

PHYSICS WITH CALCULUS APPLICATIONS

Instructor: Veronica Lopez

Final Project

Goals:

To construct an original mechanism or device that illustrates the concepts learned during the class.

To use local disposal and recycled material to design and build a mechanism that is earth friendly, functional and fun.

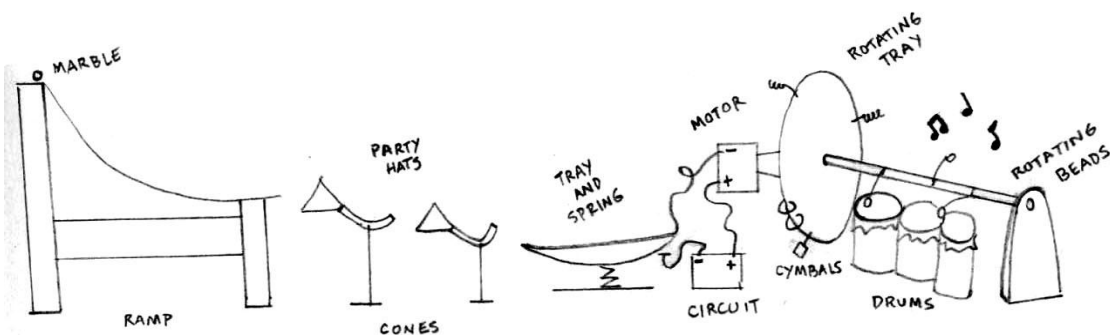
To understand that creativity and hard work are essential for success in this and future projects they may have in their academic and professional life.

Accomplishments:

1. The students were able to synthesize the knowledge acquired in the class. After several preliminary designs they decided to build “The musical Recycler'oaster”. The two figures below show some of their first designs:



2. The students were able use their creativity and utilize disposal and recycled materials such as news paper, marbles, party hats, pipes, mailing tubes, metal rods, circular trays, exercise bands, beads, tape, springs, a motor and some paint. The diagram below shows the main parts of the final design:



In this design, the marble would go down the ramp and jump to the first and second cones attached to the bended tubes, it would leave the tubes and land on the tray to compress a spring and close a circuit to which a motor is connected. The motor in turn would make the shaft rotate, and the beads attached to it would hit the drums to create a rhythm. The cymbals on the rotating tray would also create a metallic sound.

3. The students were able to build the mechanism and identify the velocities, displacements, accelerations, forces, and energy involved in it. They also added a fun purpose to it, which was to produce music.



Ramp



Cones and tray



Tray, cymbals and drums

Conclusion:

The students were able to apply effectively the concepts learned in class, this concepts include but are not limited to; displacement, velocity, acceleration, projectile motion, Newton's laws, potential gravitational energy, kinetic energy, potential elastic energy, circular motion, impulse, work and collisions.

They also learned the importance of team work, creativity and responsibility. They had fun building their device and felt proud of the outcome. They learned that even though the resources were limited, hard work and creativity were key to solve the problems that were encountered during the 2 days they spent fabricating their project.



During the summer of 2009, the students built a new mechanism, applying the concepts learned in class. The video that illustrates the development and finalization of the project can be watch at <http://www.youtube.com/watch?v=YwsXTUI6N-E&feature=channel>