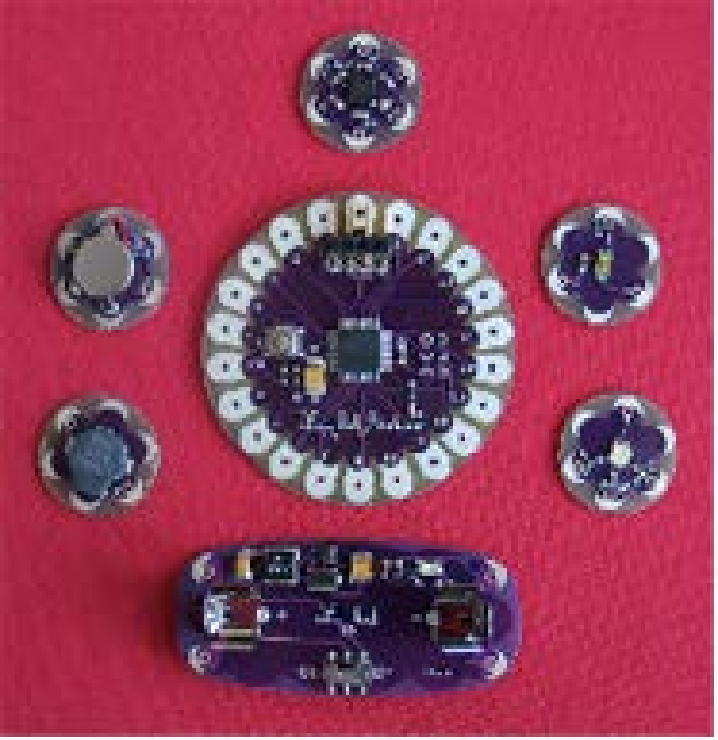


ROBOTICS

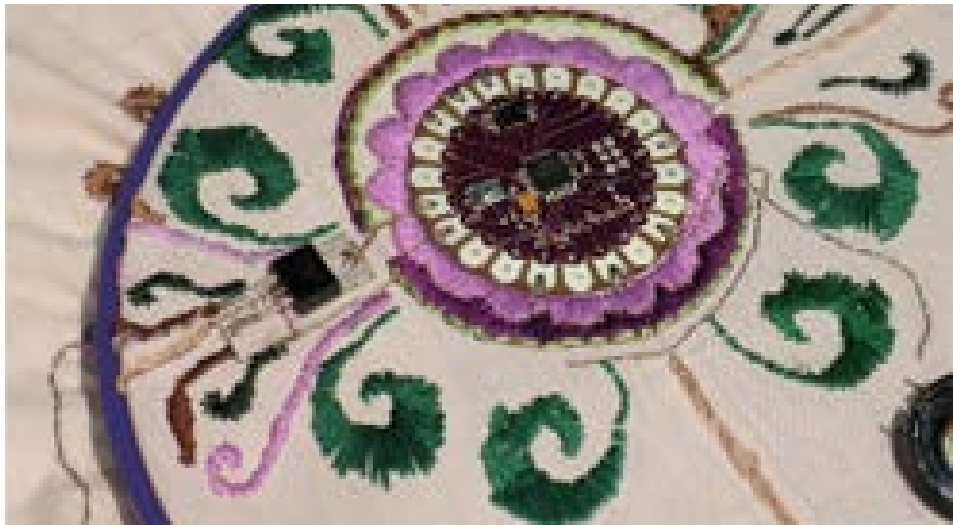
GAMES







Electronic Textiles

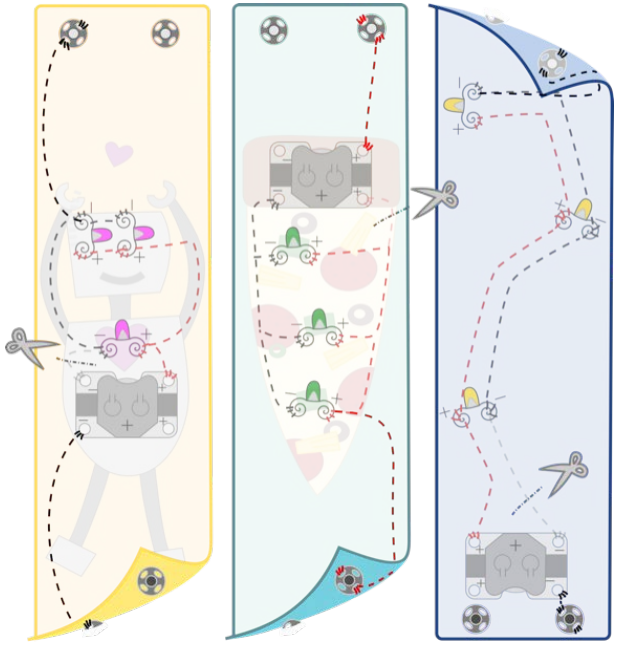


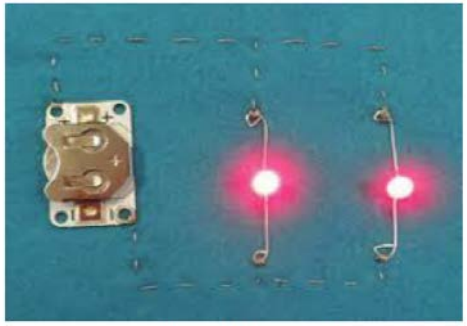
```
if (sensorValue < 500)
{
analogWrite(5, brightness);
analogWrite(6, brightness);
. . .

brightness = brightness + fadeAmount;
if(brightness == 0 || brightness == 255) {
fadeAmount = - fadeAmount;
}
delay(50);
}
else
{
. . .
```

We may say most aptly that the Analytical Engine weaves algebraical patterns just as the Jacquard loom weaves flowers and leaves.

Augusta Ada King,
Countess of Lovelace
1843





Circuit Design
Simple
Parallel

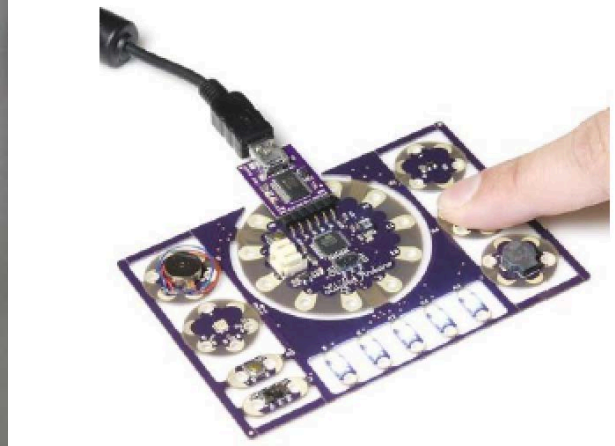
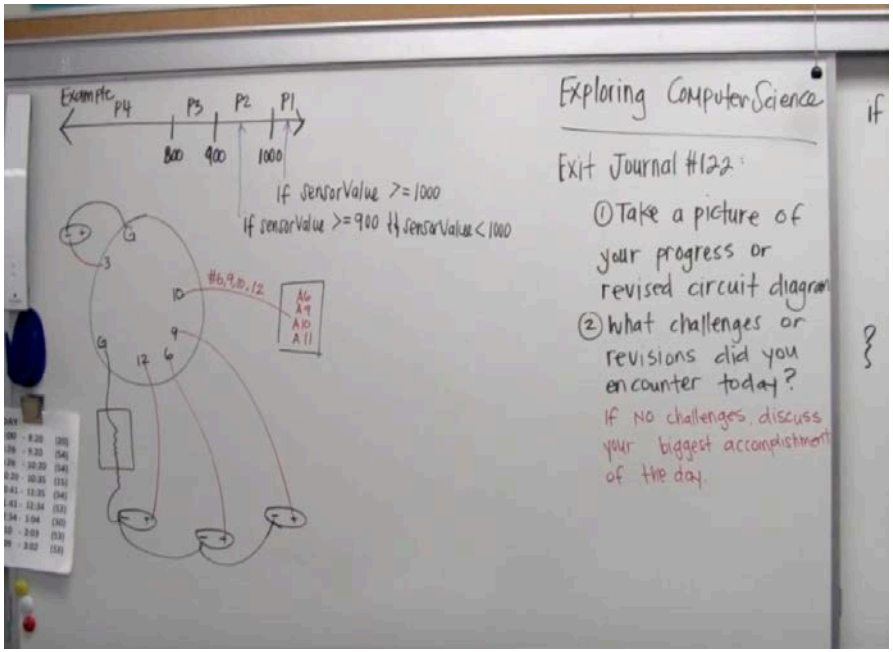


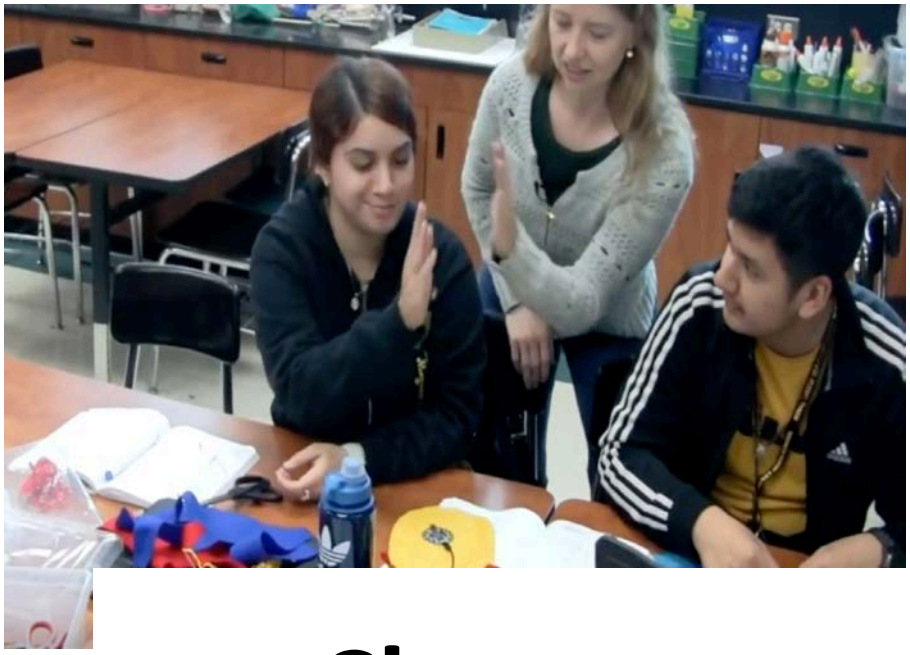
Figure 43: Protosnap LilyPad Development Board

```
digitalWrite(COOL3,LOW);
delay(50);
digitalWrite(COOL4,HIGH);
delay(100);
digitalWrite(COOL4,LOW);
delay(50);
digitalWrite(COOL3,HIGH);
delay(100);
digitalWrite(COOL3,LOW);
delay(50);
digitalWrite(COOL2,HIGH);
delay(100);
digitalWrite(COOL2,LOW);
delay(50);
digitalWrite(COOL1,HIGH);
delay(100);
digitalWrite(COOL1,LOW);
delay(50);
}
if (Switch1 == OFF && Switch2 == ON)
{
digitalWrite(COOL3,HIGH)
digitalWrite(COOL1,HIGH)
digitalWrite(COOL2,HIGH)
```

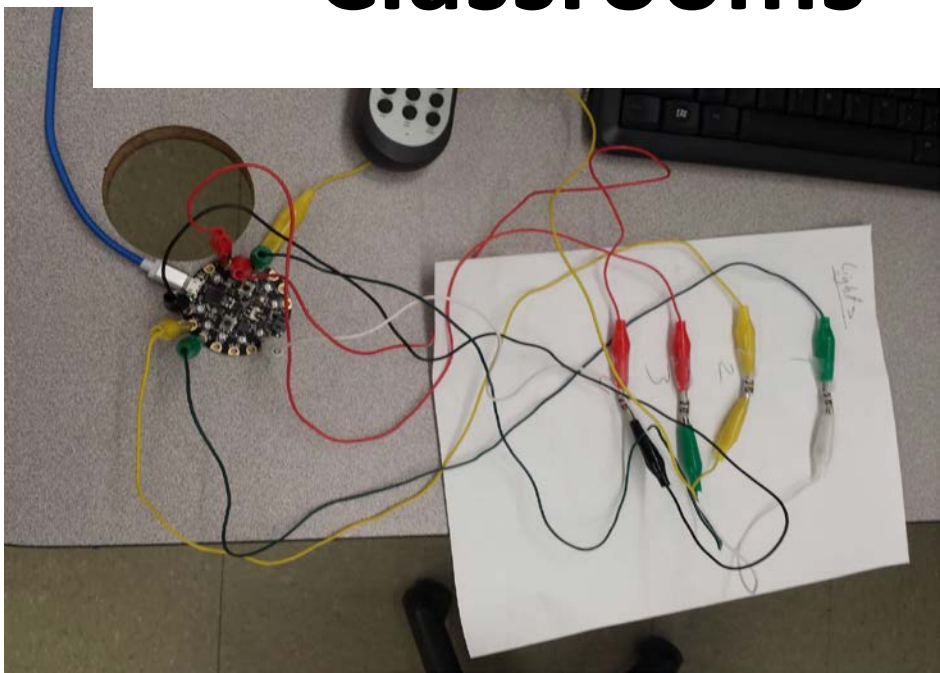
Pattern # 3: (Describe your pattern, what is it going to do or look like)

Coding


Exemple
P4
P3
P2
P1
800
900
1000
If sensorValue >= 1000
If sensorValue >= 900 && sensorValue < 1000
#6,9,10,12
A6
A9
A10
A11
Exploring ComputerScience
Exit Journal #122
① Take a picture of your progress or revised circuit diagram
② What challenges or revisions did you encounter today?
If no challenges, discuss your biggest accomplishment of the day.



Classrooms



- UNIT 1: HUMAN COMPUTER INTERACTION
- UNIT 2: PROBLEM SOLVING
- UNIT 3: WEB DESIGN
- UNIT 4: PROGRAMMING
- UNIT 5: COMPUTING & DATA ANALYSIS
- UNIT 6: E-TEXTILES

CS Concepts

We seek to develop teachers' confidence in course content, which includes in-depth yet accessible computing concepts.

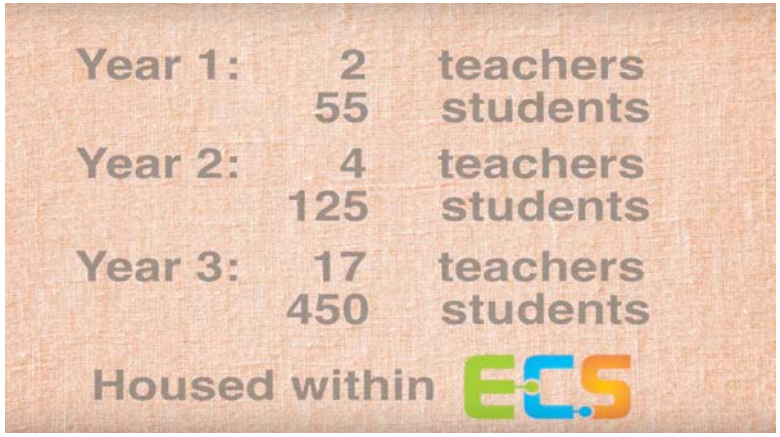
Inquiry

Our curricula involve many opportunities for collaboration, problem-solving, pattern-finding, and abstract thinking.

Equity

We seek to provide meaningful educational opportunities to teachers and students who typically encounter barriers to access.

	Latino/a	African American	White	Asian	Other
2014-15	74%	8%	9%	8%	2%
2013-14	73%	11%	8%	7%	2%
AP-CS	44%	7%	15%	22%	1%
District Demographics	73%	10%	10%	6%	1%

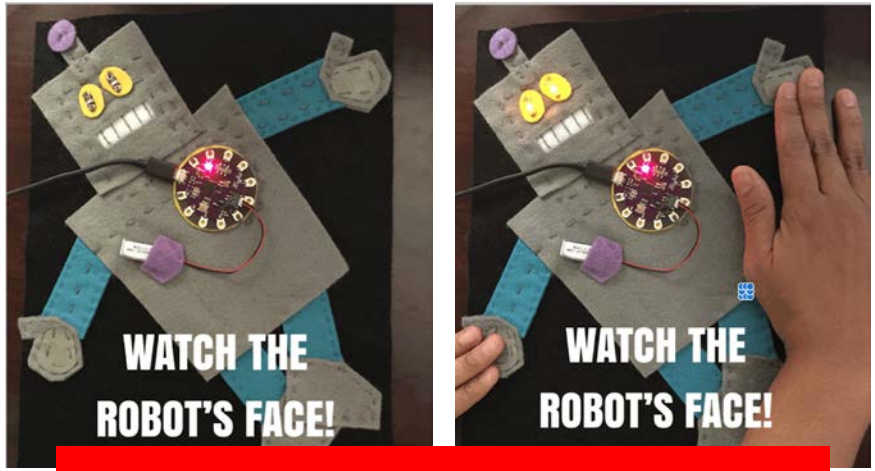


A Diverse Group of ECS students

Project 1: **E-Cards**

Project 2: **Wristband**

Project 2: **Class Banner**



Project 4: **Human Sensor**

DIVERSITY in Students and Projects

	Human Sensor Rubric (100 pts total)	Points Earned
Basic Requirements (10 pts)	At least four independently controllable LEDs attached & two conductive patches	
Design Notebook (10 pts)	All Design Notebook entries completed.	
Sewing (15 pts)	- Electrical components are securely sewn in - Stitches are neat, evenly spaced and secure - The back of the project is as neat as the front.	
Design (15 pts)	- The design appears to be purposeful and/or personal. Care has been taken in the look and feel of the project.	
Comments on design & craft:		
Diagram (15 pts)	- The diagram is clear, readable, and functional. Someone else could use this to make the design themselves! - Circuit Playground pins are clearly labeled and positive and negative pins/lines are distinct on the circuit diagram.	
Light-On (5 pts)	- The lights function when a Circuit Playground is powered.	
Comments on Circuitry:		
Coding		
Four Lighting Patterns (5 pts)	- There are four functional lighting patterns. Each is different in some way.	
Coding (15 pts)	- Naming & Setup sections are complete - Conditionals are programmed effectively and are functional.	
Commented Code (5 pts)	- Code is well commented: there are comments on each named variable, each conditions, and some description of each lighting pattern.	
Sensors (5 pts)	Aluminum foil sensors work and detect at least four variable levels of touch. The sensors are programmed to be continuous (or vary intentionally non-continuous).	
Comments on Coding:		
Extra Credit	Use of additional coding elements such as fading, random light patterns, or sound. Additional conditions (i.e., more than 4 lighting patterns or similar outputs) triggered by the sensor. Or some other form of going above and beyond on this project	
Design & Craft:	**Circuitry:** **Coding:** **Extra Credit:** **TOTAL:**	**/100**

TEACHER EVALUATION

Rubrics

Description

- My project is a minion from the movie of Despicable Me.
- My sensors are placed in the overall of the minion. The LED's are placed in the head of the minion as the fire emergency lights.
- For Pattern 1, I want each light to turn on and turn off one by one. Pattern 2 I want them to turn on one by one with a 500 delay and then turn them off with also a 500 delay. Pattern 3 I want them to all turn on at the same time and have a 10 delay then turn off at the same time. Pattern 4 is exactly the same as pattern 3 but with a

Challenges

Loose thread because I had to redo the line from the patch to the circuit playground

One of the challenges I had would be the sewing it was very difficult because the fur on the stuff animal kept getting in the way of the thread. So I tried making sure the thread was touching the circuit playground and not the fur. Also it made it difficult to see where the sewing lines and I didn't want to cross lines and mess up my circuit diagram.

Only one light because I had to redo the line because one of the lights

Revisions

- At the beginning I was planning to put the sensors all the way on the top of the overall to make it as buttons but the sensors had to be bigger.

- In the image below it is picture of my circuit diagram, I had planned how I was going to do my minion. I was running out of time so I forgot to put the arms and legs. So I had to do a minion without the arm and legs.

Reflection

I feel like I improved a lot in the design and making a better minion. My sewing might be a little ugly still but I feel like I do it a little bit more faster. On my wristband project I planned to do it with a minion face but I could not cut it out to look good. Notice that in circuit diagram for my wristband I scratched out the minion face because I had to change it to just it being the overall.

Diagram for wristband

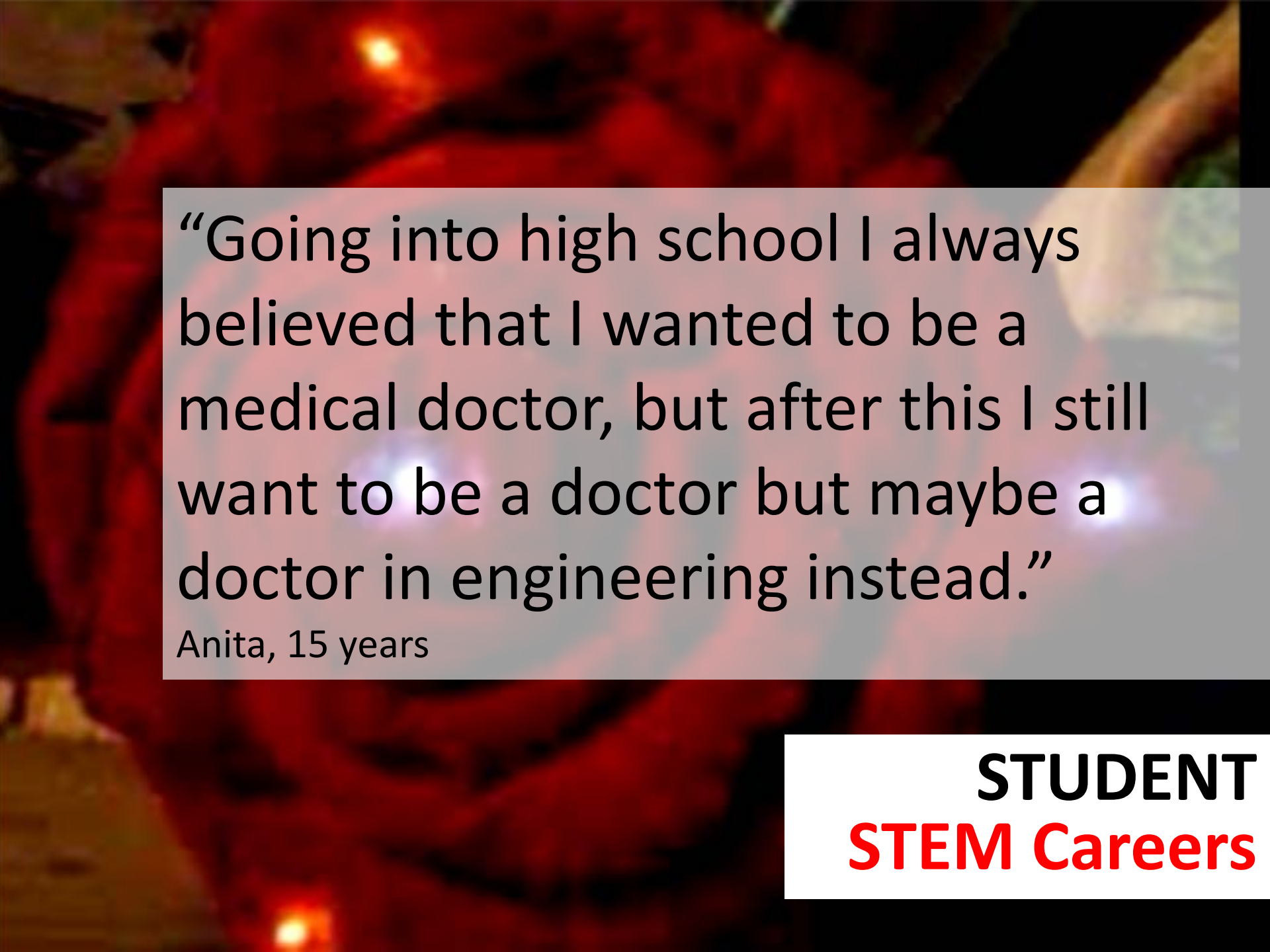
Final wristband project

Improvement

STUDENT e-Portfolios

One skill that I learned in the E-textiles unit is that I improved from continuing from the unit was sewing. This skill affected my life by learning something new that I didn't know how to do it .Now I can use the skill of sewing when ever I need to when shirt rips , my pants and other clothing

THE END


“Going into high school I always believed that I wanted to be a medical doctor, but after this I still want to be a doctor but maybe a doctor in engineering instead.”
Anita, 15 years
STUDENT
STEM Careers

CURRICULUM

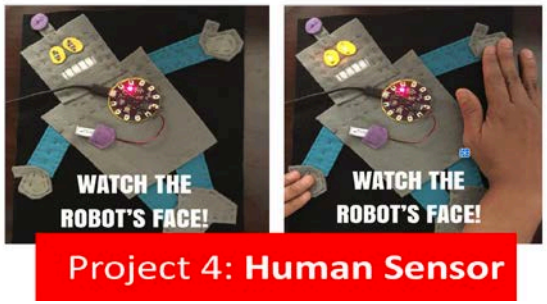
Deborah Fields
John Landa
Yasmin Kafai
Tomoko Nakajima
ECS teachers

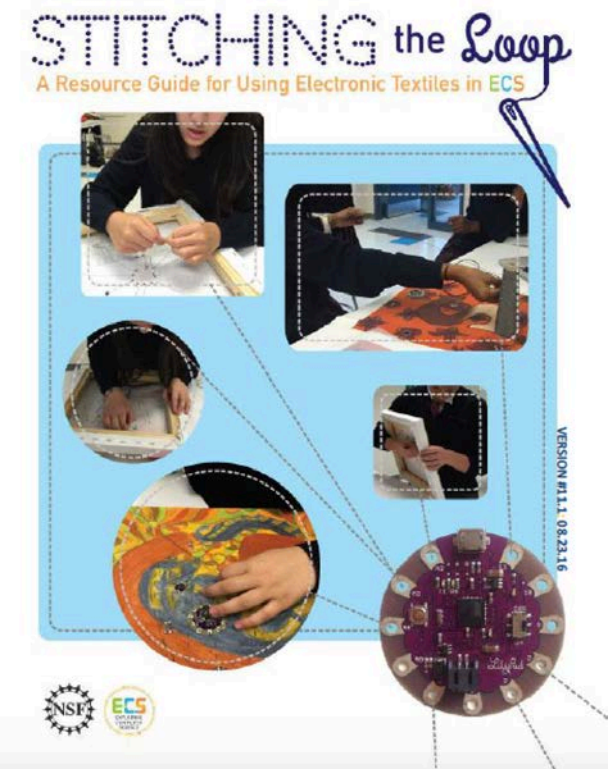
RESEARCH

Yasmin Kafai
Deborah Fields
Joanna Goode
Tomoko Nakajima
Jane Margolis
Debora Lui
Breanne Litts
Justice Walker
Gayithri Jayathirtha
Mia Shaw
Sari Widman
Janell Amely

1509245/1510725/1512760
Yasmin Kafai, Joanna Goode and Jane Margolis

CURRICULUM SUMMER 2018 TECHNICAL Guide

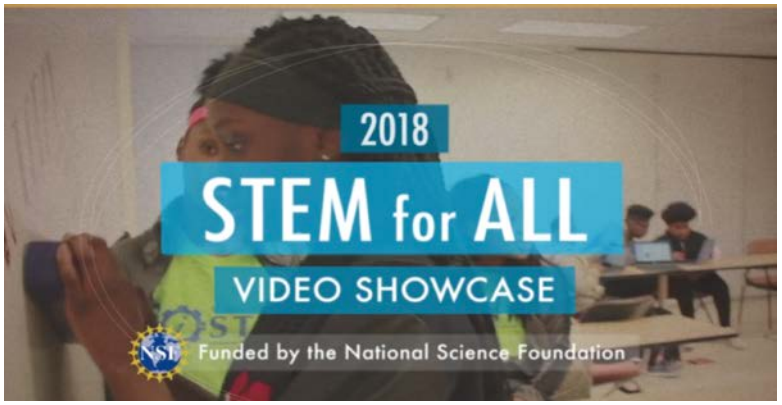


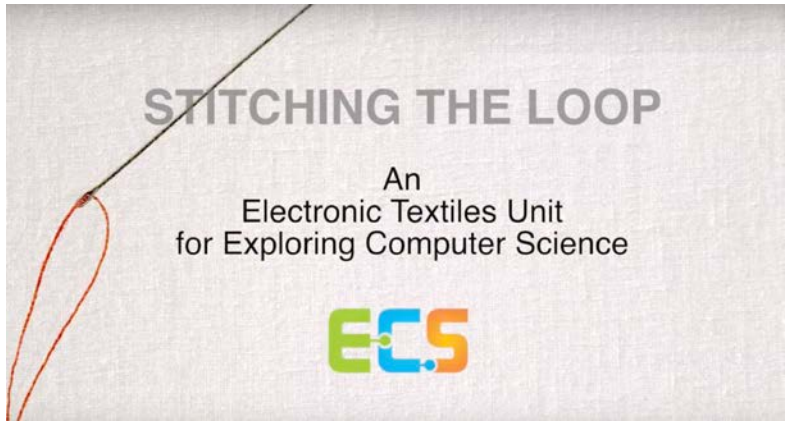


CS STANDARDS Guide

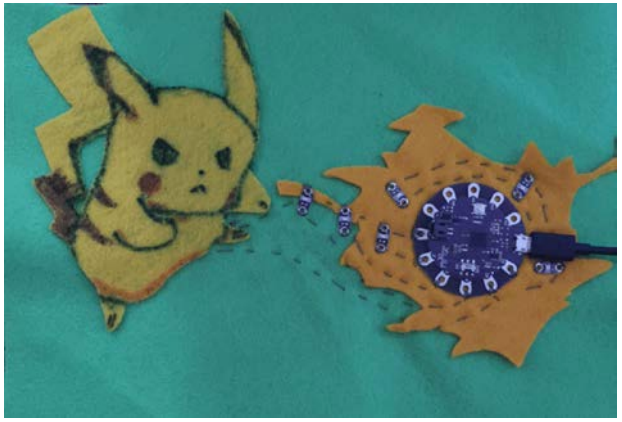
RESOURCE Guide

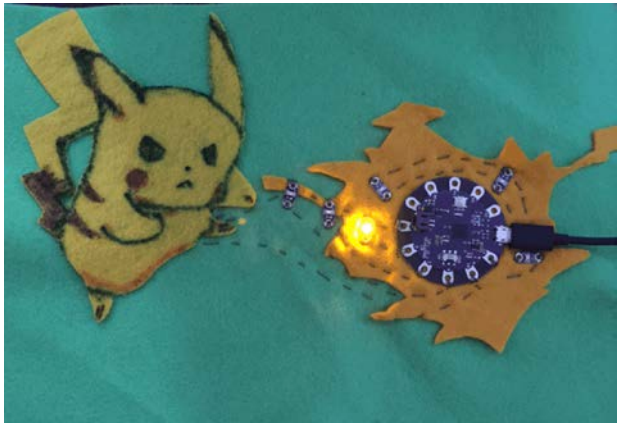
www.exploringcs.org/etextiles

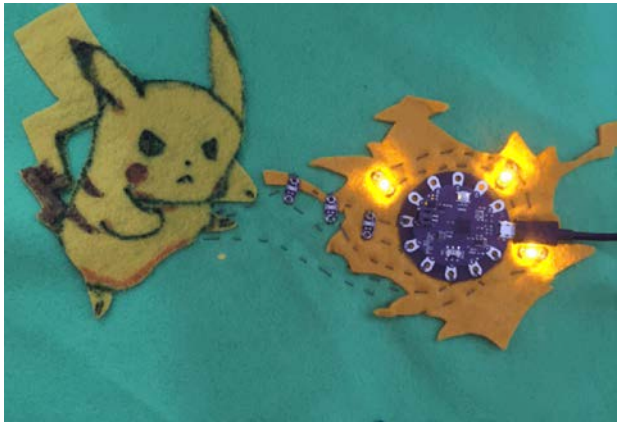




WATCH OUR VIDEO & VOTE FOR US!







Using Spatial Narratives to Link Community Engagement and Awareness of STEM Careers

BETH SCHLEMPER, DEPARTMENT OF GEOGRAPHY AND PLANNING

STELAR ITEST PI & EVALUATOR SUMMIT

MAY 14, 2018

Frightening?

"Rather than think of what jobs will disappear, experts advise thinking of how jobs will change."

Source: https://www.independent.co.uk/news/science/robots-are-coming-but-will-they-take-our-jobs-uk-artificial-intelligence-doctor-who-a8080501.html

Much more frightening

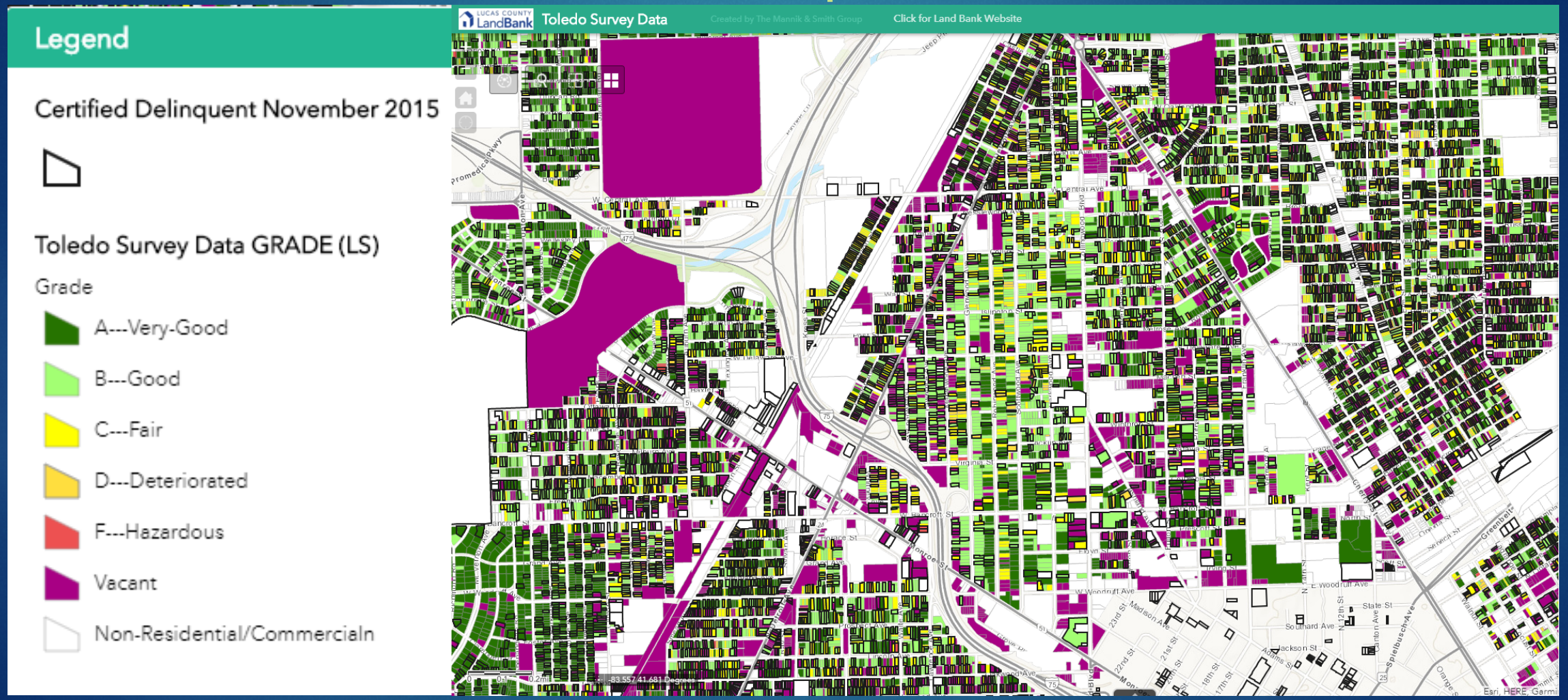
Dan Wasserman-Tribune Content Agency

- Richest 1 percent owned more than half the world's wealth in 2016.

Source: http://www.reuters.com/article/2015/01/19/us-davos-meeting-inequality-idUSKBN0KS0SW20150119

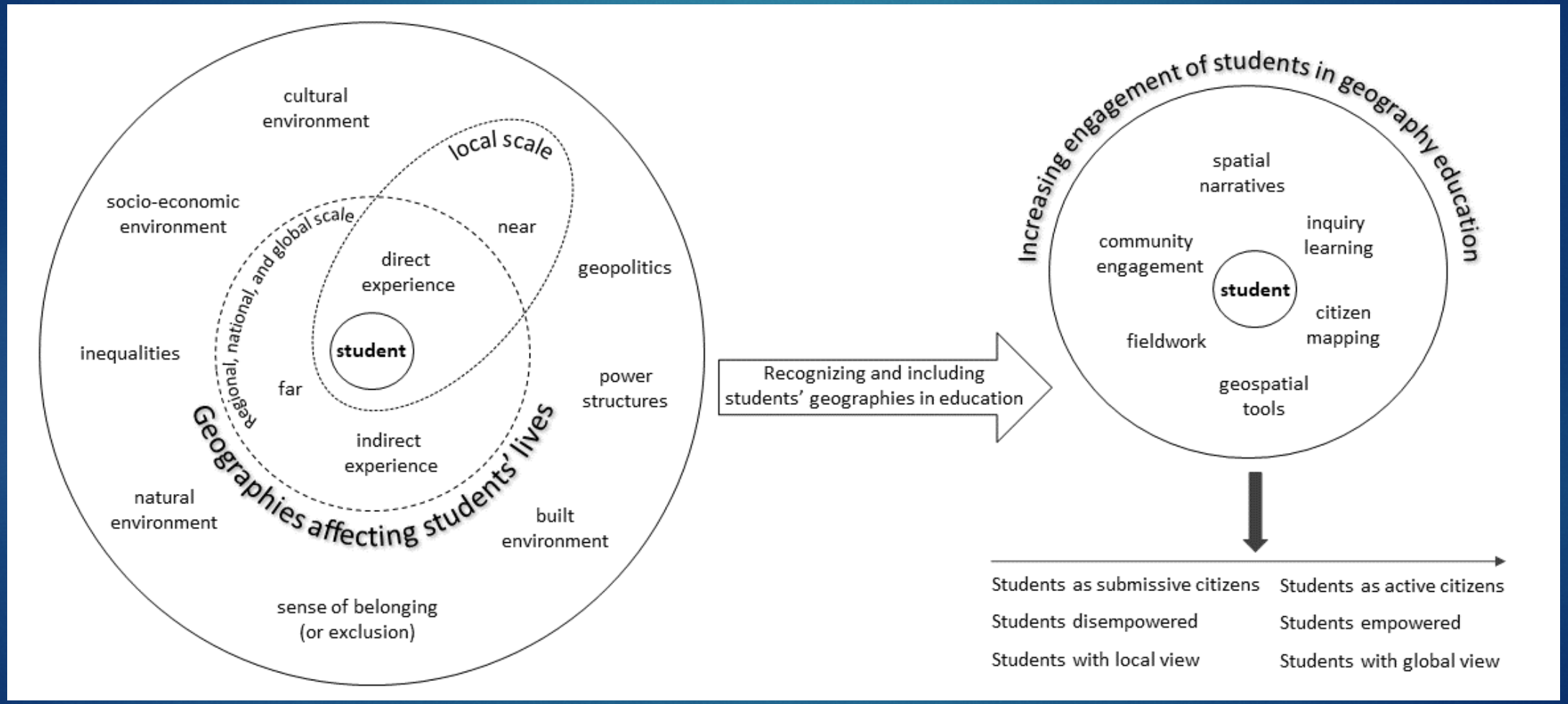
Locally the gap is evident too

- Example: Toledo, Ohio



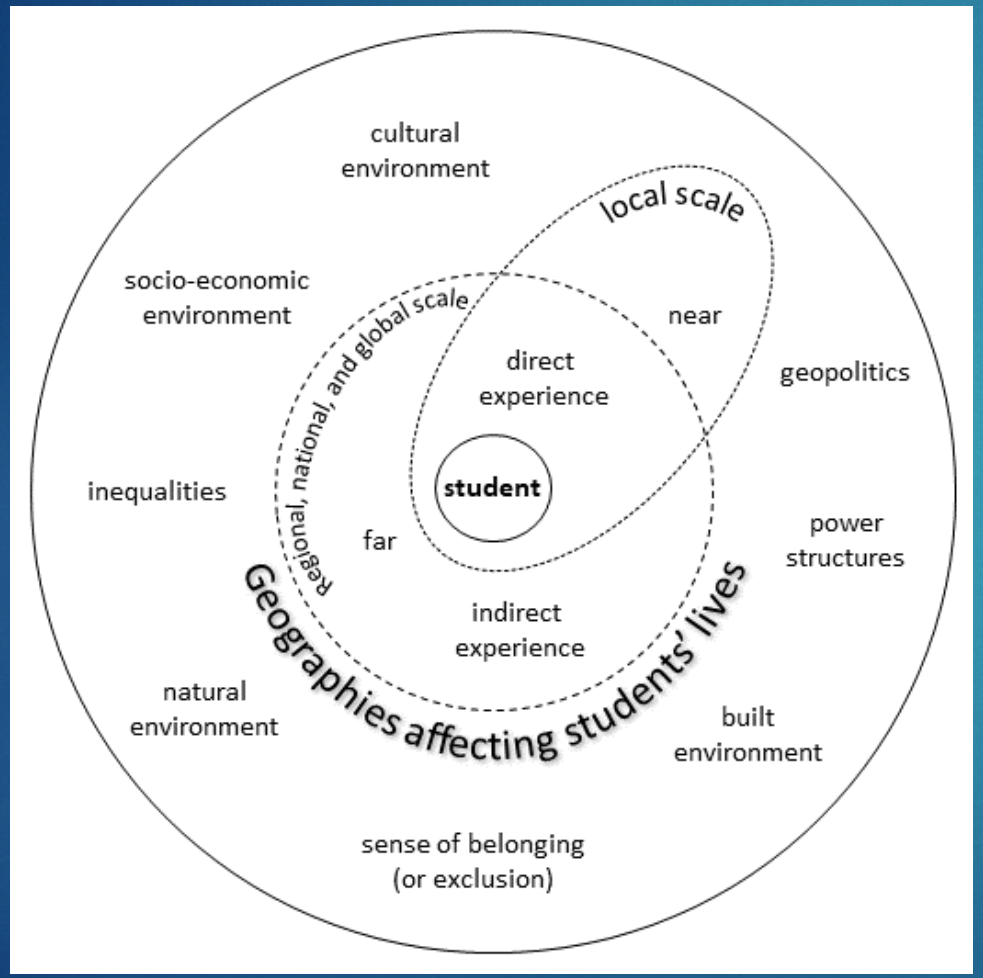
Source: Lucas County Land Bank Survey: http://co.lucas.oh.us/2783/The-Toledo-Survey

Including Students' Geographies and Increasing Engagement



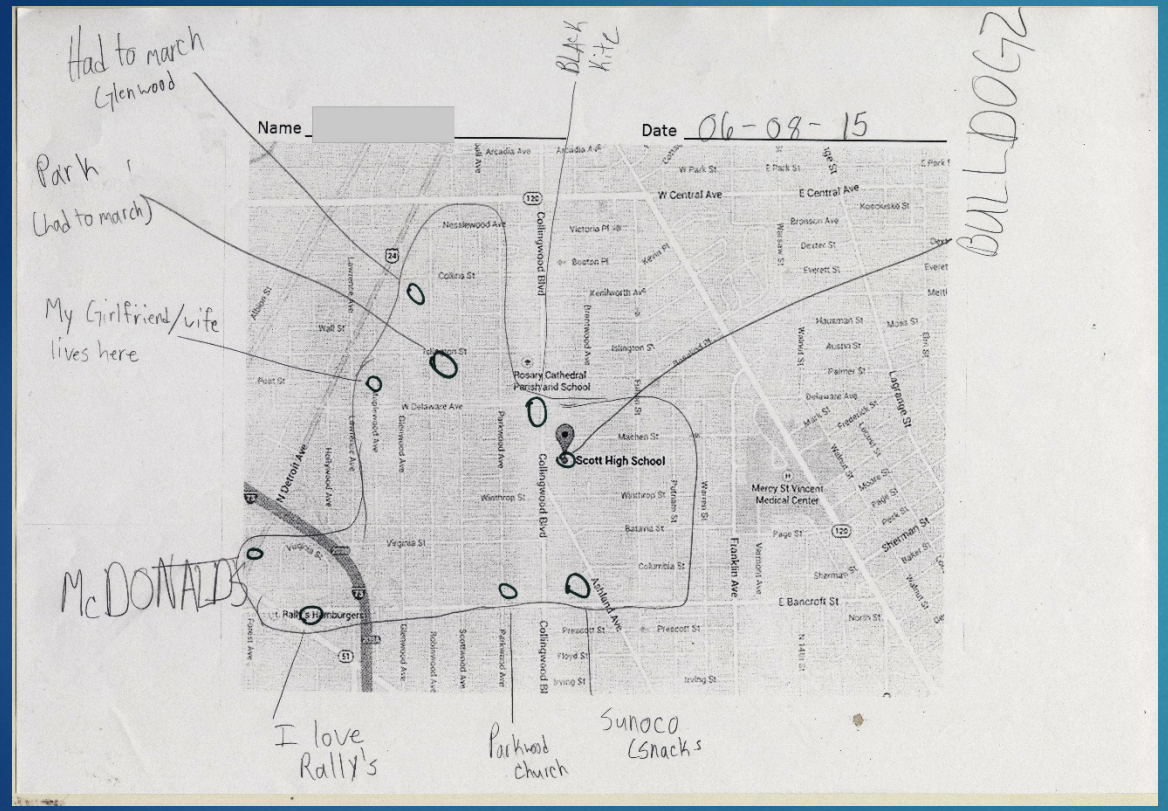
Source: Figure 1 (Schlemper, Stewart, Shetty, & Czajkowski, 2018, 10).

Equity:
Environmental and Social Justice

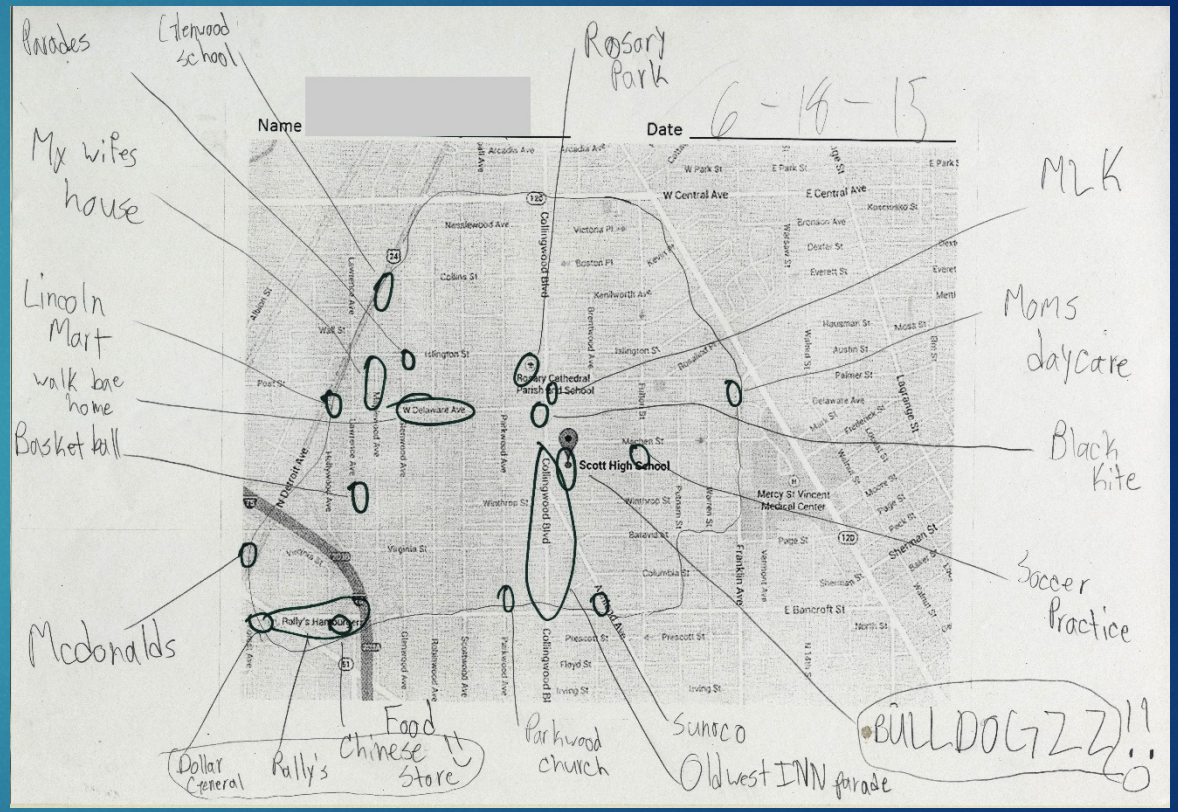


Spatial Narratives

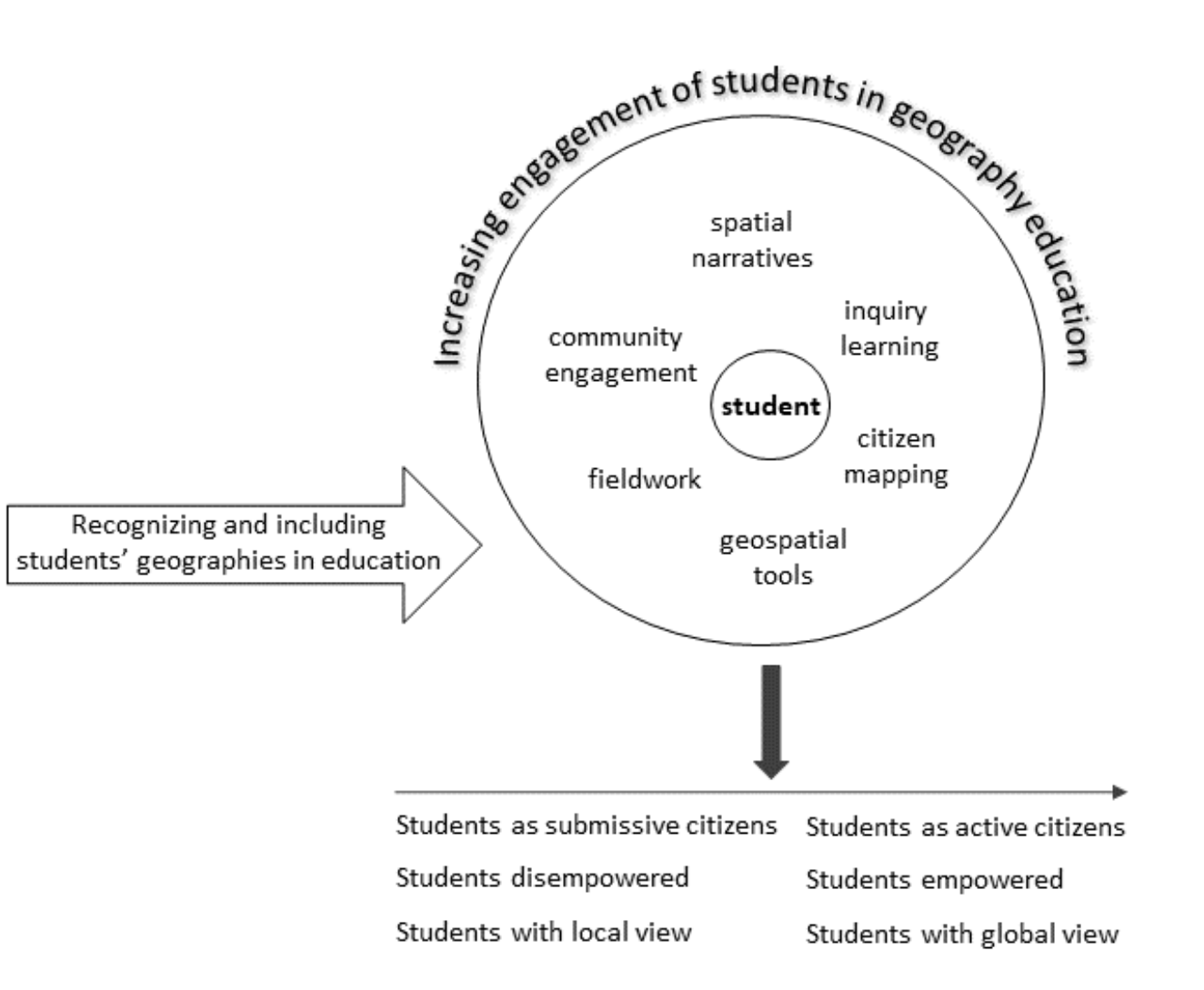
Pre-Sketch Map Familiar Areas



Post-Sketch Map Familiar Areas



Including Students' Geographies and Increasing Engagement



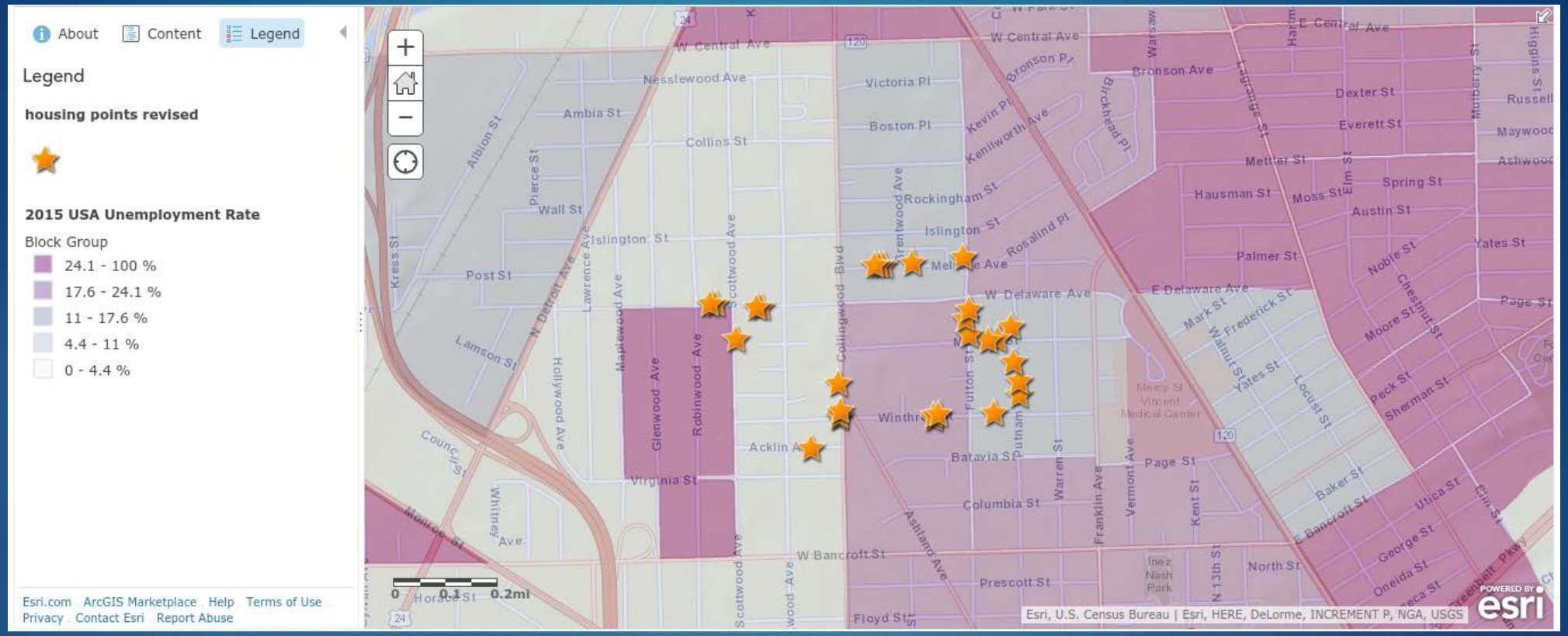
Case Study: Housing Group

(Summer 2016)

- Inquiry Question:

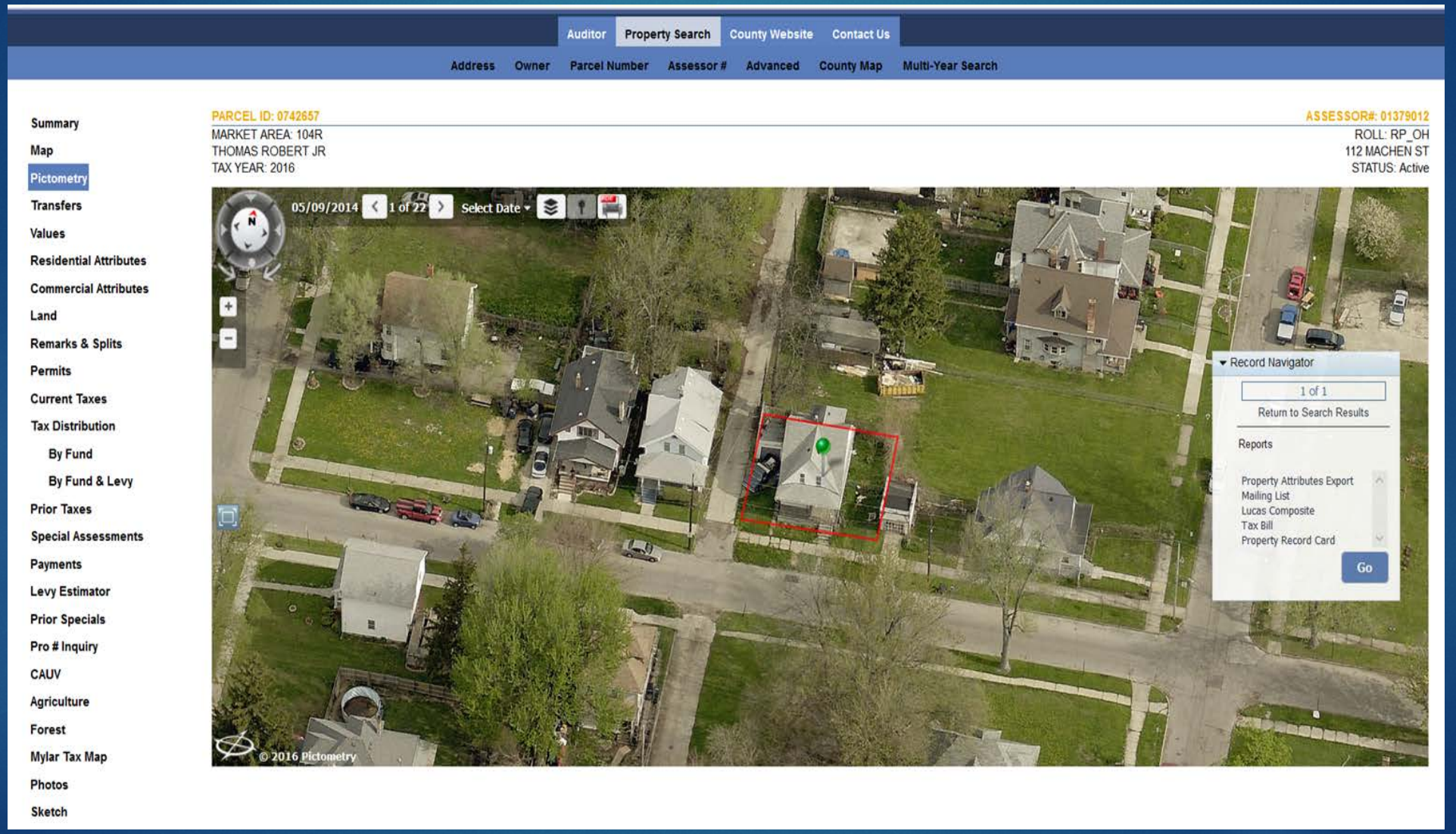
"Do abandoned houses impact the value of other houses in the community?"

Citizen Mapping



One of their maps illustrating the GPS data points of houses they identified as abandoned (with 2015 unemployment rates data layer)

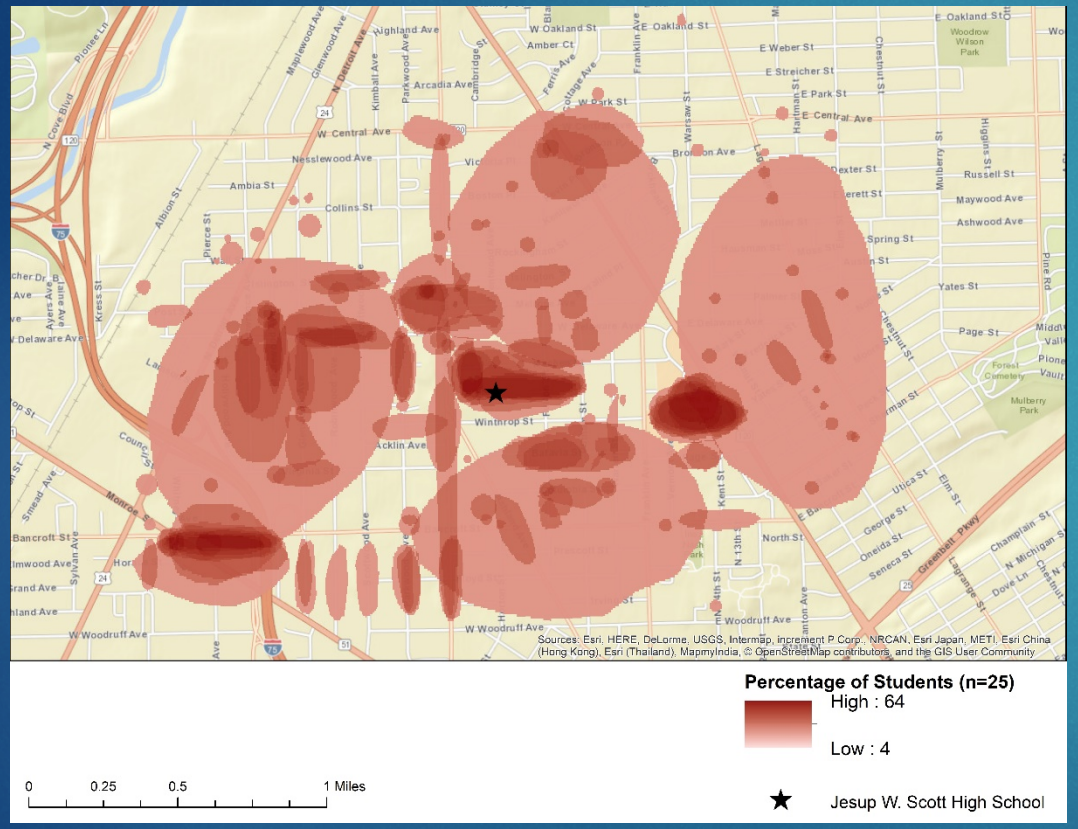
Case Study: Housing Group



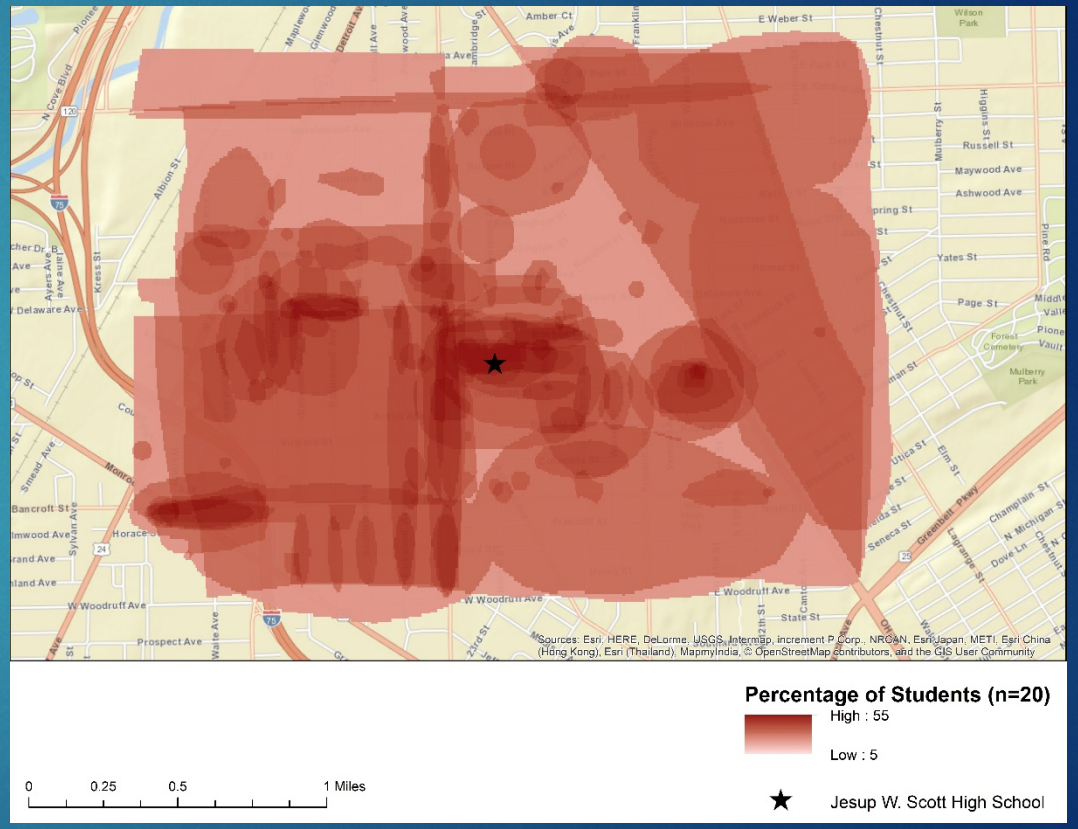
What did they discover?

Expanding Students' Spatial Narratives

Pre-Sketch Maps Familiar Areas

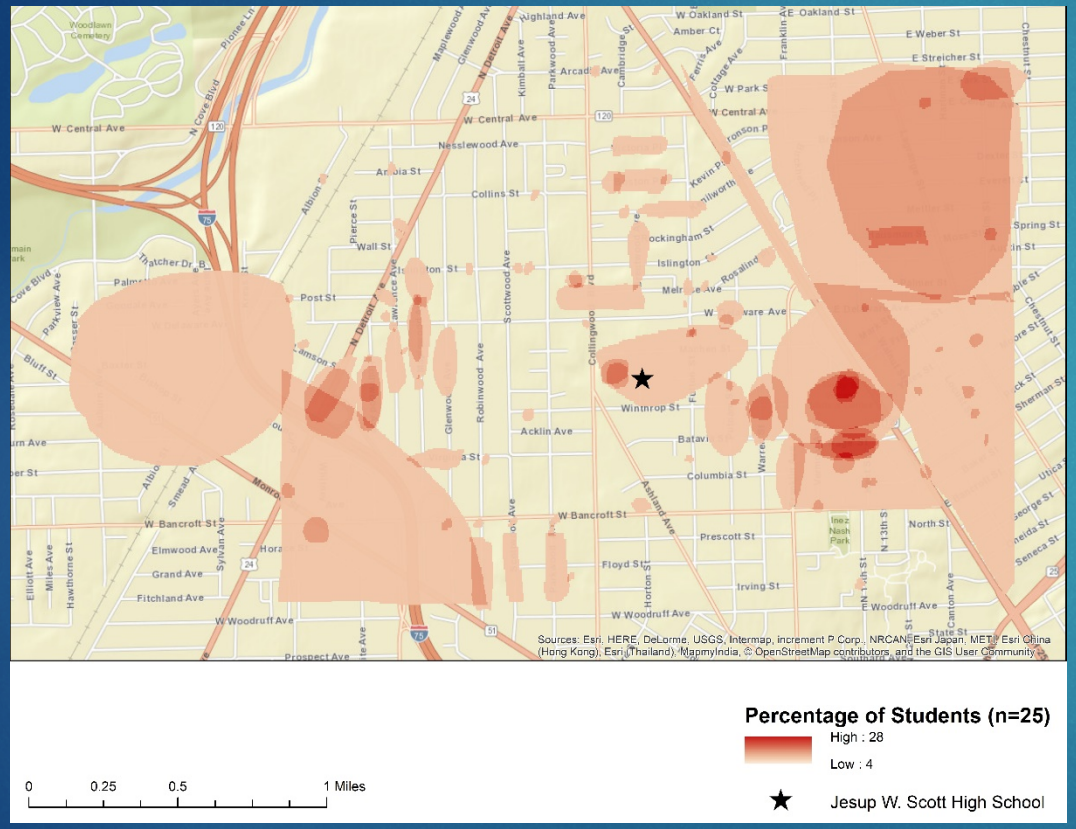


Post-Sketch Maps Familiar Areas

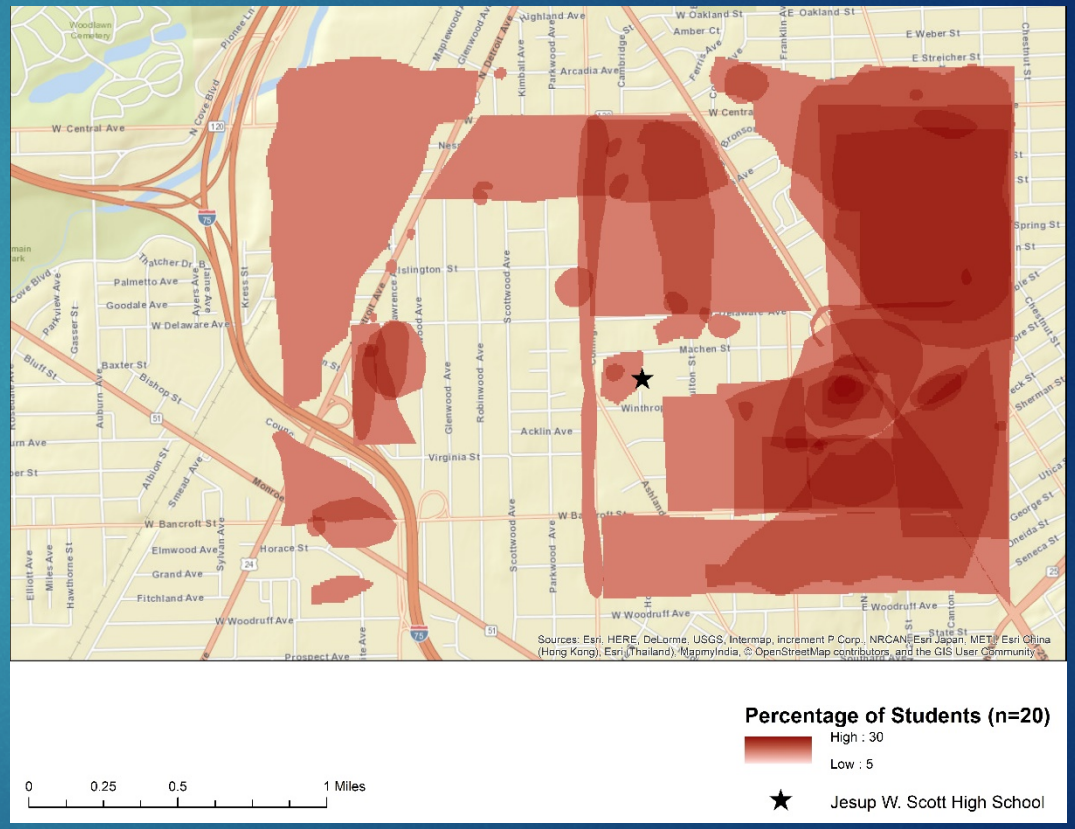


Expanding Students' Spatial Narratives

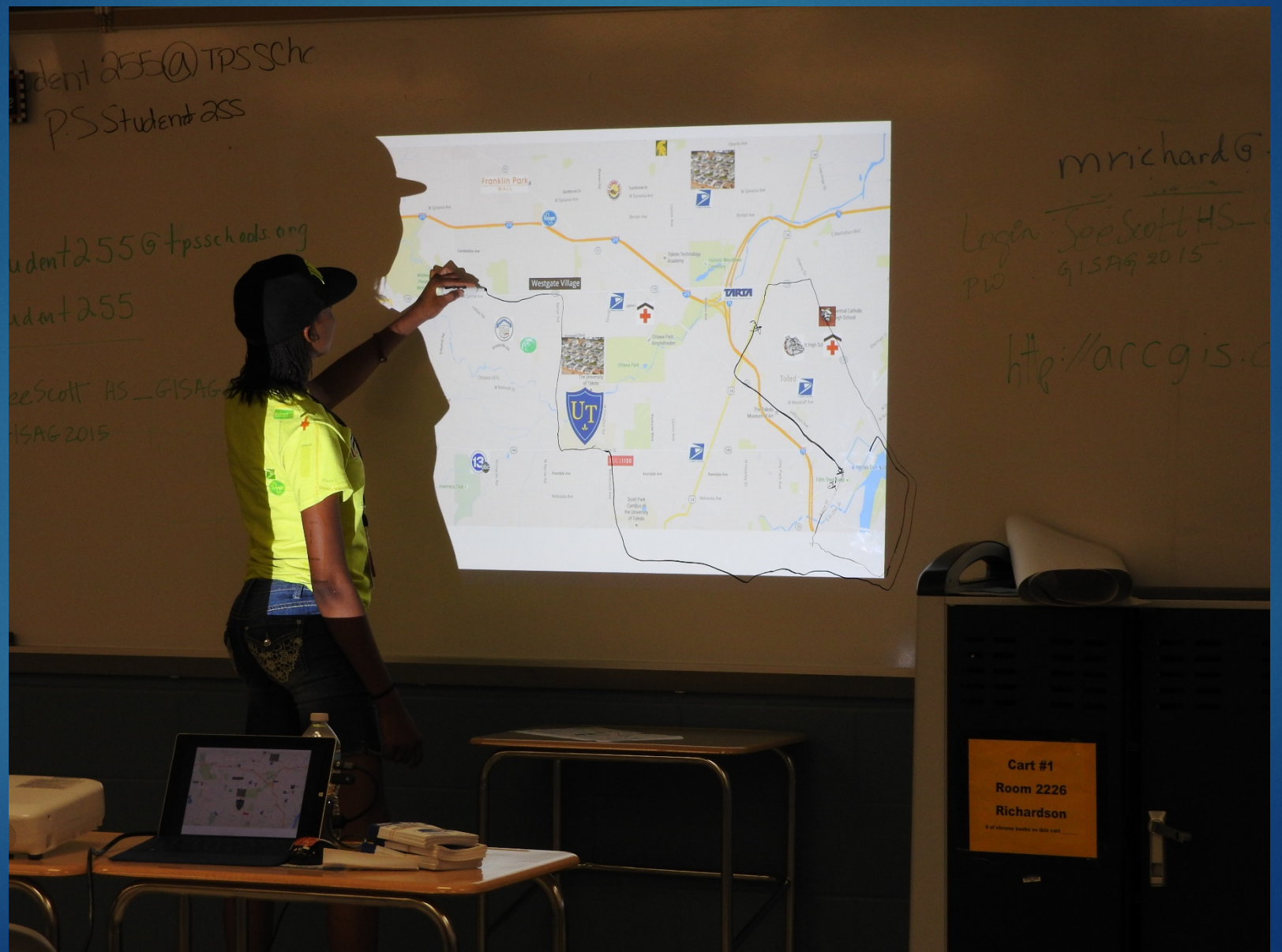
Pre-Sketch Maps Avoided Areas



Post-Sketch Maps Avoided Areas

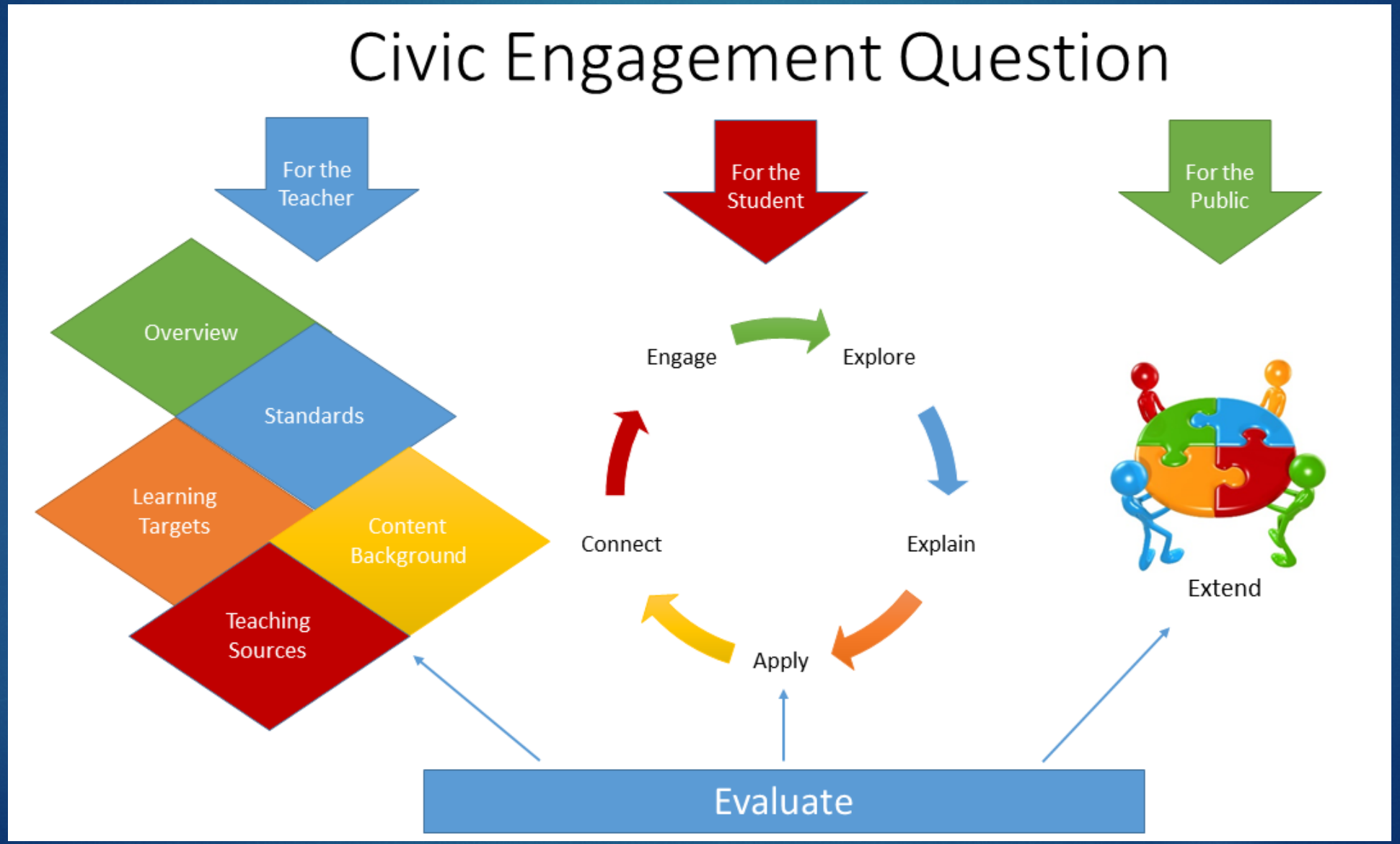


Connections to Careers



Connections to Careers

Curriculum Framework



Six Validated Modules

Technology and Society

Acknowledgements

- Supported by an ITEST grant from the National Science Foundation (DRL-1433574)

- Schlemper, M. B., Stewart, V. C., Shetty, S., & Czajkowski, K. (2018). Including students' geographies in geography education: Spatial narratives, citizen mapping, and social justice. *Theory & Research in Social Education*. doi:10.1080/00933104.2018.1427164

- For more information about the project and to access the curriculum modules, please visit the project website:
- http://www.utoledo.edu/research/advancing-geospatial-thinking/

BUILDING UNIQUE INVENTIONS TO LAUNCH DISCOVERIES, ENGAGEMENT AND REASONING IN STEM

TUSKEGEE ACADEMY

Martha Escobar (Oakland University) & Mohammed Qazi (Tuskegee University)

What is BUILDERS?

- Summer camp and academic year experience.
- Target: rising 10th-12th graders in Macon County, Phenix City, and Montgomery public schools.
- Facilitators: teachers from participating schools, STEM faculty and graduate students at Tuskegee University.

Our schools

Schools	% Minority	% Free and Reduced Lunch
Macon County School District		
Booker T. Washington HS	100%	100%
Notasulga HS	94%	100%
Phenix City Schools		
Central High School	74%	76%
Montgomery Public Schools		
Robert E. Lee HS	89%	100%

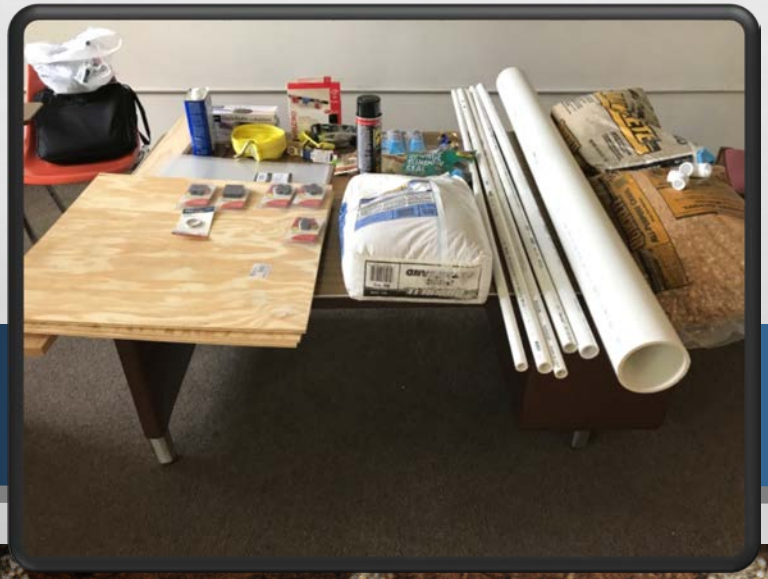
What do BUILDERS do?

- Students are tasked with identifying a problem that affects their communities.
- Teamwork in a **Makerspace** to design, develop, and test a prototype that solves this problem.
- Goal: Help students develop 21st century skills for STEM careers and the workplace.

Prototypes?

- Students must research their problem and find a plausible solution.
- Prototypes must be:
  - ✓ Inexpensive
  - ✓ Use readily available materials
  - ✓ Portable

RULES:
We give you the materials, you make it happen

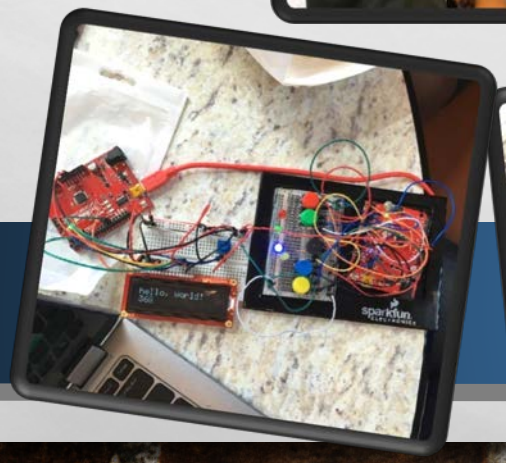


This is how it happens…

- Teachers receive training on facilitating the makerspace.

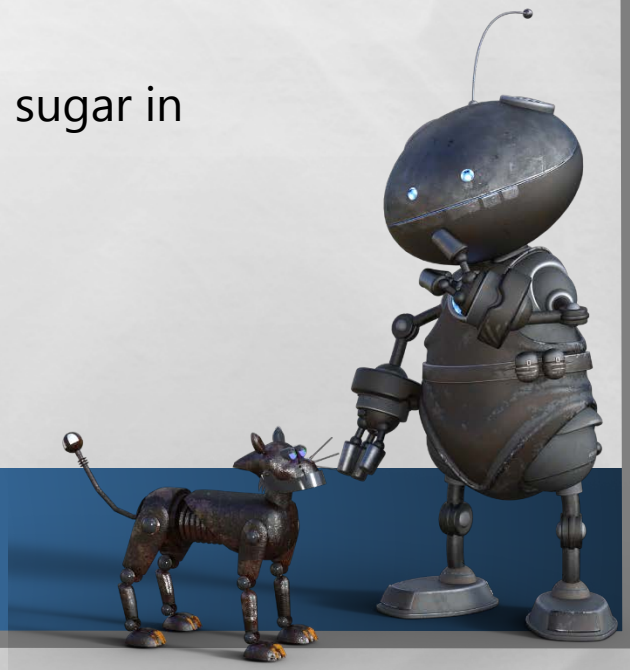
Technology at your service

- Electronic devices on loan for the summer.
- Access to STEM faculty, graduate students, and lab equipment at Tuskegee University.



What problems?

- Emphasis on the use of technology to address a real problem that could affect their community.
  - ✓ Develop an inexpensive water purification system.
  - ✓ Make a waterproof system to track pets using GPS.
  - ✓ Create an effective and inexpensive battery with minimal ecological impact.
  - ✓ Invent a non-invasive method to track blood sugar in individuals with diabetes.



The Makerspace

- Project-based learning with loose organization.
- Teacher and students are partners in learning.
- Instruction is incidental to the project.
- Failure is viewed as a preliminary success.
- Students construct their knowledge.

Our Teachers

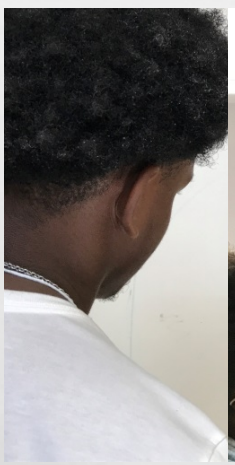
- Guides rather than lecturers.
- Mentors who provide encouragement and continuous feedback.
- Take advantage of “teachable moments” as the project develops.
- Supported by STEM faculty and graduate students.

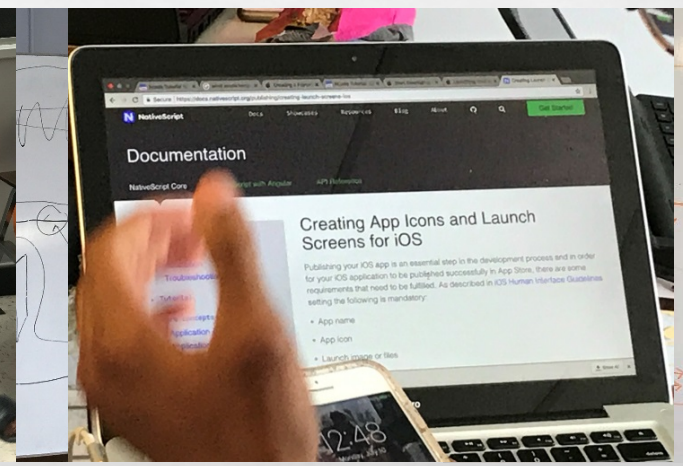
Soundboxes

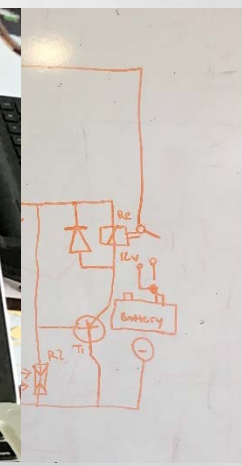
- First making activity of the camp.
- Materials: Cardboard, fabric, foam, tape, bubble wrap, garbage bags.
- Team- and confidence-building.
- Concepts taught within an hour:
  - ✓ Sound vs. light waves
  - ✓ Density
  - ✓ Sound transmission
  - ✓ Sound perception

Research and design

- Teams researched their problem, made blueprints, decided on materials.
- Use of online and campus-based resources.







Collaborative Planning of Hardware

Brainstorming of Hardware designs

Building & refining prototypes

- Construction led to many failures...
- Students continued working on their prototype after school through the school year.

Solar cell-powered battery

Building & refining prototypes

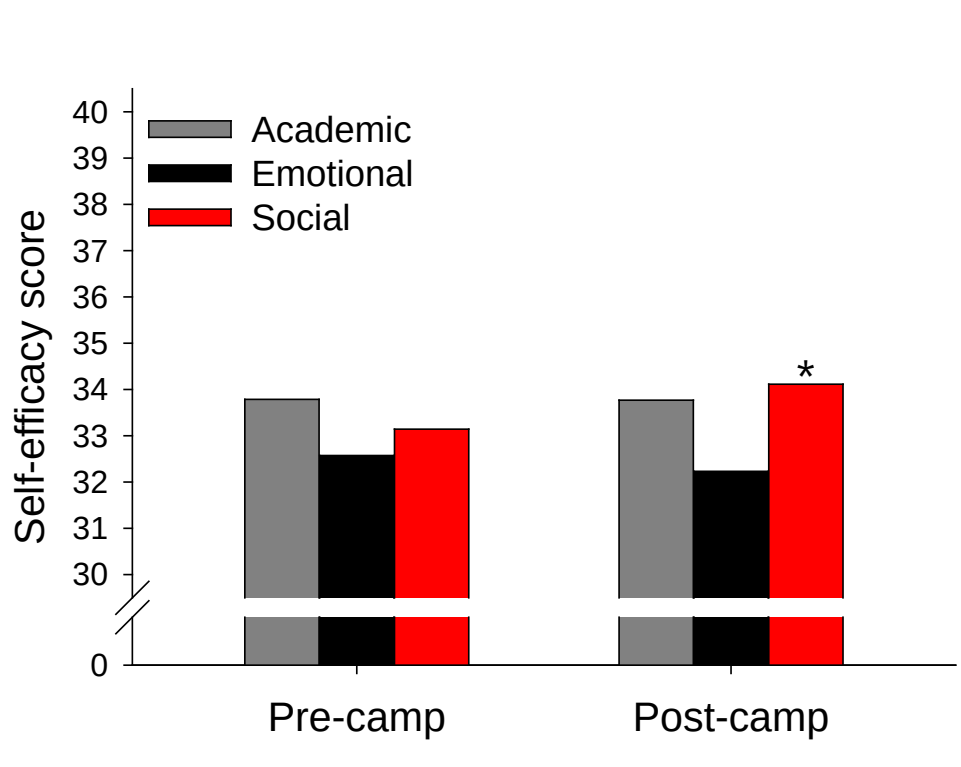
- Students' put great effort into producing a product that they felt proud to present.

Our research

- 32 campers, pre-post camp data available from 28.
- 71% African-American, 13% mixed race, 6% white.
- 69% male, 31% female.
- All students had a GPA higher than 3.0 and were recommended by STEM teachers at their school.

Self-efficacy

- Students scored very high in self-efficacy even before attending the camp.
- However, social self-efficacy increased as a result of the teamwork experience.



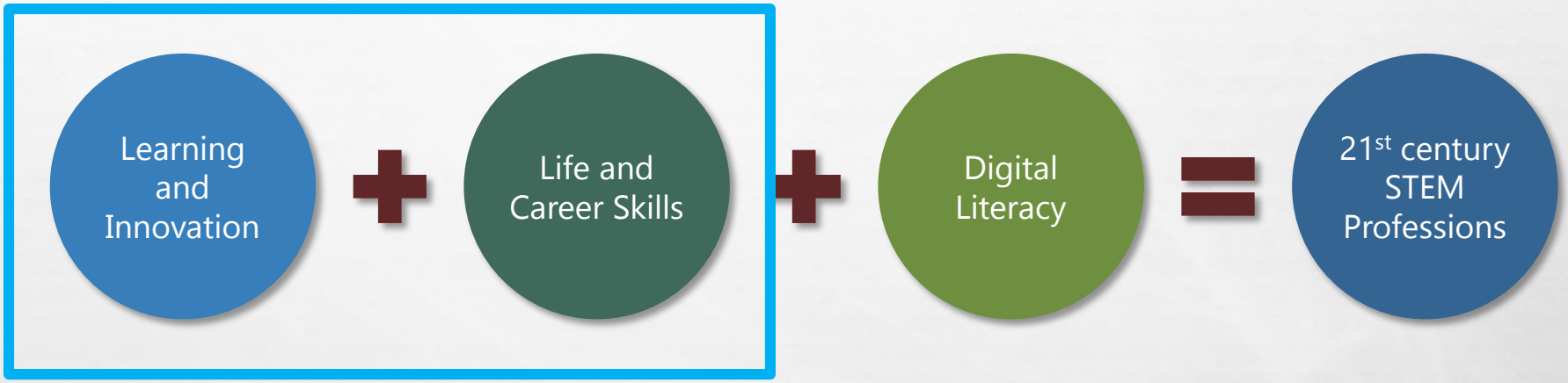
SEQ-C (Muris, 2001)

Makerspace experience

- Students thought the makerspace experience:
  - ✓ Taught them useful things.
  - ✓ Will help them with college and job applications.
  - ✓ Made their parents and themselves proud of what they accomplished.
  - ✓ Helped them meet others

Lunchtime looked like this…

21st Century Skills



Learning & Innovation:

- ✓ Knowledge of core subjects
- ✓ Critical thinking and problem solving
- ✓ Communication and collaboration
- ✓ Creativity and innovation

Life & Career Skills:

- ✓ Flexibility and adaptability
- ✓ Initiative and self-direction
- ✓ Social and cross-cultural interaction
- ✓ Productivity and accountability
- ✓ Leadership and responsibility

Identification with 21st century skills

	Before summer experience	After summer experience
Critical Thinking	Self ~ STEM professional*	
Flexibility & Adaptability	Self < STEM professional	
Social Interaction	Self < STEM professional	
Creativity & Innovation	Self < STEM professional	
Knowledge of core subjects	Self < STEM professional	
Leadership & Responsibility	Self < STEM professional	
Productivity & Accountability	Self < STEM professional	
Initiative & Self-Direction	Self < STEM professional	
Communication & Collaboration	Self ~ STEM professional	

*Frequency of use of descriptors for each skill

www.TuskegeeBuildersAcademy.org

@TUBuilders

What comes next?

- 2017 campers will hold a public showcase of their prototypes.
- 2018 camp will have 5 returning campers to serve as peer mentors.
- Assessment of long-term gains from the year-long experience.
- Measure development and validation.

This material is based upon work supported by the National Science Foundation Grants DRL-1657399 and DRL-1657123. Any opinions, findings, and conclusions or recommendations expressed here are those of the authors and do not necessarily reflect the views of the National Science Foundation.

Flash Talk Table Conversations

- What is something new you learned?
- What do you want to learn more about?
- What connections do you see in your own work?

Flash Talk Round 2:

- Design Notebooking and Knowledge Building Practices during Elementary School Engineering
  - Kristen Wendell, Tufts University

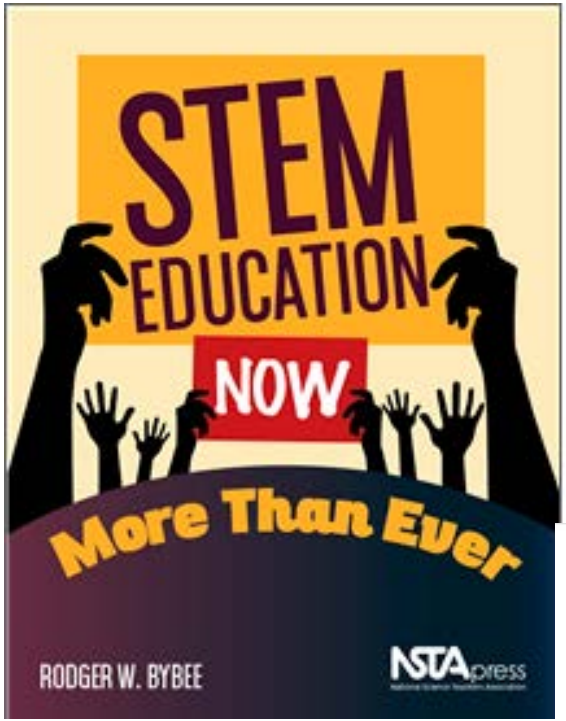
- Think Data, Act Local
  - Cassie Xu, Columbia University

Design Notebooking and Knowledge Building Practices During Elementary School Engineering

Kristen Wendell
Tufts University
Departments Of Mechanical Engineering and Education

ConnecTions in the Making
Tufts University, UMass Boston, Boston Public Schools & Marlborough Public Schools
Tej Dalvi, Chelsea Andrews, Nicole Batrouny, Fatima Rahman

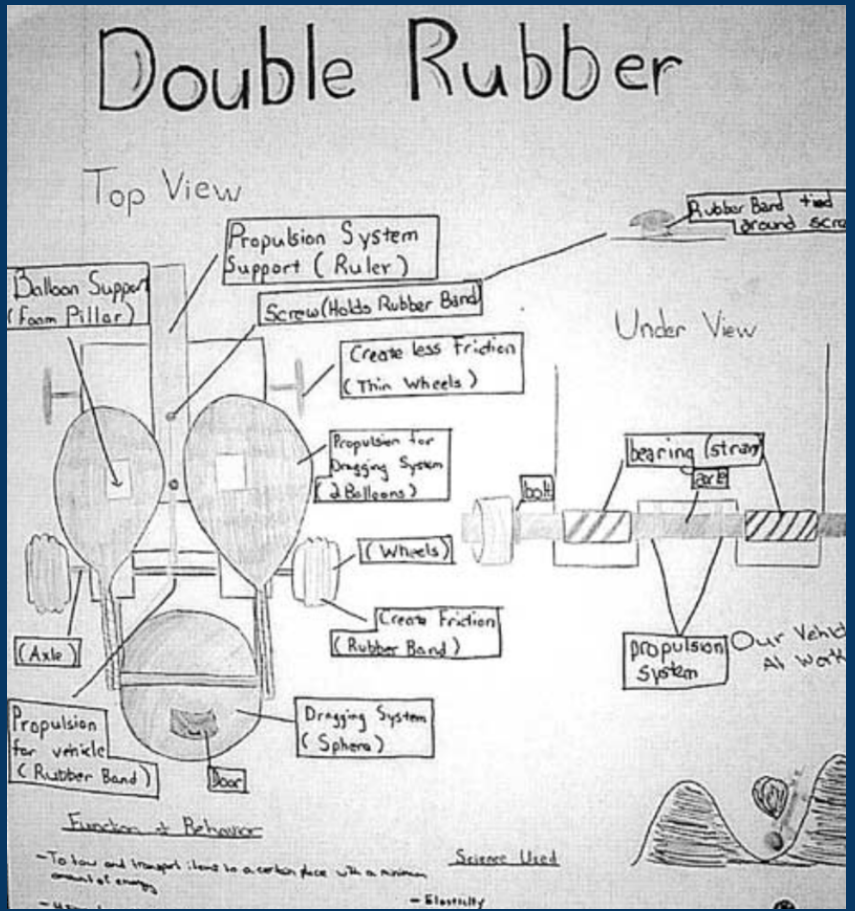
Tufts UNIVERSITY | Center for Engineering Education and Outreach

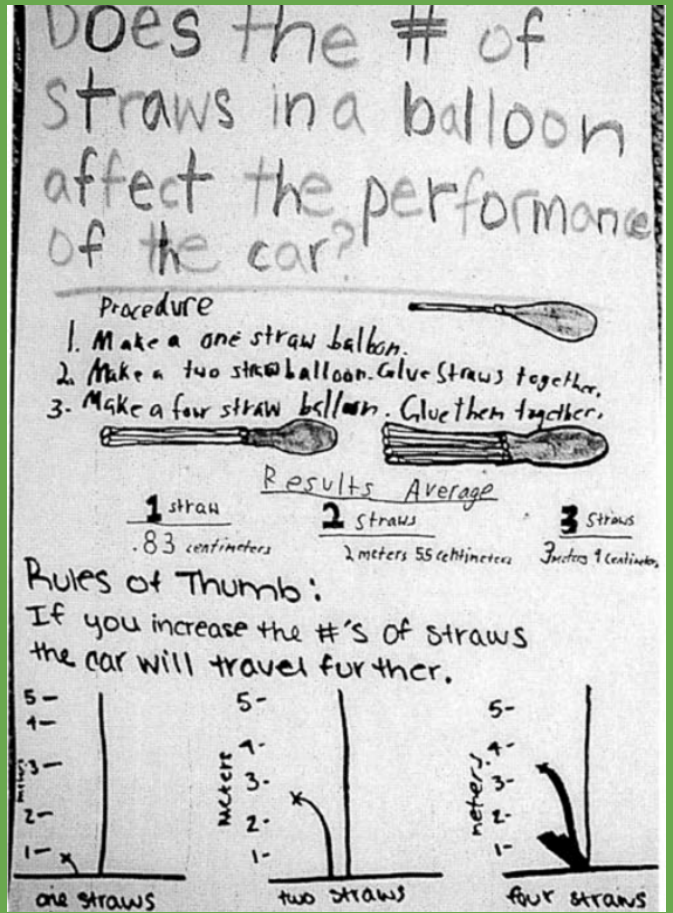


NEXT GENERATION
SCIENCE
STANDARDS

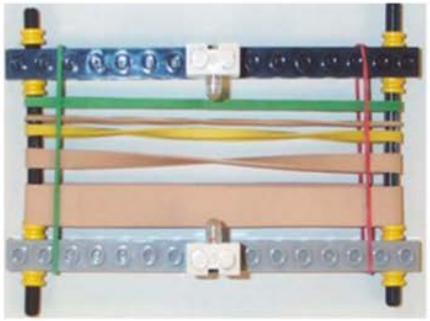
POWER OF
STEAM
SCIENCE TECHNOLOGY ENGINEERING ART MATHEMATICS

ART + science = PROGRESS



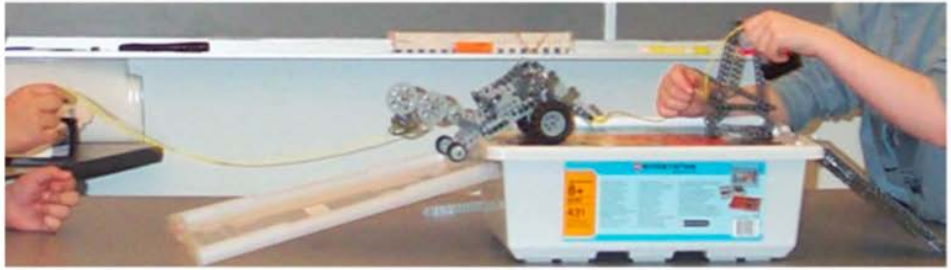


Middle Schoolers' Work from Learning by Design™ (Kolodner et al., 2003)

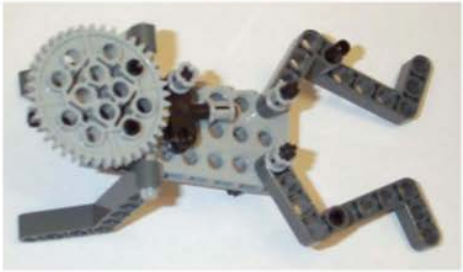


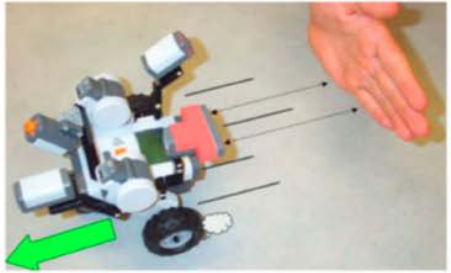
DESIGN A MUSICAL INSTRUMENT that can play at least 3 different pitches.

DESIGN A MODEL HOUSE that is stable, quiet, thermally insulated, and waterproof.



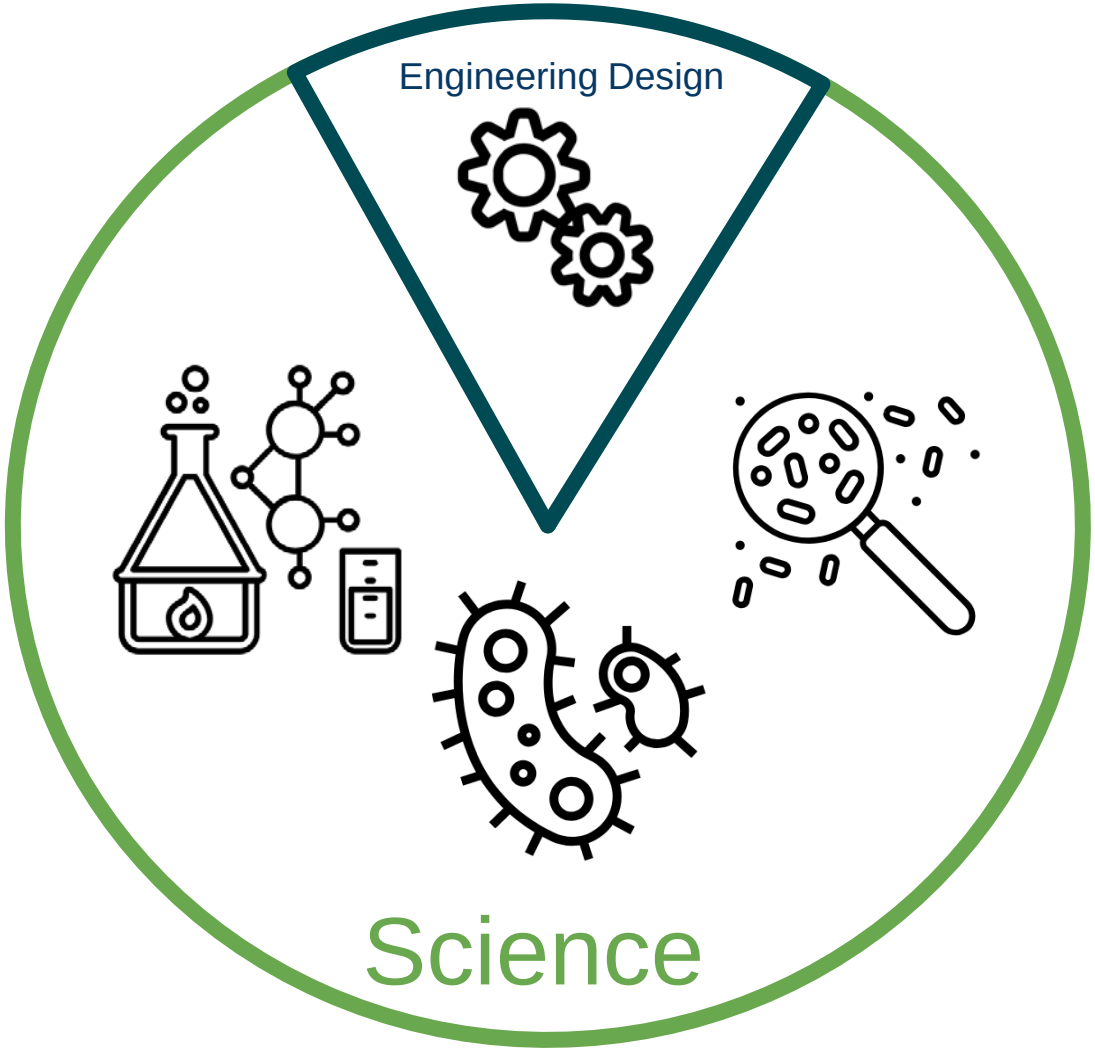
DESIGN A PEOPLE MOVER: a complex machine that can move a LEGO figurine and load up and over an obstacle.

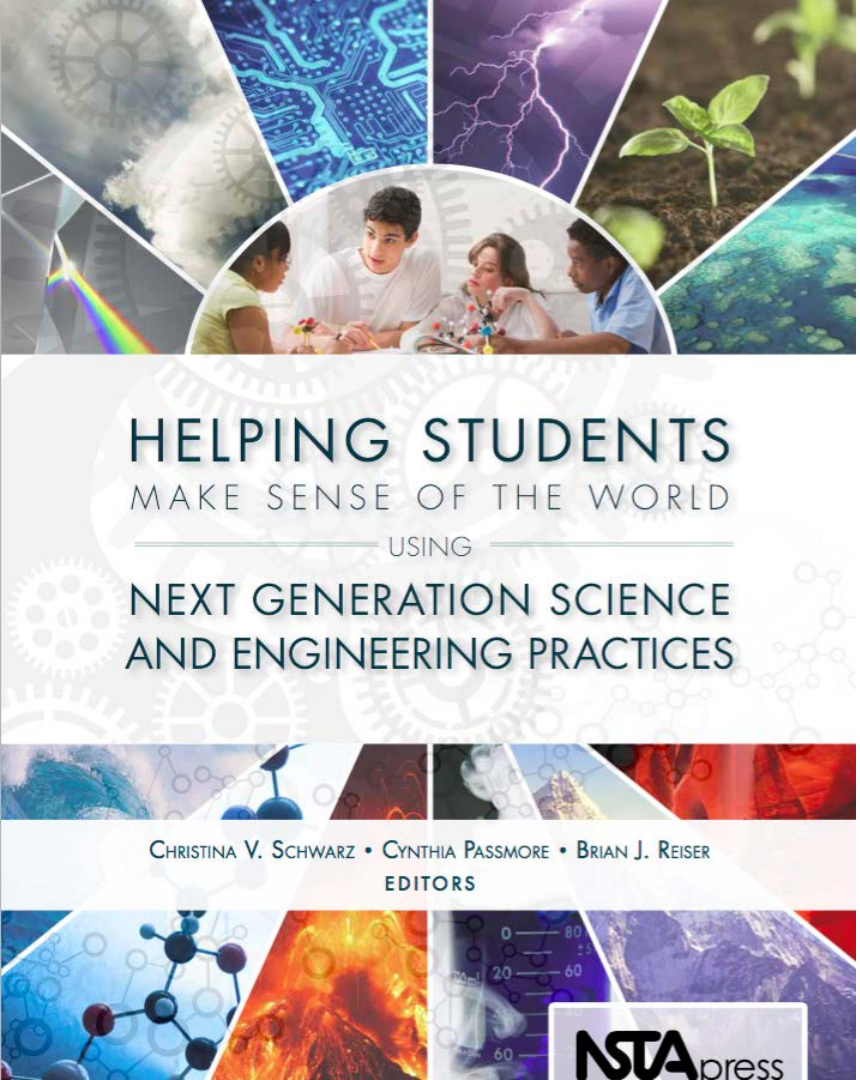


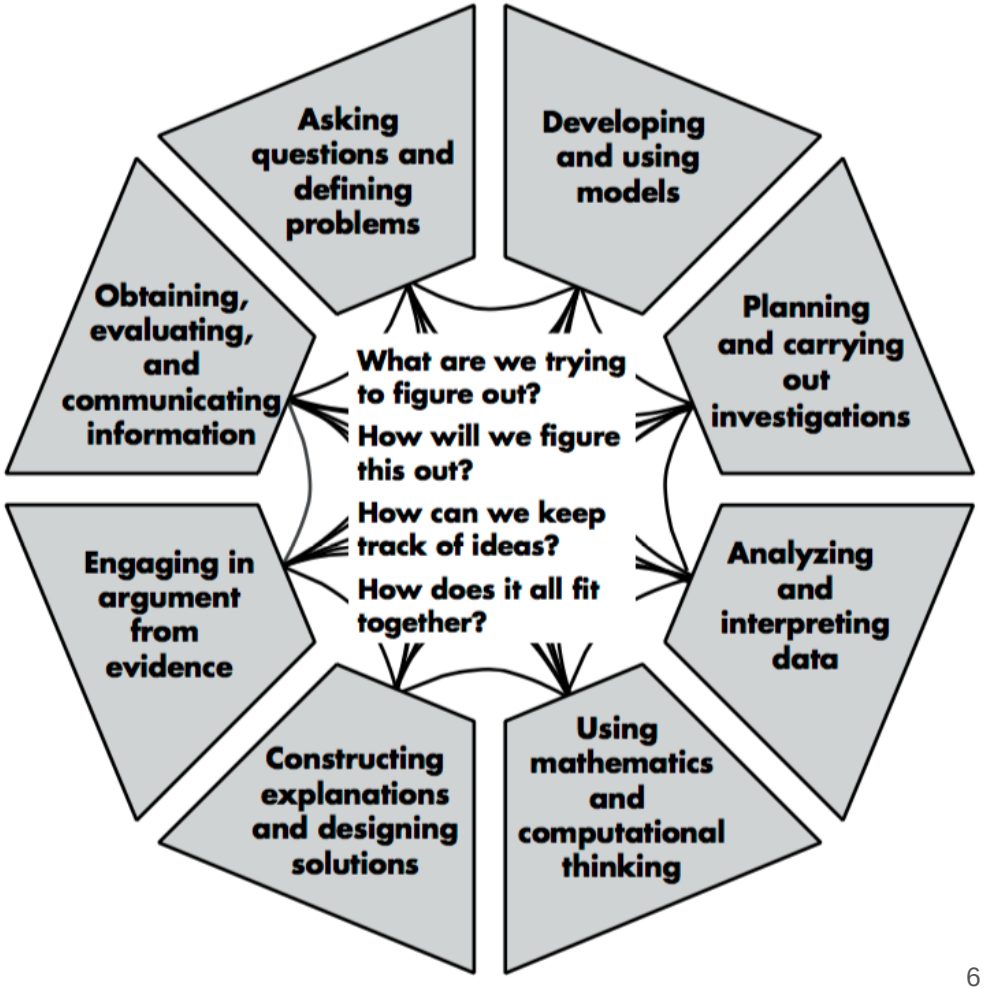


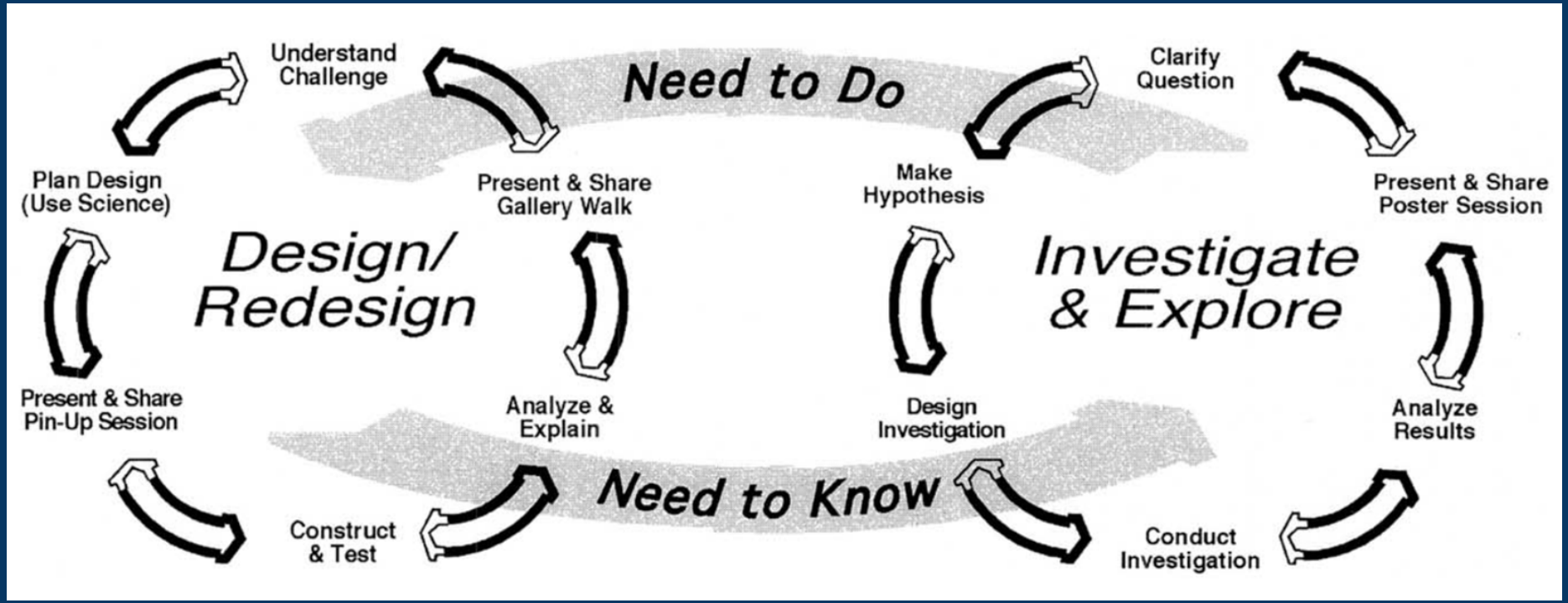
DESIGN AN ANIMAL MODEL: a mechanical model and a robotic model of a "newly discovered" animal that could survive in a tropical rainforest.

Elementary Student Work from Science through LEGO™ Engineering (Wendell & Rogers, 2013)

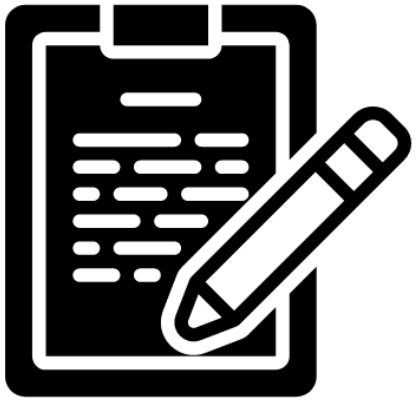

Engineering Design
Science

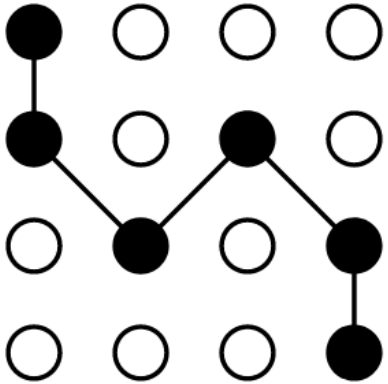

HELPING STUDENTS
MAKE SENSE OF THE WORLD
USING
NEXT GENERATION SCIENCE
AND ENGINEERING PRACTICES
CHRISTINA V. SCHWARZ • CYNTHIA PASSMORE • BRIAN J. REISER
EDITORS
NSTApress


Asking questions and defining problems
Developing and using models
Planning and carrying out investigations
Analyzing and interpreting data
Using mathematics and computational thinking
Constructing explanations and designing solutions
Engaging in argument from evidence
Obtaining, evaluating, and communicating information
What are we trying to figure out?
How will we figure this out?
How can we keep track of ideas?
How does it all fit together?



The Learning by Design Cycle. “Promoting transfer through case-based reasoning: Rituals and practices in learning by design classrooms” (Kolodner, Gray, & Fasse, 2003; Reprinted in Wendell & Kolodner, 2014)

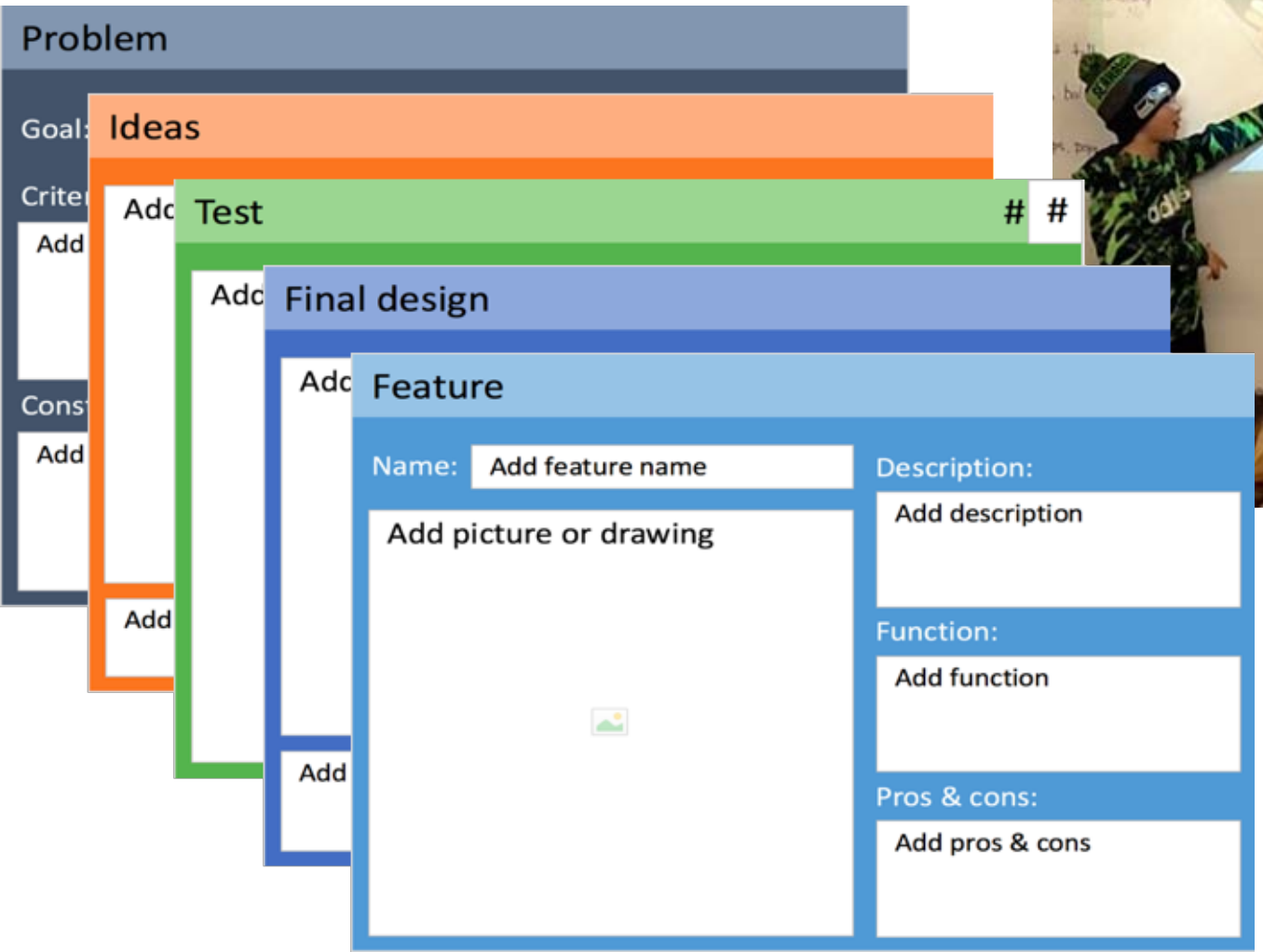


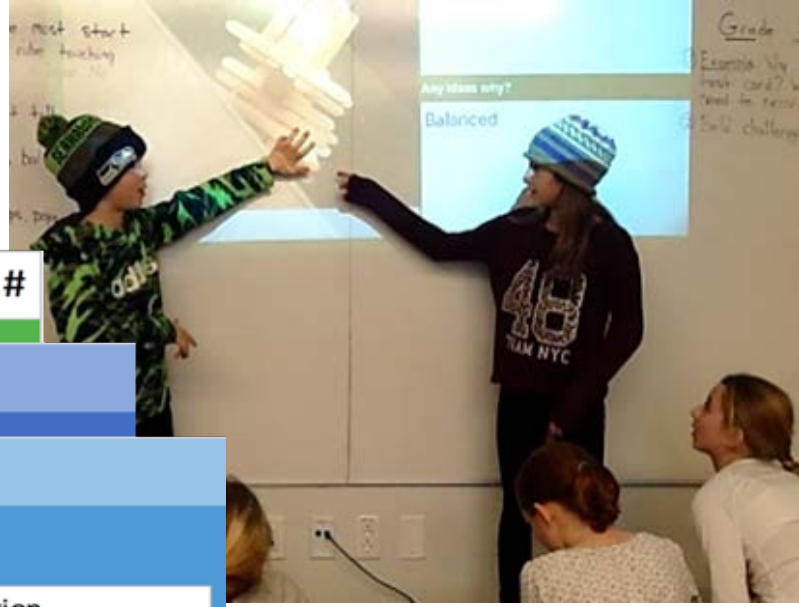


Documentation

Collaboration

Working with Data for Explanation and Argumentation





Design Keeper

(Andrews, Wendell, & Danahy, LKS Labs)

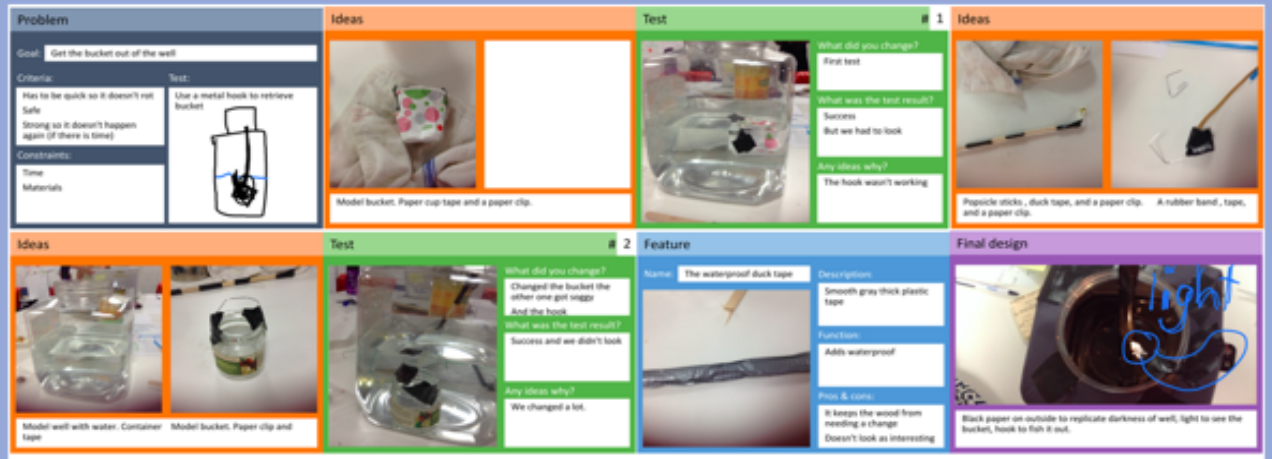
Add new card
View all cards of one type
View card timeline
All cards (shown)

All cards have a designated space for photos and drawings; test cards also allow short videos.

All Cards

Summary

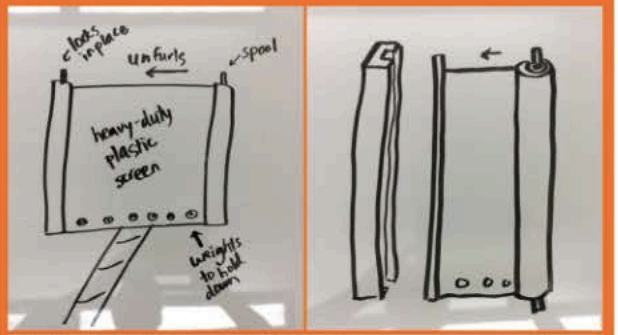
In the book Ruby Holler, the bucket falls off the rope and into the well. Our design gets the bucket out of the well. We also had to make a model well to test it.



Sandbags at the Fenway subway tunnel in a 2010 storm

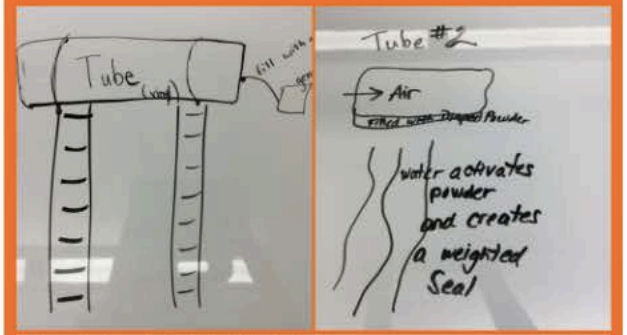
A scale model of the flood-prone tunnel portal

Ideas



Rolled Curtain: Unfurled with a mechanical arm (like the tarp over a dump truck bed), weighted (sandbags, shower curtain weights), stored in wall then locks in place

Ideas



Tube would be made of vinyl and filled with air.

Test

What did you change?

Add changes

What was the test result?

Water leaked through, but the diaper filled, blocking some water.

Any ideas why?

The diaper material was porous so water flowed through before the polymer activated.

The bag and diaper did not fit well into the portal so water flowed under and around

Test

What did you change?

Changed the shape of the bag by squaring off corners. Added pressure to bag.

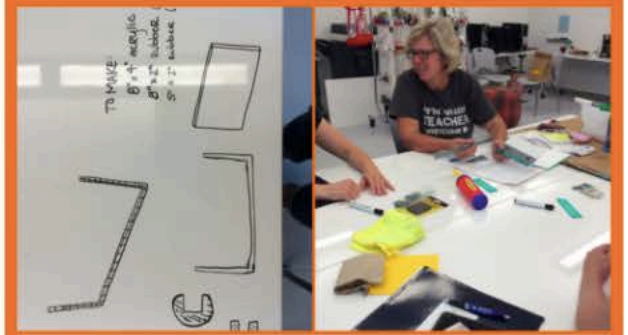
What was the test result?

Very little water went through until pressure was released.

Any ideas why?

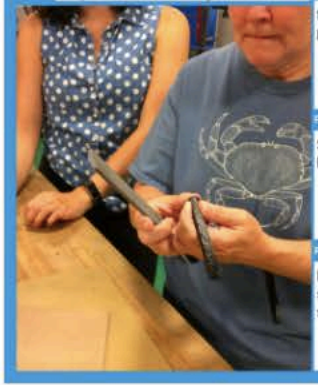
Add why

Ideas



prototype design

Feature



Name: 3D printed seal for acrylic door

Description:

filing the seal to get a tighter fit in the portal

Function:

Seal between acrylic door and portal to block water

Pros & cons:

Difficult to modify soft 3D printed material so we need to print a new piece (improved shape and more accurate dimensions)

Petroleum pollution persists near reservoir in Marlborough

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Tackling real world problems

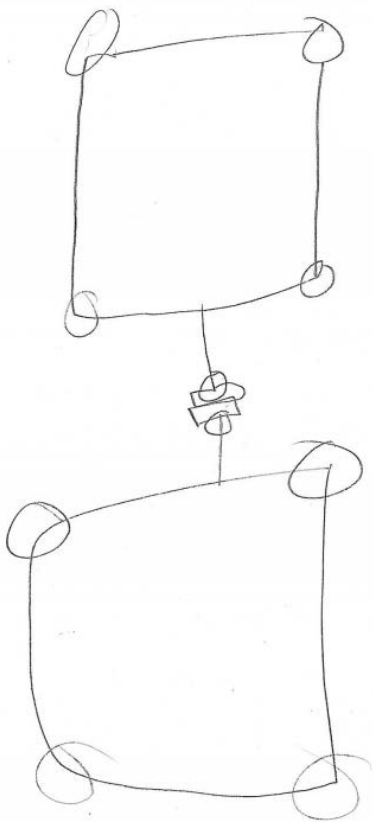
MBTA Design Challenge (Day 1)

Date: 11-29-17

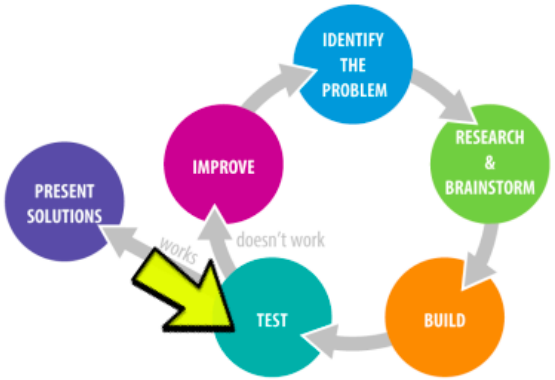
FOCUS QUESTION: What science and engineering do transportation professionals do? What are the problems the MBTA needs to solve in the story?

the professionals have to plan befor they build. They make Blueprints. then they build the machin. then they test the machin. then they drive it around. they need to make some vehicle that can go in snow. And the problem is the snow is to high and thick.

O=super glue



ENGINEERING DESIGN PROCESS

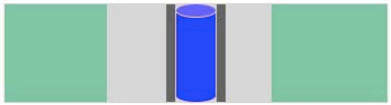


Date	Height	Observations
10/31/2017	18 cm	All of our layers are still visible as the browns and greens and they are not yet soil
11/13/2017	17.5 cm	There's weird white stringy things in the bottoms near the potato skins and there's more soil in the bottom but the layers are still visible and the height dropped a half centimeter.
11/28/2017	13.5 cm	Our compost is looking like it's starting to grow mushrooms and our compost level has dropped 4 and a half centimeters since the 31st of october

Test Results: What happened to your waste? Look at your test results. Was your group successful? Use evidence to support your group's claim.

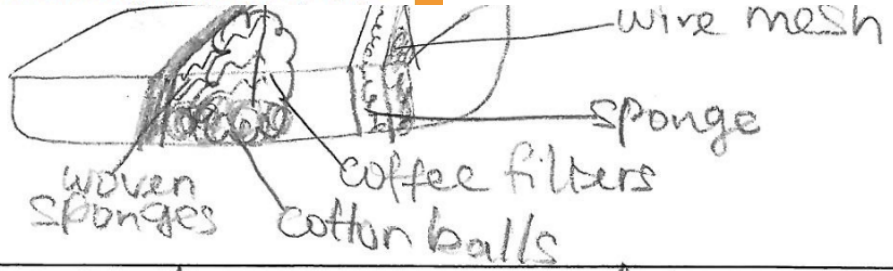
Type here NOt much of our waste decomposed especially the potatoes and egg shells, but the waste level dropped 5 hole centimeters and turned really dark and wet. I,d say our group was overall semi successful because things decomposed but not all of it.

Ideas



Add description, materials, etc.

We could cut the wire fence so it can fit into the model and we roll the wire fence. Put clay to secure wire. Put 1 inch wire to barricade the entrance. mesh and a v shaped sponge with clay supporting the



We noticed that the sponges helped a lot and cotton balls too. We should make sure the clay is thin so water can flow.

Practice 7: Engaging in Argument from Evidence

Specific Sub-Practices	Individual Notebooking	Collective Notebooking
(7.4) Support an argument with evidence, data, or a model	No students	All students
(7.5) Use data to evaluate claims about cause and effect	No students	No students
(7.6) Make a claim about the merit of a solution by citing relevant evidence about how it meets criteria	All students	All students

Practice 6: Constructing Explanations and Designing Solutions

Specific Sub-Practices	Individual Notebooking	Collective Notebooking
(6.2) Use observations to explain or design	All students	No students
(6.3) Identify the evidence that supports particular points	Some students	No students
(6.4) Apply scientific ideas to solve design problems	Some students	All students

Fractions that equal 1

Think Data, Act Local

(aka: Exploring STEM Impact and Engagement in Student-Led and Purpose-Driven Projects)

Cassie Xu

Lamont-Doherty Earth Observatory, Columbia University

“Data, I think, is one of the most powerful mechanisms for telling stories. I take a huge pile of data and I try to get it to tell stories.”

- Steven Levitt, co-author of Freakanomics

The project

=

Students in decision-making roles

+

a community-level problem

+

open-source data

+

data experts/skills

+

industry professionals and community groups

The teacher component

- Year 1: Teachers experience the learning themselves
- Year 2: Teachers facilitate after-school program

1. Students in decision-making roles

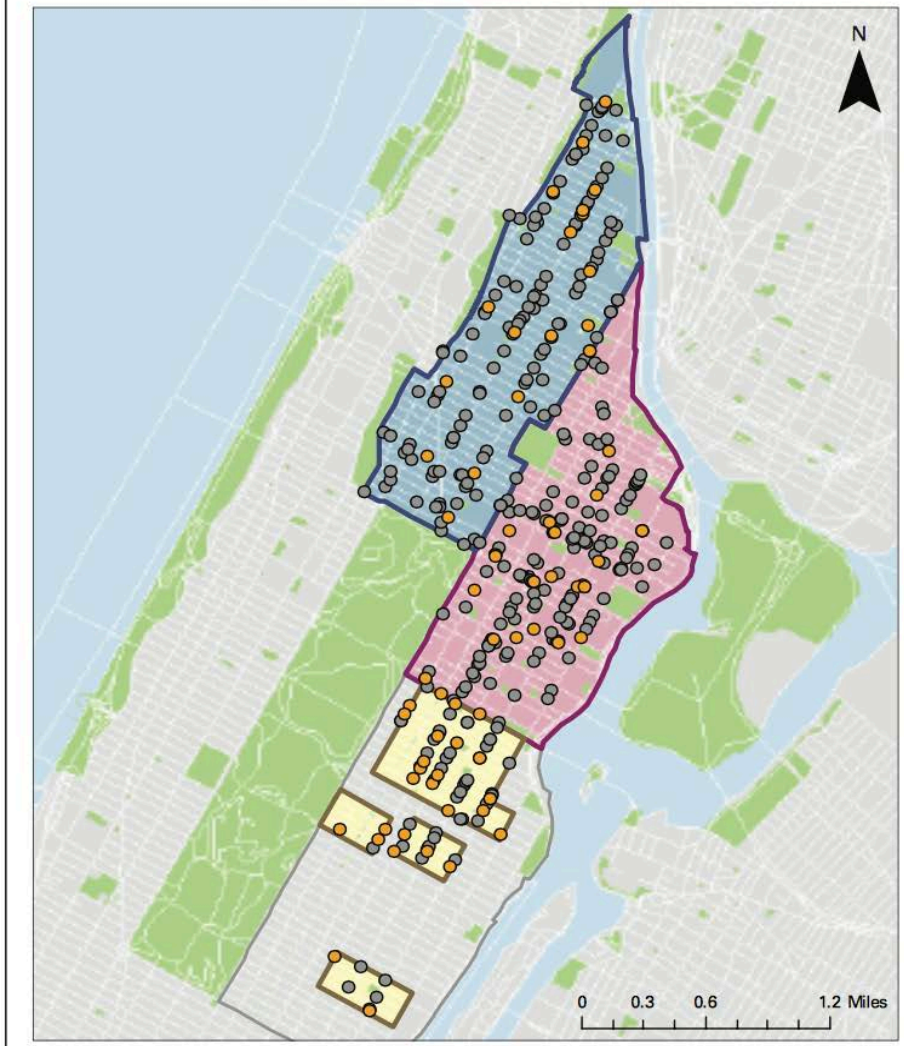
- Constructionism – knowledge is derived from active experiences where learners are creating personally meaning artifacts

- Service learning – participants engage in civic engagement activities

2. A Community-level problem

Community = geographic areas where students live and the people they share common interests with

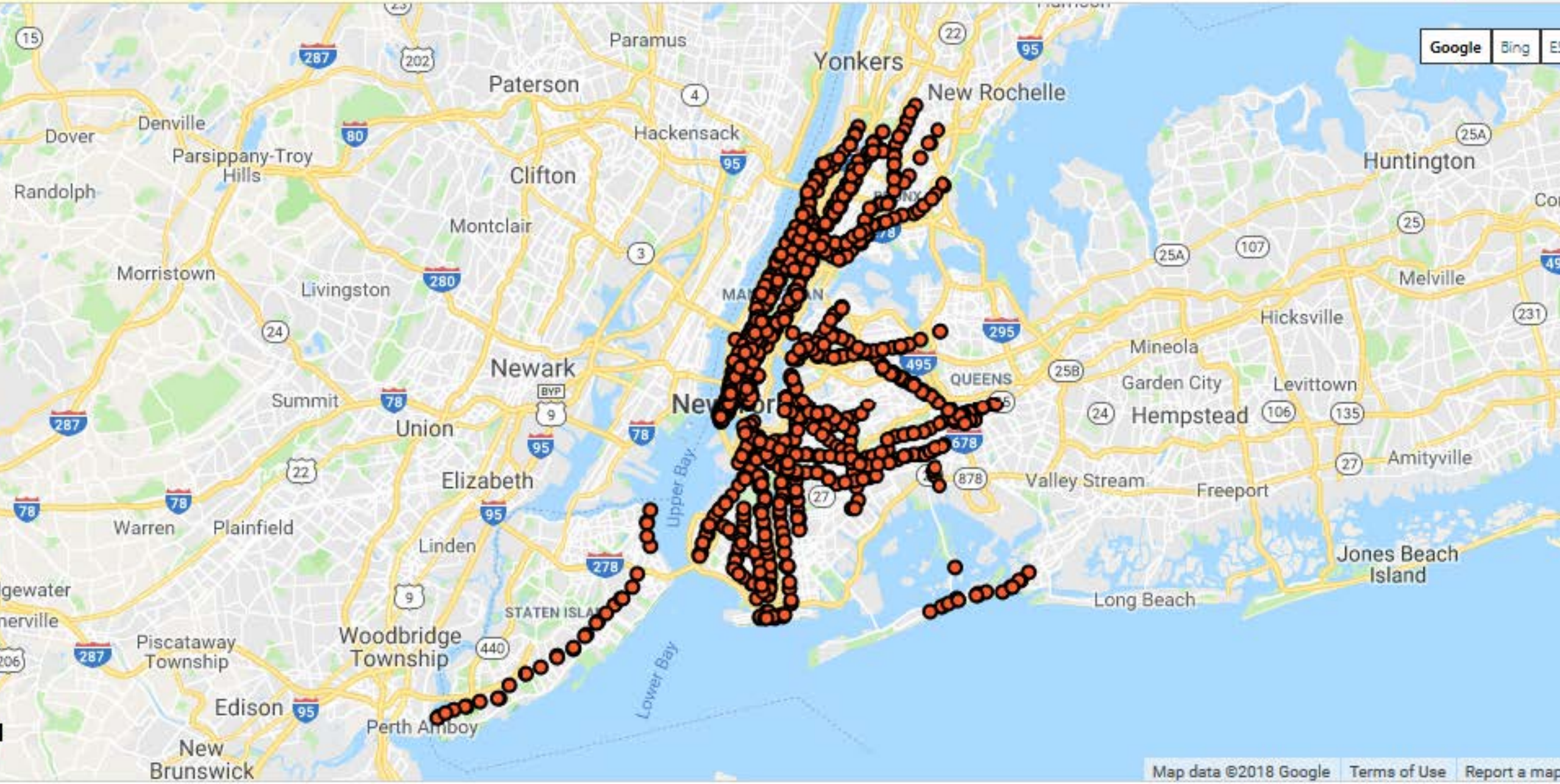
Figure 1. Bodegas far outnumber supermarkets in East and Central Harlem.



3. Open-source data

NYC Open Data – data generated by NYC agencies and city organizations for public use

on Subway Entrances
NYC Subway Entrances



Data experts

Dara Mendeloff – Center for International Earth Science Information Network; GIS, water quality

Dan Bader – Center for Climate Systems Research; climate science, data communication

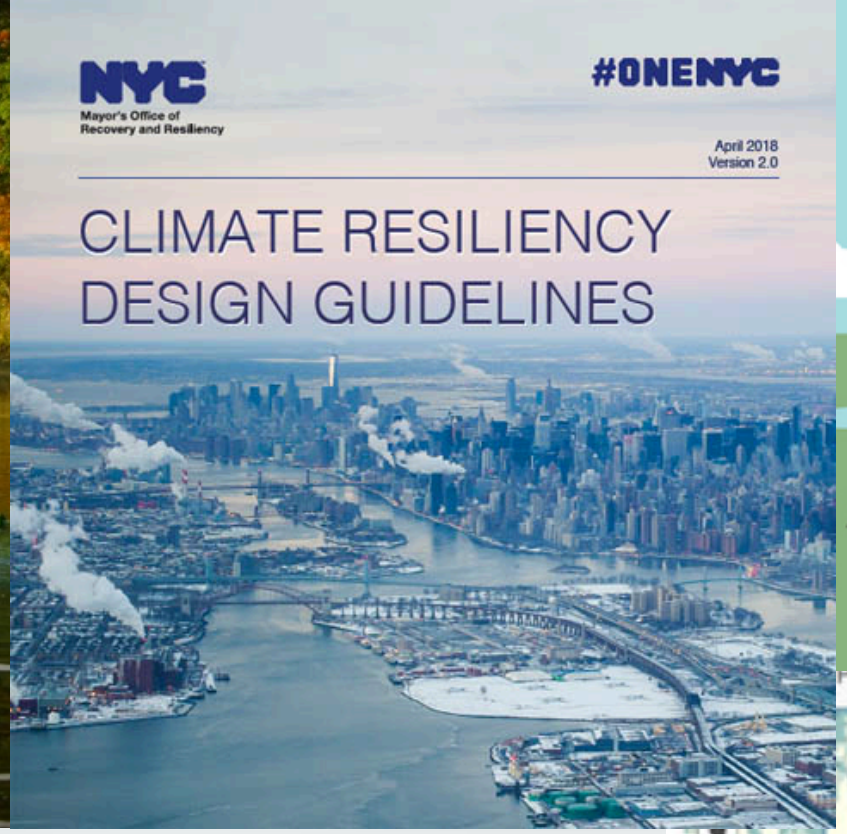
Margie Turrin – Lamont-Doherty Earth Observatory; environmental conservation, citizen science

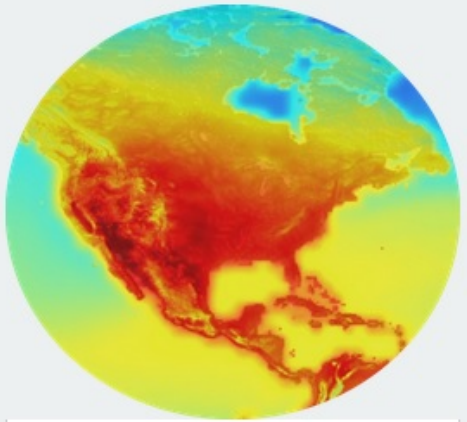
NYC
Mayor's Office of
Recovery and Resiliency

#ONENYC

April 2018
Version 2.0

CLIMATE RESILIENCY DESIGN GUIDELINES

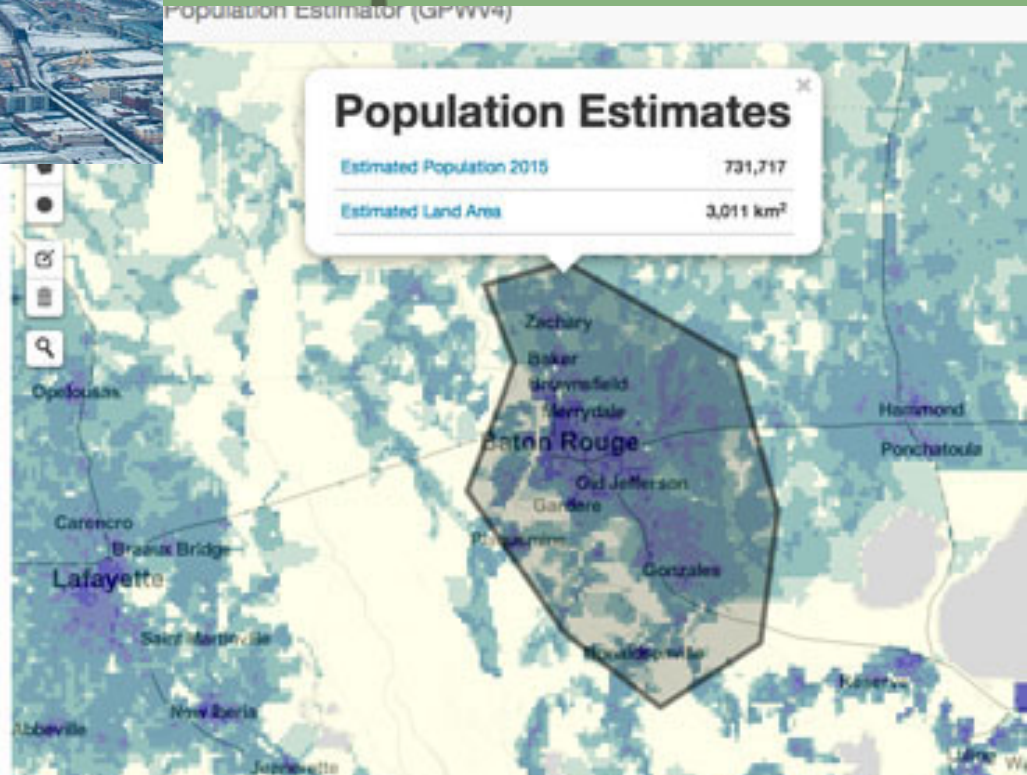




Climate Science

Engineering and Urban Design

Social Dimensions of Adaptation



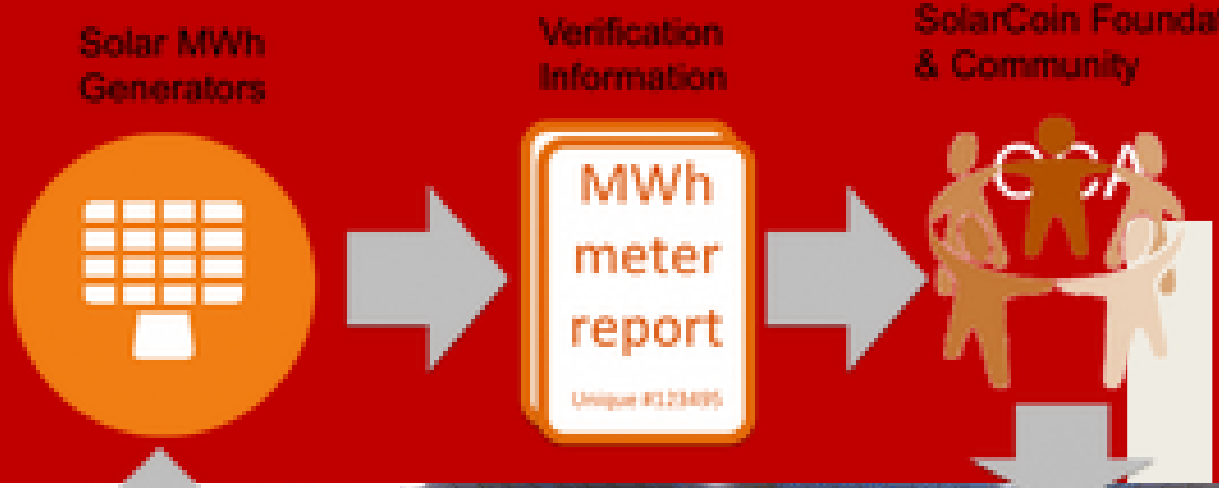
4. Data Skills

- Role of data in research
- Collection, analysis, and communication
- Data in decision-making

5. Industry professionals and community groups

Gowanus Canal CONSERVANCY

Energy generation enables circulating SolarCoins

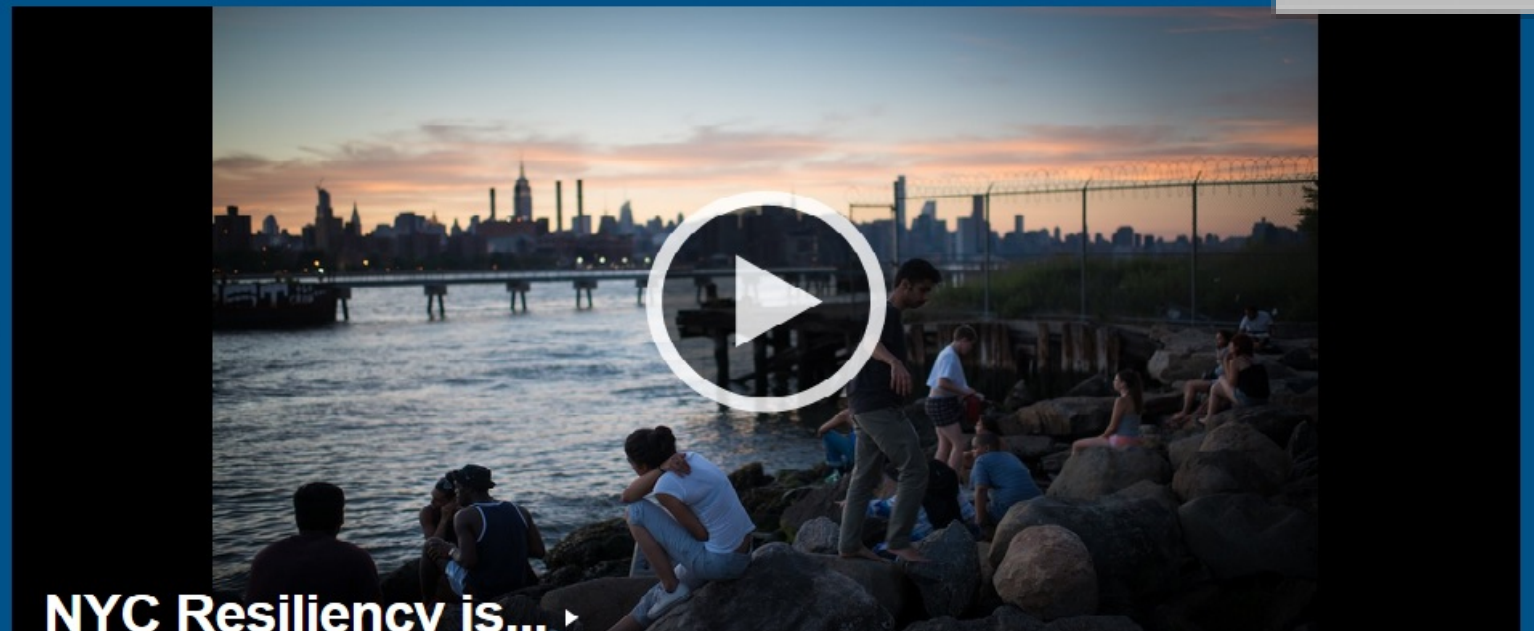


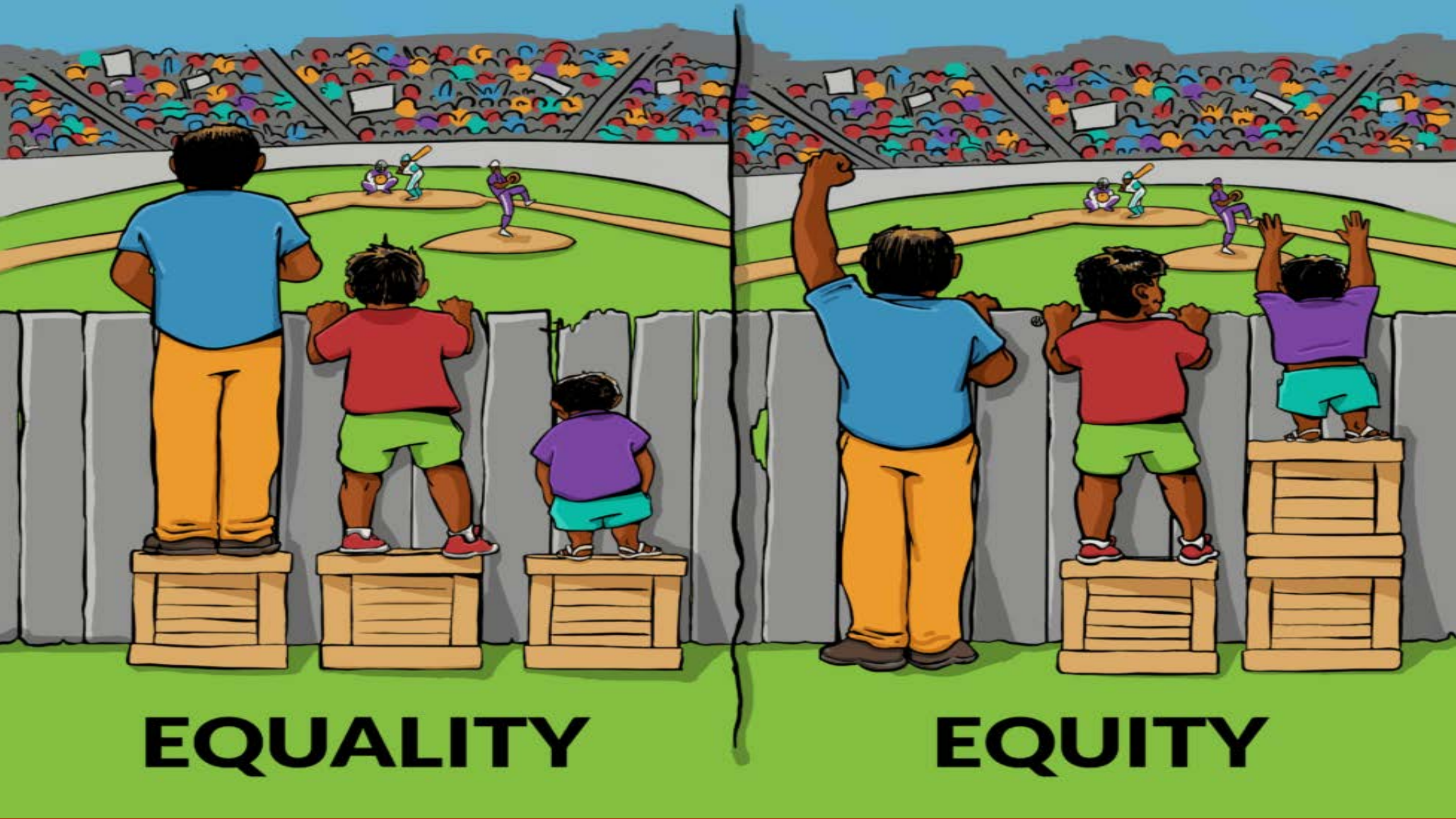
Generator receives SLR grant from Foundation

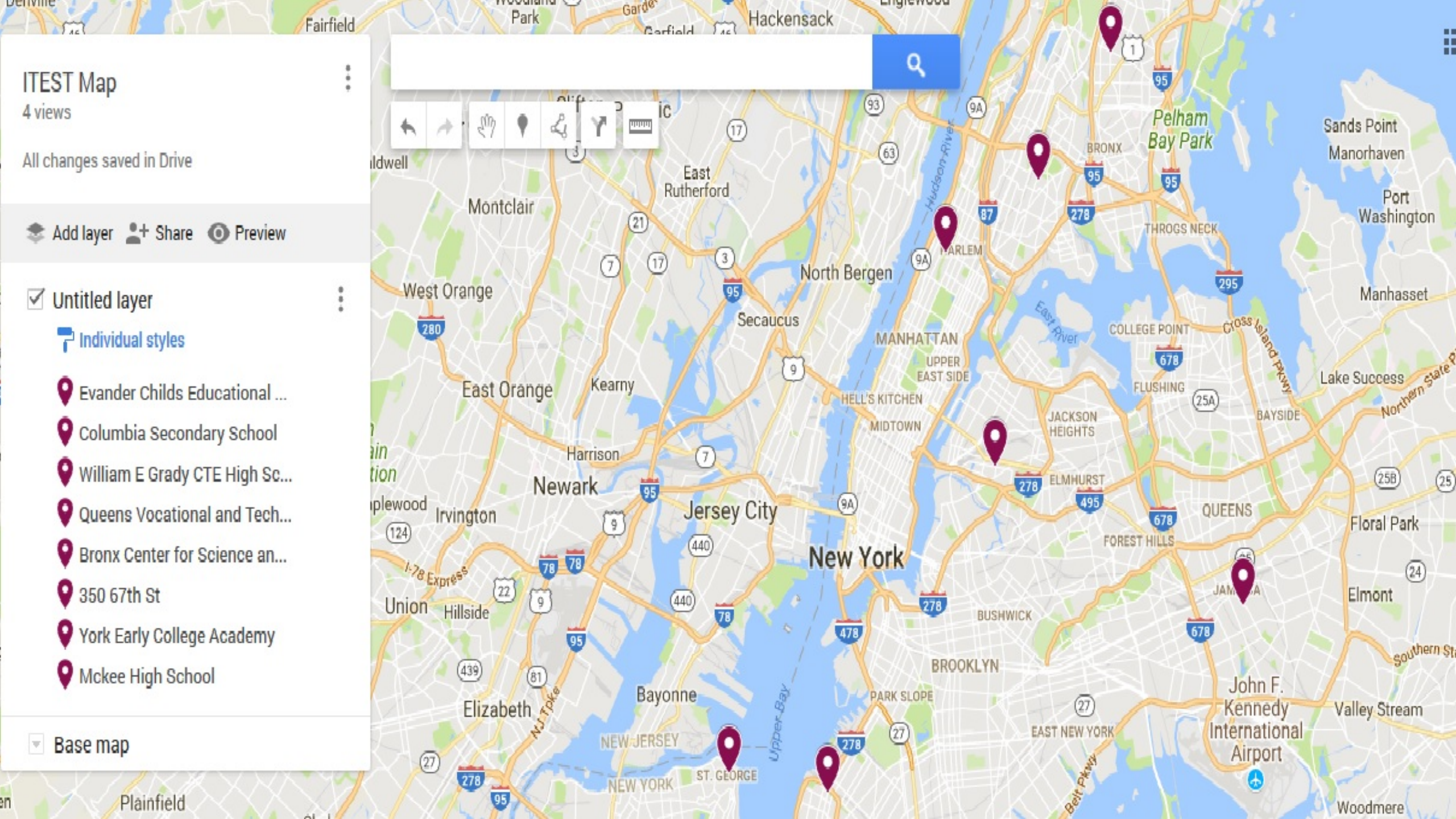
NYC Mayor's Office of Recovery & Resiliency

Text-Size

About | Challenges | 8 Million Stories | Projects | OneNYC | News




EQUALITY
EQUITY


ITEST Map
4 views
All changes saved in Drive
Add layer
Share
Preview
Untitled layer
Individual styles
Evander Childs Educational ...
Columbia Secondary School
William E Grady CTE High Sc...
Queens Vocational and Tech...
Bronx Center for Science an...
350 67th St
York Early College Academy
Mckee High School
Base map
Fairfield
Hackensack
Montclair
East Rutherford
West Orange
North Bergen
Secaucus
East Orange
Kearny
Harrison
Newark
Irvington
Union
Hillside
Elizabeth
Bayonne
Jersey City
New York
MANHATTAN
HARLEM
BRONX
Pelham Bay Park
THROGS NECK
Sands Point
Manorhaven
Port Washington
Manhasset
COLLEGE POINT
FLUSHING
Lake Success
BAYSIDE
JACKSON HEIGHTS
ELMHURST
QUEENS
FOREST HILLS
Floral Park
Elmont
BUSHWICK
BROOKLYN
PARK SLOPE
EAST NEW YORK
John F. Kennedy International Airport
Valley Stream
Woodmere
UPPER EAST SIDE
HELL'S KITCHEN
MIDTOWN
ST. GEORGE
NEW JERSEY
NEW YORK
Plainfield
Hudson River
East River
Upper Bay
I-78 Express
NJ Tpke
Belt Pkwy
Cross Island Pkwy
Northern State P
Southern St

Relevant Summit Goals

- How youth develop their work identities
- Why we should be concerned about making sure that there is work for everyone

$$E = \left[\frac{hc}{2\lambda}\right]_2 + \left[2\left(\frac{\varepsilon_0 E^2}{4}\right)_\gamma \cos^2(\omega t) + \left(\frac{B^2}{2\mu_0}\right)_\gamma \sin^2(\omega t)\right]_\gamma$$

$$E = \frac{\pi hc}{\varepsilon_0 \alpha^3 \lambda^2} \quad B = \frac{\mu_0 \pi hc}{\alpha^3 \lambda^2} \quad V = \frac{\cos 23}{2\pi r^2}$$

THANK YOU!

cassie@ldeo.columbia.edu
@Edxucation

Flash Talk Table Conversations

- What is something new you learned?
- What do you want to learn more about?
- What connections do you see in your own work?

Flash Talk Round 3:

- Data Science through Digital Storytelling
  - Seth Marceau, Youth Radio

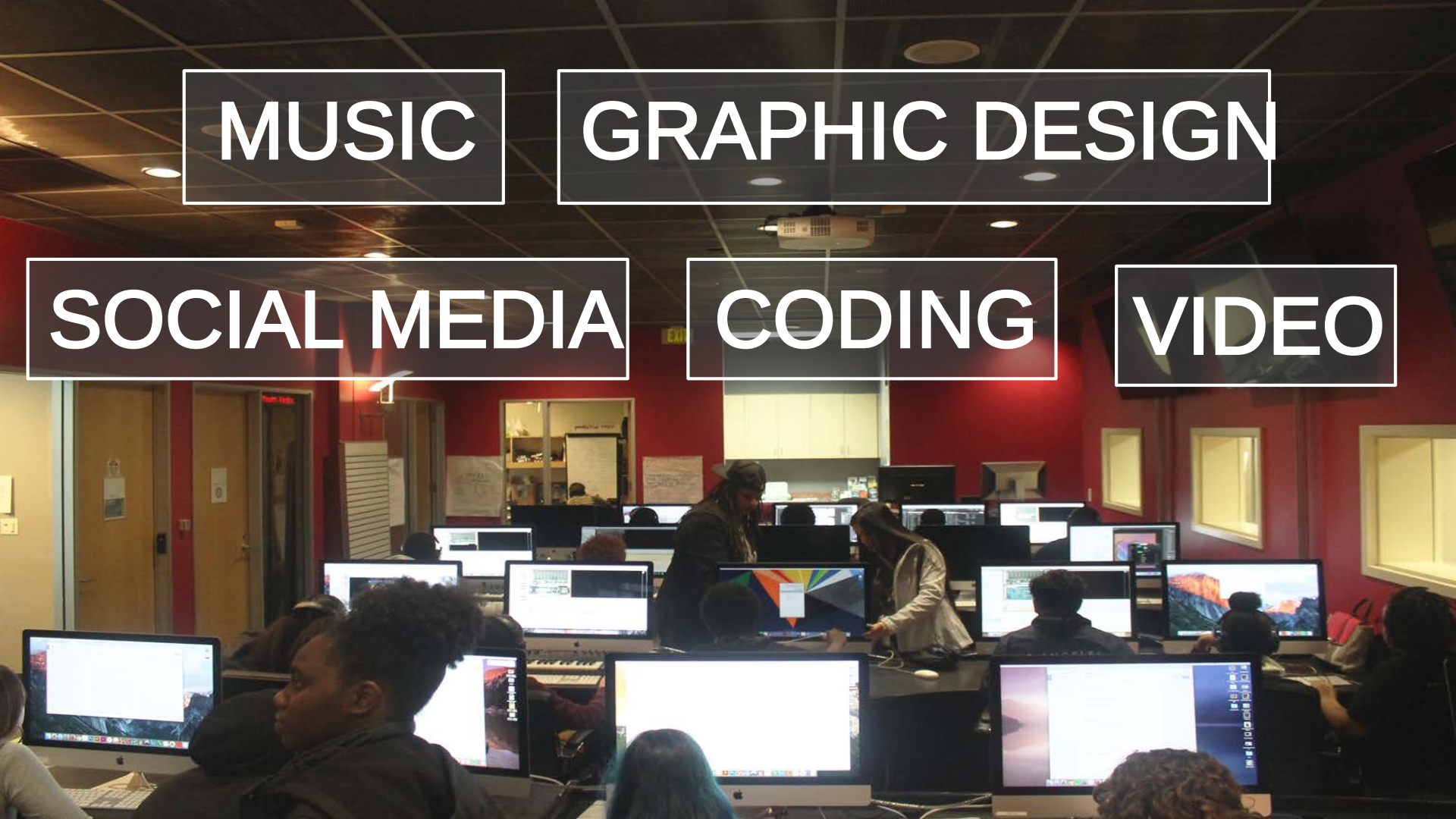
- Chief Science Officers: Empowering Youth to Make a Global Impact in STEM
  - Jeremy Babendure, Institute for Learning Innovation

  & Chief Science Officer Brandon

Data Science *Through* Storytelling

Data to Awesome - Youth Radio

2014


MUSIC
GRAPHIC DESIGN
SOCIAL MEDIA
CODING
VIDEO

DROUGHT

GENTRIFICATION

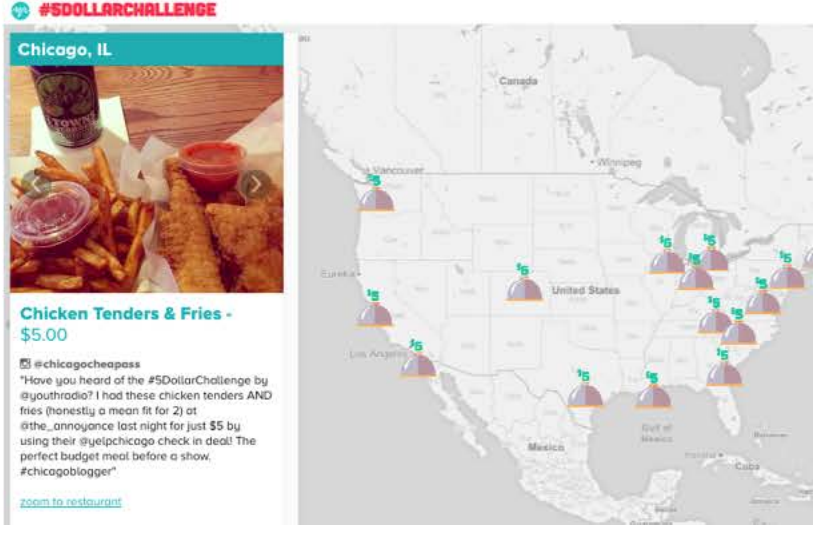
VOTING

MENTAL HEALTH

FOOD EQUITY

JUVENILE JUSTICE

POLICE BRUTALITY



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<link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/font-
<link rel="stylesheet" href="/css/animate.css">
<link rel="stylesheet" href="css/theme.css">
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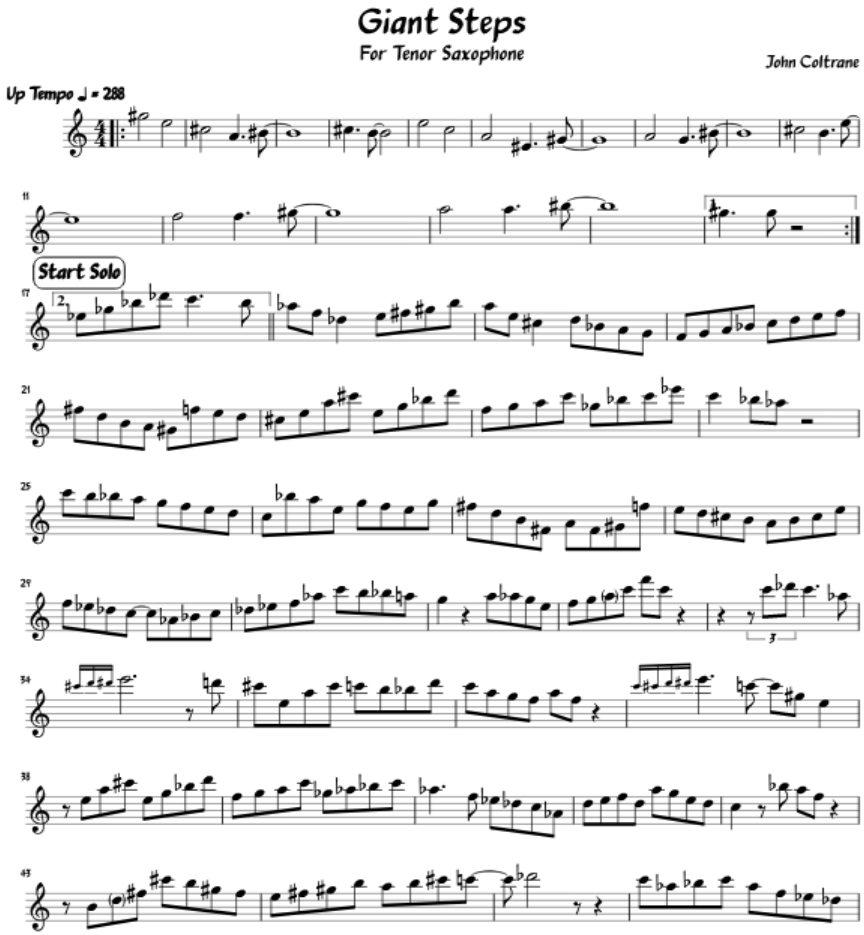


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    <head>
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    <link rel="stylesheet" href="personal-project.css">
    <link href="https://fonts.googleapis.com/css?family=Press+Start+2P" rel="stylesheet">
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    <script src="https://code.createjs.com/preloadjs-0.6.2.min.js"></script>

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                    <img src="https://clayxavier.files.wordpress.com/2017/04/untitled-1.png?" width=100 height=100/>
                </div>
                <div class="col-md-8 col-6"></div>
                <div class="col-md-2 col-3">
                </div>
            </div>
            <!--Title/Text-->
            <div class="row text-center">
                <div class="col-md-2 col-12"></div>
                <div class="col-md-8 col-12">
                    <h1>How To Make A Clay Xavier Beat</h1><br/>
                    <p>Clay Xavier is a DJ, Music Producer, and Graphic Designer based out of Oakland, CA. His first
beat tape, "September", was released this year as an experiment to find his sound. This website was created to let y
break down a song he created using the sounds from the song. Enjoy!</p>
                    <br>
                    <br>
                    <div class="bg-dark p-2 ">
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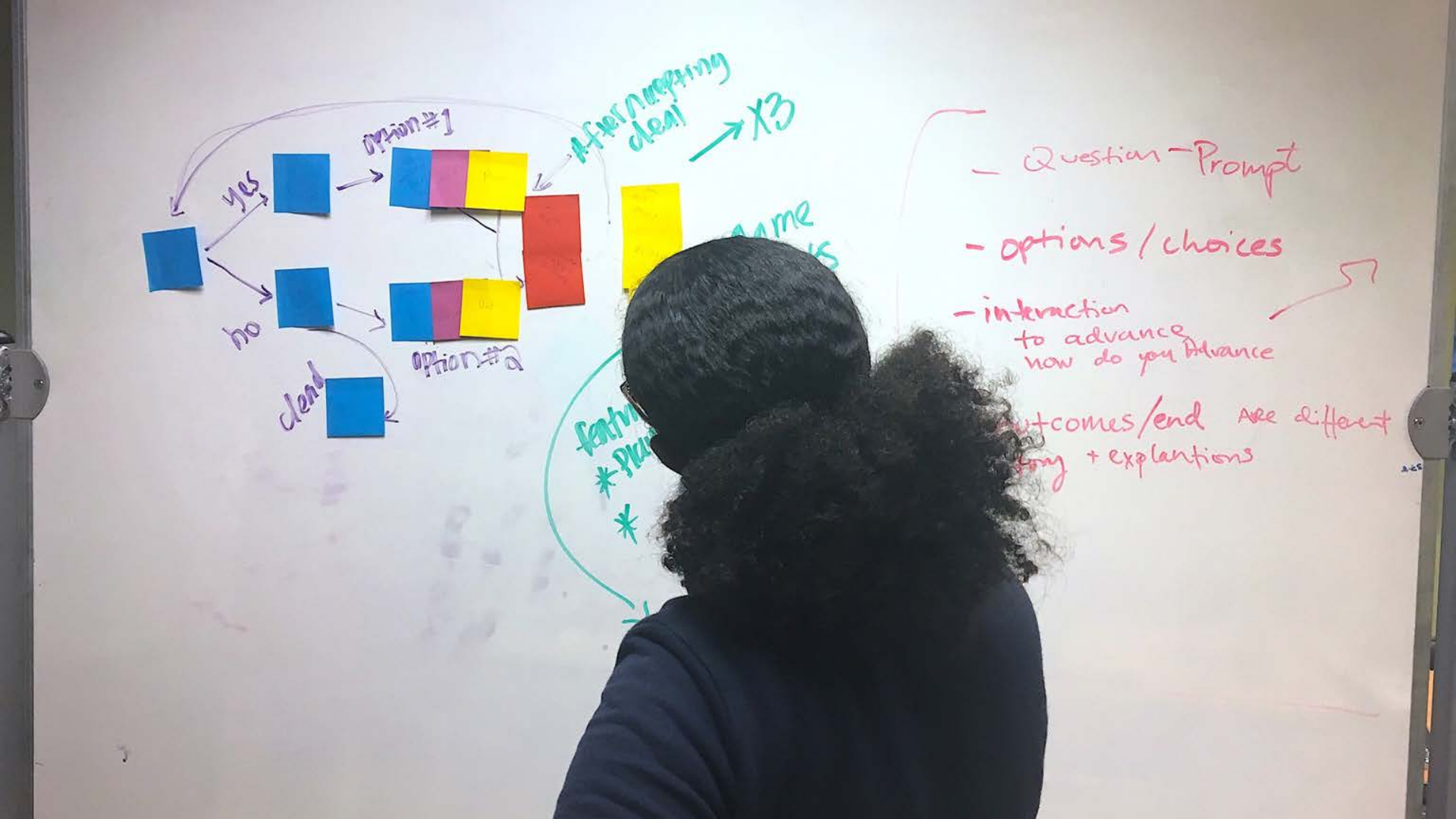
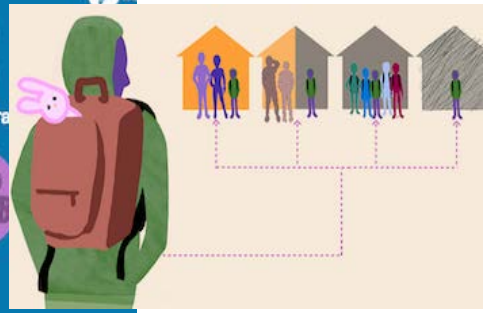
url=https%3A//api.soundcloud.com/tracks/343501891&amp;color=%23ff5500&amp;inverse=true&amp;auto_play=false&amp;show_
ue"></iframe> </div>
                    <br><br>
                    <br>


                </div>
                <div class="col-md-2 col-12"></div>
            </div>
            <!--Buttons-->
            <div class="row music text-center">
                <div class="col-md-2 col-12"></div>
                <div class="col-md-8 col-12">
                        <h4> Play with these sounds! You can activate the sounds by pressing the corresponding numbe
the keyboard! </h4>
```



yes
no
option #1
option #2
clead
After accepting deal
X3
- Question - Prompt
- options / choices
- interaction
to advance
how do you Advance
utcomes/end Are different
+ explantions

Youth Driven



Data Powered

Impactful Stories

de of three things
Design

2018 Youth Media California Statewide Conference

YOUTH RADIO
MAP THE MOVEMENT
#NEVERAGAIN
A student-led movement demands student-led coverage.
Powered by Youth Radio
Enter

YOUTH RADIO

MAP THE MOVEMENT #NEVERAGAIN

Share Tweet

#MARCHFOROURLIVES | NATIONAL SCHOOL WALKOUTS | SCHOOLS PREPARE | THE MOVEMENT SPREADS | OUTRAGE TO ACTION | TRAGIC BEGINNING

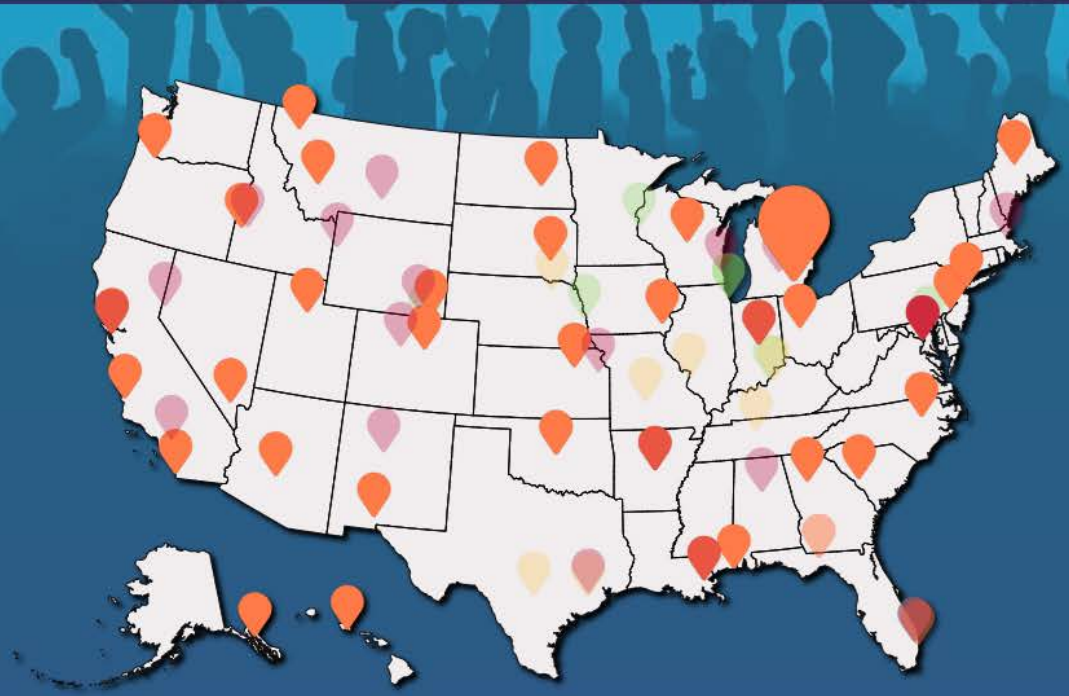
National School Walkouts 3/14

Despite freezing cold temperatures, rain, and -- in some cases -- threats of disciplinary action, students across the country walk out of class to demand tighter gun controls.

Ann Arbor MI

youthradio
@youthradio

In 21 degree weather, hundreds of students walked out at Huron High School in #AnnArbor. The 17-minute walkout included speeches, slam poetry, and a moment of silence for the Parkland shooting



Want More Coverage of the Movement? Click Here

Subscribe to Youth Radio Subscribe

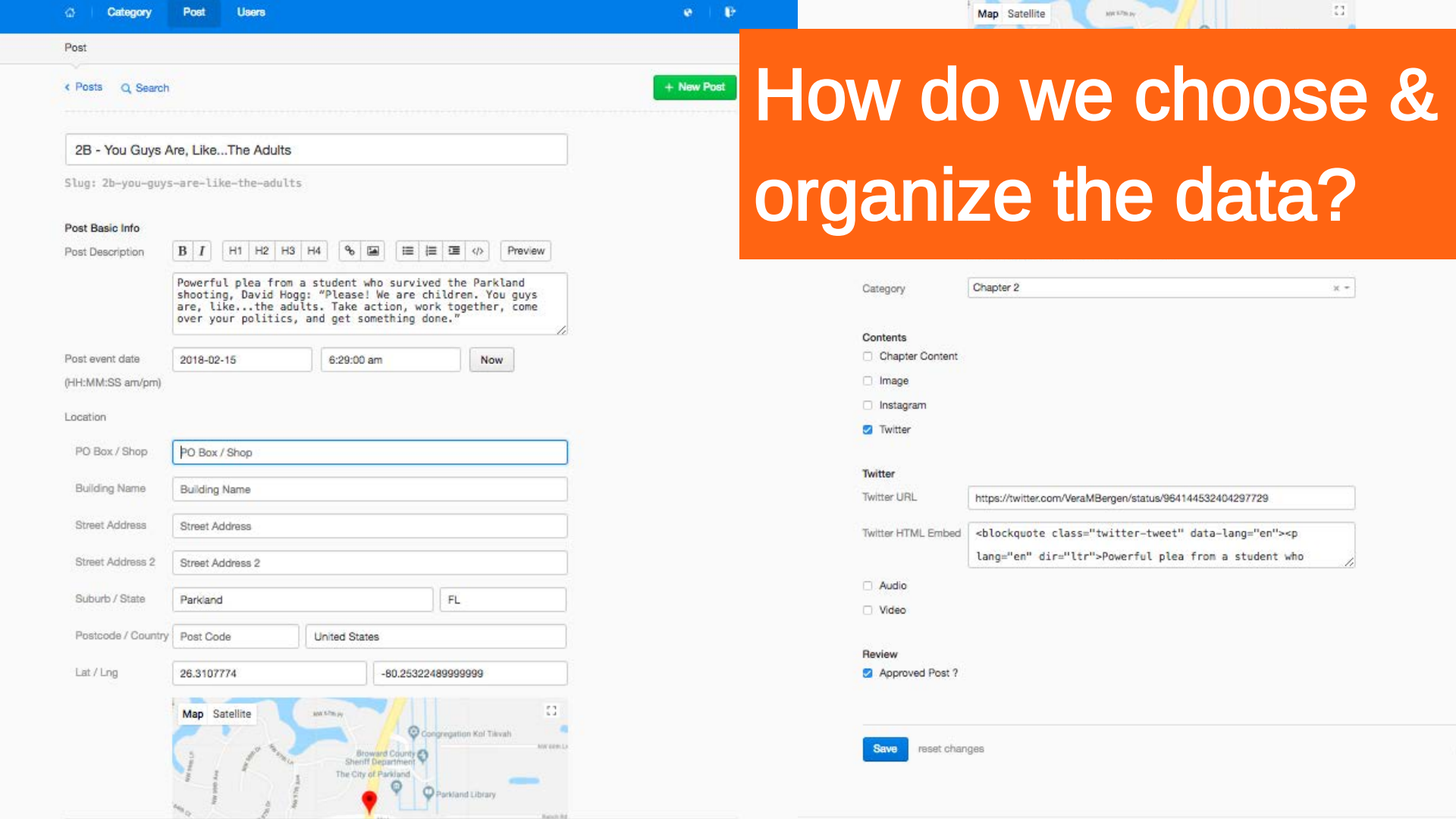
What Data Do We Need?

LOCATION
(lat, long)

SOCIAL MEDIA EMBED

IMAGE

DATE & TIME


Category
Post
Users
Post
Posts
Search
+ New Post
2B - You Guys Are, Like...The Adults
Slug: 2b-you-guys-are-like-the-adults
Post Basic Info
Post Description
B I H1 H2 H3 H4 Preview
Powerful plea from a student who survived the Parkland shooting, David Hogg: "Please! We are children. You guys are, like...the adults. Take action, work together, come over your politics, and get something done."
Post event date
2018-02-15
6:29:00 am
Now
(HH:MM:SS am/pm)
Location
PO Box / Shop
Building Name
Street Address
Street Address 2
Suburb / State
Parkland
FL
Postcode / Country
Post Code
United States
Lat / Lng
26.3107774
-80.25322489999999
Map
Satellite
Congregation Kol Tikvah
Broward County Sheriff Department
The City of Parkland
Parkland Library
Map
Satellite
How do we choose & organize the data?
Category
Chapter 2
Contents
Chapter Content
Image
Instagram
Twitter
Twitter
Twitter URL
https://twitter.com/VeraMBergen/status/964144532404297729
Twitter HTML Embed
<blockquote class="twitter-tweet" data-lang="en"><p lang="en" dir="ltr">Powerful plea from a student who
Audio
Video
Review
Approved Post ?
Save
reset changes

IMPACT

Josh Stearns @jcstearns · Follow

If you are following the marches across the country this weekend there may be no better tool than this map from @youthradio which features student-led coverage around the U.S. #MarchForOurLives #NeverAgain yri.youthradio.org/neveragain/

12:11 PM - 23 Mar 2018

34 Retweets 34 Likes

1 34 34

ACLU of Northern CA @ACLU_NorCal · Mar 23

Follow along here for live, student-led coverage of tomorrow's #MarchForOurLives event. #NeverAgain yri.youthradio.org/neveragain/

youthradio @youthradio · Follow

You want to see this roundup of #MarchForOurLives coverage from around the nation by *student* reporters on the ground --->

All Around The Country, Young People March For Our Lives
On Saturday, activists from across the U.S. are gathering with one message: #Enough. We'll keep you updated on marches in DC and around the country.
youthradio.org

2:47 PM - 24 Mar 2018

67 Retweets 121 Likes

Steve Fainaru @SteveFainaru · Mar 22

In advance of @AMarch4OurLives, here's most complete accounting of historic movement, by @youthradio yri.youthradio.org/neveragain/

1 3

Educator Innovator @innovates_ed · Mar 24

A student-led movement demands student-led coverage: check out @youthradio's Map the Movement: #NeverAgain project, documenting the nation-wide student movement against gun violence: bit.ly/2pzRoTK

5 7

Nancy DeVille @devillenews · Follow

Young people all over the country are calling for #guncontrol. Thanks to the @YouthRadio team of young coders, you can now map the movement. #NeverAgain #MarchForOurLives #MFOLDC #MFOL

Map the Movement! #NeverAgain | Youth Radio
A student-led movement demands student-led coverage. Map

TRAINING FOR COLLEGE & CAREER

- Peer Teaching
- Collegial Pedagogy
- Projects Reach Real Audiences

How often do students have a voice…

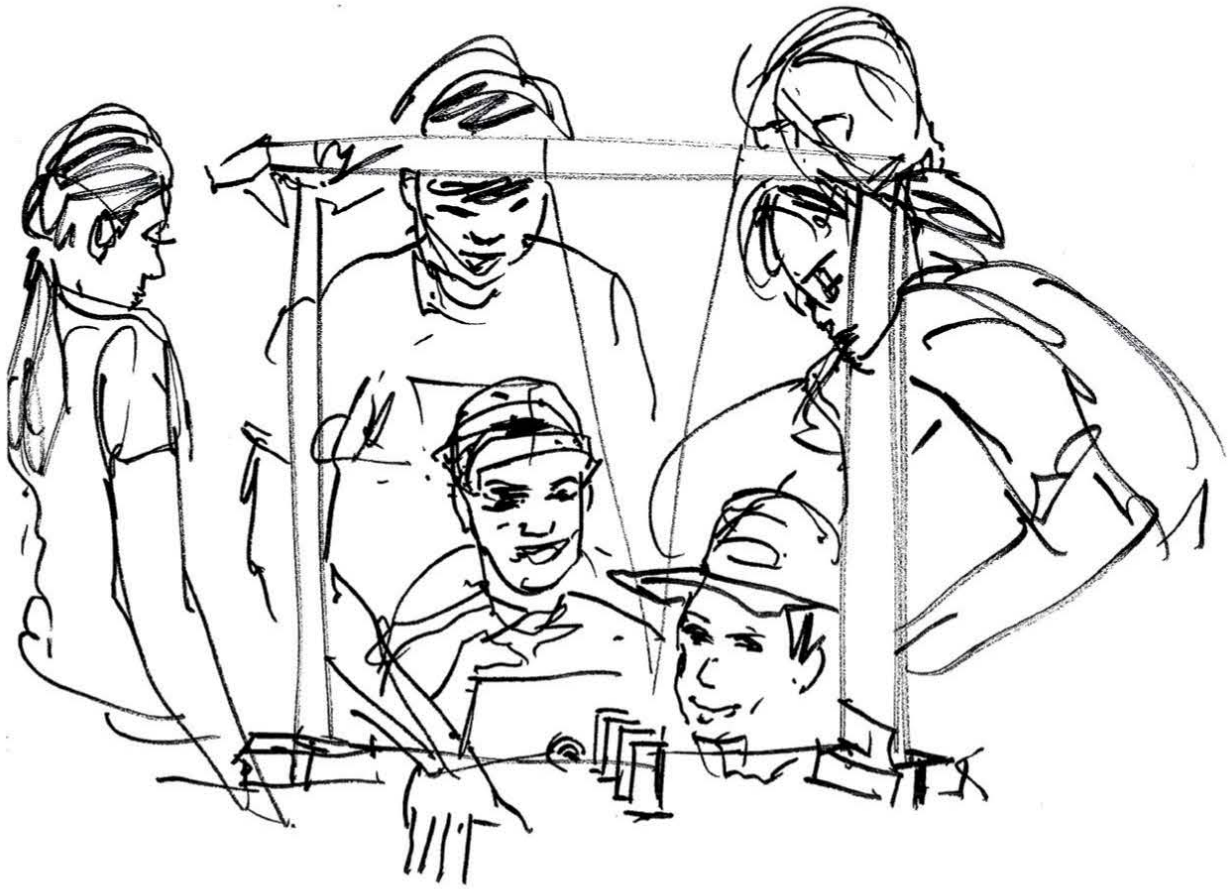
…in making STEM connections in THEIR communities

How often do students have a voice…

…in advocating for STEM in THEIR schools

How often do students have a voice…

…in planning the jobs of THEIR future



Introducing the World's First Chief Science Officers (CSOs)!

Chief Science Officers: Who are we?

"I want to have people be excited and have fun when working in science"

Brandon
CSO, Alhambra High School

"I want to spread the passion of STEM and help grow the leaders of tomorrow"

Shalae
CSO, Connolly Middle School

"I want to peak students' interests in STEM related activities and help make them more available to all students."

Mackenzie
CSO, John Glenn High School

"I want to spread STEM awareness to my peers and bring their ideas to the community

Anthony
CSO, John Glenn High School

"I want to share that the world around us is full of science and technology"

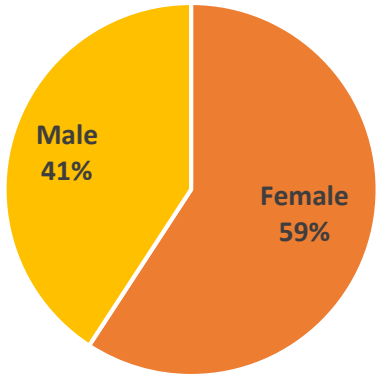
Sebastian
CSO, Metro Tech High School

"I want to help advocate for those who don't have a voice"

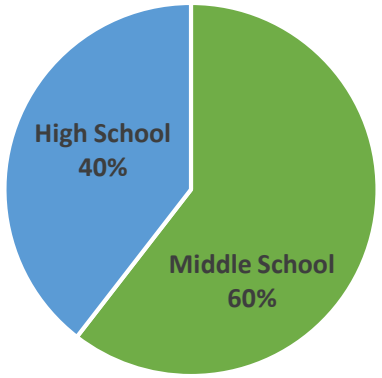
Mayra
CSO, Central High School

A Diverse Representation Across Arizona

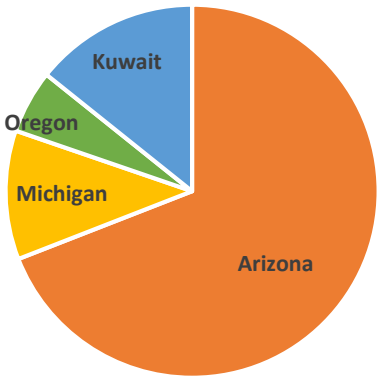
CSOs by Gender



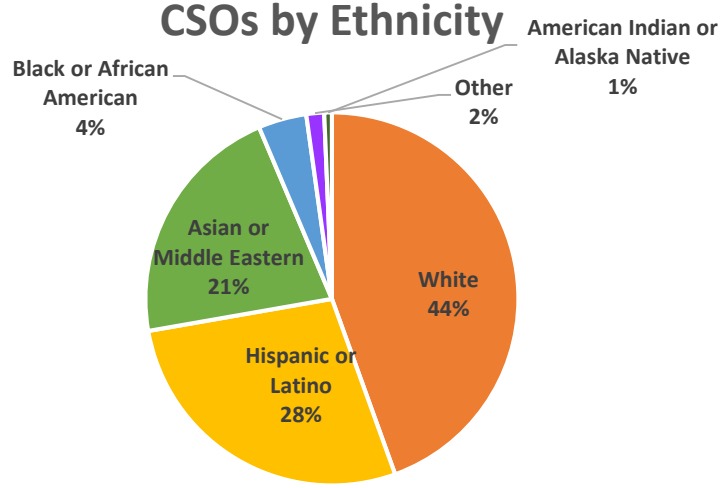
CSOs by Grade Level



CSOs by Region



CSOs by Ethnicity

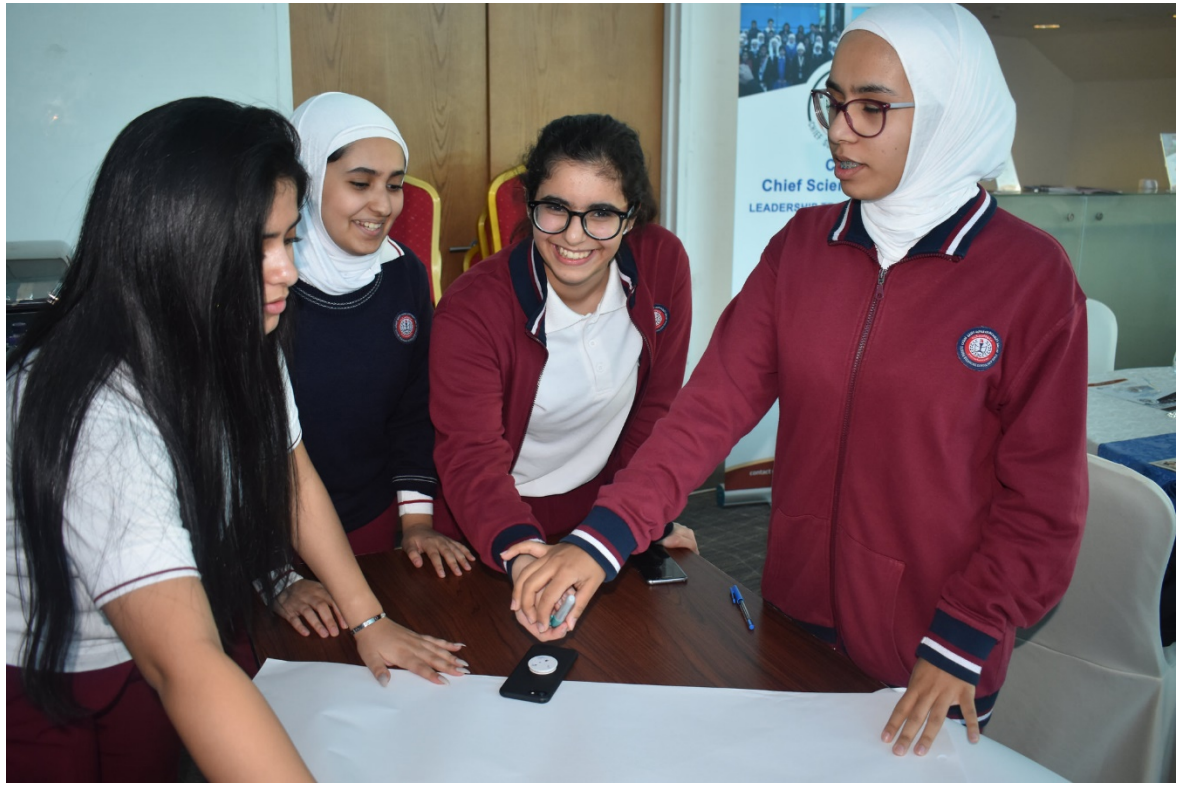


What are our goals?

1. Cultivate a pipeline of **diverse STEM leaders**

What are our goals?

2. Increase **communication and collaboration** among CSOs.



What are our goals?

3. Enrich **school STEM culture** and career awareness.

What are our goals?

4. Increase **student voice** in STEM conversations in the community.

What type of training do CSOs get?

Teamwork

Strategic Planning

Networking

What type of training do CSOs get?

Public relations

Camera

Writing

What type of training do CSOs get?

STEM presentations

Inspirational activities

Bonding time

In School

CSO Brandon and CSO America at the check-in table for their event "STEAM: Passion with a Purpose." *The event included student STEM projects, hands-on activities, performances by school dance teams and guitar classes, and a STEM-themed poetry slam.*

In the Community

CSO Brandon shows young event attendees a fun STEM demonstration at Luke Airforce Base's "Luke Days: STEAM City"

As a collective cabinet

CSO Brandon participates in "speed pitches" with fellow Chief Science Officers from his district

Internationally

International CSO Summit – Oct 7 - 12

- Unify the growing **global cabinet** of Chief Science Officers
- Increase **awareness** of CSOs with **national leadership**
- Expand **influence of CSOs** and student voice with national decision makers
- Build **synergies** with **STEM Ecosystems**

2017/18 numbers

- 500 CSOs
- 300+ SciTech Jedi Industry Mentors
- 70+ community events
- 170+ school based events
- 40+ News and media stories
- 5,000+ students directly impacted by CSOs
- 50,000+ students represented by CSOs

** Anticipate 700, 1000 and 1400 CSOs for the 2018/19, 2019/20 and 2020/21 seasons.*

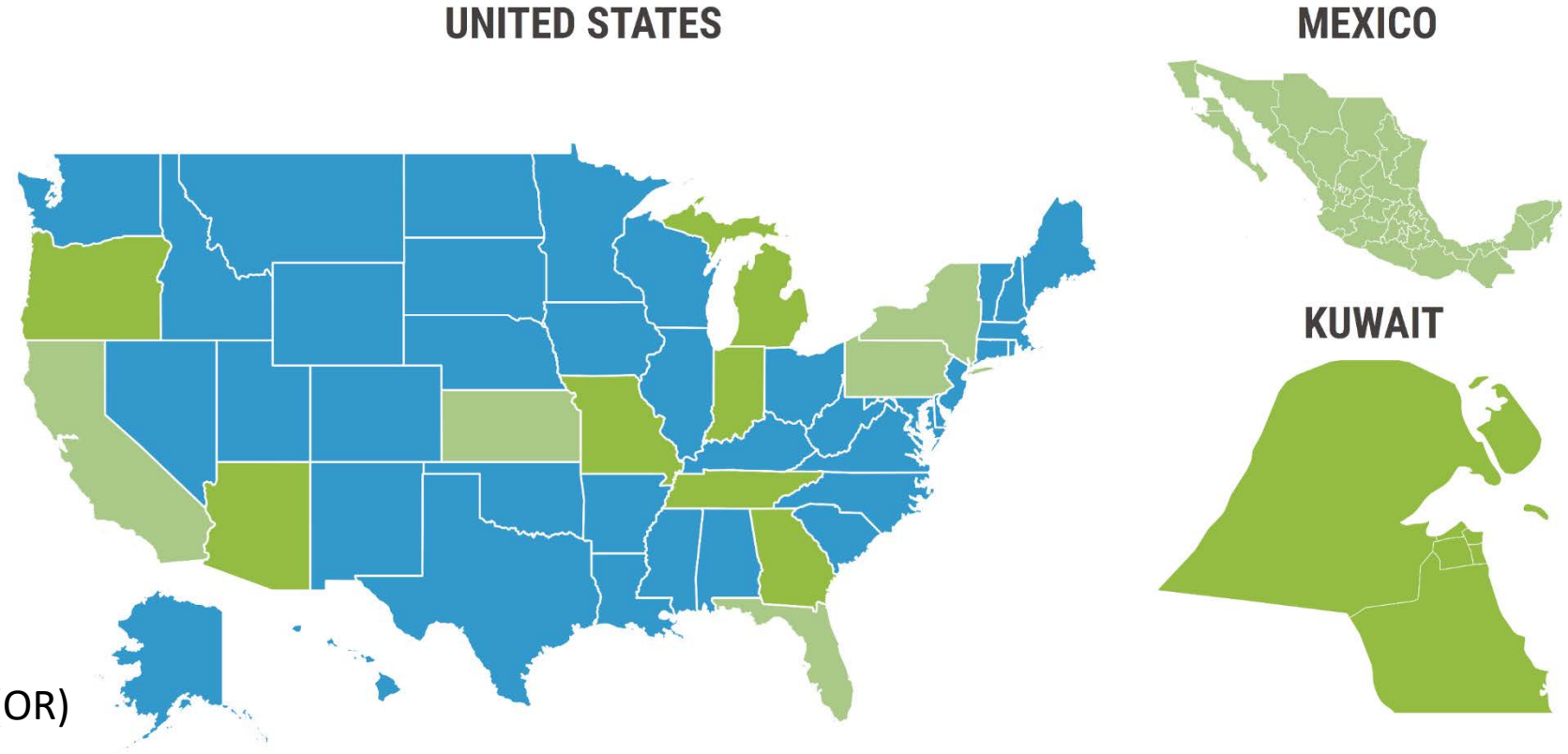
Join the International Movement!

2017/18 season

- Southern Oregon STEM Hub
- Great Lakes Bay Region (MI)
- Midwest (TN, MO, IL, IN)
- Kuwait

2018/19 season

- NE Florida
- Tampa Bay (FL)
- Atlanta (GA)
- Kansas City (MO/KS)
- Missouri
- Buffalo (NY)
- Cochise, Verde Valley, Eastern (AZ)
- Go STEM, Frontier, Columbia Gorge (OR)
- Sonora (Mexico)



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Flash Talk Table Conversations

- What is something new you learned?
- What do you want to learn more about?
- What connections do you see in your own work?