Rubber Band Helicopter

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Purpose/Question

- I once made a rubber band bow along with some arrows. The bowstring was a rubber band. As I pulled the rubber band back and let go, the arrow shot forward.
- Why did the rubber band shoot the arrow? Then, I figured that a rubber band could fly a helicopter.

Hypothesis

- The more rubber bands I add and twist, the elastic force will increase, increasing the time of flight

Prodedures

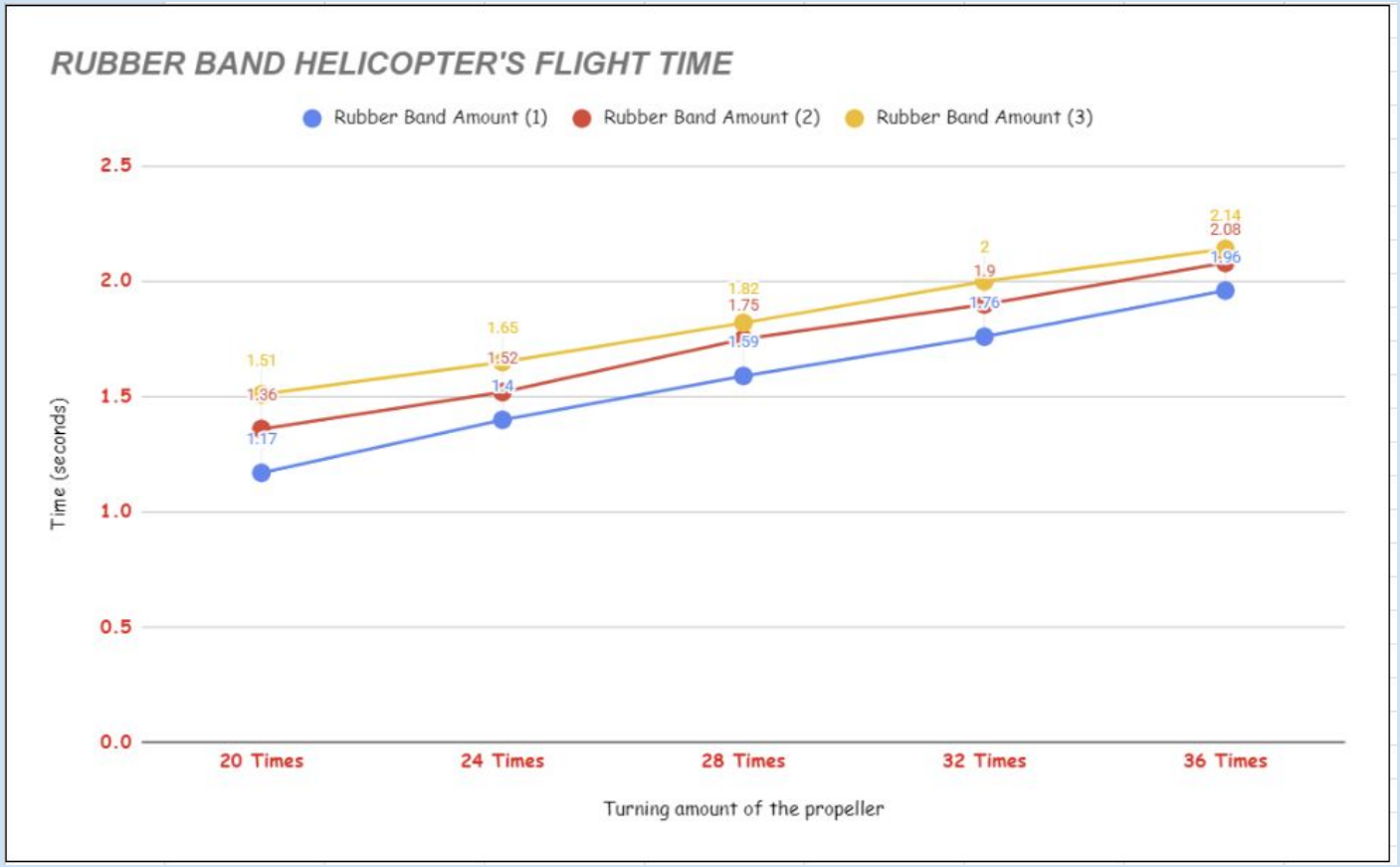
1. Put the plastic propeller onto the very tip of the craft stick and the plastic hook on the other tip.
2. Cut out the shape of a helicopter from the cardstock (1.5”, 7).
3. Tape the cardstock helicopter onto the center of the craft stick. Make sure that the cardstock doesn’t touch the propeller.
4. Attach rubber band(s) from the propeller’s hook to the plastic hook
5. Make sure that the propeller is facing you and spin it with your index finger clockwise
6. To launch, grab the twisted propeller and the plastic hook with both of your hands. Face the propeller upwards
7. Let go of the propeller first and THEN the plastic hook.
8. Try spinning it 20 times, then 24, 28, 32, and 36 times with 1, 2, or 3 three rubber bands.
9. Keep track of the time it takes before the helicopter hits the ground. Then average the times.

Pictures

Table

*Measurment time unit: seconds rounded to the nearest hundredth					
Trial 1	Twisting Amount	Twisting Amount	Twisting Amount	Twisting Amount	Twisting Amount
	20 Times	24 Times	28 Times	32 Times	36 Times
Rubber Band Amount (1)	1.13	1.34	1.5	1.55	1.88
Rubber Band Amount (2)	1.3	1.38	1.71	1.88	2.06
Rubber Band Amount (3)	1.56	1.78	1.91	2.06	2.13
Trial 2	Twisting Amount	Twisting Amount	Twisting Amount	Twisting Amount	Twisting Amount
	20 Times	24 Times	28 Times	32 Times	36 Times
Rubber Band Amount (1)	1.21	1.48	1.56	1.81	2.08
Rubber Band Amount (2)	1.35	1.53	1.8	1.95	2
Rubber Band Amount (3)	1.4	1.63	1.66	1.91	2.1
Trial 3	Twisting Amount	Twisting Amount	Twisting Amount	Twisting Amount	Twisting Amount
	20 Times	24 Times	28 Times	32 Times	36 Times
Rubber Band Amount (1)	1.18	1.58	1.71	1.92	1.93
Rubber Band Amount (2)	1.43	1.66	1.75	1.88	2.2
Rubber Band Amount (3)	1.51	1.65	1.91	2.05	2.21
Average	Twisting Amount	Twisting Amount	Twisting Amount	Twisting Amount	Twisting Amount
	20 Times	24 Times	28 Times	32 Times	36 Times
Rubber Band Amount (1)	1.17	1.4	1.59	1.76	1.96
Rubber Band Amount (2)	1.36	1.52	1.75	1.9	2.08
Rubber Band Amount (3)	1.51	1.65	1.82	2	2.14
Experiment location: Wellness Center					

Graphs


RUBBER BAND HELICOPTER'S FLIGHT TIME
Rubber Band Amount (1)
Rubber Band Amount (2)
Rubber Band Amount (3)
2.5
2.0
1.5
1.0
0.5
0.0
Time (seconds)
1.51
1.36
1.17
1.65
1.52
1.4
1.82
1.75
1.59
2
1.9
1.76
2.14
2.08
1.96
20 Times
24 Times
28 Times
32 Times
36 Times
Turning amount of the propeller

Results

- My hypothesis was supported, as I increased the twisting, along with the rubber band amount, the time increased as well.
- As I twisted the rubber band more, the length the rubber band stretched increased, so the elastic force increased. Adding more rubber bands stiffened the rubber band, making it harder to make it stretch. This means that the rubber band goes back to its original shape much stronger than if you only stretch one rubber band. This increases the elastic force.
- Force is how hard the rubber band is pulling right now, and energy is the total amount of work stored in the rubber band due to the force.
- To keep a helicopter to fly longer, you need to increase the elastic potential energy. When you twist the rubber band, you’re doing work and storing elastic potential energy. When you let go of the helicopter, the stored energy turns into kinetic energy, the rotation of the propeller. The turning of the propeller makes the helicopter fly. So, my hypothesis was supported.

Works Cited

- 고, 희정. 어린이 과학 형사대 CSI 27. 가나출판사, 2015
- Rubber Band Helicopters - Engineering Project for Kids https://www.instructables.com/Rubberband-Helicopters-step-by-step/
- Science Olympiad https://www.freeflight.org/science-olympiad/science-olympiad-resource