

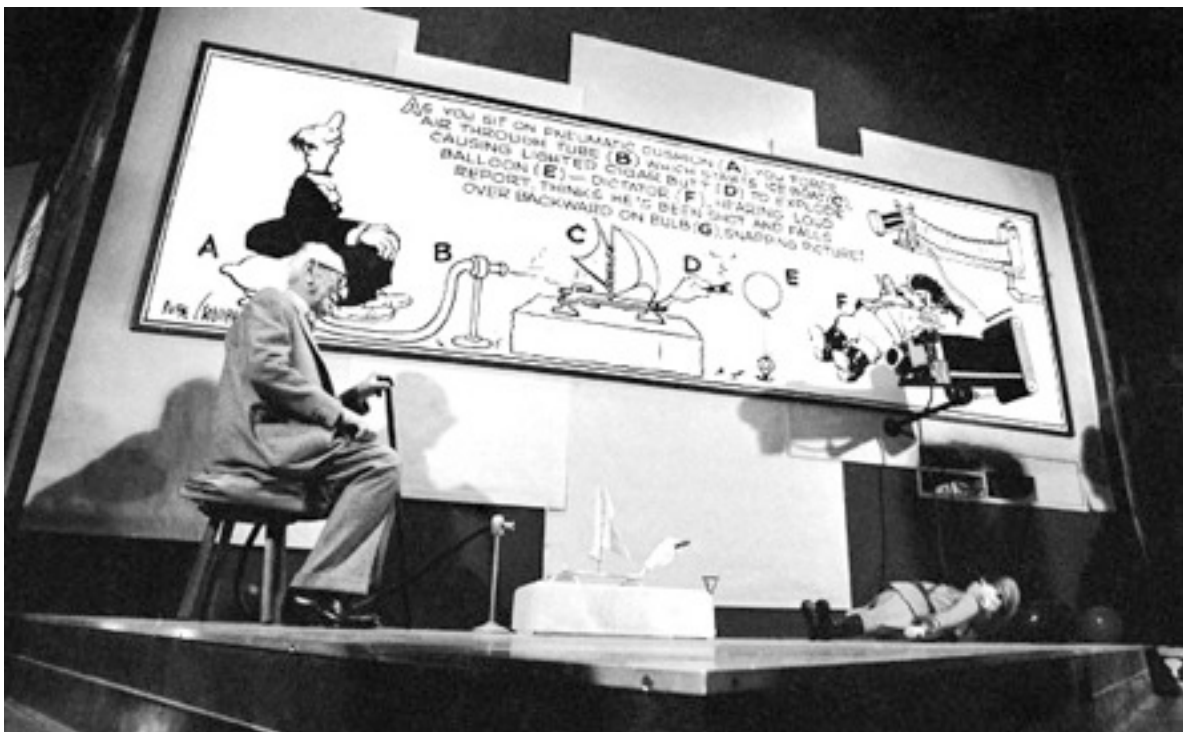
# Rube Goldberg Machine

Peem, Man, Sai, Seara, Jopang, Pitcher:  
Group 9

A Rube Goldberg machine is an invention/creation that is based on creativity, and the invention usually go in chronological order and works in mechanism form. A Rube Goldberg machine performs a very simple task in a very complex way. This machine was named after an American inventor named Rube Goldberg. He used his machine as an expression of working on something simple in a complex way. Rube Goldberg was a cartoon writer, sculptor, and author in his early life. He received many honors, especially for his political cartoons. He started to adapt his imagination when he decided to make cartoons and invented a machine that worked very simply, but in an extremely complex form. The machine spread throughout the United States and was named after him, thus; the Rube Goldberg Machine.



His idea was spread around the US thoroughly, and was influenced by an American industrialist named John Pierpont Morgan. He drafted his comedian intention automatic machine called "Automatic Hitler-Kicking Machine," and presented it to the crowd, in which his artwork showed his rebellious intentions towards Hitler and Nazis.



*"Automatic Hitler-Kicking Machine," by John Pierpont Morgan*

Rube Goldberg Ideas:

<http://www.youtube.com/watch?v=GOMIBdM6N7Q>

<http://www.youtube.com/watch?v=ve4M4UsjQo>

<http://www.youtube.com/watch?v=qybUFnY7Y8w>

[http://www.youtube.com/watch?v=ICYg\\_gz4fDo](http://www.youtube.com/watch?v=ICYg_gz4fDo)

<http://vimeo.com/22111968>

<http://vimeo.com/4687067>

[http://www.youtube.com/watch?v=xdPDnIKUz\\_A](http://www.youtube.com/watch?v=xdPDnIKUz_A)

<http://www.youtube.com/watch?v=ooTS9Z6PFh0>

[http://www.youtube.com/watch?v=rWd3vgLaA\\_M](http://www.youtube.com/watch?v=rWd3vgLaA_M)

<http://vimeo.com/24504225>

## Potential Energy and Kinetic Energy

Potential Energy is the stored energy that is held in position, ready to give out the kinetic energy. While the kinetic energy is any object with mass moving. There is a relationship because the potential energy transfers its energy to the object, allowing it to move. There are many types of potential energy, but the most common ones are gravitational potential energy (held in higher place before releasing for example weights), and elastic potential energy (something that is pulled out of place before releasing for example spring). An example of this in our machine is the marble held up on the lever before being released to fall down and hit the dominos, resulting in kinetic energy at the dominos, being the gravitational potential energy.

## Design Specifications:

- 1) It will be able to go from the beginning to the end with no major problems.
- 2) It is consistent in the way that we are able to perform multiple trials without difficulty.
- 3) Has the likeness of a safari ride, in order to relate to the theme.

## Design Brief:

The first step my group took in creating our Rube Goldberg machine was to make a long, continuous line of dominoes from the start until the end of one side of the square we were given. The next was to make use of various tunnels that utilized marbles to knock down the line of dominoes until they reached the wind up car. We painted and modified the windup car to our liking, and were able to relate it to the theme by coloring it like a safari car.

## Developing Ideas:

The first idea that my team and I had was to make the outline of an elephant's head inside the square, and put whatever else we needed inside the outline. However, we quickly dismissed this idea because of the time limit we were given.

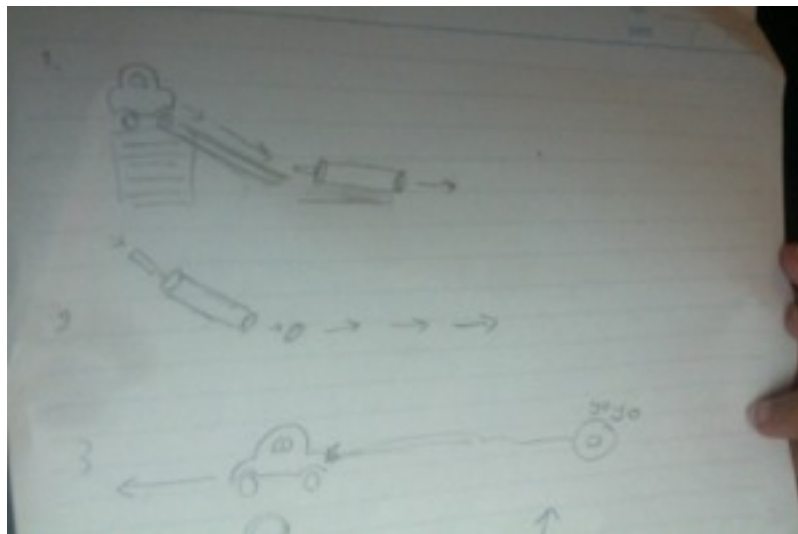


The next idea that my team and I had was to fill up the entire square that we were given as a guideline and make it into an elephant's body. This is quite similar to the first idea that we had, which was why we decided not to do it.



The last idea that my group had was to make a safari track within our square. We got this idea after researching on the internet, when one of the group members found something similar, but made out of toothpicks. We decided on this idea because we thought it would be relatively quick and easy to make, as well as being related to our theme.

As shown from the picture to the right, my group took a lot of time developing different ideas and improving on them. The picture to the right is a list of what we could have done with the car in our project. We managed to incorporate most or all of these ideas into our project, which my group was extremely proud of.



## Evaluating:

My group had a lot of difficulty in successfully carrying out our design specifications. The first specification was our main struggle because even though other parts of our machine worked well, we couldn't get the whole machine to work as a cohesive whole. This proved to be the cause of a lot of frustration and irritation, but we worked through the problems and were finally able to get the machine running well a few times.

The second specification was also difficult to accomplish. In our project, even though we were successful a few times in running our machine, we couldn't get it to work back to back, consistently, no matter how hard we tried. After hours of practicing, we were able to get a little bit closer to our major goal, which was to have our machine work well every time we tried using it.

The third specification was probably the easiest to fulfill. All we had to do was paint the car that was involved in our machine like a safari car. We also added some animal toys around the project to give it a 'safari' feel.

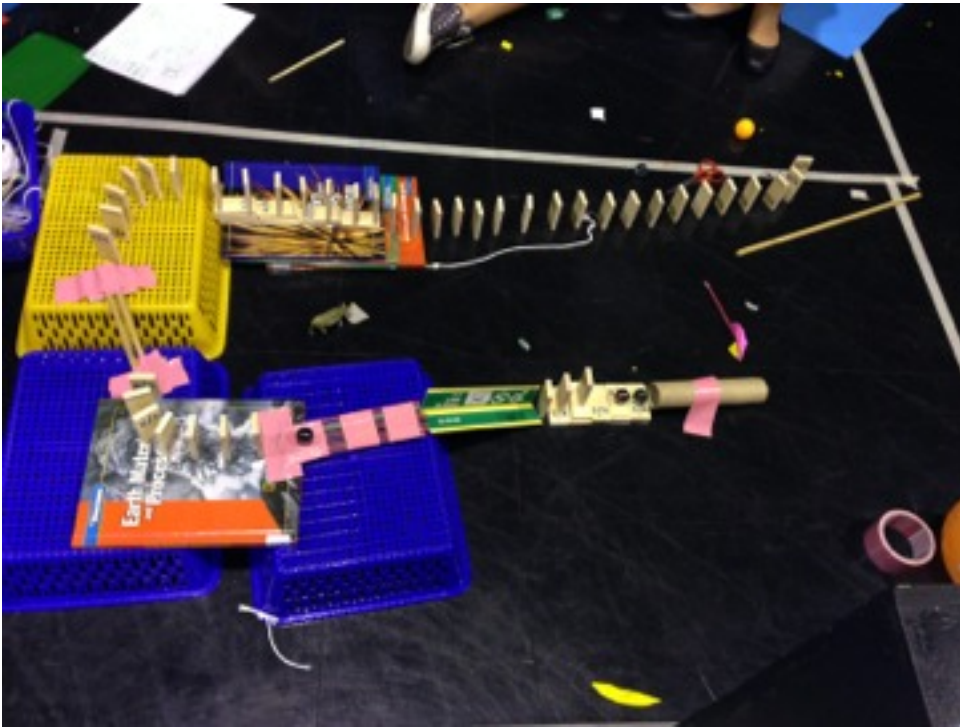
One of the changes that my group had to make while working on our project was on our pulley system with a balloon and yoyo, we had to tape a domino on the balloon so that the yoyo and balloon were equal weights. This proved to be immensely helpful and saved my group a lot of stress and worry. This idea was suggested by a teacher and it worked wonderfully during our project.

Another change that my group had to make was to tape all of our tunnels to the ground so that they wouldn't be accidentally shifted. Our original idea was to leave the tunnels untaped so that they had more freedom in the event that the marble that was supposed to drop down the marble veered off course. However, after many tests and trials, we decided it would just be better to secure the tunnel.

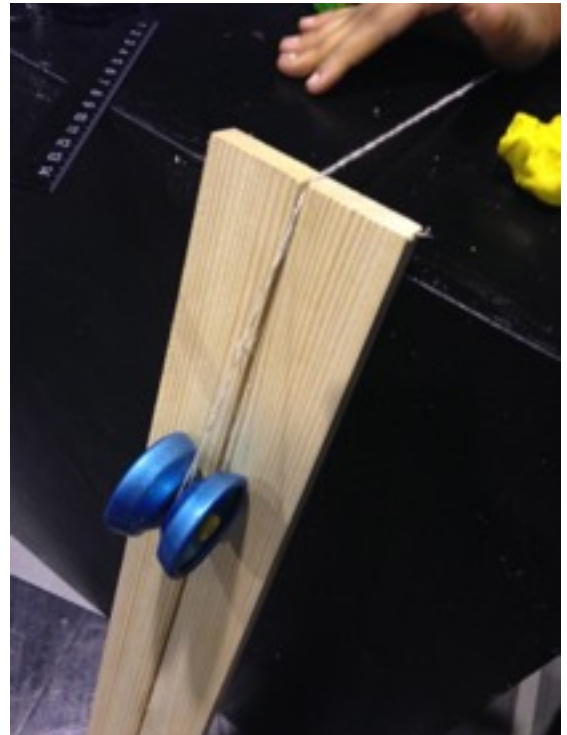
The last change that my group made was to replace the yoyo/pulley system with a balance beam/ lever sort of creation. At the back of the black box positioned in the middle of our designated square, was a multitude of inclined planes dropping down to a row of dominoes. We decided to replace the yoyo with this because about halfway through the creation of our machine, we realized that we didn't have enough simple machine components included in our project.



**Pictures:**



*The first half of the finished machine.*



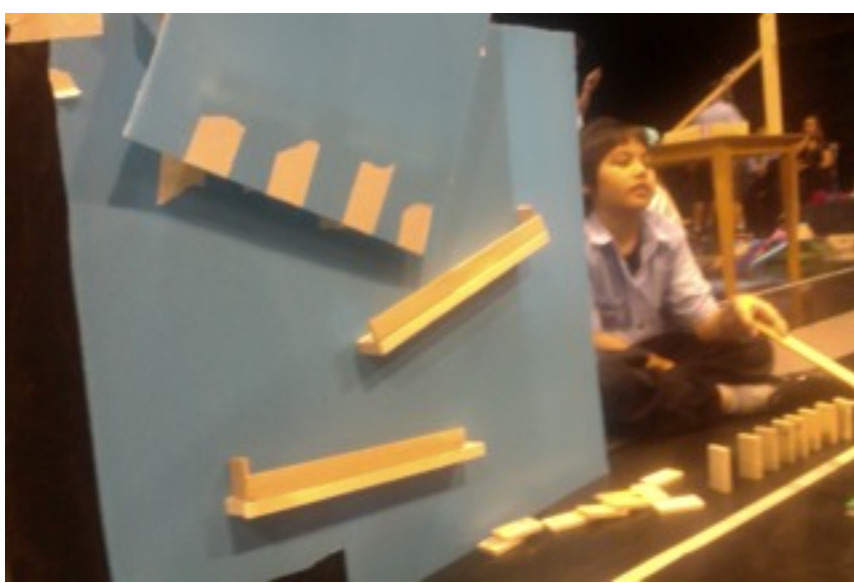
*A failed, albeit creative, idea in which the yoyo would be lowered down the wooden plank and hit the dominoes below.*



*The basket that contained all of our materials.*



*An extremely successful idea that we carried out, where a wind up car laden with unraveled safety pins hit the balloon, causing it to pop and let go of a marble using a balance beam at the top of a large box.*



*The second half of the finished machine.*



*Wind up car decorated like a safari truck.*

I think with more time, research, and materials, my group's project could have come out a lot better. My group had trouble completing this machine within the time constraint, and that would ultimately lead to a messy and disorganized product. A major problem in this machine was how inconsistent it was. Throughout our testing, our results would vary from exceptionally well to extremely poor.

Another thing that could have improved the machine overall would be to have included more reliable materials (metal, steel, etc.) instead of the flimsy materials that we used such as wood, paper, and plastic. I think if we'd done this then our project wouldn't be easily breakable and dependable.

The last thing that could've been improved during this project would be to have deposited the baskets containing our materials in a better place. Throughout the course of this week, my group lost an innumerable amount of materials, dominoes, and other important pieces of the machine. This was mainly due to us leaving our materials out so carelessly and not communicating as a group.

## Works Cited:

"ANIMALHEADPAGE." *Jollyroger*. N.p., n.d. Web. 14 Nov. 2013.

*MythBusters Rube Goldberg Machine*. Perf. Jamie Hyneman and Adam Savage. DiscoveryChannel, 2006. Youtube.

"Rube Goldberg." *Wikipedia*. N.p., n.d. Web. 13 Nov. 2013.

"Simple Machine Components." *WrightMiddle*. N.p., n.d. Web. 15 Nov. 2013.

"Potential Energy." *Physics Classroom*. N.p., n.d. Web. 14 Nov. 2013. <<http://www.physicsclassroom.com/class/energy/u5l1b.cfm>>.

"Potential Energy." *U Oregon*. N.p., n.d. Web. 14 Nov. 2013. <<http://jersey.uoregon.edu/vlab/PotentialEnergy/>>.