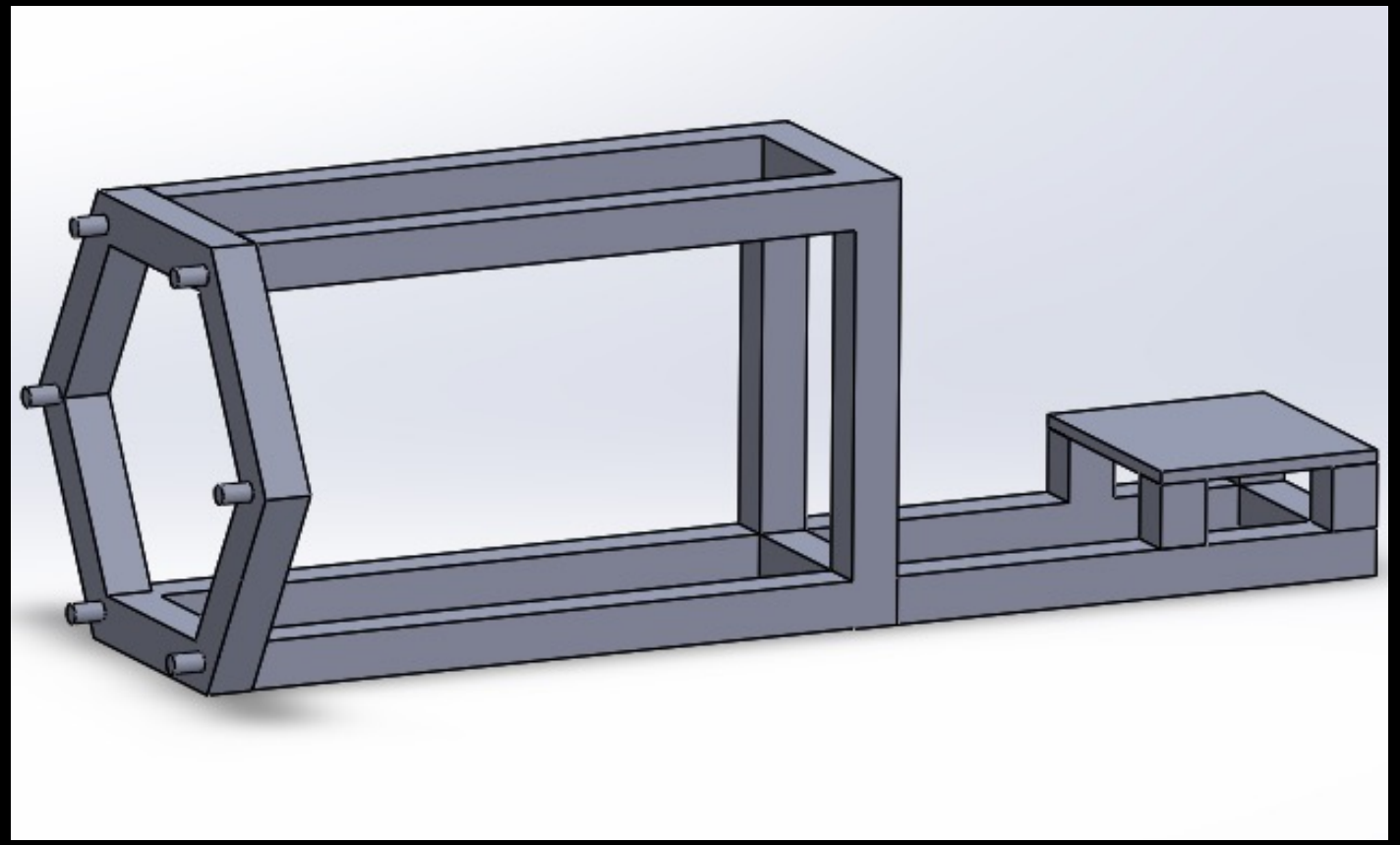
Slingshot Spider

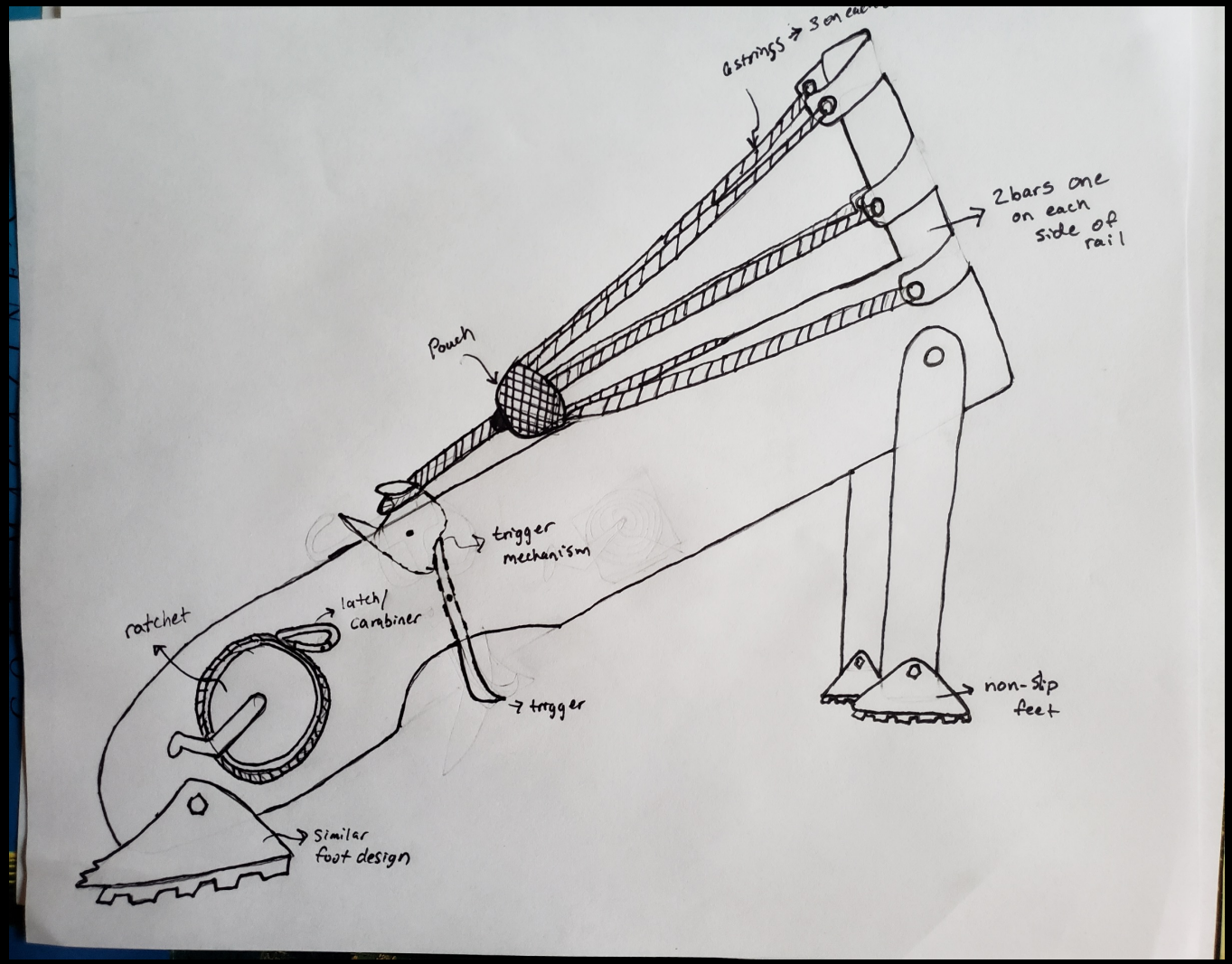
Team: Manuel, Gunnar, John, Tesfay, Tom, and Justin

Background of Slingshot Spider

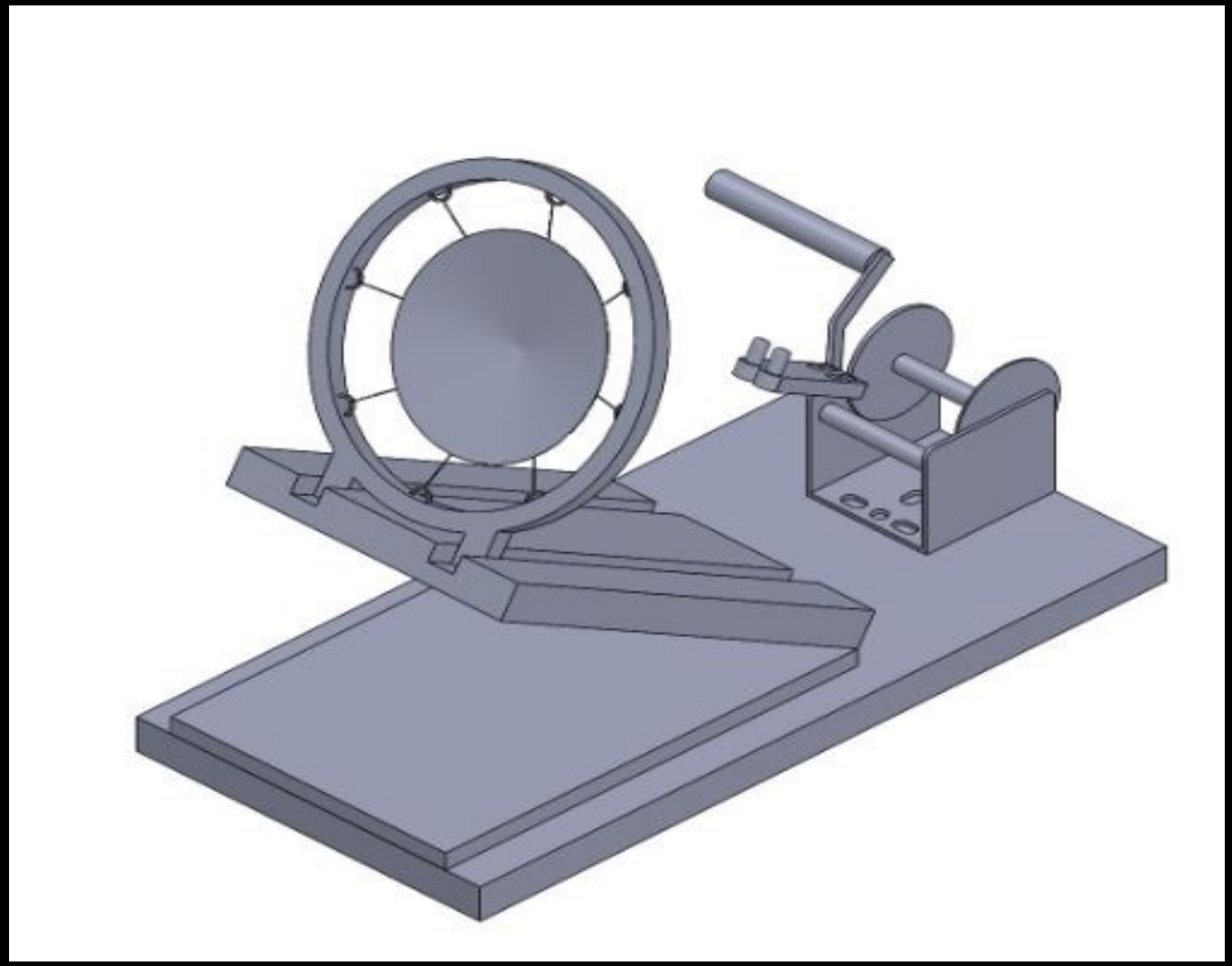
Design Idea 1



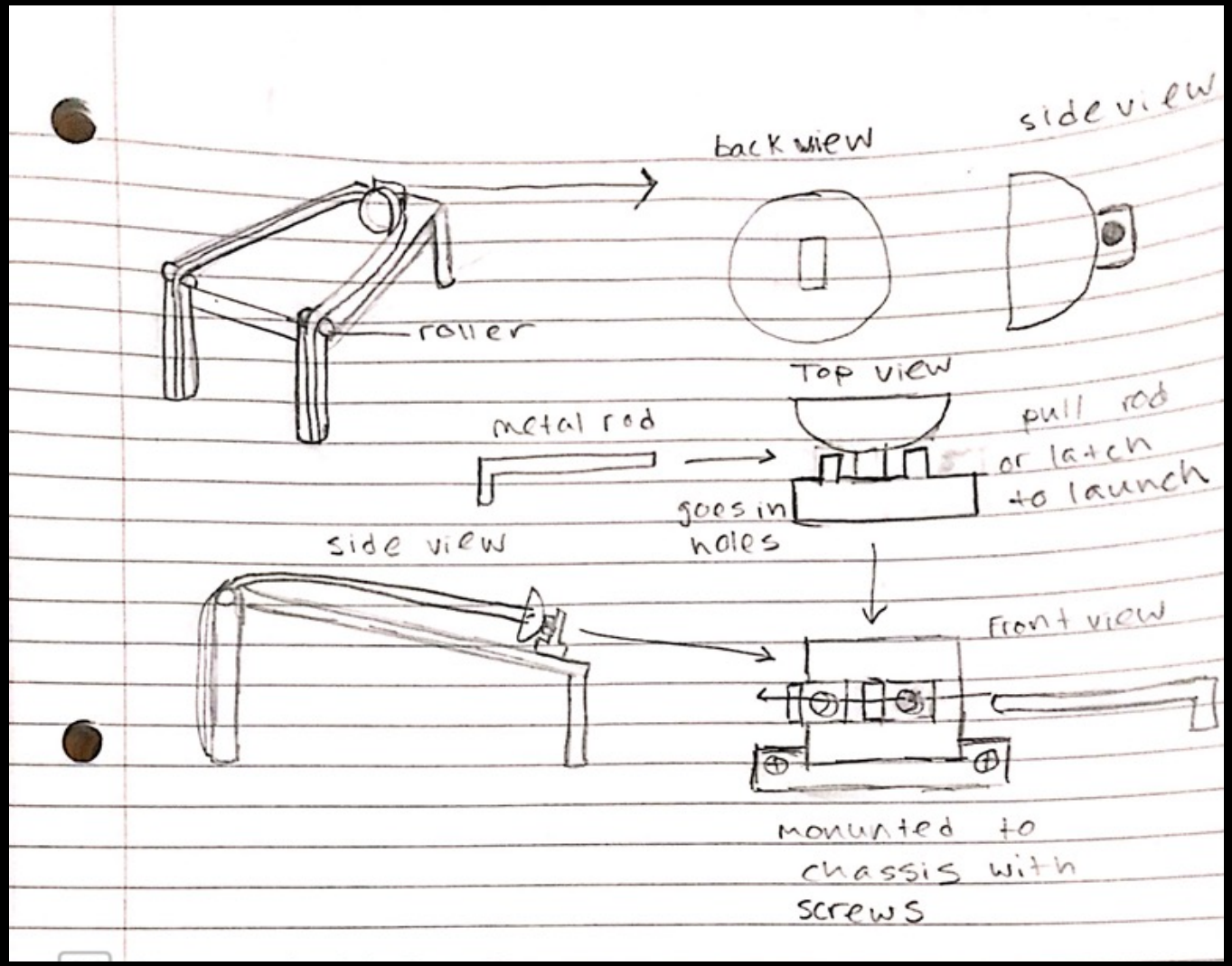
Design Idea 2



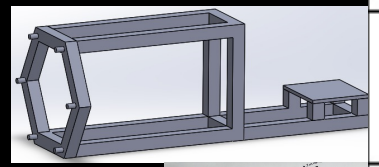
Design Idea 3

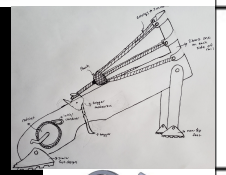


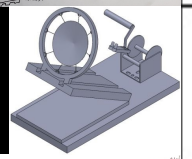
Design Idea 4

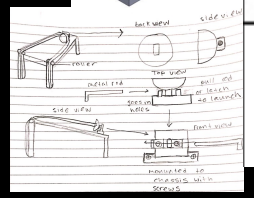


Decision Matrix









	Safety	Performance	Reliability	Build Difficulty	Rank
Weighting Factor	.20	.4	.25	.15	1.0
Design 1	8 / 1.6	8 / 3.2	9 / 2.25	7 / 1.05	8.1
Design 2	7 / 1.4	4 / 1.6	5 / 1.25	7 / 1.05	5.3
Design 3	8 / 1.6	7 / 2.8	4 / 1	5 / .75	6.15
Design 4	7 / 1.4	3 / 1.2	10 / 2.5	9 / 1.35	6.45

Design Development

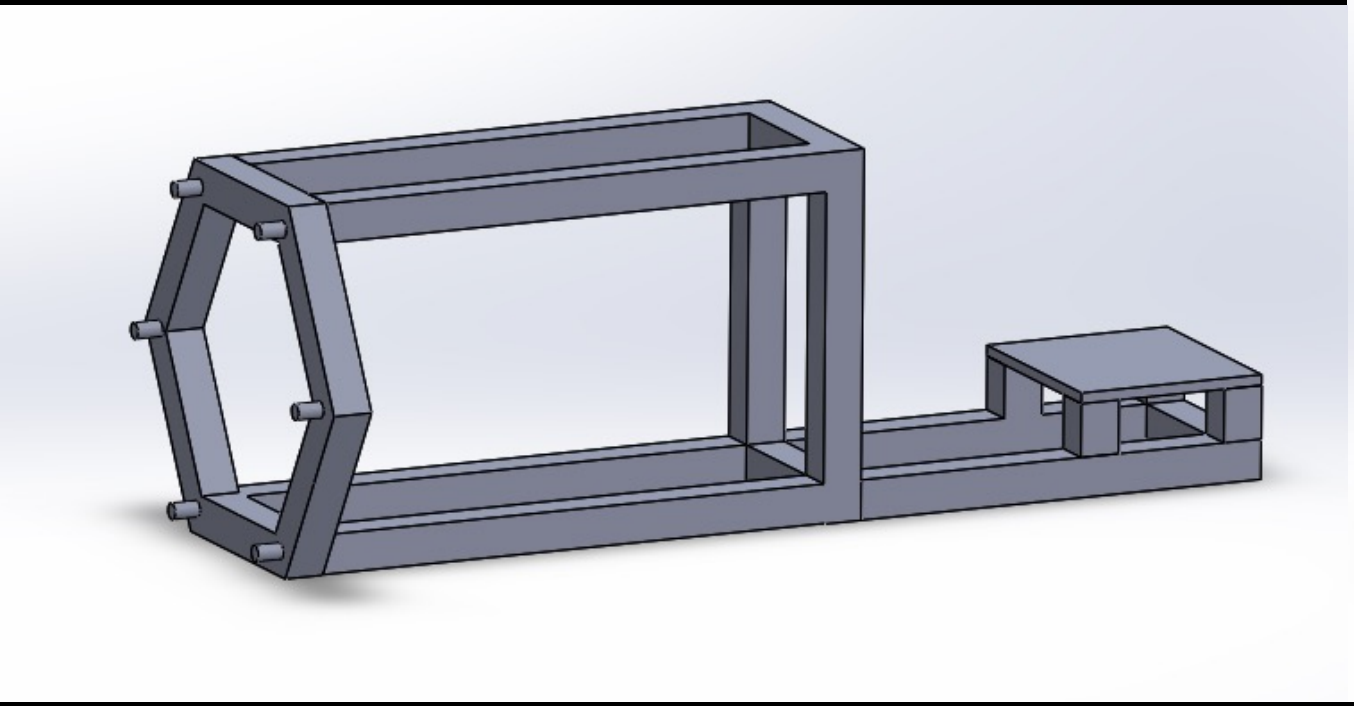


Figure 1

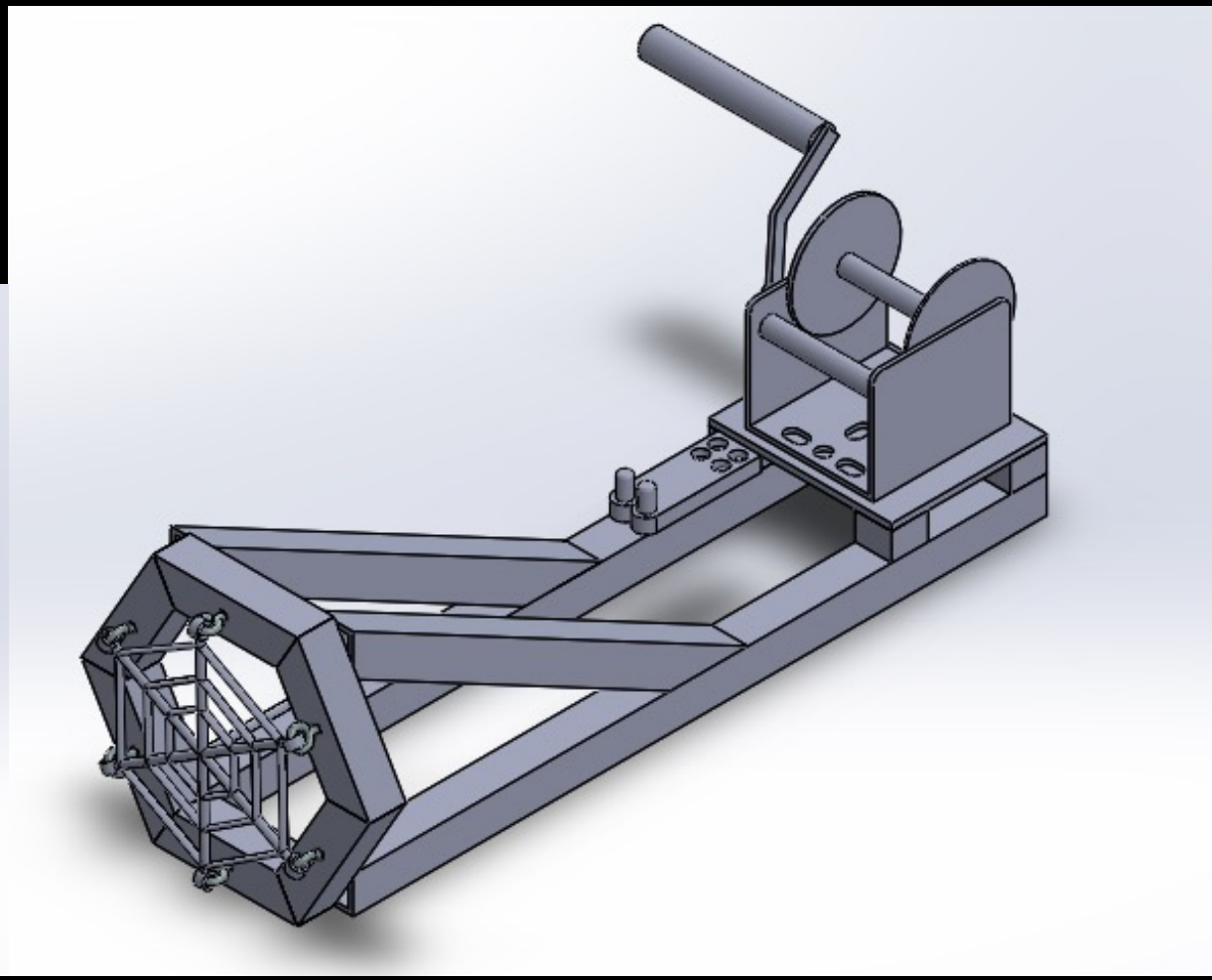


Figure 2

Relationship Between Designs and Spring Constant k

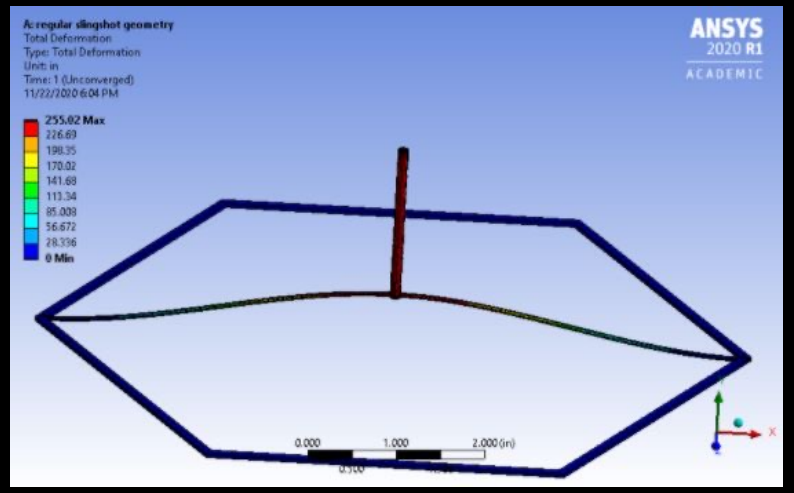


Figure 1: Sling shot style

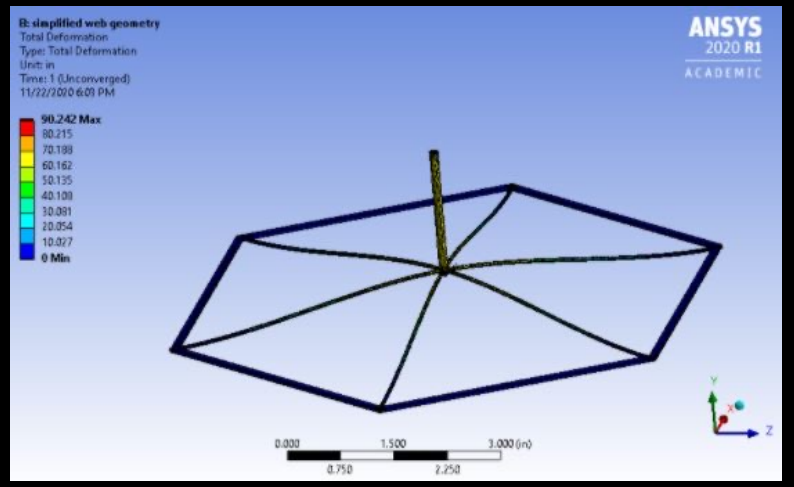


Figure 2: Simple style

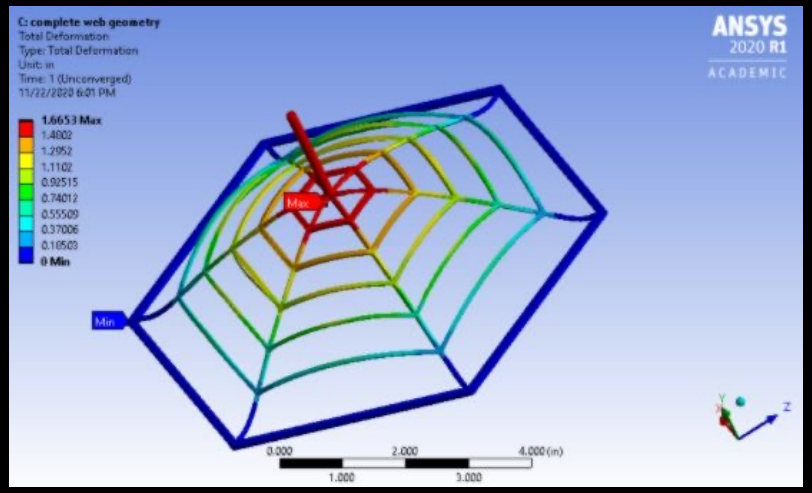


Figure 3: Complex style

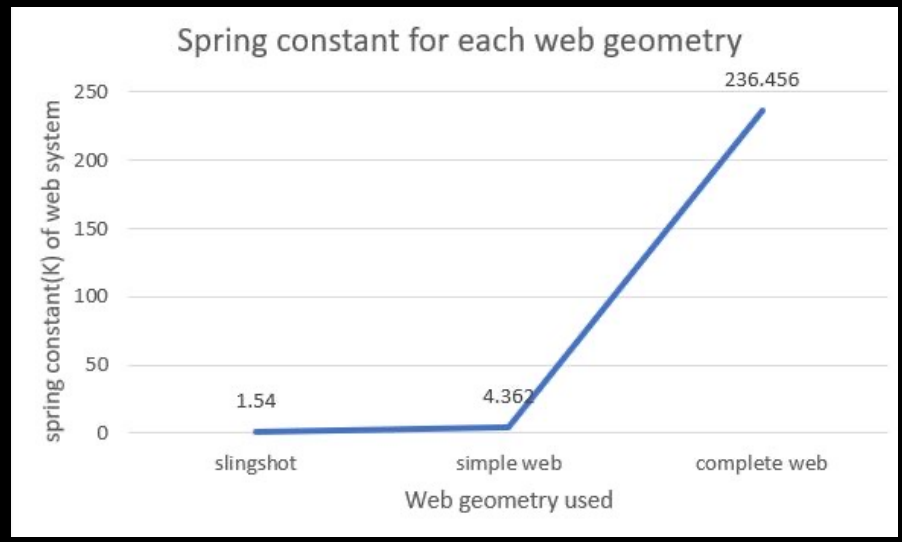
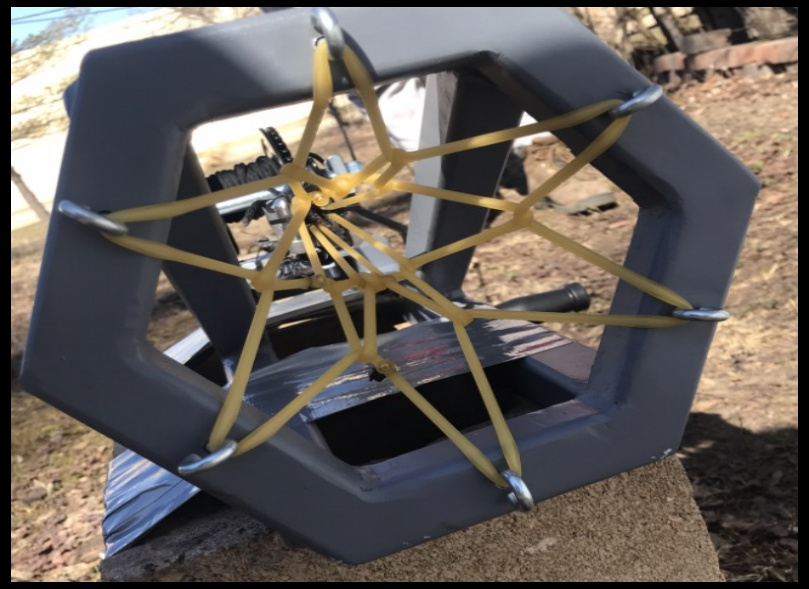


Figure 4: Spring constant k with each different design

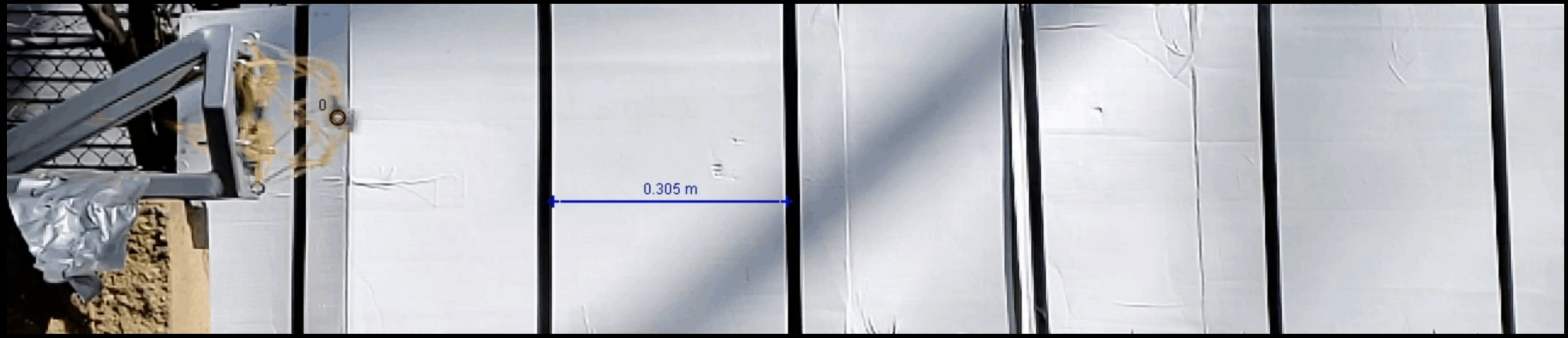
Material Selection for the Web

Paracord (nylon)



Rubber Tubing

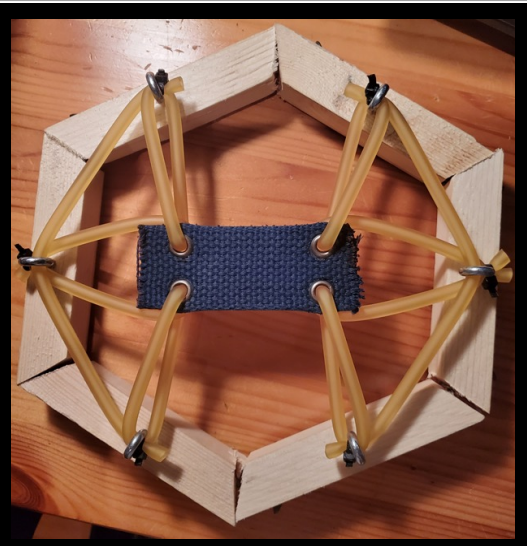
Experimental Methods



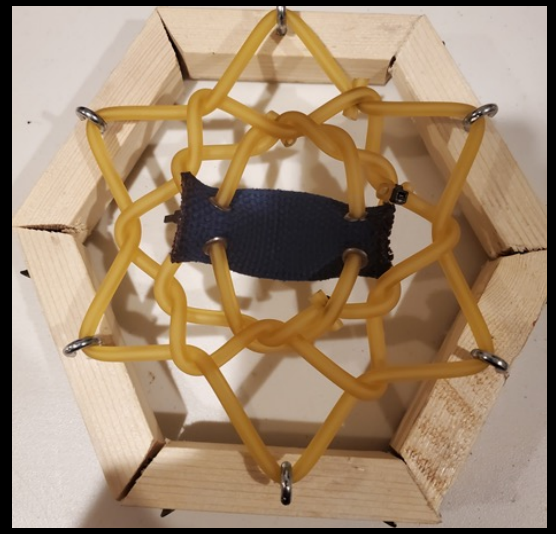
Comparing Energy Density

	Displacement (m)	Velocity (m/s)	Acceleration (m/s^2)	Acceleration (gs)	PE (J)	E (KJ/Kg)
Web Design 1	0.3556	77.01	8340	850	16.33	0.72
Web Design 2	0.4318	66.41	5107	521	23.85	0.60
Sling Shot Spider	0.0268	4.16	1163	130	-	3.92

- $a = \frac{V^2}{2\Delta X}$
- $k = \frac{F}{\Delta X}$
- $Pe = \frac{1}{2} k \Delta X^2$



Web Design 1



Web Design 2

Conclusion

Special Thanks: To Matthew Alonso for all his invaluable advice,
Pranav Bhounsule for his knowledge and helpfulness, and
Mycauley for his help with the Welding.