

The Avenger's Trebuchet

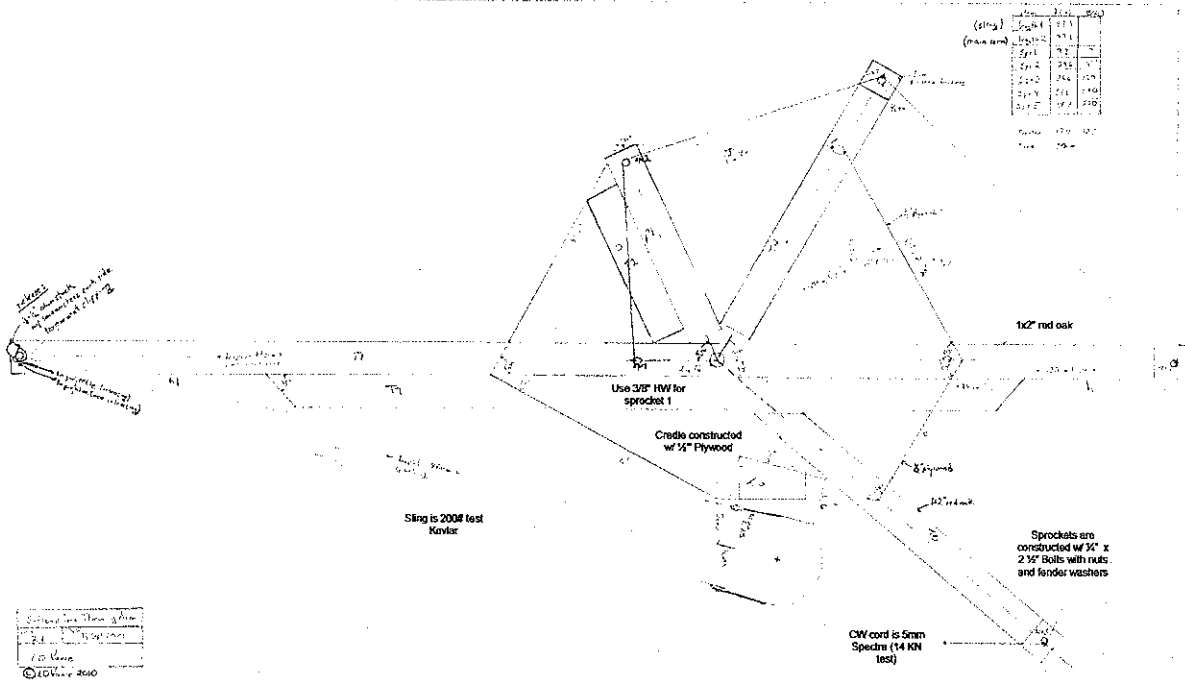
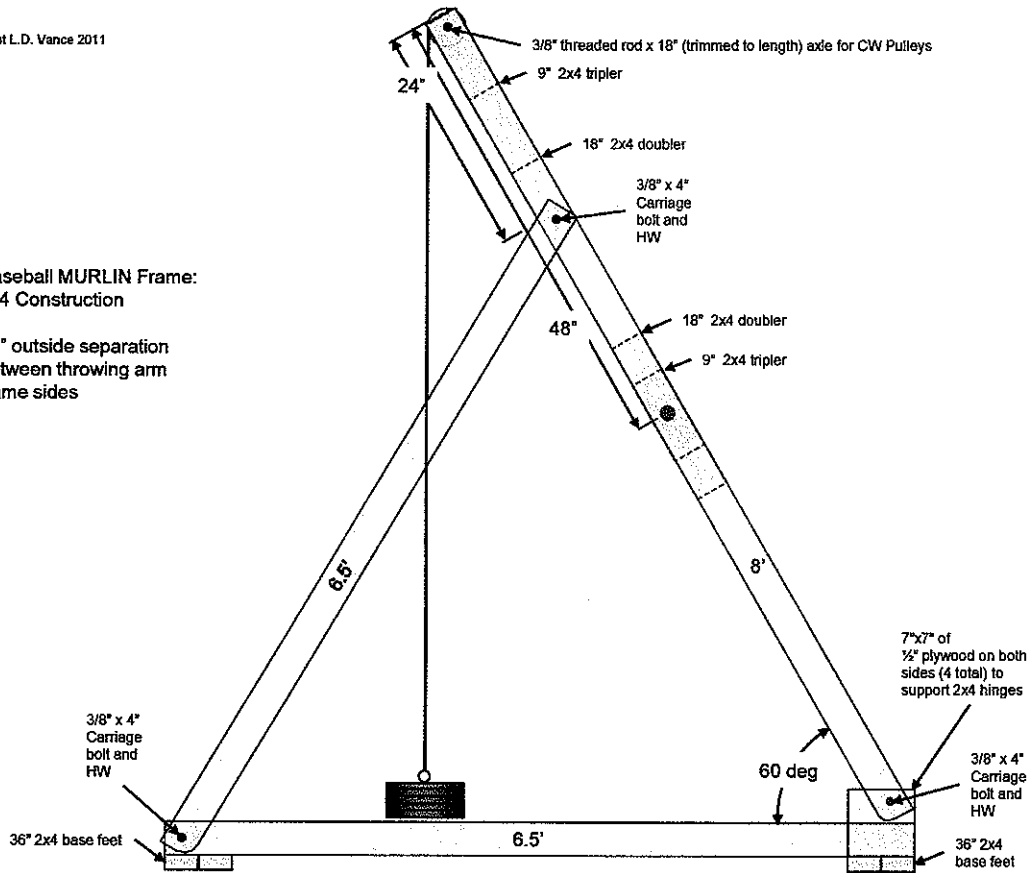
Name: Tyler Whiting

Group Names: Sterling Jones, Esteban Cano, Tanner Sharek

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Baseball MURLIN Frame:
2x4 Construction

14" outside separation
between throwing arm
frame sides



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Student Name	Tyler	Sterling	Esteban	Tanner
Assignment Criteria	25 points possible	25 points possible	25 points possible	25 points possible
Group Member follows directions	5	5	5	5
Group Member cooperates with group members	5	5	5	4
Group Member always follows lab safety rules and lab directions	5	5	5	4
Group Member stays on-task	5	5	5	4
Group Member does their job	5	5	5	5
Total Assessment	25	25	25	22

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Data Table

Horizontal motion		Formula	Vertical Motion		Formula	Projectile Motion		Formula
dx	89.5m	(Measured)	dy	84.39 m	$dy = v_{iy} \cdot t + \frac{1}{2} \cdot a_y \cdot t^2$	ttot	8.3s	(Measured)
tx	8.3s	(Equal to ttot)	tup	4.15s	$t_{up} = t_{tot} / 2$	vi	42.07 m/s	$v_i = \sqrt{v_{iy}^2 + v_{ix}^2}$
vix	10.78 m/s	$v_{ix} = dx / t_x$	viy	40.67 m/s	$v_{iy} = v_f - a \cdot t$	L/A	75	$L/A = \tan^{-1}(v_{iy} / v_{ix})$

Work Shown

$t = 8.3_s$

X

$V_{ix} = 10.78 \text{ m/s}$

$t_x = 8.3_s$

$d_x = 89.5m$

$V_i = \frac{dx}{t_x}$

$V_i = \frac{89.5m}{8.3_s}$

$V_{ix} = 10.78 \text{ m/s}$

y

$V_{iy} = 40.67 \text{ m/s}$

$V_f = 0 \text{ m/s}$

$a = -9.8 \text{ m/s}^2$

$t_{up} = 4.15_s$

$V_{fy} = V_{iy} + a_y \cdot t$

$-a_y \cdot t = -a_y \cdot t$

$V_{fy} - a_y \cdot t = V_{iy}$

$0 - (-9.8 \cdot 4.15) = V_{iy}$

$V_{iy} = 40.67$

$C = \sqrt{a^2 + b^2}$

$C = \sqrt{10.78^2 + 40.67^2}$

$V_i = 42.07$

$\tan^{-1}\left(\frac{40.67}{10.78}\right)$

$L/A = 75^\circ$

$d_y = v_{iy} \cdot t_{up} + \frac{1}{2} \cdot (a) \cdot t_{up}^2$

$d_y = 40.67 \cdot 4.15 + \frac{1}{2} \cdot (-9.8) \cdot 4.15^2$

$d_y = 84.39 \text{ m}$

Analysis Questions

2. How did undertaking this project improve your understanding of projectile motion?

a. This project improved my understanding of the importance of the launch angle to gain the most efficiency. It noticeable when the launch angle was off because with our trebuchet it would shoot backwards, or straight up.

It would have been cool to see it be adjustable

3. How did you feel about this project when it was first assigned?

a. When this project was first assigned I was very excited about it and started to research designs that were weird and unique so that when we built ours it would be different from everybody else.

4. How do you feel about this project now that it has concluded?

a. I had a wonderful time doing this project and I think that others did as well. It was a active projects that a lot of kids got involved in, I think that the willingness to participate could be found in most if not all the kids. It was overall a good project and we were given sufficient time to work on it. Our group couldn't have had any less time though.

5. What would you have done differently as you and your team worked through this project?

a. If I did this project again I would Probably only pick one maybe two other kids to work with, it was very hard finding time for all of us to meet together to work on it. I would also want everyone in the group to know that I am going above and beyond and if they don't want to rise to the bar then they aren't going to be in the group.

- good point

It is hard to have that expectation of others when it is not required.

It is a privilege to have you in class!