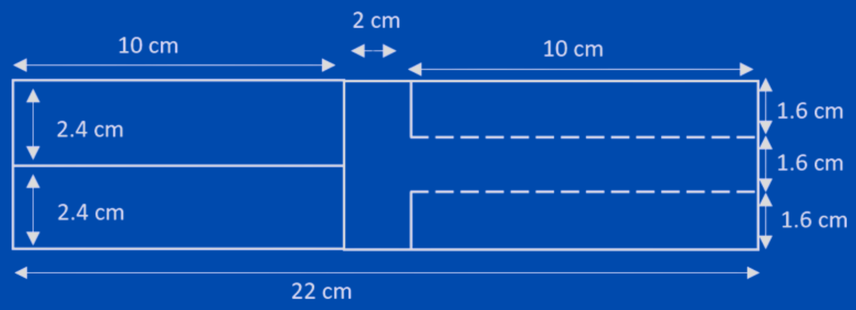
WHAT IS THE BEST DESIGN FOR A PAPER HELICOPTER?

Introduction

We wanted to discover what the best design for a paper helicopter is. So, we decided to conduct several experiments to answer the question: What is the best design for a paper helicopter? We invented a base template (shown below) and always kept all but 1 independant variable the same. For example, if we changed the length of wingspan, we kept all the values other than the length of the wingspan, the same. We found that the helicopter made using paper and the base template took 1.73 seconds to touch the ground.



Method

For each experiment, we compared two distinct paper helicopters by dropping them from a height of 1.5 meters. We started a stopclock when the heliciopter was released and stopped it when the helicopter touched the ground. If the helicopter took a short amount of time to touch the ground, it was a bad helicopter since it did not glide for long enough. However, if it hit the ground after more time, it would mean that it was a good helicopter because it stayed in the air for a longer period of time.
Our aim was to see how weight changed the characteristics of the helicopter.

Conclusion

In conclusion, our experiment on paper helicopters revealed that factors like aerodynamics and air resistance significantly influence the success of the helicopter. This has provided us with reliable evidence to optimise helicopters in the future.

In the experiment, the double card paper helicopter, being relatively heavier, demonstrated a faster descent of 0.64 seconds. Conversely, the single card helicopter, with lighter weight, had a slower descent of 0.93 seconds. These results reveal that light paper helicopters are better in achieving a slower descent and improved aerodynamic control. The experiment shows the significance of weight in the paper helicopter design and gives us a good idea of what to expect for our upcoming tests.

	Time to rech the ground (seconds)			
Material	Test 1	Test 2	Test 3	Average
a4 card	0.96	1.01	0.81	0.93
Thick card (2 sheets of card)	0.60	0.57	0.74	0.64

In the section of our experiment where we tested what wing span length (one 3 cm longer and one 3 cm shorter) produced the slowest and fastest rates, the 13 cm wingspan averaged 0.06 seconds, faster than the original design as expected, since there was more atmospheric drag than the original. The 7 cm wingspan design was also faster, averaging 0.55 seconds, faster than the base. This surprised us as there is the same weight being supported by a smaller wingspan so it decreased atmospheric drag.

	Time to rech the ground (seconds)			
Length of wingspan (cm)	Test 1	Test 2	Test 3	Average
13	1.56	1.77	1.68	1.67
7	1.05	1.21	1.27	1.18

In the final stage of our experiment, we altered the dimensions of the helicopter while maintaining identical proportions. The larger variant, which had a 10% increase in size, took an average speed of 0.58s, exceeding the base model's time due to additional weight in its structure. Conversely, the smaller helicopter performed at the same speed as the base design.

	Time to rech the ground (seconds)			
size in % compared to the original template	Test 1	Test 2	Test 3	Average
10	1.09	1.15	1.20	1.15
-10	1.83	1.59	1.78	1.73

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