Mar 6th, 10:15 AM - 11:00 AM

Transformation from Standards to STEM

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Three strategies to support the transition from the standard to STEM

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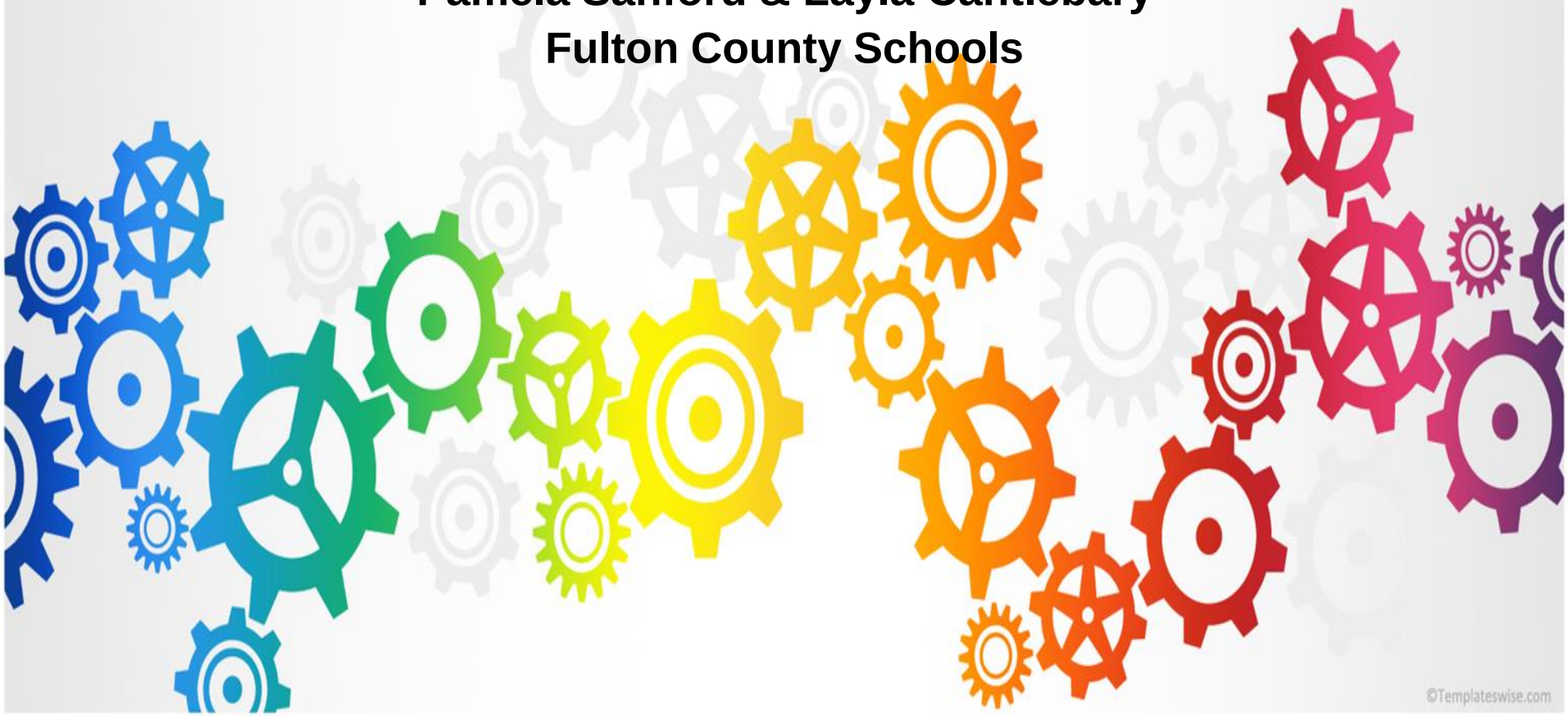
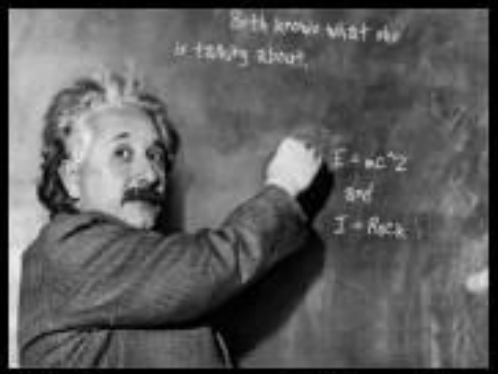


Three strategies to support the transition from the standard to STEM

- How did the STEM initiative changed classroom teaching?
- Science Olympiad Day as well as Club
- Sea Perch Robotics

TEACHER

What my friends think I do.



What my mom thinks I do.

What society thinks I do.

What kids think I do.

What I think I do.

What I actually do.

Standards

STEM

How did the STEM initiative changed classroom teaching?

- Collaboration
- Engineering Design Process
- Problem based learning
- Real World Connections
- Business and community partners

(Connecting Math and Science Instruction)

Collaboration

What's the first thing you notice about this picture?

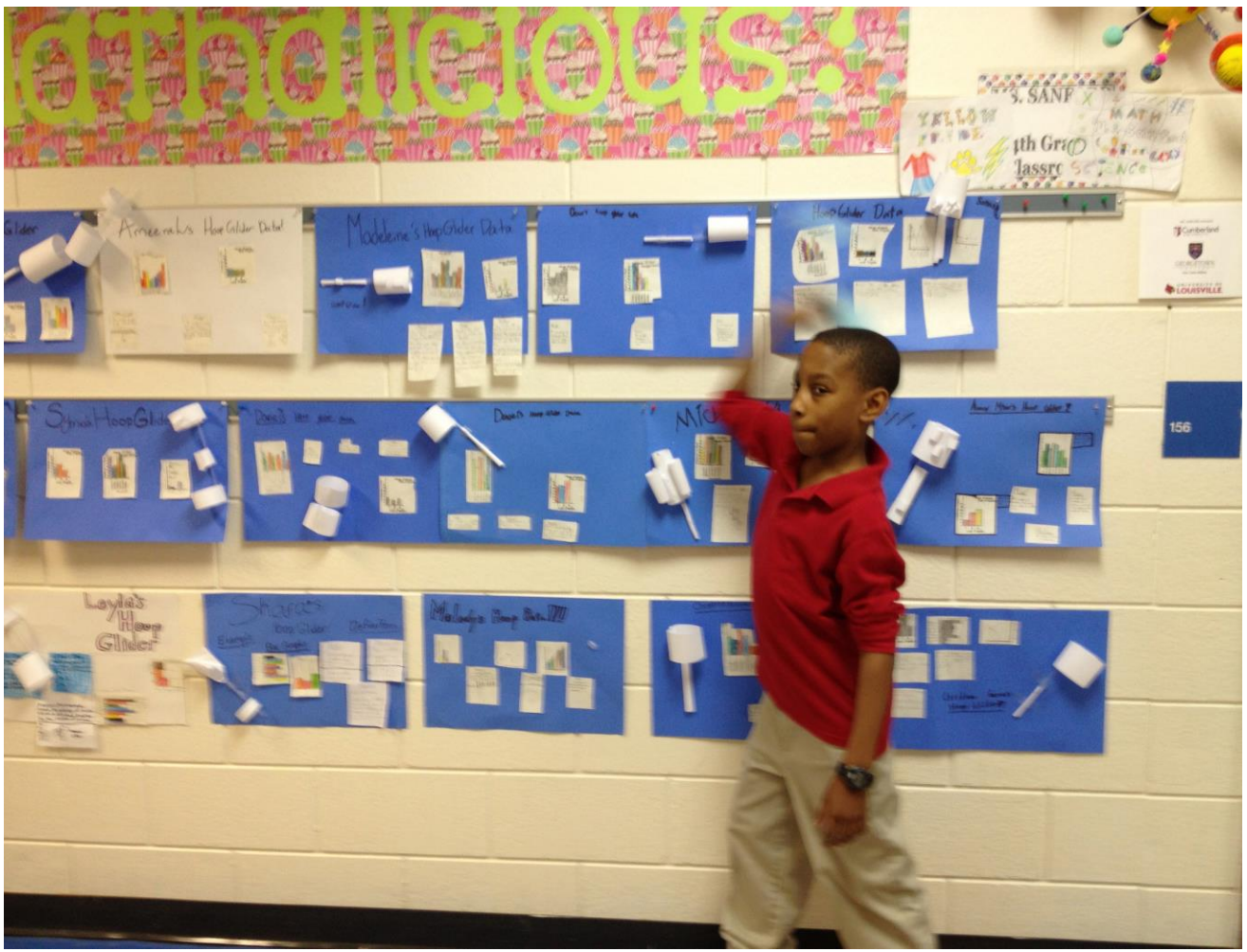
(I'm guessing it isn't the amazing diversity of this collaborative group!)

Collaboration

Here, we were designing load bearing structures from playing cards.

These two groups were the winners. What's most interesting about this picture is what you do not see.

Engineering Design Process



Problem-based learning

- Student centered (The teacher facilitates/ mentors)
- Problems are often real-world challenges
- Often involve research (What do we need to know to solve this?)
- The question is central to PBL

Real-World Connections

S5E1. Students will identify surface features of the Earth caused by constructive and destructive processes.

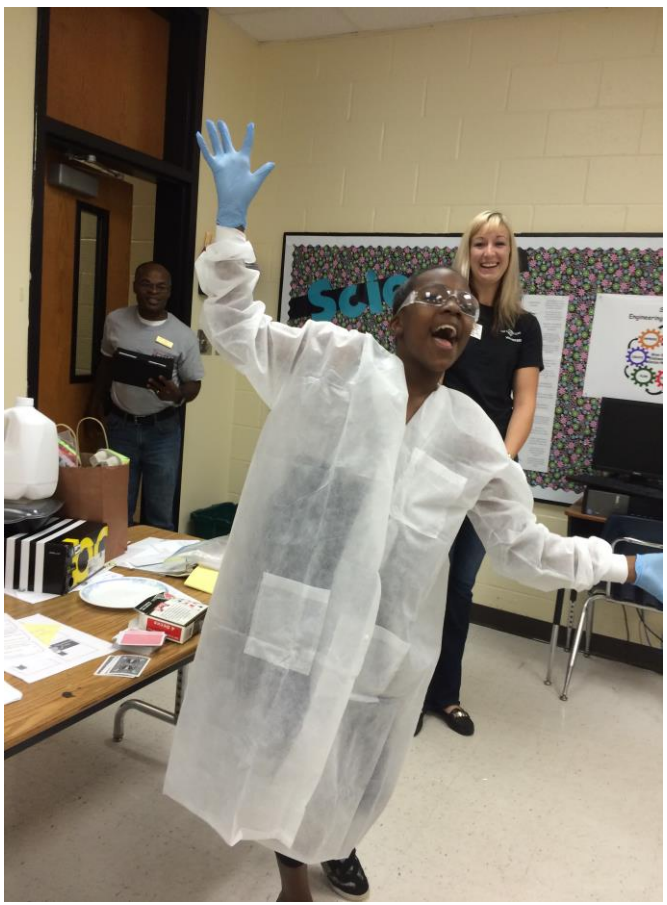
Identify surface features caused by constructive processes. Deposition (Deltas, sand dunes, etc.) Earthquakes Volcanoes Faults

Real-World Connections

In conjunction with “An Hour of Code”, we wanted to see the real world applications of coding, and how it could be beneficial in the workplace and the real world.

Here you see Dr. Britton from Georgia Tech sharing their robot that monitors chicken coops.

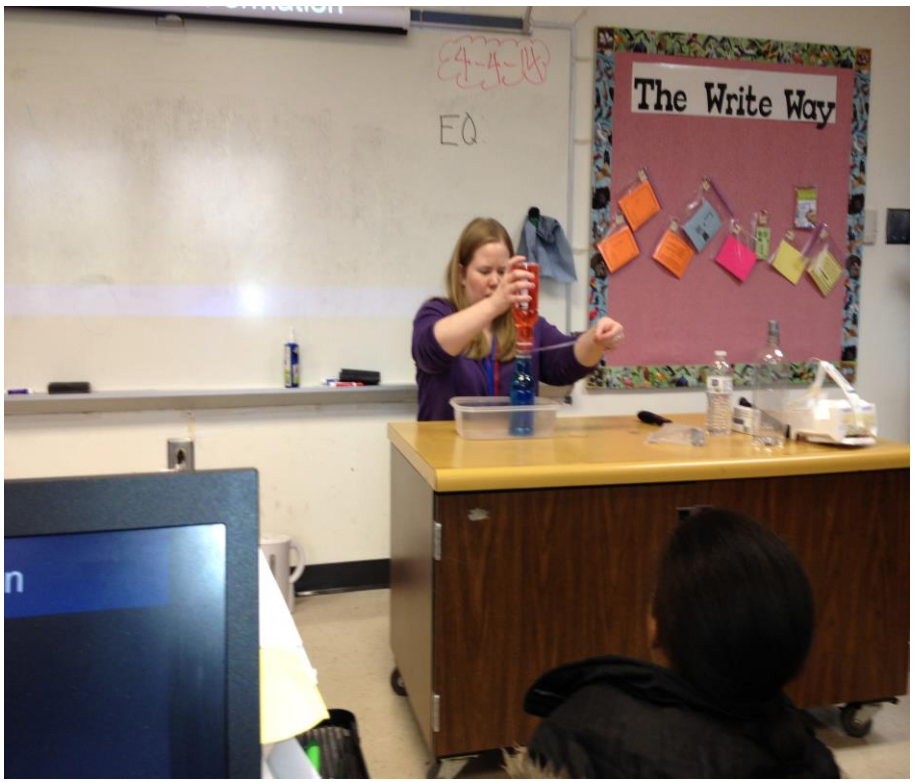
Business and community partners



Kimberly Clark is an official partner with our school, and sends engineers to all of our STEM Days to both speak, and support the students.

Here we were reviewing workplace safety, but they have been instrumental in making personal connections with my students.

Business and community partners



Exploring the World of Science

Genesis of idea

- Wanted to start a team
- Needed a recruitment tool
- Attended a workshop
- School decided to start STEM certification

Planning

- Decide on events
- Recruit help
- Find financial assistance
- Create timeline


November
• Decided events
dec./jan.
• Compiled supply list
• Made schedule
Feb./mar.
• Create lesson plans
• Get supplies
April
• Create volunteer documents and teacher schedules
• Finish packaging supplies
May
• Teacher training
• Volunteer recruitment
• Event

S3CS8. Students will un
Students will apply the foll
a. Scientific in
things are l
and doing
b. Clear and a
scientists t
scientists, a
c. Scientists u
and compa
d. Science inv
ages and b

Co-Requisite - C

Earth Science

S3E1. Students will inve
a. Explain the
b. Recognize t
color, textu
c. Use observa
and color i
d. Determine h
observation

S3E2. Students will inves
a. Investigate
informatio
b. Describe ho

Physical Science

S3P1. Students will inves
and will understa
a. Categorize
mixing one
b. Investigate
c. Investigate
d. Use thermo
warm, cold

S3P2. Students will inve
objects.
a. Investigate
b. Investigate

ENERGY BOX

Description:

Teams will construct, ahead of time, an insulated house-like structure no larger than 40 cm on a side (outside dimensions) to house and retain the heat of approximately 75 ml of water in a standard, empty, 100 ml Pyrex beaker (supplied by students).

Number of Participants: 2

Approximate Time: 45 minutes

The Competition:

1. The Energy Box will be turned in a minimum of an hour before the event. Only one box is allowed per team. The judges will load them at thirty second intervals until all of the competing boxes have their hot water samples. Judges should use water taken from a constant temperature bath such as an electric coffee pot.

2. There must be easy access to the energy box interior for easy loading or pouring and rapid measurement of the water sample temperature at the end of the competition period. Beakers may not be permanently installed in the energy boxes.

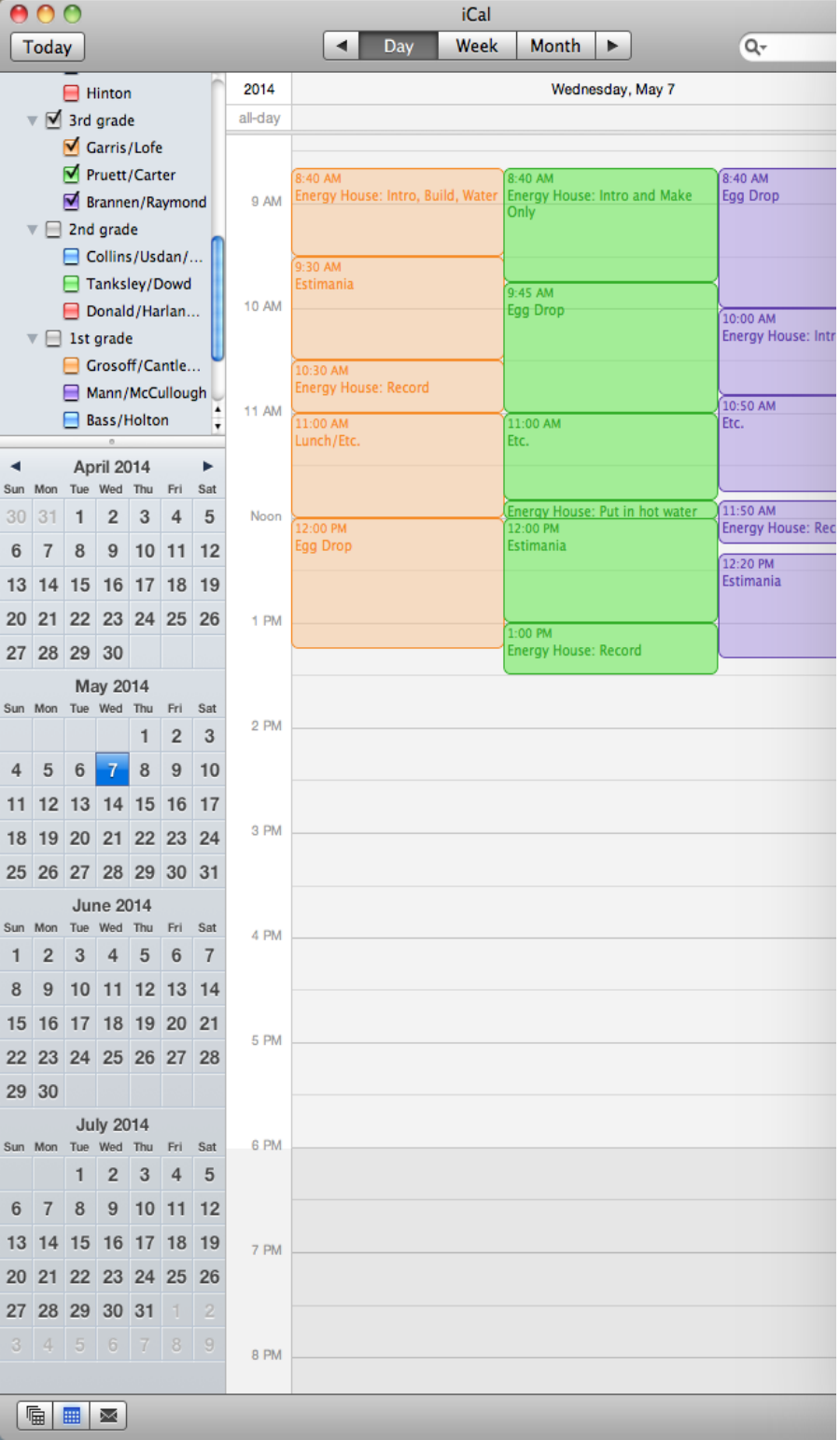
3. At the end of a 20-30 minute time period (determined by the judges), energy boxes will be opened in the same order in which they were loaded by the judges, at thirty second intervals. Temperature measurements will be taken and recorded immediately by the judges. The hottest sample will win. Judges will supply the thermometer(s)-(digital would be best).

Scoring:

1. Scoring will be based on the formula: score = M x $\triangle$T (where M = mass of box and $\triangle$T = the change in temperature). The lowest score wins.

2. In case of a tie, the team with the smallest $\triangle$T will be declared the winner.

3. Winning energy boxes will be inspected to insure that no other source of energy was used other than the hot water supplied by the judge.



Garris/Lofe

8:40-9:30	Energy House Intro Build Put in hot water
9:30-10:30	Estimania
10:30-11:00	Energy House Temperature/ Record results
11:00-12:00	Lunch/Etc.
12:00-1:15	Egg Drop
1:35	Awards Ceremony

*Note: The upper field will be closed

Brannen/Raymond

8:40-9:55	Egg Drop
10:00-10:50	Energy House Intro Build Put in hot water
10:50-11:50	Lunch/Etc.
11:50-12:15	Energy House Temperature/ Record results
12:20-1:20	Estimania
1:35	Awards Ceremony

*Note: the upper field will be closed.

Pruett/Carter

8:40-9:25	Energy House Intro Build
9:45-11:00	Egg Drop
11:00-11:50	Lunch/Etc.
11:50-12:00	Energy House Put in hot water
12:00-1:00	Estimania
1:00-1:20	Energy House Temperature/ Record results
1:35	Awards Ceremony

*Note: The upper field will be closed

5th Grade:

* Chopper Challenge *
  Groups of 2
    Each group gets:
    - 2 sheets of cardstock (1 to play with 1 for fi
    - 3 small paperclips

* Write It, Do It
  Groups of 2 (one writing, one doing)
    Each writer gets:
    - 1 write it paper (two-sided)
    - shares one display figure with another write
    Each builder gets:
    - 1 writer-written set of instruction
    - 1 bag of Legos, matching the number/letter

* Paper Rockets *
  Individual
    Each student gets:
    - 1 pencil (to return)
    - 2 sheets of white paper
    - scotch tape to share with 2/3 other students

4th Grade:

* Bottle Rockets *
  Groups of 3
    Each group gets:
    - 1 2-L soda bottle
    - 1 2-L soda bottle "nose cone"
    - 3 yards of kite string
    - 1 plastic garbage bag
    - 1 piece of foam core board
    - 1 piece of white paper for planning
    Each class gets:
    -rolls of duck tape to share

* Grab a Gram
  Groups of 2
    Each group gets:
    -Two gallon bags
    Each CLASS gets:
    - bag of pretzels
    - bag of dog food
    - bag of plastic beads
    - bag of sand
    - bag of rice
    - bag of Cheerios

Sci Oly STEM Day Supply List - cheapest prices

Item	Quantity	Link
Black Foam Board - 20"X30"	25	http://www.dollartree.com/household/arts-and-crafts/paper-notel /500c565c567p310686/index.pro?method=search
Transparent Scotch Tape with dispenser	38	http://www.dollartree.com/household/arts-and-crafts/tape-glues- Packs/500c565c568p10980/index.pro
Timers	16	Dollar Tree (in store)
Non-Slip Shelf Liner	8	Dollar Tree (in store)
Duck Duct Tape	30	http://maxbuyer.officemax.com/shop/shopmvc.selectItemDetail.
Masking Tape	65	http://maxbuyer.officemax.com/shop/shopmvc.selectItemDetail.
Cardstock	2 (250)	http://maxbuyer.officemax.com/shop/shopmvc.selectItemDetail.
Paperclips, Small	1 box (1,000)	http://maxbuyer.officemax.com/shop/shopmvc.selectItemDetail.
Rubberbands	2 (100)	http://maxbuyer.officemax.com/shop/shopmvc.selectItemDetail. dex=5&csid=2-107-2196-184-2-156559-233985-184-2196-1823
Copy Paper	6 (reams)	http://maxbuyer.officemax.com/shop/shopmvc.selectItemDetail.
Pipe Cleaners	1 boxes (1000)	http://maxbuyer.officemax.com/shop/shopmvc.selectItemDetail.
Modeling Clay	2	http://maxbuyer.officemax.com/shop/shopmvc.selectItemDetail.
Eraser (light-must be identical)	7	http://maxbuyer.officemax.com/shop/shopmvc.selectItemDetail. dex=4&csid=2-107-2196-184-2-162568-180664-184-2196-3445
Notebook Paper	2	http://maxbuyer.officemax.com/shop/shopmvc.selectItemDetail.

Event: **Paper Rockets**

Time Total: 1 hour

The Low-down: Students wi
off" using the straw w

Important notes:

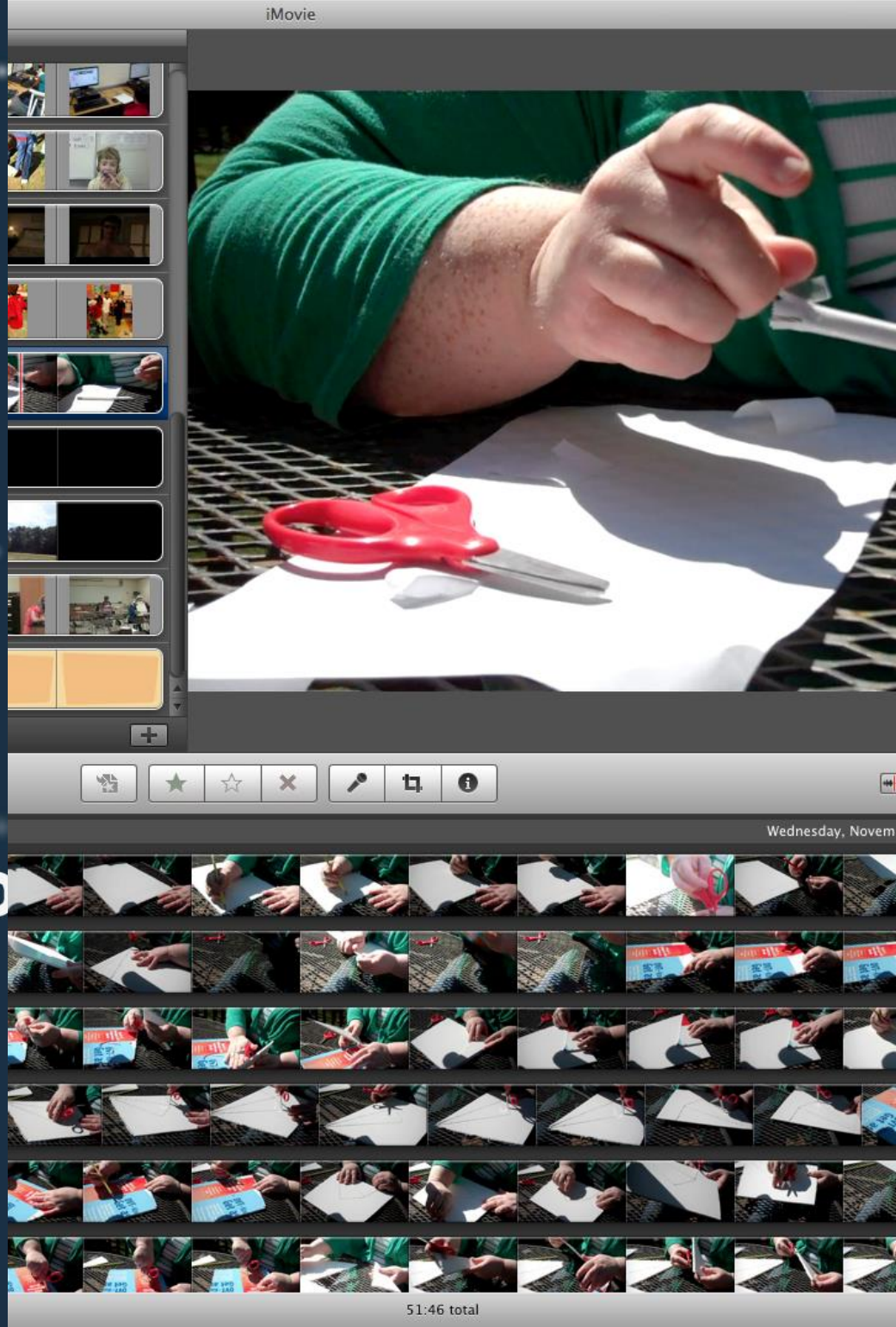
1. Kids HAVE to st
a fair competi
2. Teachers can't
have to design
information fro
3. Students can b
to shoot off for
4. Designate one
5. Students cann
6. Pencils should
with you can p
sheet.

Introduction: 15 minutes (o

1. Explain to kids
2. Open Prezi an
3. Explain where
must be patien
could become
4. Let students kn
make with two
with.
5. Remind studen
possible. When
different angle
distance and
6. Watch tip vide
paper, one str
between stude
7. After tip video

Building and Testing: 25 mi

1. Start the 25-mi
2. Students shoul
3. While students
4. Give students
busy, they mig



Training

- In-service day for teachers
- Week before event
- By grade level
- Downloaded presentations and videos
- Answered questions
- Shared lessons and schedule

WE NE

Science Olympia
educational competi

Volunteer to help us
materials, ta

Scien
W
7

Brie

2:4

Due to safety concerns,

Pretty p

Yes! I'm incr

Name: _____

Cell: _____

E-mail: _____

Grade levels of chil

WE

Science O
amazing, fu
nee

Volunteer to hel
cracks, deliver m

Due to safety conce

Bridge Building Schedule

These are the times to pick up Bridge Building result sheets from teachers

9:15- Donald and Harlan

10:30- Tanksley and Dowd

1:25 (please be there at 1:20)- Collins, Usdan, and Schaffer

Final Preparations

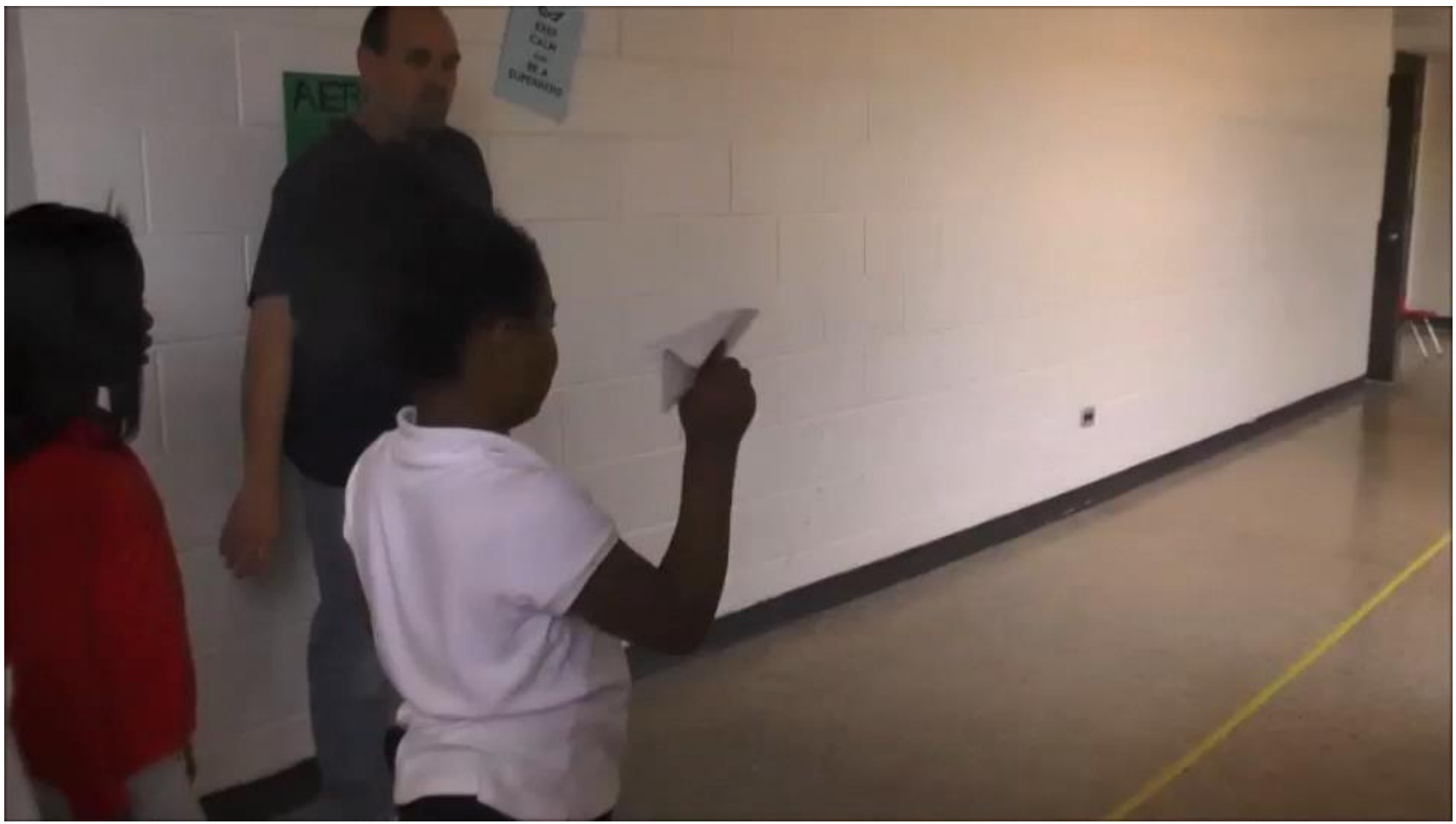
- Delivered supplies, put up signs, readied “command central,” and placed tape afternoon before
- School news show shout out
- Test areas finished the morning of
- Walkie talkies


PRID
SECOND
DROP

After Event

- Overwhelmingly positive response from teachers, parents, and students
- Touch point for students
- Photos and footage to be used recruitment

Commercials



SeaPerch

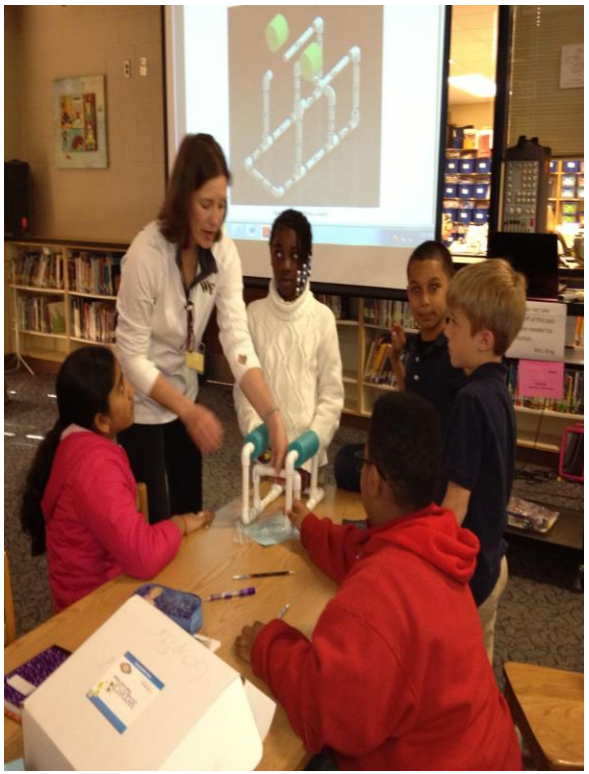
It all begins with the site…

And a grant!

SeaPerch

SeaPerch

Assemble the basic frame

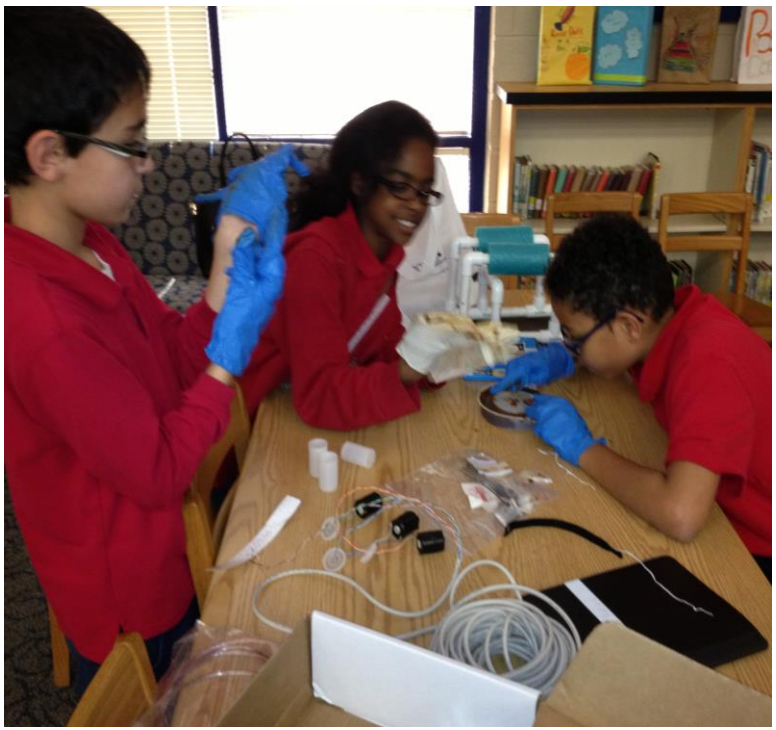


SeaPerch

Mounting the motors

SeaPerch

Sealing the motors

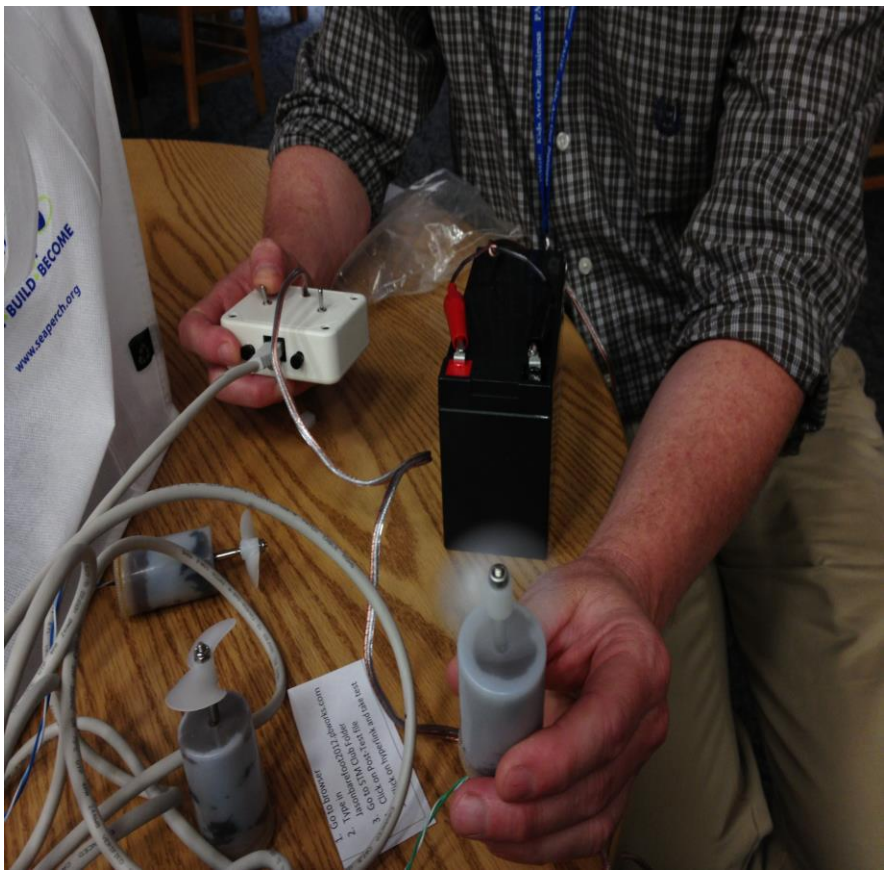


SeaPerch

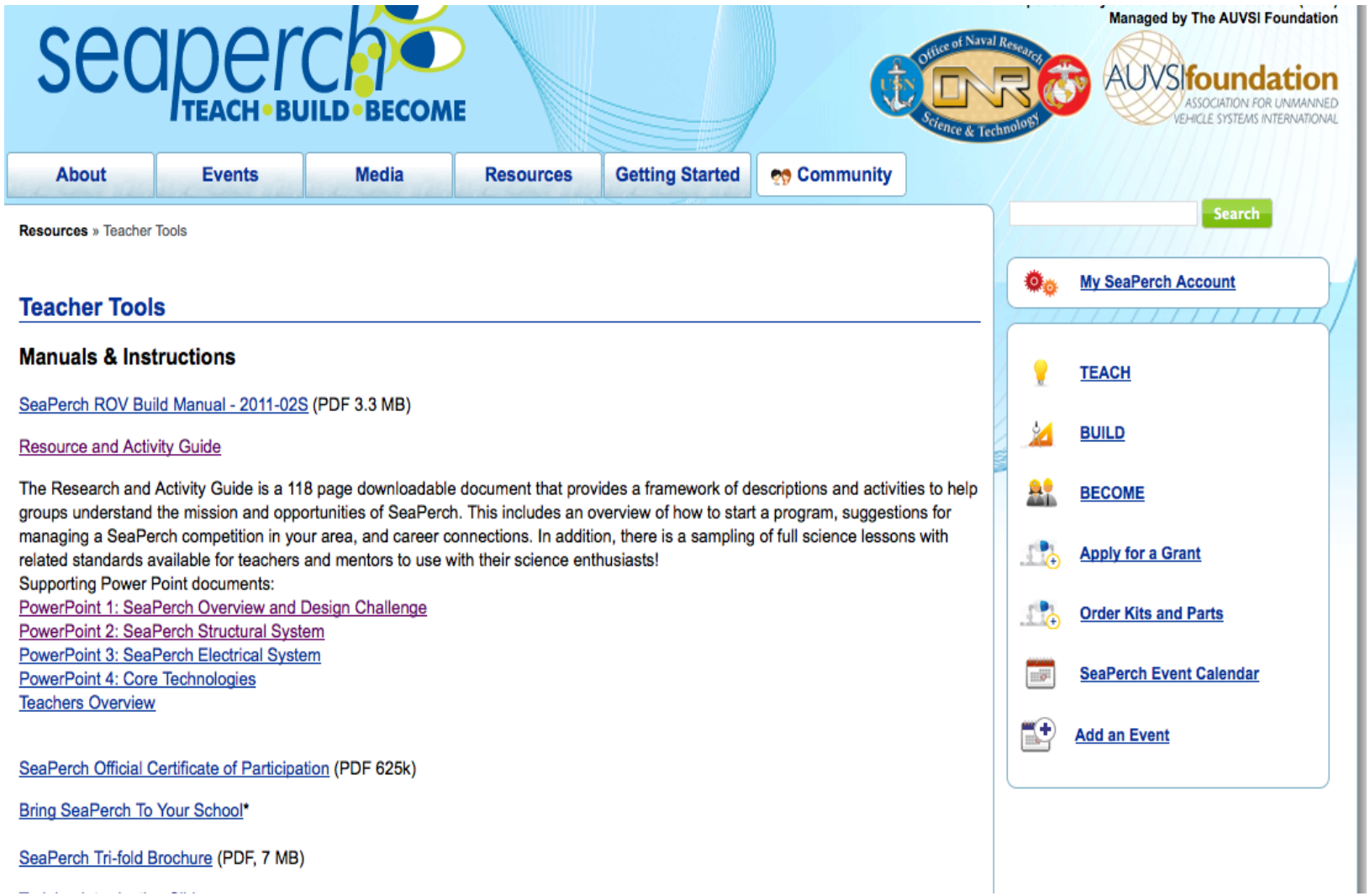
Sealing the motors

SeaPerch

Trouble-shooting



SeaPerch Site



SeaPerch Site

Labs & Lesson Plans*

Biological Sampling Device Using a SeaPerch (PDF 87.8 KB)

Exploring Underwater Habitats and Environments
Hunt for Red October
Measurement of the Depth of the Ocean
Student-Designed Modification of SeaPerch

How Everything Works

PVC
Relays
Microcontrollers
Switches
Electric Motors

How Everything Works - Advanced*

Buoyancy
Electricity
Sensors

SeaPerch Parts

Full Parts Listing and Vendors

Legacy build manuals (OLD ones)

SeaPerch Construction Manual (Standard Assembly) (101 pages, 3.42 MB)

SeaPerch Short Build Manual (21 pages, 649k)

SeaPerch

SeaPerch

Sample Task

- Paper Rockets (adapted from Science Olympiad Elementary Handbook)

- Using a pencil, straw, one sheet of copy paper, and Scotch tape, you will design a paper rocket that will land on a given target some distance away from you.

Tip Video

Timer