

Friction Lab Activity – Student Edition

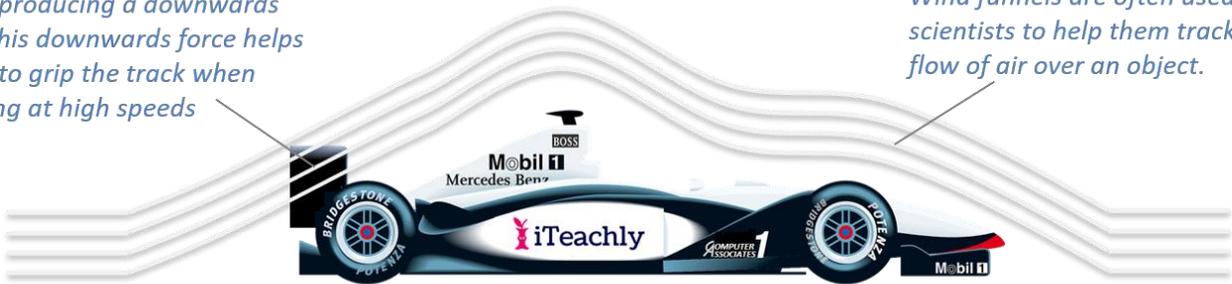
Racing Wings

Background Information:

A race team is looking to change the design of the wing on the back of their formula 1 car to reduce the amount of drag created by the wing on the rear of the car. Drag occurs as air moves past a solid surface limiting the cars ability to reach its maximum speed.

Air moves over the rear wing of the car producing a downwards force. This downwards force helps the car to grip the track when cornering at high speeds

Wind funnels are often used by scientists to help them track the flow of air over an object.



Aim: To investigate the length of the wing size and drag.

Pre-lab Questions:

1. Define the term drag.

2. Write a hypothesis which describes the relationship between drag and wing size.

Lab set up:

Time allowance: 30 minutes

Grouping: Pairs or threes

Equipment needed:

- | | |
|--|----------------|
| 1. stopwatch | 3. paper clip |
| 2. paper helicopters (see resource page) | 4. meter ruler |

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Method:

1. Cut out and assemble the four helicopters from the resource page according to the instructions.
2. Attach a paper clip to one of the helicopters.
3. One group member holds the helicopter with the paperclip at a height of 2 meters with the paperclip end pointing towards the floor.
4. Release the helicopter and time how long it takes to reach the ground.
5. Record your results in the table.
6. Repeat three times before testing helicopters of other wing lengths.

Results:

Wingspan (cm)	Drop time (s)			Average time (s)	Average speed (ms ⁻¹)
	Test 1	Test 2	Test 3		
3					
4					
5					
6					

Post-Lab Tasks:

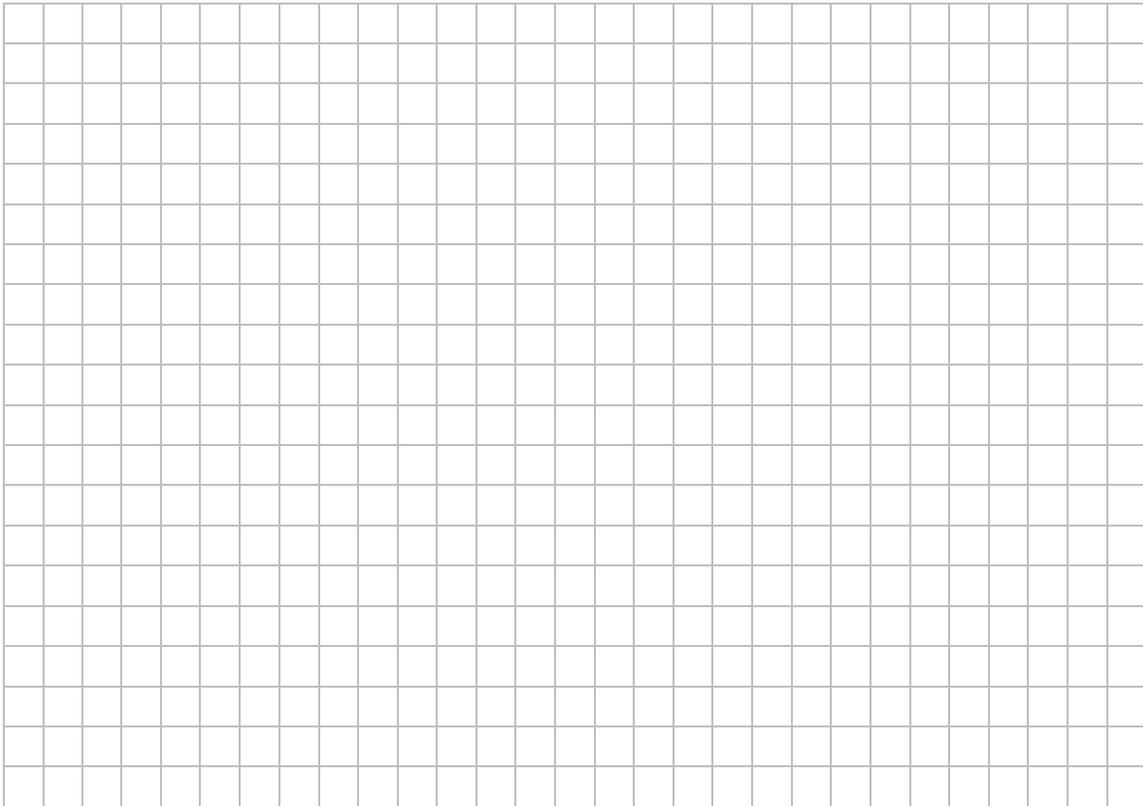
1. Answer the questions that follow:
 - a. Order the wings based on their drop time. _____
 - b. Outlying data is data which does not fit within the pattern of the data. Identify any outlying data in your experiment.

 - c. How does the presence of an outlier affect the overall trend shown?

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d. Describe how you could treat outlying data if it were present in your tests.

2. Graph the average drop time from 2 meters in relation to wingspan in the space below. Place time on the x-axis.



3. Use your graph to predict the speed of a helicopter with a wingspan of 3.5cm

4. Formulate a conclusion

Use your data to write a conclusion which answers your hypothesis for this lab:

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Resource Page:

Instructions:

1. Carefully cut out around the outside of each T-shaped helicopter along the solid lines.
2. Make a smaller cut where the scissors (✂) symbol indicates. DO NOT CUT COMPLETELY
3. Fold along the dashed lines.
4. Attach paper clip to the base.

