



Part 2 Method of Investigation

Put a Ping-Pong® ball into a medium-sized funnel. There is no way that you can blow the ball out of the funnel by holding it vertically and blowing up from the bottom. However, if you put the edge of the funnel just under your lower lip and blow horizontally across the top of the funnel, the ball will pop right out.

Observations & Suggestions

As you blow up from the bottom of the funnel, air rushes around the sides of the Ping-Pong ball. The air pressure on the sides of the ball becomes less than the air pressure from the still air pushing down on the ball. The harder you blow, the more firmly the ball will sit in the funnel. However,

when you blow horizontally across the top of the funnel, the vertical air pressure decreases. The air under the ball now has the greater pressure (because it is not moving) and will force the ball up and out of the funnel.



Key words: Bernoulli's principle

Daniel Bernoulli (1700–1782) was a Swiss mathematician who became interested in the force exerted by moving gases.

Bernoulli's principle states that as a gas moves horizontally across a surface, the vertical pressure of the gas on the surface decreases. The faster the gas moves, the less the air pressure at right angles to the gas's motion. An airplane wing is designed to take advantage of Bernoulli's principle. The top of the wing is curved. As the plane moves forward, air traveling over the top of the wing moves faster than air under the wing. As a result, the air under the wing has greater air pressure than the air on top and the plane gets a lift.





CHALLENGE LEVEL THE FLYING CUFF

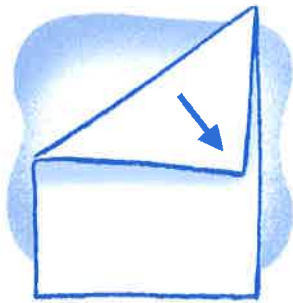
MATERIALS AND EQUIPMENT

- a sheet of standard white paper
- scissors
- tape

Can flying objects have unusual shapes and still fly? Here's an amazing wingless wonder.

Method of Investigation

- 1 Fold the upper-left-hand corner of the paper toward you so that the top edge is exactly on top of the right edge. Crease the paper.



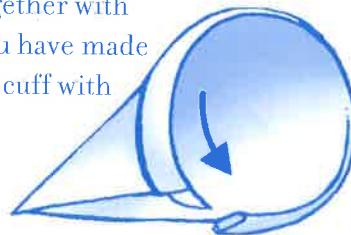
- 2 Cut off the extra paper below the double sheet. This will leave you with a square that has been folded in half diagonally.



- 3 Open the square and turn it so that the crease runs from left to right. Make a 1/4-inch fold on the corner on the bottom. Keep folding the bottom edge over and over again until your "cuff" just covers the crease.



- 4 Keep your folded band on the outside and curve the paper. Slip one pointed end of the "cuff" into the other point. Fasten the ends together with tape. You have made a folded cuff with a tail.



- 5 Throw your flying cuff with the cuff in front and the tail in the rear.



Observations & Suggestions

I got some very long glides by throwing the cuff gently off the palm of my hand. What happens when you bend the tail up or down? Compare your gliders to some paper airplanes.

Key words: paper airplanes