Trebuchet Project

Counts as two test grades

The Challenge

Design and build a model of a medieval war machine, called a trebuchet, that will throw a Softball projectile against a wall.

The Rules

- The trebuchet should have a lever arm with a sling attached able to launch a Hackey Sack as a projectile.
- The lever arm moves by the release of a counterweight.
- The counterweight is a maximum of 2 kilograms.
- The base of the trebuchet should fit in a square area of 50 cm by 50 cm.
- Winners will be determined by the range of the trajectory and the damage done to the castle wall.

The Deadlines

Design - Jan. 13

Model - Jan. 29

Competition - Feb. 2

Reporting - Feb. 4

Research

Getting started… Use the internet to research various designs of trebuchets, problems and suggestions on building a trebuchet, uses of trebuchets. Make sure you document each source using the APA format handed out in class. All images and sounds collected should also be cited and collected in a file or on a disc.
These sites are good **starting** points:

Http://ww.pbs.org/wgbh/nova/lost empires/trebuchet

Http://www.tasigh.org/ingenium/physics.html

Http://www.io.com/~beckerdo/other/trebuchet.html

Now find more on your own.

Design

Using the drawing capabilities in Microsoft Word or Publisher or the computer program "Interactive Physics" design your trebuchet showing measurements. Discuss the reasons for your design using the information you have collected.
Team design should be handed in on Friday, November 15th.

Building

Following your design, build your trebuchet model. You may use the materials provided by the instructor or your own materials. Please make sure your model fits the rules of the project.

Working models should be ready for testing on Friday, Nov. 22.

Testing

Contest conditions will be available Friday, Nov. 22 and Monday, Nov. 25 for testing the model. This time can be used to modify the model if needed or to work on the rest of the project. Testing and modifications need to be documented

The Contest

Tuesday, November 26th

Teams in each class will compete with each other in trying to "Destroy the Castle". Each team will get three tries to hit the castle wall. The team that does the most damage to the wall wins. If no team hits the wall in the first round, there will be a second round with the wall placed closer to the models.

A motion detector will be used to measure the final velocity of the projectile as it leaves the sling.

Digital pictures and video will be taken of the trebuchet models in action for later incorporation into the students' final reports.

Prizes will also be awarded for the maximum range.

The Analysis

Each team will analyze the effectiveness of their trebuchet. The analysis should also include the following:

Compare the actual range of the projectile with the predicted range using equations for projectile motion.

Calculate the force and torque on the projectile.

Calculate the ideal mechanical advantage of the model.

Calculate the actual mechanical advantage of the model.

The Reporting

Each team will report their design and analysis to the class using one of the following methods: PowerPoint Presentation Publisher Newsletter or Brochure Web Site

Teams will present their final report on Friday, Dec. 6th.

The report should include:

A diagram of the design

A digital picture or video of the trebuchet in action

The equations used

The analysis of the effectiveness of the model

A Works Cited page listing all sources used

Grading Rubric

	Maximum Grade		Grade Earned
Research and Design	**25**		_____
Building and Testing Model	**25**		_____
Teamwork	**10**		_____
Presentation	30	_____	
Accuracy	10	_____	
Velocity	10	_____	
Competition	**50**		_____
TOTAL GRADE	**110**		_____