babcock™

Activity 18

Create and test your own wing

1 HOUR

Materials

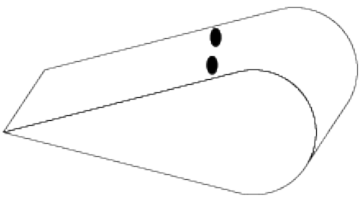
- Printer
- Card
- Paper
- Pencil
- Hole punch
- Glue/double-sided tape
- 2 chop sticks
- Fan/hair dryer

Activity Overview

- Create a wing, then use a hair dryer or fan to demonstrate lift.

Activity Plan

- Print the final page of this document onto paper.
- Cut out the rectangle and tear drop shape.
- Using the teardrop shape as a template, cut three teardrops out of card.
- With the hole punch, punch 4 holes into the rectangle of paper, as shown by the yellow dots.
- Fold the paper rectangle round the first tear drop, so that the tear drop is along the middle blue line, and stick in place.
- Repeat with the other two teardrops, on the other blue lines.
- Secure the ends of paper together.
- You have a wing!
- Slot your wing over the two chop sticks, keeping the chopsticks upright and the curved edge at the top.
- Using the fan or hair dryer, blow air at the rounded end of your wing. What happens? (*It should lift*)



The Theory

- The shape of a wing is called an airfoil. The underside of the wing should be flatter, whilst the upper side is more rounded.
- When an airplane is moving forward, the air is split at the front edge of the wing, passing above and below the wing. The air will move at different speeds so that it will meet at the back edge pf the wing at the same time
- The air will rush over the top and stretch out. This will decrease the air pressure on top of the wing.
- Conversely, the air below the wing moves in an almost straight line, meaning it stays at the same speed and pressure.
- Because high pressure always moves towards lower pressure, the air below the wing pushed up towards the lower pressure above the wing, therefore creating lift on the wing.
- When this lift outweighs gravity, the airplane rises into the air.
- The faster an airplane moves, the more lift is created.
- This is called Bernoulli's Principle.

Reflection Questions

- Why did your wing lift up?
- What would happen if you turned the wing upside down or changed the shape?
- How would funneling air around the wing, make it react?

Further Activity

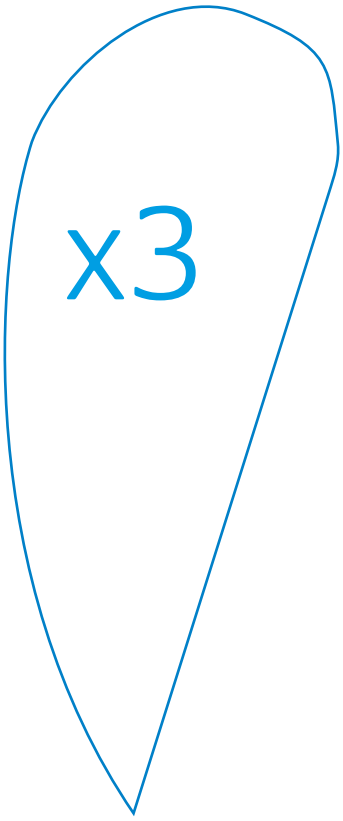
Build a wind tunnel to funnel the air towards the wing. You could us a box and cut off each end so that the air can flow through. At one end, create a funnel shape so that the air is narrowed into the tunnel. If you want to make it even better, why not insert a clear window into the side of your tunnel so that you can see the wing lifting.

Aviation efficiencies

Aircraft manufacturers work hard to develop their aircraft to be as efficient as they can be and to suit the aircraft's purpose. Using Bernoulli's Principle to create wings with more shape allows for aircraft that can lift faster, need less thrust to take off and are quieter. Using these theories as a basis of flight, they can then be tweaked and changed to create an even better aircraft.

When looking at what aircraft would best suit our customer's needs, we also look at the innovations and efficiencies the manufacturer has created. A more efficient aircraft will need less fuel and will therefore cost less to maintain.

Did you know: A propeller blade is tilted so that when it rotates it creates an action similar to that of the Archimedes' screw. It transforms rotational power into a linear thrust.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