MC 2 STEM HIGH SCHOOL

CLEVELAND FABLAB

UNITED STATES FABLAB NETWORK

imagination at work

GREAT LAKES Science Center

NASA

CLEVELAND METROPOLITAN SCHOOL DISTRICT

Vision to Victory

Formal Education

- MC2 STEM High School
  - Started in 2009
    - (State initiative – Platform School)
  - Focus on STEM
    - (Science, Technology , Engineering and Math)
    - Project-Based Learning
    - Partnerships (GE Lighting, Science Museum, Universities
  - First graduated class 2012
    - 98% graduated – 97% going onto college or miliatry
    - Many following STEM disciplines

MC2 STEM HIGH SCHOOL

CLEVELAND METROPOLITAN SCHOOL DISTRICT
Vision to Victory

9th Grade

GREAT LAKES Science Center

- Great Lakes Science Center
- Downtown Cleveland
- Exposure to exhibits
- Partnerships
- NASA
- FABLAB
- Situated on Great Lakes

10th Grade

imagination at work

- General Electric (GE) Lighting and Industries Headquarters
- Tutoring & Mentorships
- Sophomore Engineering & Design Project
- First Industrial park started by Thomas Edison
- FABLAB

11th & 12th Grade

City of Cleveland as Campus

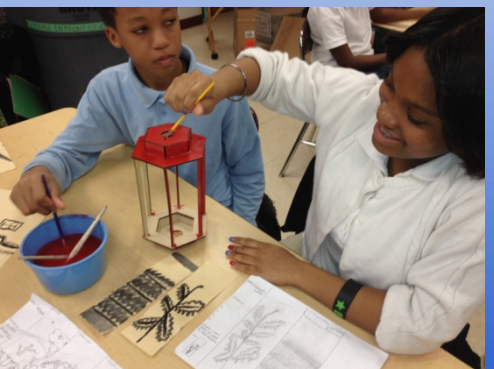
- Community / Business Internships
- College Level Classes
- Real world experiences
- FABLAB

Mobile FABLAB:

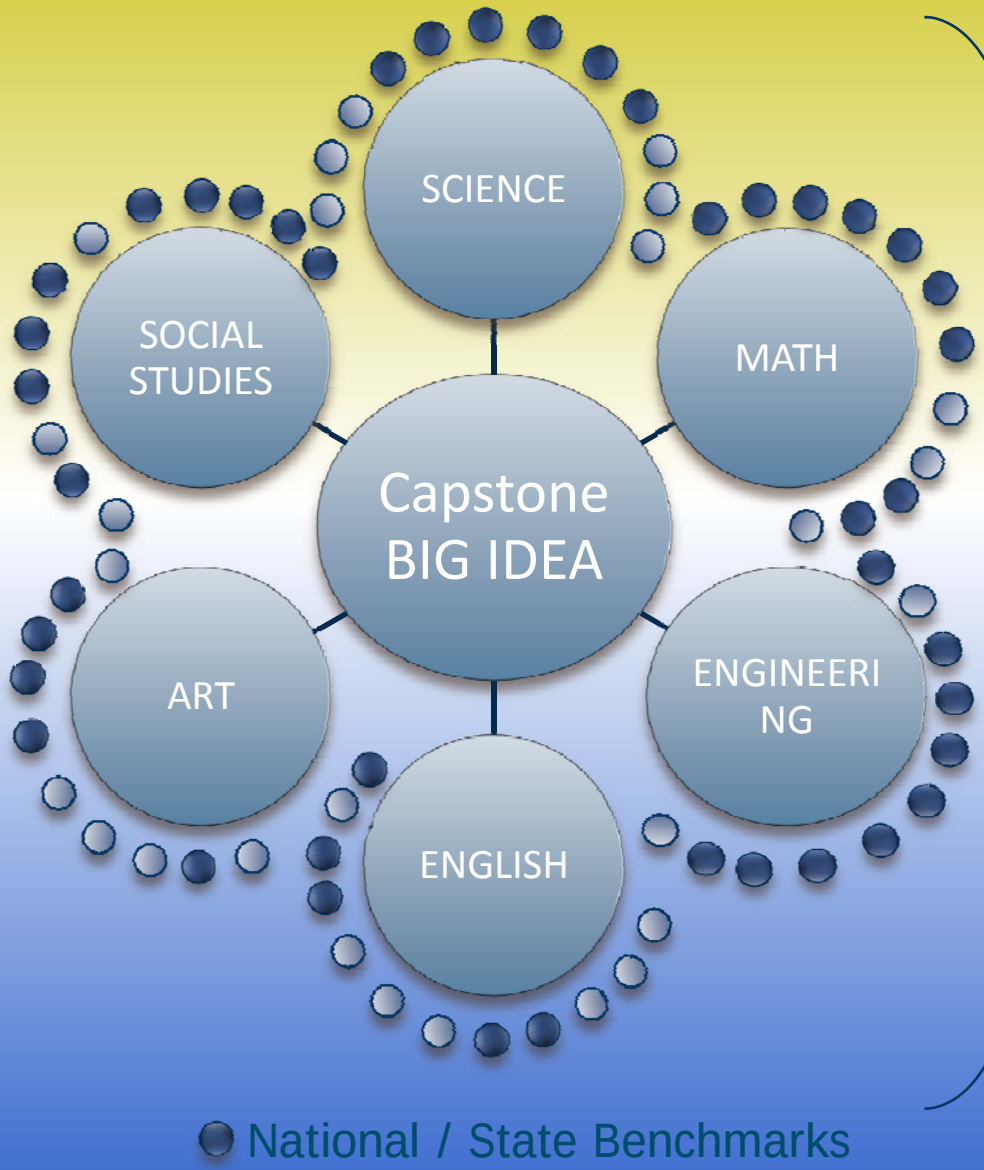
- City, State, Country wide exposure
- Local K-8 Curriculum and Implementation

Mobile FABLAB

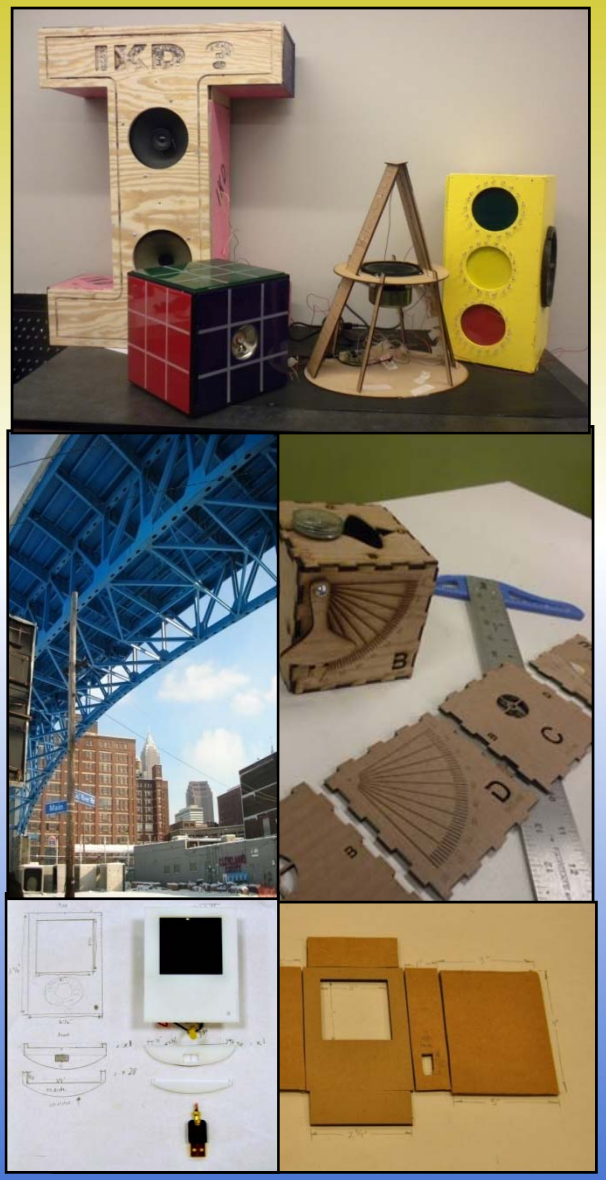
- **Grant Funded Outreach to District, City, Community, and Education**
- **STEM Pedagogy**
- **Increase DIY, Maker, Hacker awareness and network**



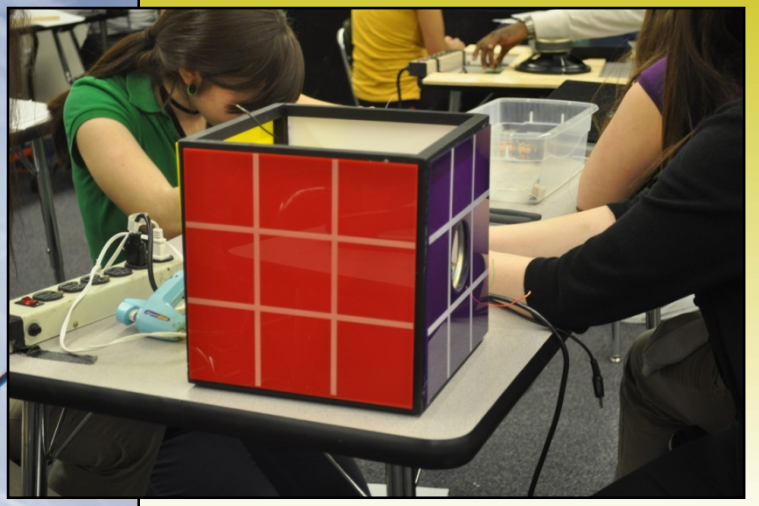
Benchmark Alignment

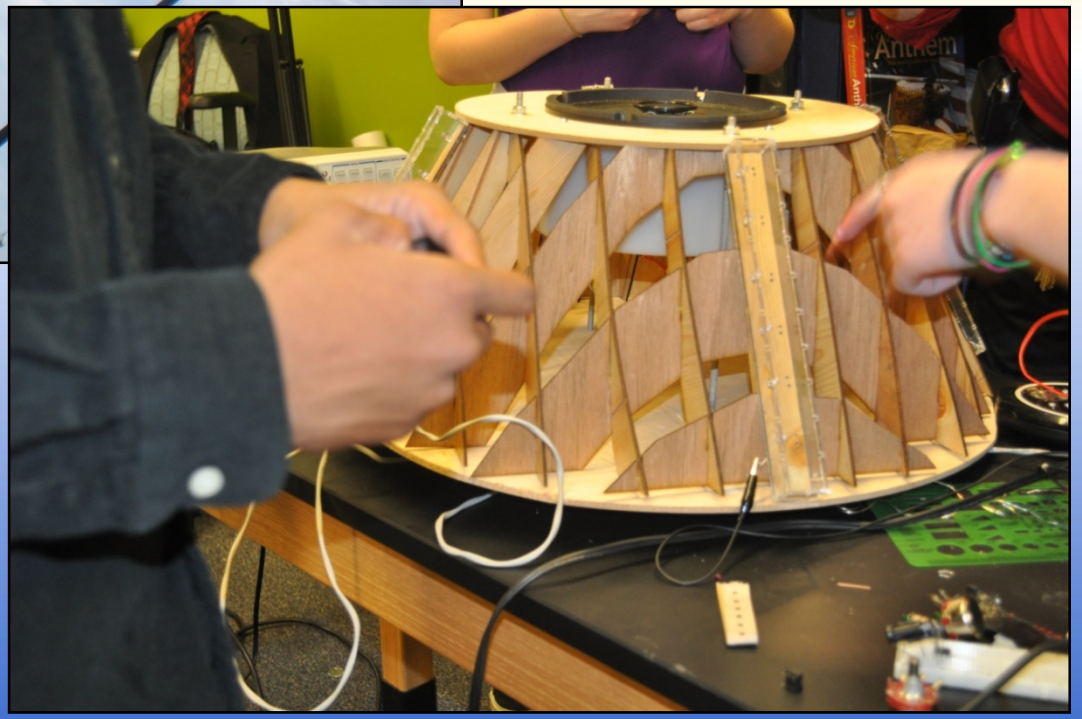


Capstone Units

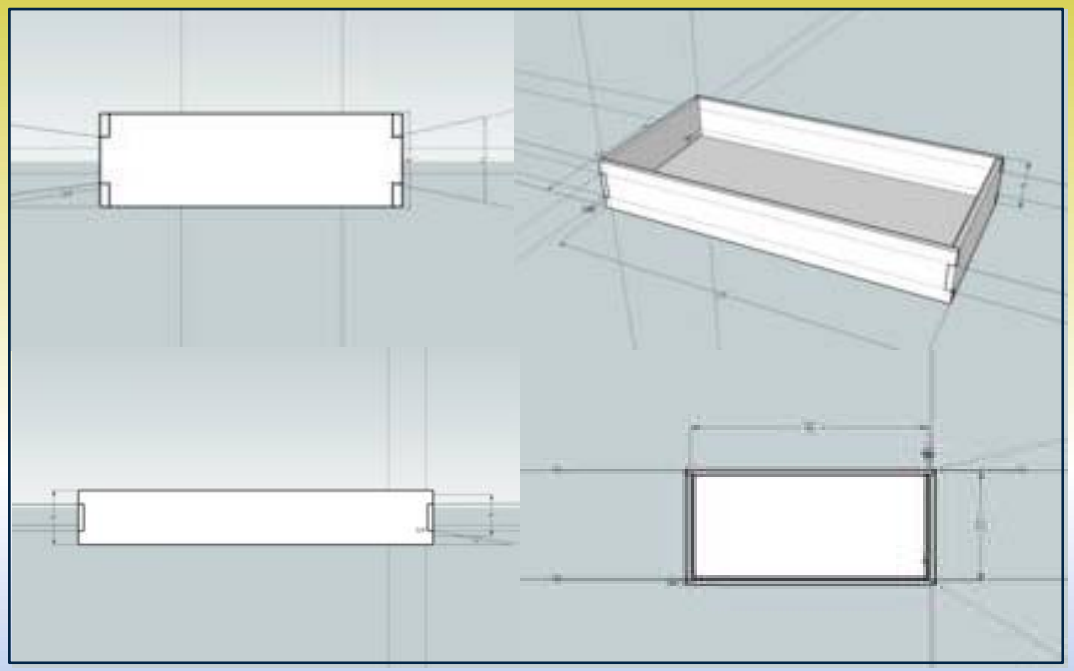


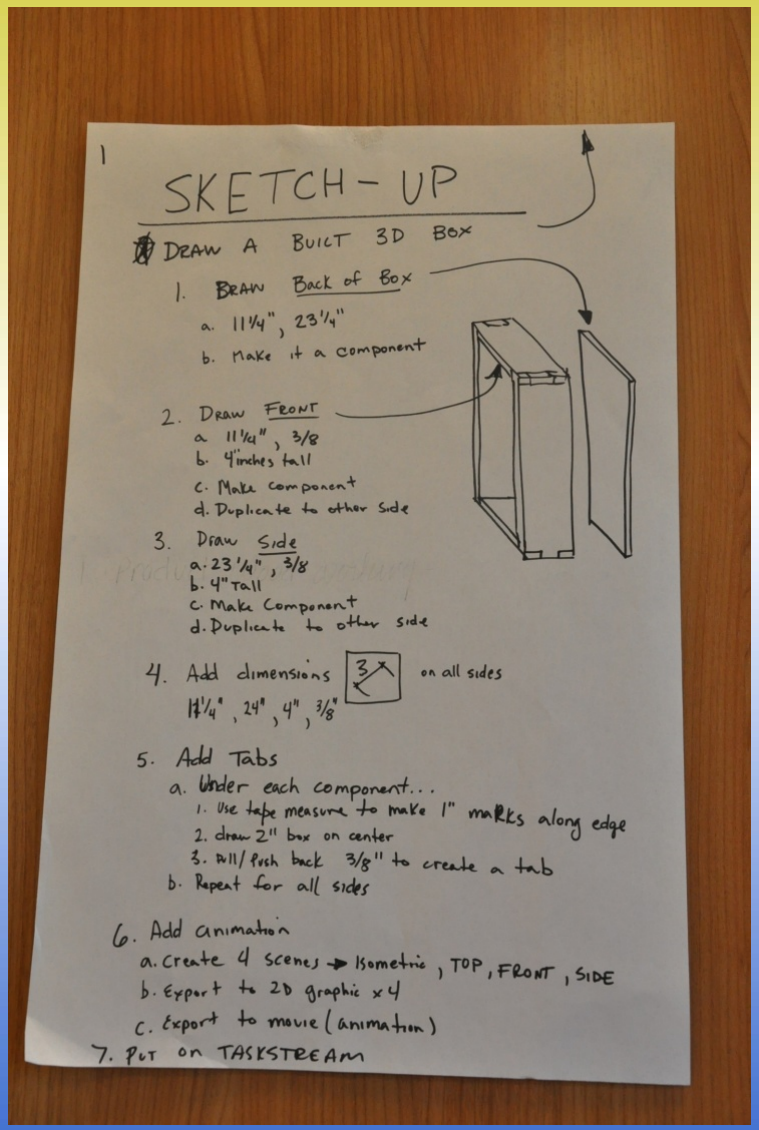
Project Based Learning





Lightbox Capstone





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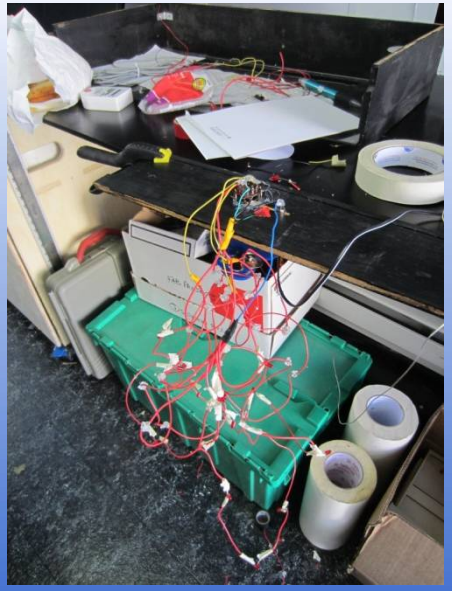

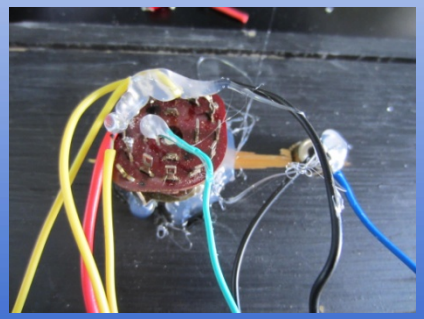

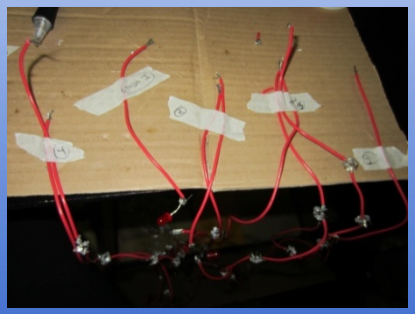

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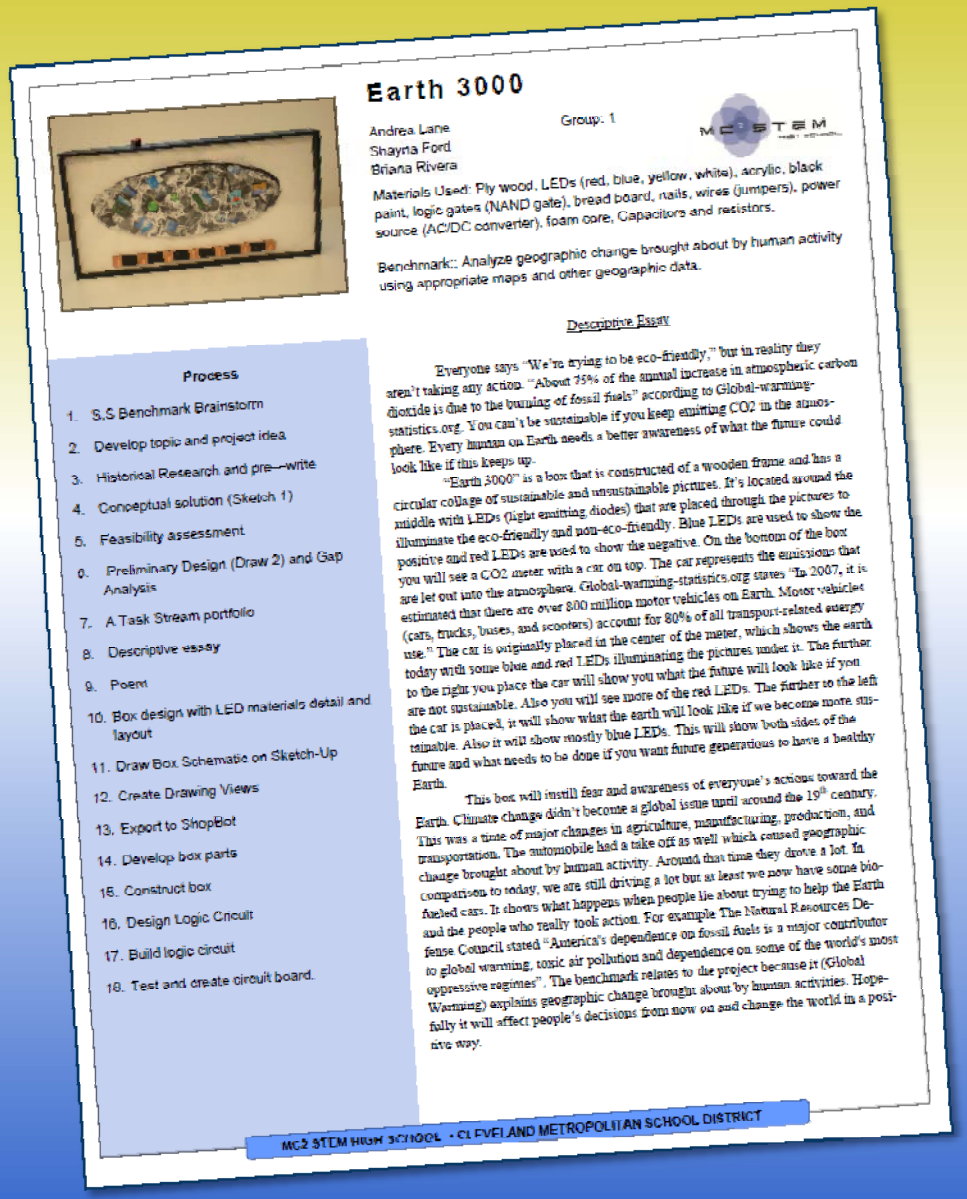


Earth 3000

Andrea Lane
Shayna Ford
Briana Rivera

Group: 1

Materials Used: Ply wood, LEDs (red, blue, yellow, white), acrylic, black paint, logic gates (NAND gate), bread board, nails, wires (jumpers), power source (AC/DC converter), foam core, Capacitors and resistors.

Benchmark:: Analyze geographic change brought about by human activity using appropriate maps and other geographic data.

Process

1. S.S Benchmark Brainstorm
2. Develop topic and project idea
3. Historical Research and pre—write
4. Conceptual solution (Sketch 1)
5. Feasibility assessment
6. Preliminary Design (Draw 2) and Gap Analysis
7. A Task Stream portfolio
8. Descriptive essay
9. Poem
10. Box design with LED materials detail and layout
11. Draw Box Schematic on Sketch-Up
12. Create Drawing Views
13. Export to ShopBot
14. Develop box parts
15. Construct box
16. Design Logic Circuit
17. Build logic circuit
18. Test and create circuit board.

Descriptive Essay

Everyone says "We're trying to be eco-friendly," but in reality they aren't taking any action. "About 75% of the annual increase in atmospheric carbon dioxide is due to the burning of fossil fuels" according to Global-warming-statistics.org. You can't be sustainable if you keep emitting CO2 in the atmosphere. Every human on Earth needs a better awareness of what the future could look like if this keeps up.

"Earth 3000" is a box that is constructed of a wooden frame and has a circular collage of sustainable and unsustainable pictures. It's located around the middle with LEDs (light emitting diodes) that are placed through the pictures to illuminate the eco-friendly and non-eco-friendly. Blue LEDs are used to show the positive and red LEDs are used to show the negative. On the bottom of the box you will see a CO2 meter with a car on top. The car represents the emissions that are let out into the atmosphere. Global-warming-statistics.org states "In 2007, it is estimated that there are over 800 million motor vehicles on Earth. Motor vehicles (cars, trucks, buses, and scooters) account for 80% of all transport-related energy use." The car is originally placed in the center of the meter, which shows the earth today with some blue and red LEDs illuminating the pictures under it. The further to the right you place the car will show you what the future will look like if you are not sustainable. Also you will see more of the red LEDs. The further to the left the car is placed, it will show what the earth will look like if we become more sustainable. Also it will show mostly blue LEDs. This will show both sides of the future and what needs to be done if you want future generations to have a healthy Earth.

This box will instill fear and awareness of everyone's actions toward the Earth. Climate change didn't become a global issue until around the 19th century. This was a time of major changes in agriculture, manufacturing, production, and transportation. The automobile had a take off as well which caused geographic change brought about by human activity. Around that time they drove a lot. In comparison to today, we are still driving a lot but at least we now have some bio-fueled cars. It shows what happens when people lie about trying to help the Earth and the people who really took action. For example The Natural Resources Defense Council stated "America's dependence on fossil fuels is a major contributor to global warming, toxic air pollution and dependence on some of the world's most oppressive regimes". The benchmark relates to the project because it (Global Warming) explains geographic change brought about by human activities. Hopefully it will affect people's decisions from now on and change the world in a positive way.

MC2 STEM HIGH SCHOOL - CLEVELAND METROPOLITAN SCHOOL DISTRICT

Poem:
English Earth 3000

It's 2009 and everyone is committing a crime
By picking up dog poop and then in the garbage it droops

When you try and to be sustainable
But then you want a wooden table

You are cutting down trees
And leaving no where for leaves

It's 2020 and the streets are dirty and crummy
That's how it's going to look if make a 1000 page book

Trying to live right but always putting up a fight
With the Earth by making a sunny skirt

It's 2020 and the streets are clean as day
We can walk outside and breathe the clean way

It's now 3000 there's barely any human life
People are dead or living in strife

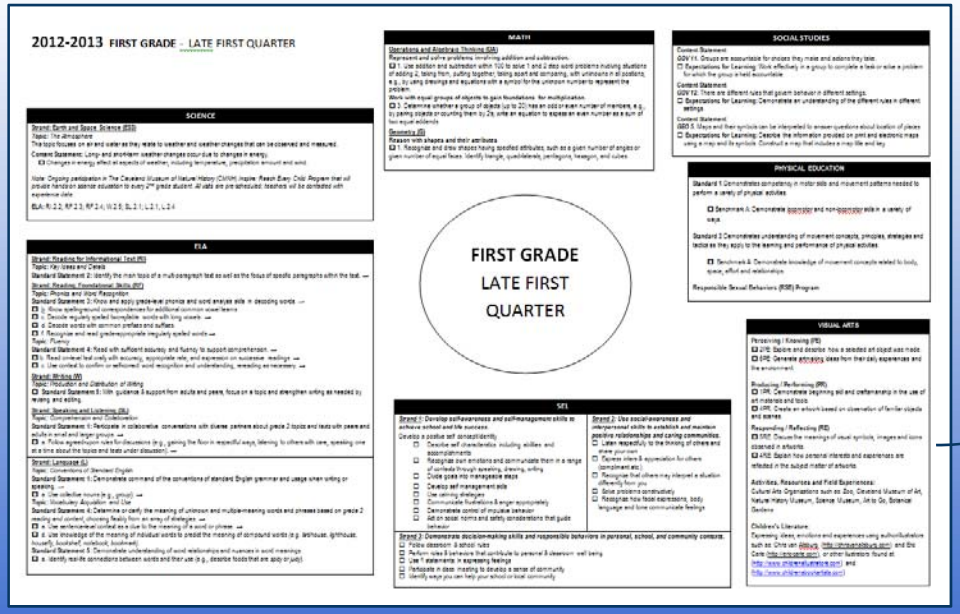
Point blank stop treating the earth like dirt!

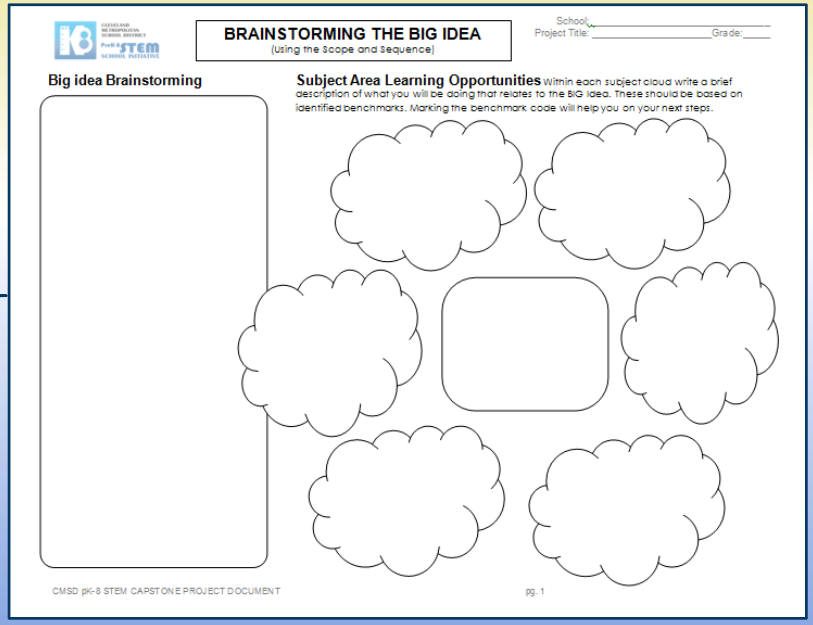
Formal Education 2

- CMSD PreK-8 STEM Initiative
  - Race to the Top – Federal STEM initiative
  - Cohort of six newly designated STEM school
    - Project Based Units
    - Science driven projects
    - Benchmark alignment
    - Teacher development
    - Vertical and horizontal collaboration
  - Mobile FABLAB experience
    - http://www.pk8stem.com
    - http://mc2stemhs.wordpress.com

K-8 Capstone Process

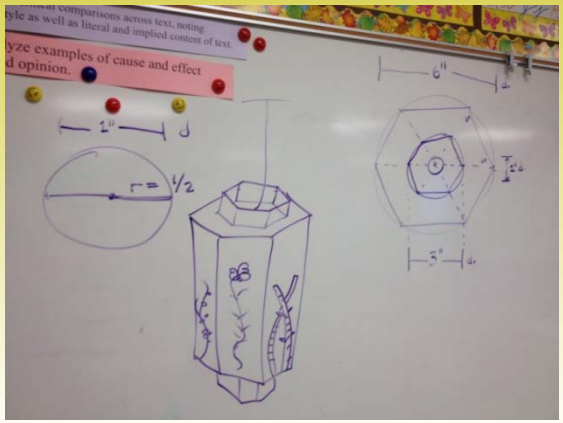
Standards / Benchmarks





Big Idea
Essential Questions
Learning Outcomes

Lantern Project



Geometry
Social Studies
Art
English
Engineering


http://mc2stemhs.wordpress.com

Professional Development

- Workshops
  - Teaching the teachers
  - Teaching Students
  - Mobile Fablab usage
- PDI Professional Development Planning
  - Project Prototyping
- Center for Innovation in STEM
  - Great Lakes Science Center 2012-2013

Professional Development

- Small group + Long Hours
  - 2-3 individuals
  - Long (All) Nights
- Practice, practice, experiment
  - Demo
  - Trial
  - Experiment