

**You will launch a ping-pong ball, at various angles, from a catapult that you build yourself.**

You may work with one partner. You may build a catapult of your own design, based on designs researched from the library or Internet, or from a kit. The catapult must provide for payload launch via a trigger type release – e.g. the catapult must not provide for payload launch via a simple operator pulled & released slingshot type mechanism. Further the catapult overall size must fit into an imaginary envelope of maximum dimensions: *30 cm wide by 30 cm high by 45 cm long*.

This project has the weight of one “Lab Report”<sup>\*</sup> grade & is voluntary (*however once you “sign-up” you are committed*). If you choose to not take part in this project you must have a note indicating your decision, signed by your parents by December 14th. Take care to have all your work in on time. You will lose 5 points/day for every day your project is late. **Due date: December 17<sup>th</sup>, 2007.**

<sup>\*</sup>NOTE: Students may additionally complete a Power-Point Presentation (*as described below*) so as to qualify their overall Catapult Project” for a “Misc. / UNQ” Quiz Grade (*in lieu of a Lab Report grade*). The plan is to have the catapult hardware demonstrated on the 17<sup>th</sup> and any available Power-Point Presentations shown on the 18<sup>th</sup>.

**OBJECTIVE**

- Create a working catapult that consistently fires ping-pong balls with a fixed trigger release. Your device must be able to change the angle at which the balls are launched. For any given launch angle, the balls should reach just about the same landing point each time.
- Increase your understanding of motion in two dimensions, and the conversion of potential energy into kinetic energy
- Refine your public speaking skills, which is often a necessity at some point in most people’s educational and professional careers (*re: Power-Point Option*).

**WHAT YOU WILL PRESENT**

A demonstration of your catapult & (*optional*) Power Point Presentation<sup>\*</sup>.

**Power-Point<sup>\*</sup>**

Should you decide to partake in a Power-Point Presentation of your project, each person in the group must do part of the oral presentation. The presentation will be from 3 to 5 minutes. The PPT will have a minimum of 8 slides, including the title and bibliography slides. It will have at least 5 pictures and/or drawings. Borrowed pictures/drawings must give the name of the source book, or website and its URL, in small font type. Include a photograph of your final product.

Adhere to the following rules when making your PPT. Points on the presentation aspect of this project will be lost if you violate these rules.

<http://www.iasted.org/conferences/formatting/Presentations-Tips.ppt>

Give a brief history of how catapults (*and similar devices*) developed. Why were they made? What are they made of? How did they work? What kind of changes were made to improve the weapon? What basic physics principles are involved in the operation of a catapult? How did you build your own catapult?

## ***Resources***

Tutorial: Power Point in the Classroom <http://www.actden.com/pp/index.htm>

Avoiding bad PPT presentations <http://www.iasted.org/conferences/formatting/Presentations-Tips.ppt>

Project resources <http://apphysicsb.homestead.com/catapult.html>

Catapult animations <http://www.redstoneprojects.com/trebuchetstore/catapultanimation.html>

Howtobuildcatapults.Com <http://www.howtobuildcatapults.com/>



## ***Demonstration***

Demonstrate your catapult in class. Show that it can throw its payload a short distance, always landing at about the same point when you fire again. Then do the same for firing the payload a longer distance.

## ***Competition***

Fire two shots at a bulls-eye, located 10 feet from a firing line. The individual or group with the payload that lands closest to the bulls-eye wins. Any operator assistance with the projectile (*after launch*) will disqualify the project from extra-credit consideration. A five (5) point, four (4) point & three (3) point coupon will be awarded to the “top three most accurate” project participants.

Fire the projectile as far as possible. You get 2 attempts. The individual or group with the payload that travels the furthest displacement wins. Any operator assistance with the projectile (*after launch*) will disqualify the project from extra-credit consideration. A five (5) point, four (4) point & three (3) point coupon will be awarded to the “top three displacements” project participants.