

The School Bell

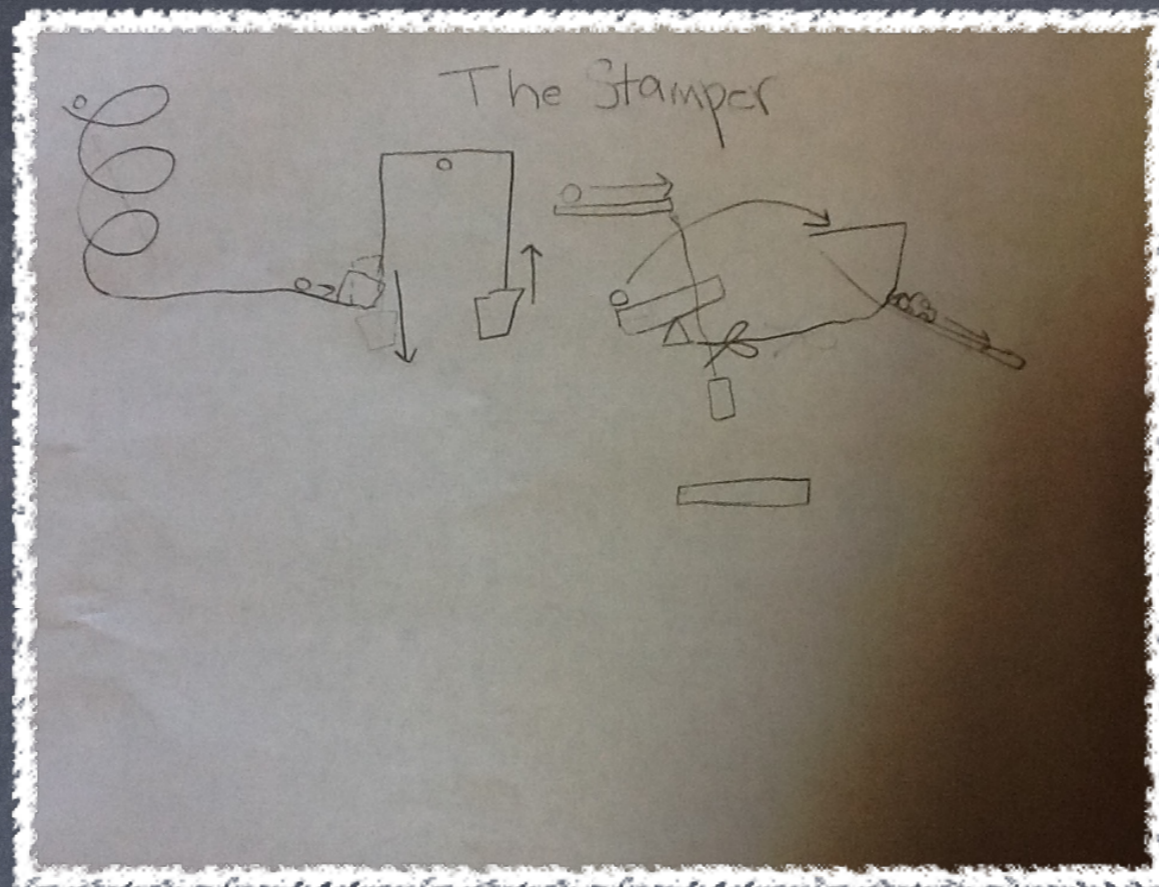


A Rube Goldberg Machine By Amritha Somasekar, Logan Sheehan, Ananya Somasekar, and Jonathan Stickle

INTRODUCTION:
PROJECT HISTORY

Our First Goal

- Ringing a school bell wasn't our first goal
- until last minute, the goal was to stamp a paper
- difficulties of already fixed steps caused stamp idea to be impossible



Our First Blueprint

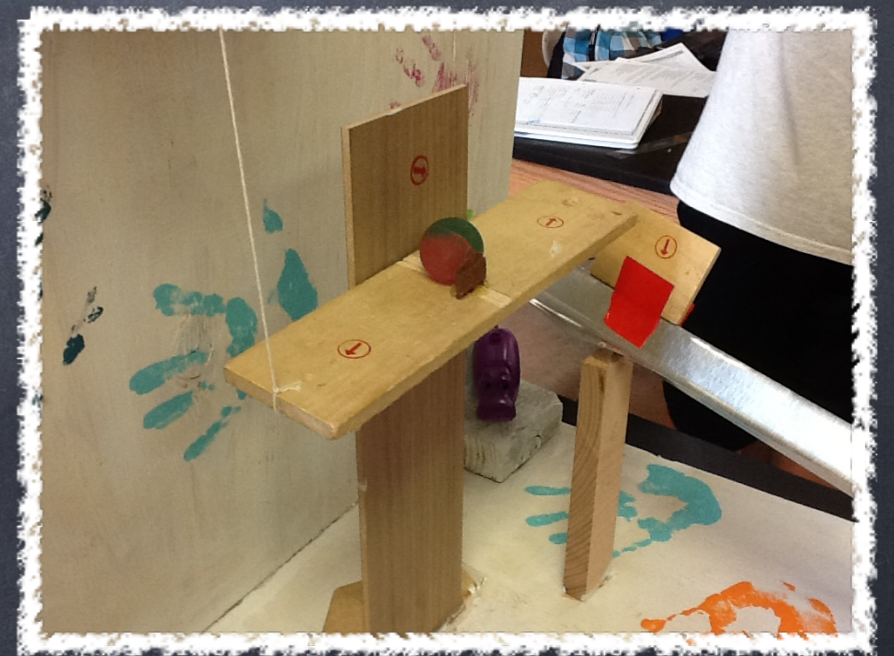
As you can see, it was pretty sparse AND the goal was to stamp a paper

Finding a working Lever

- ◉ tried and failed a numerous times to make different types of levers
- ◉ catapult ideas
- ◉ finally made a consistent 1st class lever attached to the pulley system



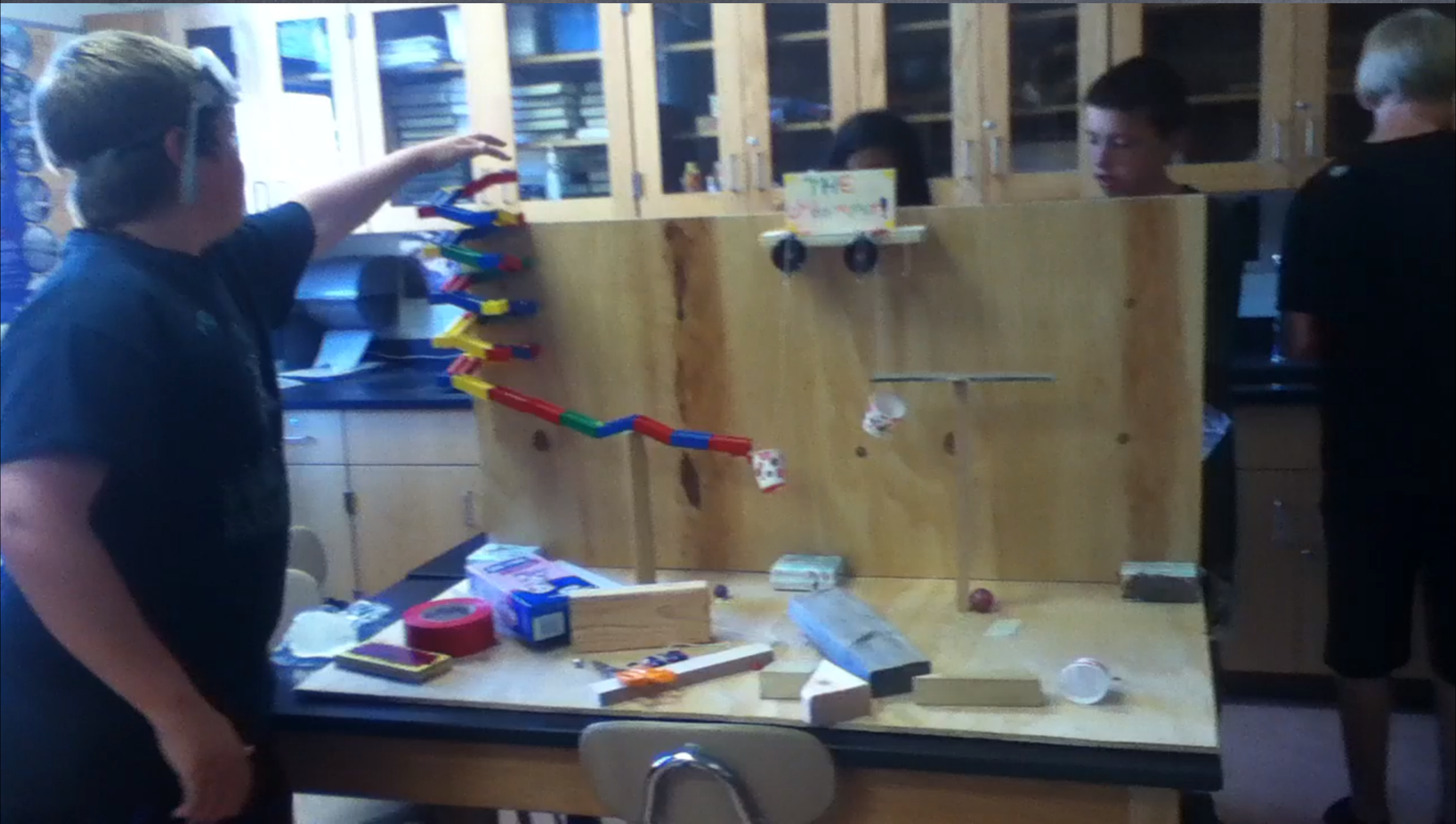
to



Getting the Pulley System to Work

- Main time occupation: the pulley system, which failed a numerous amount of times
- At first, was 2 cups, but lack of mass made that idea fail
- finally got idea of attaching pulley to lever, which worked the most consistently





PROGRESS OF THE LAST STEP

- ◉ First idea was to cut string with scissors, causing stamp to fall and work
- ◉ idea did NOT work
- ◉ hammer levers
- ◉ finally, we arrived at the bell idea



to



Project Time

- about 25 hours of work in total
- 2 hours for coming up with the first ideas
- 1 hour painting
- rest of time divided between building and tweaking*

The Physics and the Steps

(including calculations)

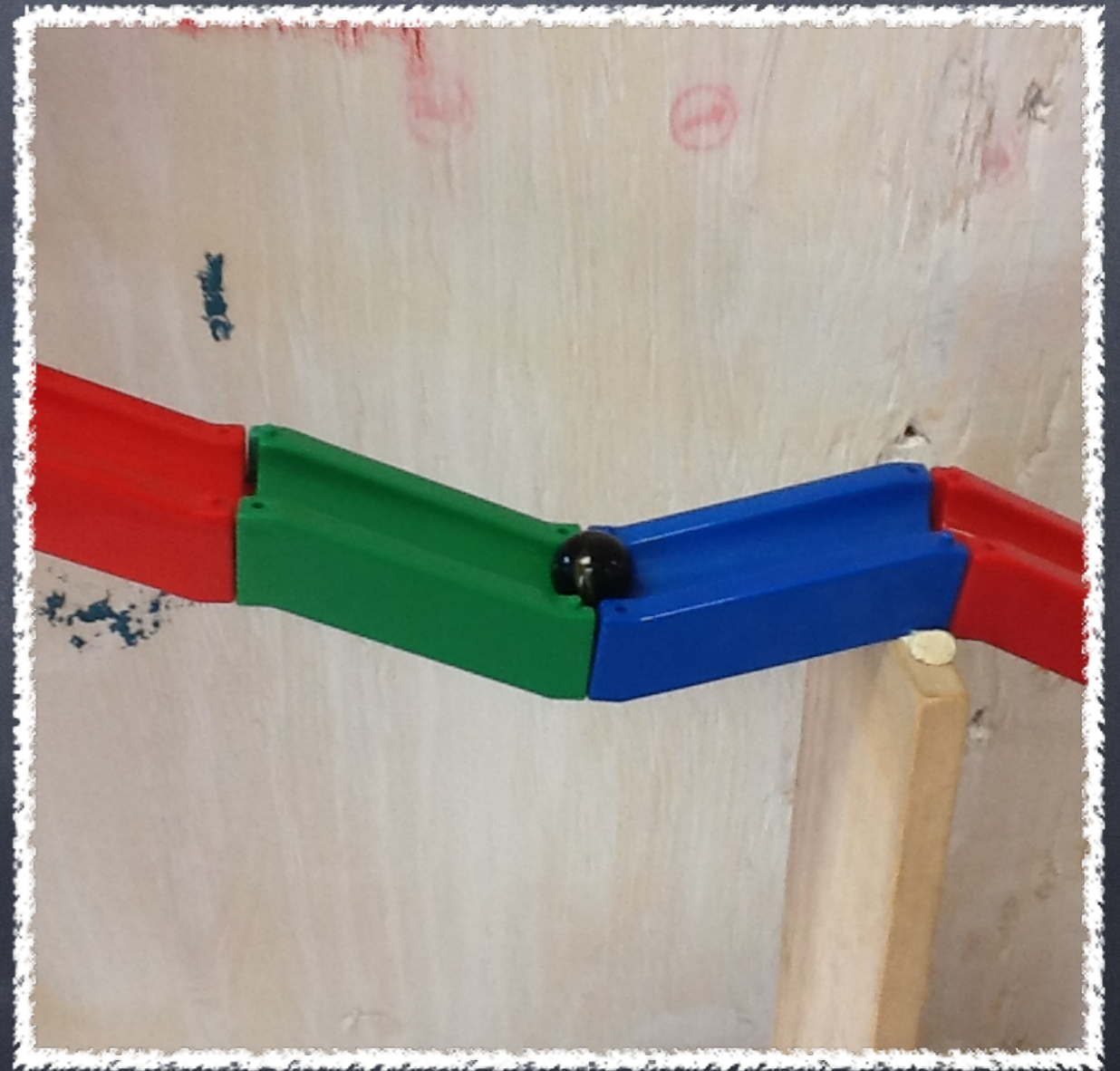
Step 1 the double screw.

- Marble rolls down 2 screws.
- Giraffe PE = 0.3332J
- MA of lego screw 7.2



Step 2 Marble collision

- Marble runs into another marble
- Work needed to go up small incline plane $0.000462J$



Step 3 Pulley Drop

- Marble goes into a cup connected to a Pulley
- MA of pulley is 1
- Force of the marbles pushing cup down 0.17N



Step 4 Lever up

- Pulley pushes the lever up.
- MA of pulley system is 1
- MA of the lever was 8.67



Step 5 Ball rolling down Lever

- The ball rolls down the lever onto an incline plane
- The speed of the ball going down is 0.375 m/s



Step 6 Incline Plane and wedge

- the ball drops from the lever to the inclined plane
- The mechanical advantage is 6.78
- the wedge moves at an average of 4.5 cm



Step 7 The Funnel

- the wedge knocks the marble into the funnel
- velocity: 0.7 m/s



Step 8 Funnel to Incline Plane

- marble falls through funnel to incline plane
- work of the marble on the inclined plane is $0,00018 \text{ J}$



Step 9 Marble Bump

- marble knocks other marble and they both go down
- the force of the energy transfer between the marbles: 0.0041 N



Step 10 Bell Ringing

- both marbles come down to hit the bell
- force of marble hitting the bell is 0.007N



THANK YOU!

brought to you by
Ananya, Amritha, Logan, and Jonathon