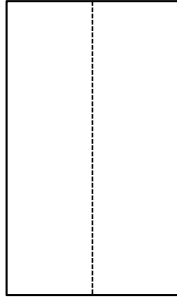


How to make a paper helicopter

Each sheet you've been given has 4 templates. Cut out one template.



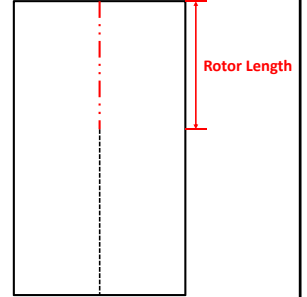
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1

How to make a paper helicopter

Measure and cut a certain distance down the dotted line. This is the **rotor length**.



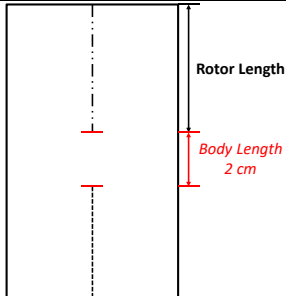
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2

How to make a paper helicopter

Measure 2 cm from the rotor cut. This is the body length, and is **FIXED** for this design. (Assume we need to transport passengers in this part of the helicopter 😊)



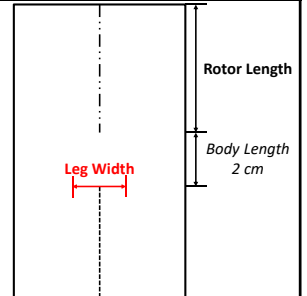
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3

How to make a paper helicopter

Measure a certain distance across the center of the helicopter, at the base of the body. This is the **leg width**.



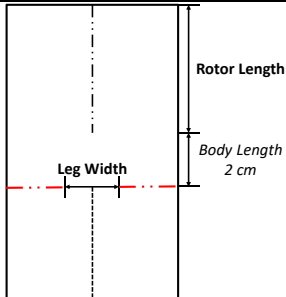
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4

How to make a paper helicopter

Cut on both sides of the body base to the marked leg width.



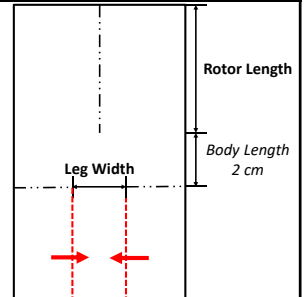
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5

How to make a paper helicopter

Fold inward at the dashed lines.



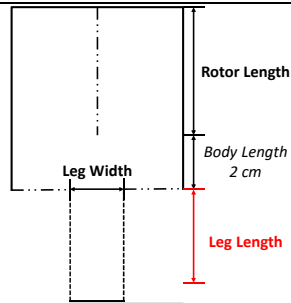
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6

How to make a paper helicopter

Mark a certain distance along the leg. This is the **leg length**.



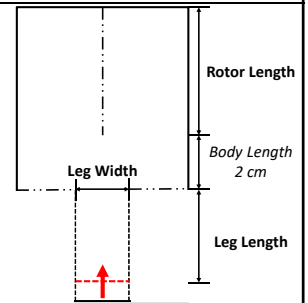
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7

How to make a paper helicopter

Fold upward at the dashed line.



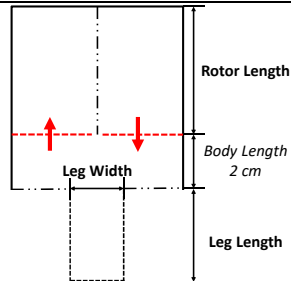
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8

How to make a paper helicopter

Fold the rotors *in opposite directions* at the dashed lines.



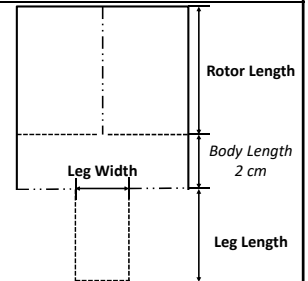
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9

How to make a paper helicopter

Fold on dashed lines; cut at broken lines.



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10

Design objective

Your goal is to make a paper helicopter with **maximum flight time**.

3 manipulated factors: **Rotor Length, Leg Width, Leg Length**

Constraints:

- You must use the full template provided. No trimming, adding extra paper, etc. Body length must be 2 cm. No modifying the prescribed design aside from the 3 factors above.
- No using extra paper for additional trials! You have 32 templates available. This includes all your experimental runs, your final optimal design (for competition), and any mistakes that you might make along the way.

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11

Design suggestions

Keep in mind the principles we discussed last class:

- What are feasible ranges for each of the three factors? (Are they independent?) Use this to determine your design runs.
- What response surface model do you think would work best? (BB, CCC, CCI, CCF)
- Repetition of experiments helps understand noise.
 - This refers to more than just dropping the same helicopter multiple times (which is also a good idea). Constructing the "same" helicopter multiple times might be useful, to account for variations in cutting/other design.
- Remember to randomize your sampling order.
- It's a good idea to test your optimal design. (Budget for this!)

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