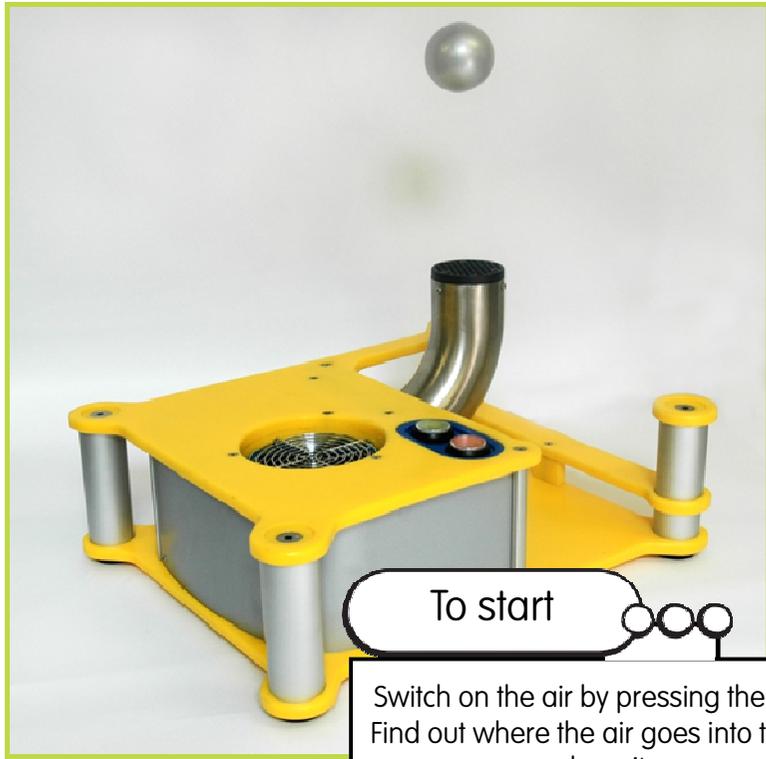


AIR STREAM

Challenge



To start

Switch on the air by pressing the green button. Find out where the air goes into the exhibit and where it escapes. Position the air vent so the air flows straight up. Introduce the blue ball gently into the air stream and let it go

1. Describe what happens to the ball.

AIR STREAM

2. What force has to be overcome for the ball to hover?

Gravity

3. With the ball hovering - and without touching it- hold the strip of paper;

a) above the ball

b) to the side of the ball

Where is the air flow fastest?

Above the ball

Can you make the paper wrap itself around the ball?

(This can be done by gently moving the paper towards the ball)

4. With the ball still hovering, slowly adjust the angle of the silver air vent so it is pointing sideways.

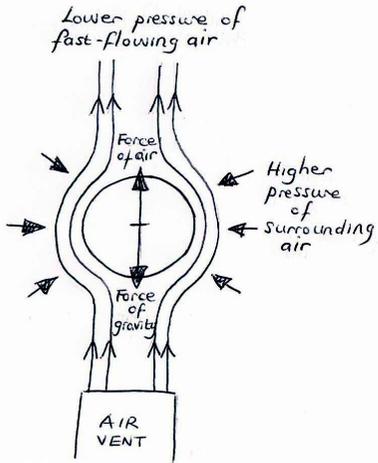
What do you notice?

The ball continues to hover and moves further away from the air vent, until eventually it drops.

The force of gravity acting on the ball is the same, but the upwards force of the air is now lower (because it is at an angle). So how does it stay upright?

AIR STREAM

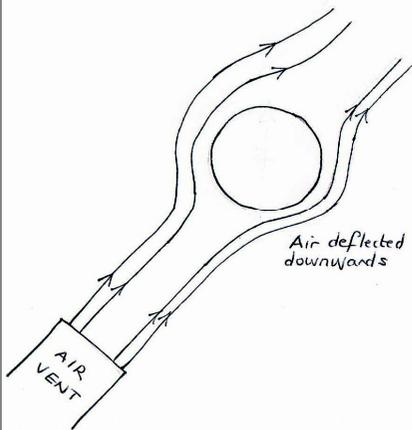
4. What's happening?



With air vent vertical

- The ball moves up until the force of the air (pushing up) is equal to the force of gravity (pulling down).
- The fast flowing column of air has a lower pressure than the air surrounding it.
- The higher pressure of the surrounding air pushes in on the ball – holding it in position.

With air vent diagonal



- As the air stream moves over the curved surface of the ball, the air flowing **underneath** the ball is deflected downwards.
- As the air is forced to move **down**, it in turn forces the ball **up**.
- This additional force - called **LIFT** - helps keeps the ball floating.

AIR STREAM

5. Experiment: Different types of ball

Return the air vent to its vertical position and try hovering the different balls

Type of ball	Observation	Explanation of difference
Blue plastic ball	Ball hovers as before	n/a
Fluffy ball	Ball doesn't hover	The fluffy surface disrupts the flow of air
Ping pong ball	Hovers higher	It has lower mass (is lighter) than the blue ball
Hard foam ball	Hovers lower	It has a higher mass (is heavier) than the blue ball
Ball with holes	Hovers briefly then falls	The air passing through the holes disrupts the flow of air

6. Try this!

Can you hover the blue and pink balls at the same time?

Two balls can be hovered vertically if introduced into the air stream gently.

Often their movement gradually becomes more turbulent until they drop.