

Defying gravity

An alternative demonstration of the Bernoulli effect

You will need....

- ✓ two straws
- ✓ two pieces of card (e.g. 5×5 and 10×10 cm)
- ✓ a pin (or piece of wire)
- ✓ some glue
- ✓ a punch or cork borer

Background:

According to Bernoulli's Principle an increase in the velocity of a fluid is accompanied by a decrease in its pressure and/or a change in its gravitational potential energy. ($\Delta p \propto \Delta v^2$)

Follow these steps:

1. Punch a hole in the small card so that a straw can be fitted and glued in place.
2. Insert the pin through the centre of the larger card and glue it in place.
3. Place the card on top of the ordinary straw, with the pin facing downwards. Blow into the straw.
4. Place the card on top of the straw with the flange, with the pin facing downwards. Blow into the straw.

So what happened?

The card is easily dislodged from the ordinary straw but if it is similarly placed on the

straw with the flange it cannot be blown off. In fact it will stay even when the assembly is inverted as long as there is a sufficient current of air. As the air enters the small gap between the card and the flange its velocity increases and its pressure decreases.

What next?

1. How small can the flange be and still hold the card in place?
2. Can the card be made to rotate?
3. Does the diameter of the straw make a difference?

