



# Flying Metal

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# Research

The position, Velocity, and Acceleration all have to do with the amount of rubber bands we put on the mechanism. Potential energy depends on how many rubber bands we put on the mechanism. Kinetic energy has to do with the amount of potential energy in the mechanism. The launch angle and the pull back angle depends on the build and how its shaped.



## Problem/Research Question

Will adding more tension to the rubber bands attached to a ball launcher allow the foil ball to land in the receiver 4.28m away more than once?



## Hypothesis

If we put more tension on the rubber bands then the ball will make it into the receiver more times because the increased tension will create more force.



## Materials

- 1 12x12 Big Cardboard Base
- 3 18 ounce Large Paper or Plastic Cups
- 1 12 inch Wooden Paint Stick
- 2 pieces of Paper
- 6  $\frac{1}{2}$ , 7  $\frac{1}{2}$  inch tall wooden Pencils
- 4, 3 inch un stretched Rubber Bands
- $\frac{1}{2}$  of a inch Clear Tape.



# Procedure

1. First we taped the two cups 5 inches apart on a cardboard base.
2. We taped a pencil on top of the cups and in the middle in front of the cups.
3. We made two holes for the rubber band to go through the cardboard.
4. We got our 12 inch paint stick and attached it to the launcher with a rubber band on the base and the second pencil in the middle of the cups.



## Procedure

5. We made our Receiving Mechanism with a cup, pencils, one piece of paper, and tape.
6. The way we tested our project was by aiming the launcher to the catching mechanism and then pulling the lever back with two fingers and then letting it go.



# Data

	First Trial	Second Trial	Third Trial	Fourth Trial	Fifth Trial
Shortest tension 5 inches	Not Made	Not Made	Not Made	Not Made	Not Made
Medium tension 7 inches	Not Made	Not Made	Not Made	Not Made	Not Made
Longest tension 9 inches	Made	Not Made	Made	Not Made	Not Made

# Pictures

All pictures taken by researcher

Ball



<===== Launcher

Receiver =====>





## Conclusion

Our results came out good. We were correct by saying if we put more tension on the rubber bands then the ball will make it into the receiver more times because the increased tension will create more force. At 5 and 7 inch of tension we did not make it at all. At 9 inch of tension we made it 2 of 5 times. We could of used more stronger materials but we worked with what we had.



## Websites we Used

Science Buddies

*Simple Machines Facts*

*Launch Time: The Physics of Catapult  
Projectile Motion.*



# Future Experiments

For future experiments, We would use stuff like hot glue and duct tape but we worked with what we had and our experiment still came out great.