Algebra's Next Top Model

Why let science teachers have all the fun?

NCTM Conference 2012
KSTF Fellows:
Jim Town - jim_town@alumni.usc.edu
Alison Espinosa - alison.mary.espinosa@gmail.com

A Brief History Lesson

- Knowles Science Teaching Foundation Modeling Workshop
  - Larry Dukerich
  - Kelli Gamez-Warbel

- KSTF Project Based Learning Workshop
  - CPM "Start Your Engines"

- Led to Dune Buggies Project

- Catapults Project based on Algebra through Engineering by ConnectEd

Dear Students,

  As you may know, I am a nerd. In my spare time I made a cool little lego car and want to race it in the classroom. The problem is, it really isn't fair that I am an engineer and will defeat your cars. To give you a chance of winning I will change the rules of the race. In this race your car will have to tie mine. You may start your car from wherever you would like. Since how fast your car is does not matter in the race, I will provide you with a car.

Each team will have two chances to tie my car. Throughout the process you should save all of your work for a final individual portfolio that shows your progress towards understanding linear equations and graphs.

Sincerely,
Mr. Town

Pace Car

4 volunteers?

Everyone records information

Graph -> line of best fit

How fast is the pace car going?

Your Car: http://tinyurl.com/nctmdunebuggy

Decide who is the
- Timer
- Taper
- Measurer
- Car Wrangler
- Recorder

Graph -> best fit line

How fast is your car going?

The Race

Where does your car need to start to tie mine?

How can you show your are correct graphically?

Questions?

- How could you use this?

- What are some common misconceptions you anticipate?

- How would you help struggling students?

Catapult Assault

You find yourself in the dark ages needing to attack an enemy castle. Your spies tell you that, like the death star, the castle has a weak spot that will destroy the whole thing. It is about 1 meter in the air. Oh yeah, it is a mini castle and you only have a mini catapult, did I forget to mention that?

One more thing, you only have one shot at this so you better make it count.

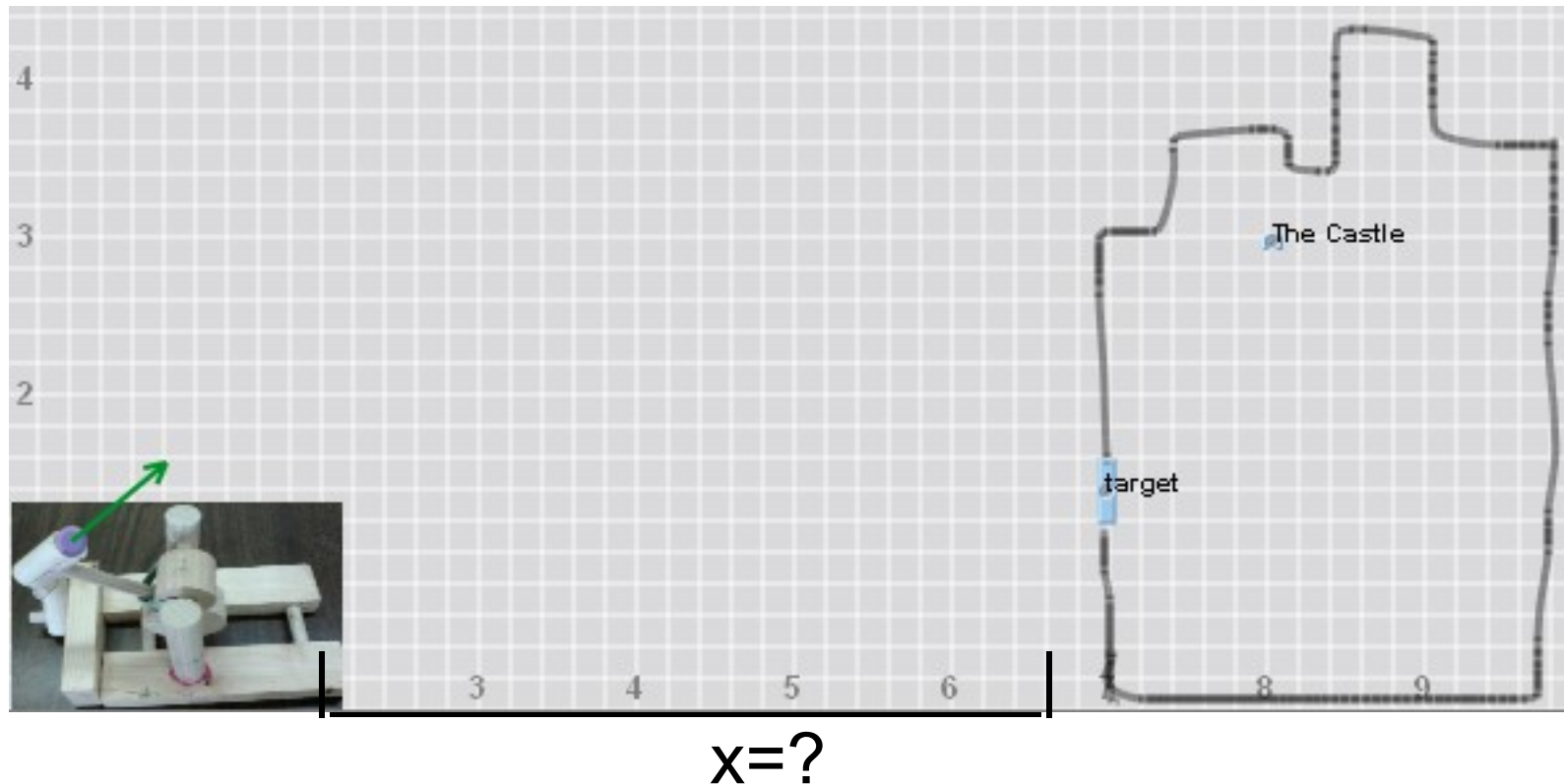# Catapult - **http://tinyurl.com/nctmcatapult**

- Measure three points for your catapult.
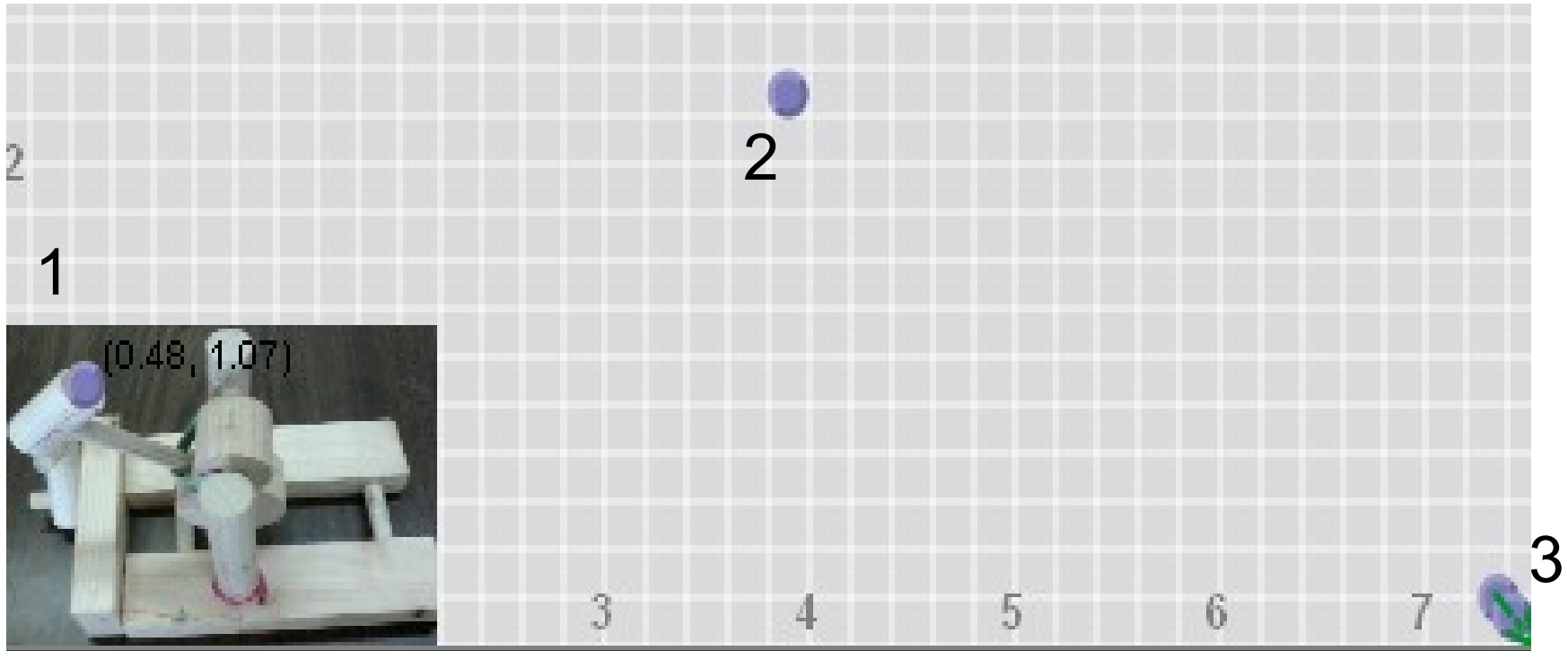
(suggested points)

System of equations -> Attack!

- Write $y = ax^2 + bx + c$ for each point and solve for a, b, & c

- Use the equation to figure out how far away to put your catapult to hit a target 1.2 m high.
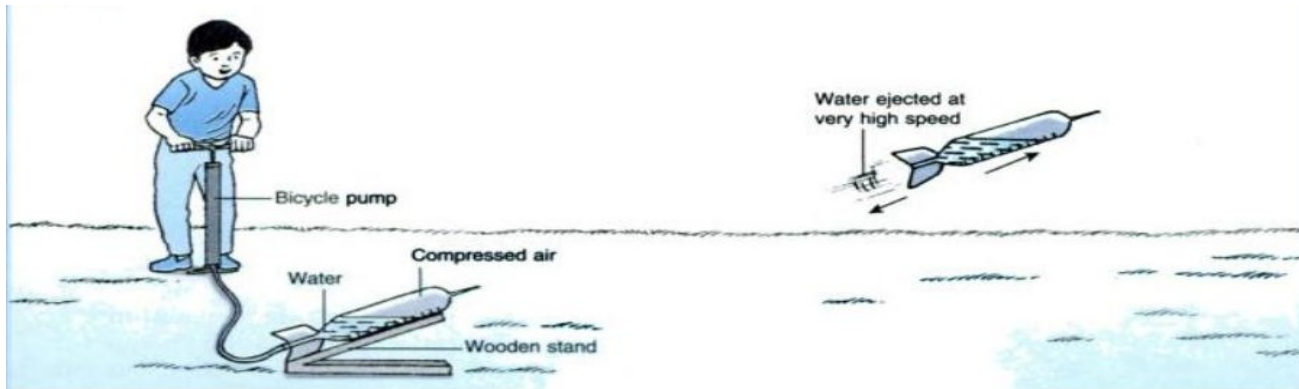

x=?

Questions?

- How could you use this?

- What are some common misconceptions you anticipate?

- How would you help struggling students?

Ideas:

- Science textbooks (especially physics)

Water ejected at very high speed

Bicycle pump

Compressed air

Water

Wooden stand

- Math textbooks (even traditional ones will have problems that you could do interactively)

Ami dropped a rubber ball from several heights and measured how high the ball bounced. Her results are shown in the table. How high would the ball bounce if it were dropped from a height of 36 centimeters?

Height of Drop (cm)	Bounce Height (cm)
40	30
60	45
80	60
100	75

- Specialty books
  - Useful Mathematical and Physical Formulae (Watkins)
  - EGADs (Erickson)
- Internet (duh)

Brainstorm

Add ideas you've had:
1. make a map using geometry
2. Stacking cups
3. Tying knots in rope
4. Dancing?
5. Jumping quadratics
6. Poker chips in a bag (catch and release)
7. Casino

Where you found them:
1. Colleague

2. EGADs
3. Discovering Algebra 1
4. Colleague

But I don't have any cars, catapults, etc

Try:

- donorschoose.org

- simulation (link on handout)

- google "math mini grants" to find local funding
    - eg Philadelphia Education Fund

- local navy bases

- borrow them from science teachers at your school