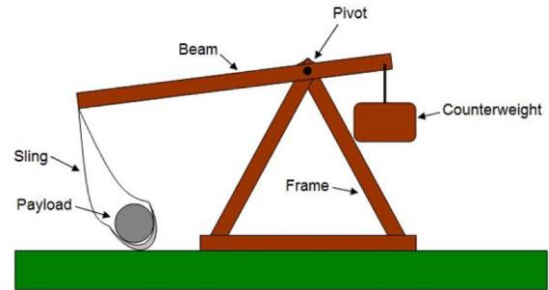


Trebuchet

Introduction

For this project you and 2 partners will research, design, prototype and construct a trebuchet that will launch a softball a distance of **at least** 25 meters. Some very specific requirements are needed for this project. They are as follows:



- Must be able to be transported (rolled into position)
- Must fit through the double exterior doors when at rest (NOT LOADED)
- Completely drawn and tested in Inventor
- Must have an initial sketch of concept that the team works from including dimensions (approved by teachers) before starting inventor
- Must include a safety pin (unable to launch until it is removed)

Materials

- 2x4's, 2x6's, 2x10's, 1x4's, Plywood, etc. – scrap wood
- String/rope
- screw eyes for the launch mechanism
- metal rod for main pivot point
- dowel for axles
- Metal for brackets
- Bolts, washers, nuts, screws, nails, etc.
- ***You may need/want to supply some of these materials yourself but the materials must be approved by the teachers first.*

Timeline:



- For this project you have 12 Friday double periods to design, construct and test the catapult. The 13th Friday is for competition.

Assessment

The following criteria will be used for **group** assessment;

- Sketches & initial drawings
- Formal drawing (to scale) of the catapult (2D) in Inventor.
- Final product compared to drawing (measurements)
- Quality of construction (including the use of CNC)
- Distance (farthest distance, accuracy, meets minimal distance)

Individual Assessment (discussion with your group and with teachers)

- Engineering Journal/Daily log book
- Participation in the group (did you hold your own weight)

Trebuchet Assessment Rubrics

Individual Assessment				
Active and Engaged Learner	<p>Poor</p> <p>Student rarely takes an active role in their own learning. Student does not participate and rarely shares ideas and is disengaged from the activity at hand. Rarely stays on task or completes work.</p>	<p>Fair</p> <p>Student sometimes takes an active role in their own learning. Student sometimes participates and shares ideas. Needs many reminders to stay on task and to complete work.</p>	<p>Good</p> <p>Student takes an active role in their own learning. Student does participate and shares ideas. Most of the time student is on task and completes work.</p>	<p>Excellent</p> <p>Student always takes an active role in their own learning. Student shares their ideas and participates often. Student always on task and complete work.</p>
Cooperative Team Member	<p>Poor</p> <p>Student rarely shares in group tasks.</p> <p>Either does none of the work or aggressively does all of the work.</p> <p>Student is non cooperative.</p>	<p>Fair</p> <p>Student sometimes shares in group tasks.</p> <p>Does some of the work or sometimes aggressively does all of the work.</p> <p>Student is sometimes cooperative.</p>	<p>Good</p> <p>Student usually shares in group tasks.</p> <p>Mostly does a fair share of the group tasks and is cooperative.</p>	<p>Excellent</p> <p>Student always shares in group tasks.</p> <p>Student is highly cooperative and shows leadership by helping other team members through teaching rather than doing their work for them.</p>
Reach Principles	<p>Poor</p> <p>Poor demonstration of Respect, Enthusiasm, Achievement, Citizenship and Hard Work.</p> <p>Student never takes leadership or helps others.</p>	<p>Fair</p> <p>Fair demonstration of Respect, Enthusiasm, Achievement, Citizenship and Hard Work.</p> <p>Student rarely takes leadership and seldom helps others.</p>	<p>Good</p> <p>Good demonstration of Respect, Enthusiasm, Achievement, Citizenship and Hard Work.</p> <p>Student also takes leadership and sometimes helps others.</p>	<p>Excellent</p> <p>Excellent demonstration of Respect, Enthusiasm, Achievement, Citizenship and Hard Work.</p> <p>Student also takes leadership and consistently helps others.</p>
Problem Solving Skills	<p>Poor</p> <p>Student rarely used resources to solve a problem. Almost always asked the teacher for help.</p>	<p>Fair</p> <p>Student sometimes used resources to solve a problem. Usually needed to ask the teacher for help.</p>	<p>Good</p> <p>Often student used resources to solve a problem. Sometimes asked the teacher for help.</p>	<p>Excellent</p> <p>Most of the time, student used resources to solve a problem. Occasionally asked the teacher for help.</p>
Engineering Journal (Daily Log of work)	<p>Poor</p> <p>Student hand wrote/typed a few words of what they did.</p>	<p>Fair</p> <p>Student hand wrote/typed what was competed each build day</p>	<p>Good</p> <p>Student hand wrote/typed what was accomplished each day, has a few drawings/sketches/pictures</p>	<p>Excellent</p> <p>Student hand wrote/typed what was accomplished each day (including others duties), what were some of the setbacks, future challenges, next build days jobs, etc</p> <p>Has many drawings, sketches, pictures.</p>
	(1)	(2)	(3)	(4)

Student Score/Mark _____

Group Assessment

Group Assessment				
Initial Sketches & Concept Drawings (Hand Drawn)	Poor Chicken scratch Used a computer	Fair A couple sketches Resembles the project Has a few notes on it	Good Several sketches, a few notes, looks like the project, a few simple dimensions	Excellent Multiple sketches, multiple dimensions, lots of notes on materials/size, construction techniques
Formal Drawing in Inventor	Poor Is not completed Missing pieces Not printed on Size D paper	Fair Is pretty much complete Missing the odd detail or piece Some dimensions are present but not enough to give to someone to build	Good Mostly drawn correctly Most dimensions are there Printed correctly on D Size paper	Excellent All parts to the project are included and dimensioned to be able to build the project Printed correctly on D Size paper
Final Product Compared to the Drawing	Poor Does not resemble the drawing Extra pieces Needed to modify/change the size of pieces compared to the drawing	Fair Resembles the drawing A piece has been modified Overall dimensions are different by more than 2"	Good Looks like the drawing (all the pieces are there) The size/location of pieces is out by more than more than 1/2"	Excellent Looks exactly like the drawing and measures within 1/2"
Quality of Construction	Poor Large gaps in joints Wobbles Arm doesn't swing smoothly and hits the frame	Fair Small gaps in joints Wobbles a bit Arm swing but not 100% smoothly, might hit the frame	Good Rock solid structure and arm swings smoothly Good joinery with almost no gaps, rough edges and everything lines up.	Excellent Rock solid structure and arm swings very smoothly Excellent joinery with no gaps, rough edges, everything lines up.
Use of Technology for building purposes	Poor Used minimal woodwork tools/equipment (Drill press, Mitre Saw, Table saw)	Fair Used minimal woodwork tools/equipment Used the CNC Router to make a single piece/part	Good Used a variety of standard woodwork tools and equipment Used the CNC Router to make more than a single piece/part	Excellent Used a variety of standard woodwork tools and equipment Used the CNC Router, CNC plasma Cutter on multiple pieces in the project
Distance travelled	Poor Did not make the bare minimal distance of 25meters	Fair Made the minimal distance of 25meters but not by much	Good Exceeded the minimal distance (30 meters)	Excellent Exceeded the minimal distance by a lot (40meters)
Accuracy	Poor Cannot hit the target Is not consistent with each shot	Fair Hits the target inconsistently Accuracy is a problem	Good Hits the target most time and is someone accurate	Excellent Hits the target every time and is very accurate
	(1)	(2)	(3)	(4)

Group Score/Mark _____