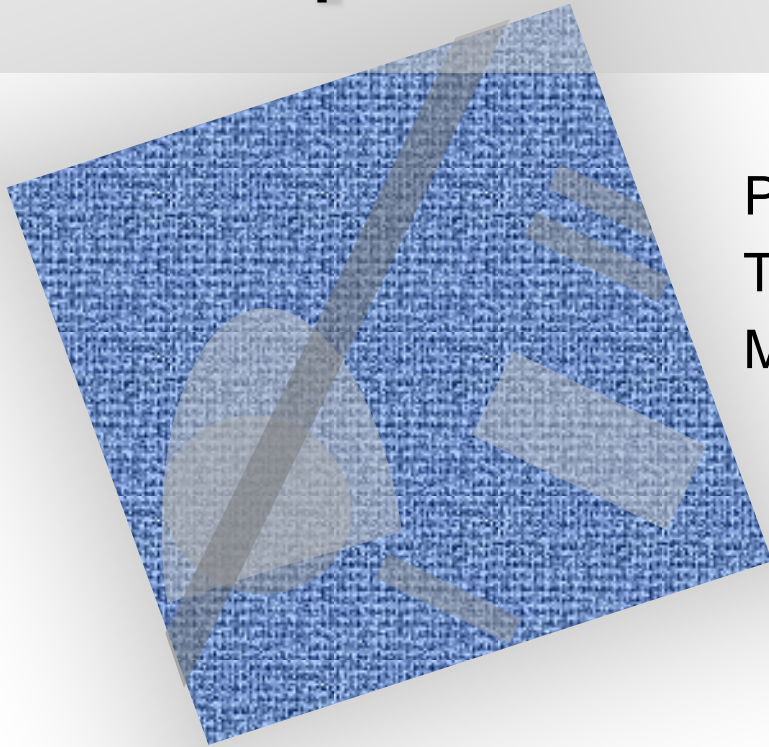


Catapult



Principles of Engineering
Technology Education
Mrs. Huot

Brighton High School
Brighton Central School District

The Problem

- Design a device that can toss a penny into a 2" diameter target placed 15' away (precision).
- Design a device that can launch a penny the greatest distance.

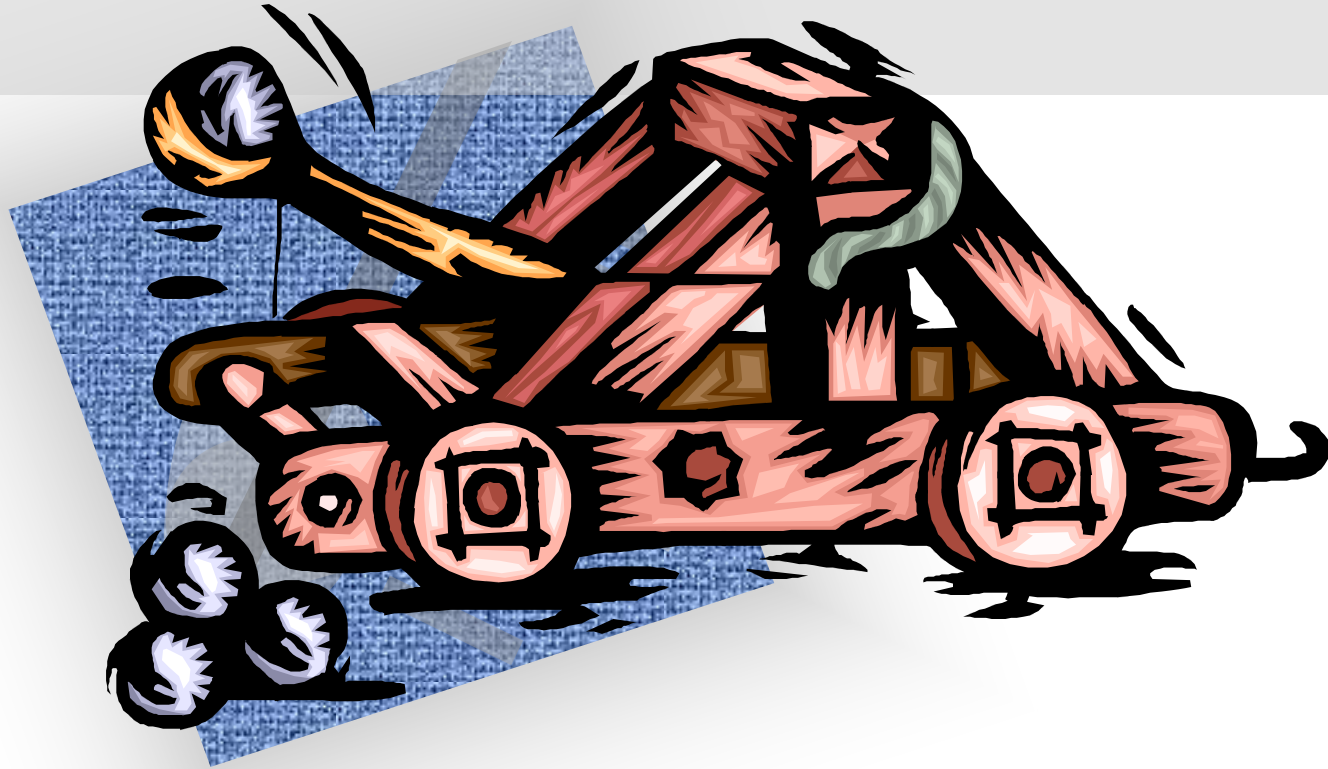
Constraints

- May only use the materials provided by the instructor.
- The device must sit on the ground.
- It must have a trigger mechanism.

Before Construction Checklist

- ✓ Brainstorm and Research
 - ✓ Develop two (2) models minimum using Interactive Physics.
- ✓ Select Optimal Solution
 - ✓ Determine dimensions.
 - ✓ Draw/sketch optimal solution.

Catapult Design

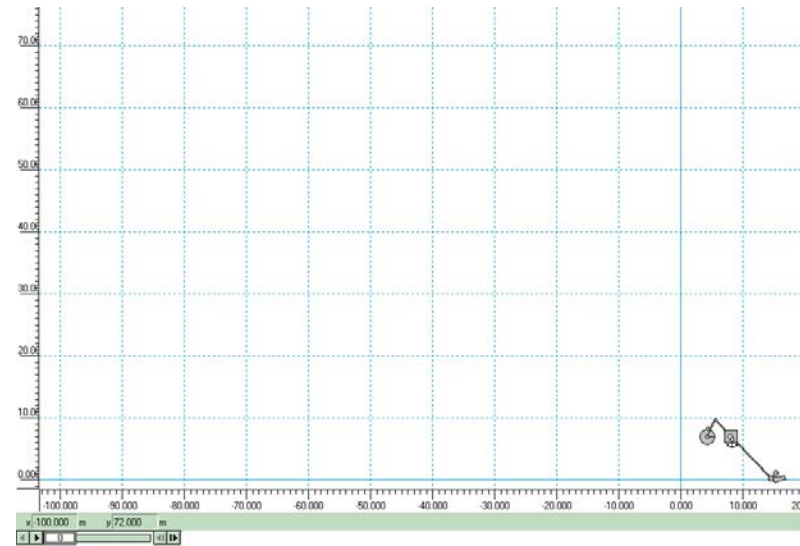


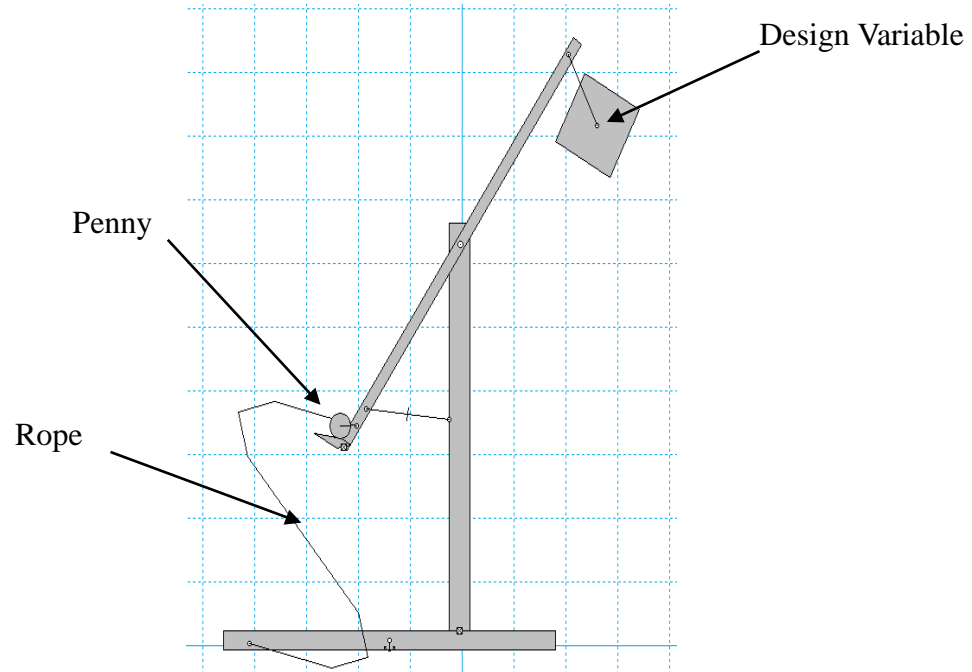
Our Goal

- Our goal is to throw the penny 15' into a target.

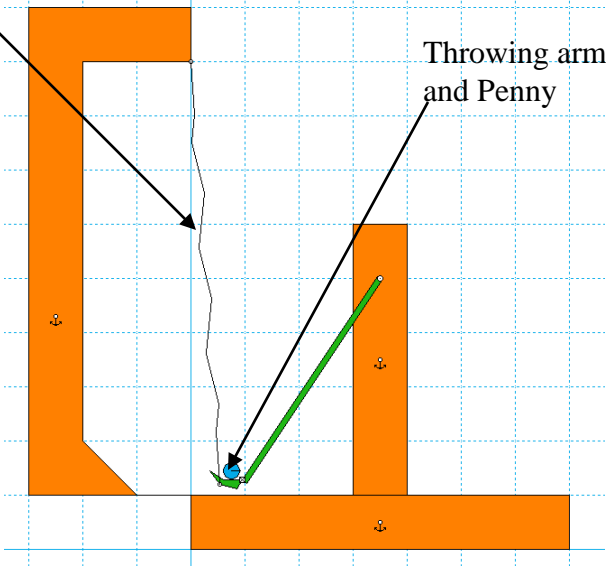
Brainstorming

- We used Interactive Physics to test and see our designs and chose which one would suit the problem best.

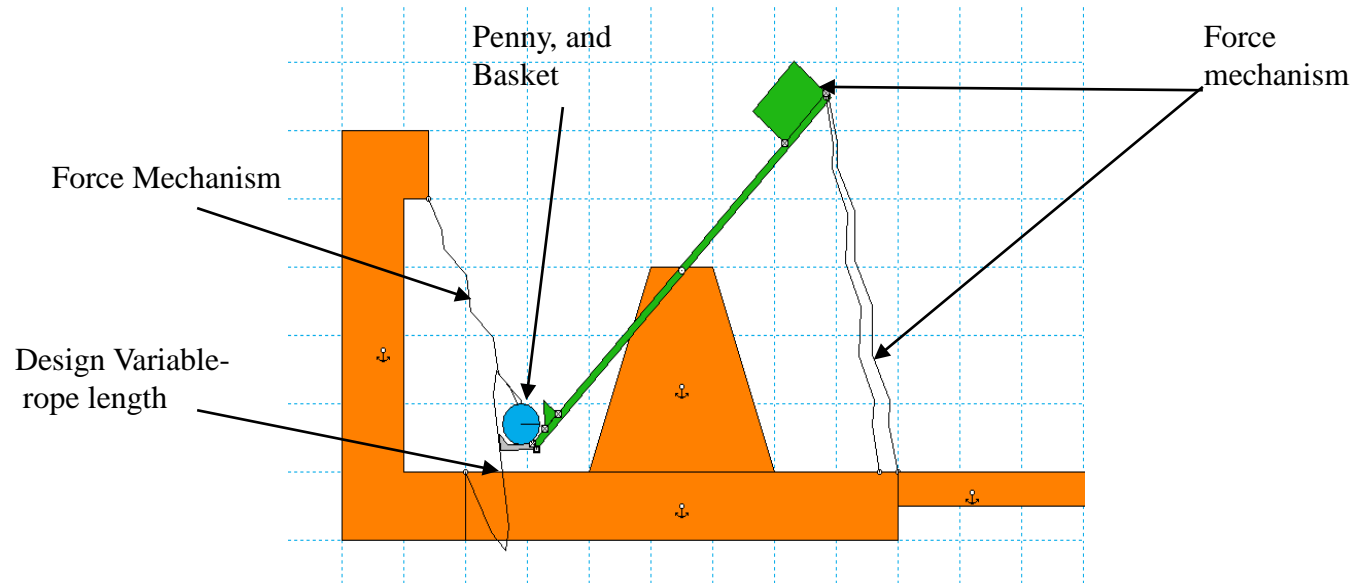


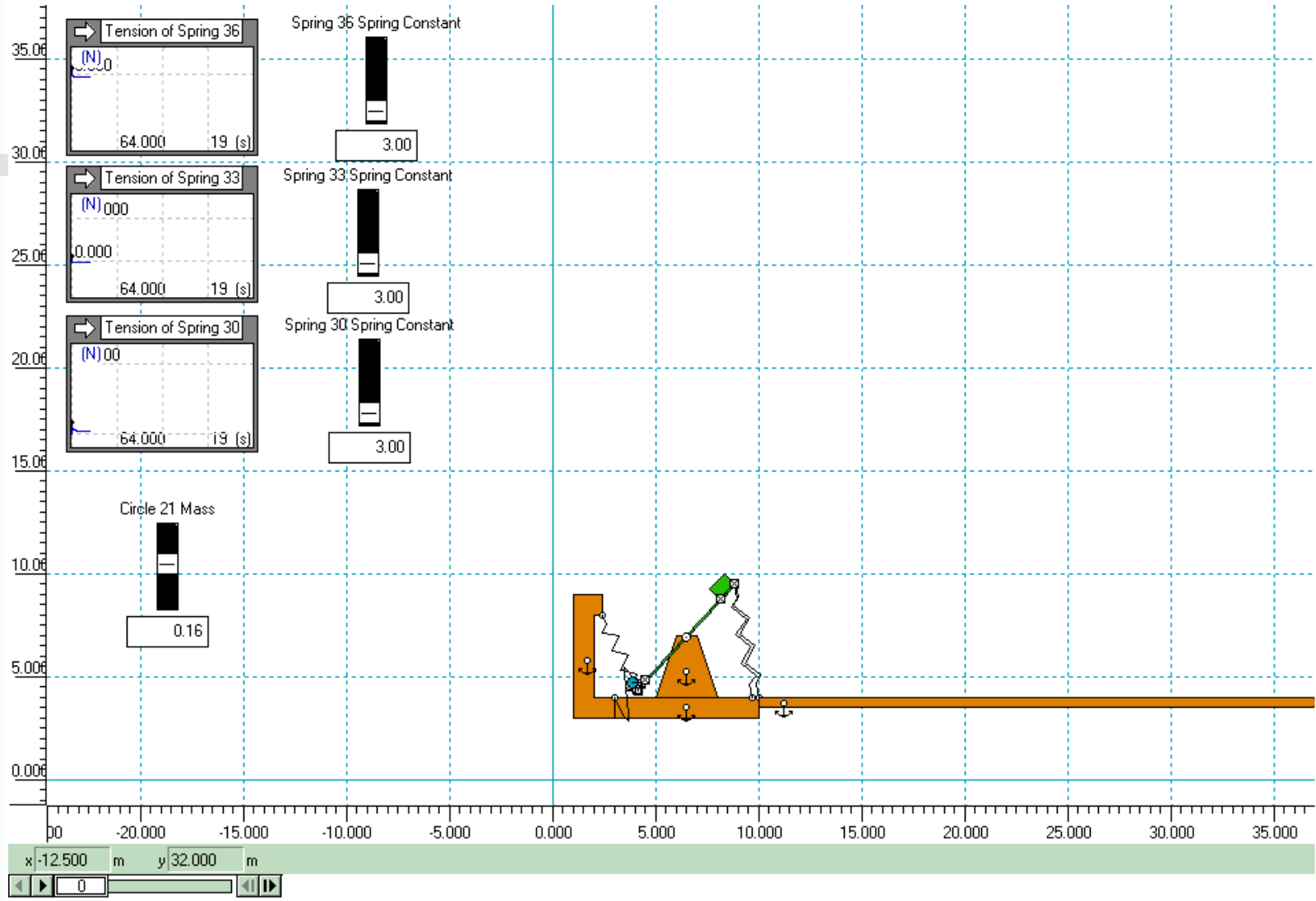


Design variable
Number of rubber bands



Optimal Solution





Post-competition

- How did your catapult perform? Explain.
- How close did it get to the target?
- How far did it toss the penny?
- Why does the penny continue to fly after it has left the catapult?
- Define the variables to control the distance.

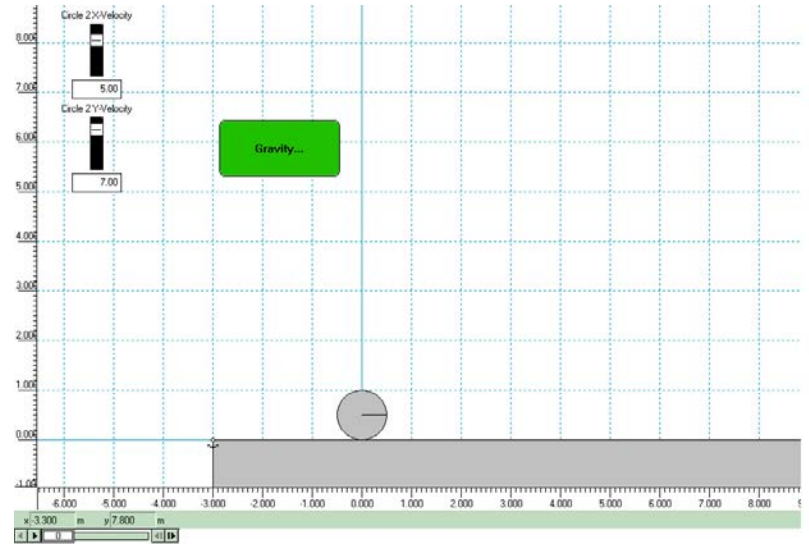
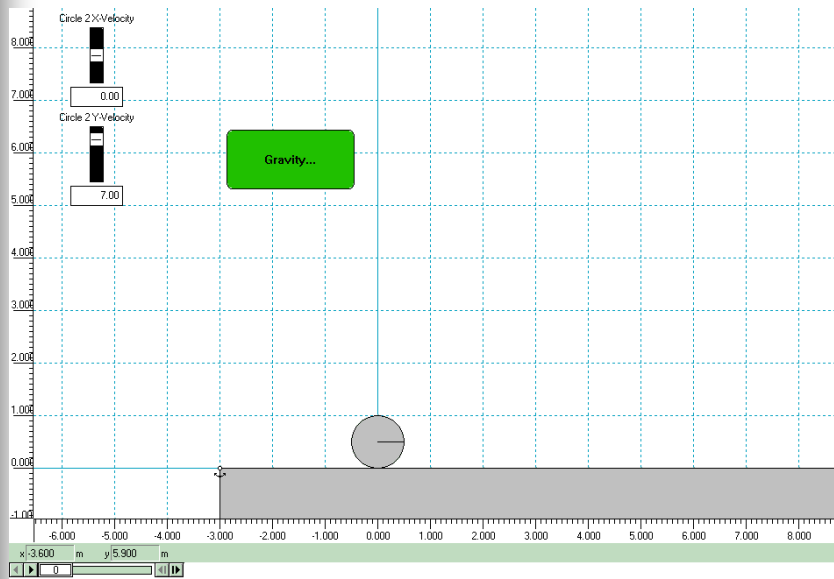
Conclusion

$\sin 10 = y/7$ $y = 1.2155$	$\cos 10 = x/7$ $x = 6.8937$	$\sin 20 = y/7$ $y = 2.39414$	$\cos 20 = x/7$ $x = 6.5778$
$\sin 30 = y/7$ $y = 3.5$	$\cos 30 = x/7$ $x = 6.06218$	$\sin 40 = y/7$ $y = 4.4995$	$\cos 40 = x/7$ $x = 5.3623$
$\sin 45 = y/7$ $y = 4.94975$	$\cos 45 = x/7$ $x = 4.94975$	$\sin 50 = y/7$ $y = 5.3623$	$\cos 50 = x/7$ $x = 4.4995$
$\sin 60 = y/7$ $y = 6.06218$	$\cos 60 = x/7$ $x = 3.5$	$\sin 70 = y/7$ $y = 6.5778$	$\cos 70 = x/7$ $x = 2.39414$
$\sin 80 = y/7$ $y = 6.8937$	$\cos 80 = x/7$ $x = 1.2155$	$\sin 90 = y/7$ $y = 7$	$\cos 90 = x/7$ $x = 0$
$\sin 0 = y/7$ $y = 0$	$\cos 0 = x/7$ $x = 7$		

We used trigonometry to explore on the angle of release as a function of distance and CAD to see our new finds.

CAD as shown on excel

Conclusion



Conclusion

- In conclusion, our design performed very well. Once we found the correct power setting we were able to consistently launch the penny between 14 and 16 feet, although the accuracy was not always spot on. In response to some of our test we had to modify our design, which left us with a machine that was fairly different from what we at first expected. Overall, our design performed up to our expectations.