

IT'S A DRAG

Challenge



Before you start...

Have balls at the bottom of the tube. Turn the exhibit upside down and watch the balls fall

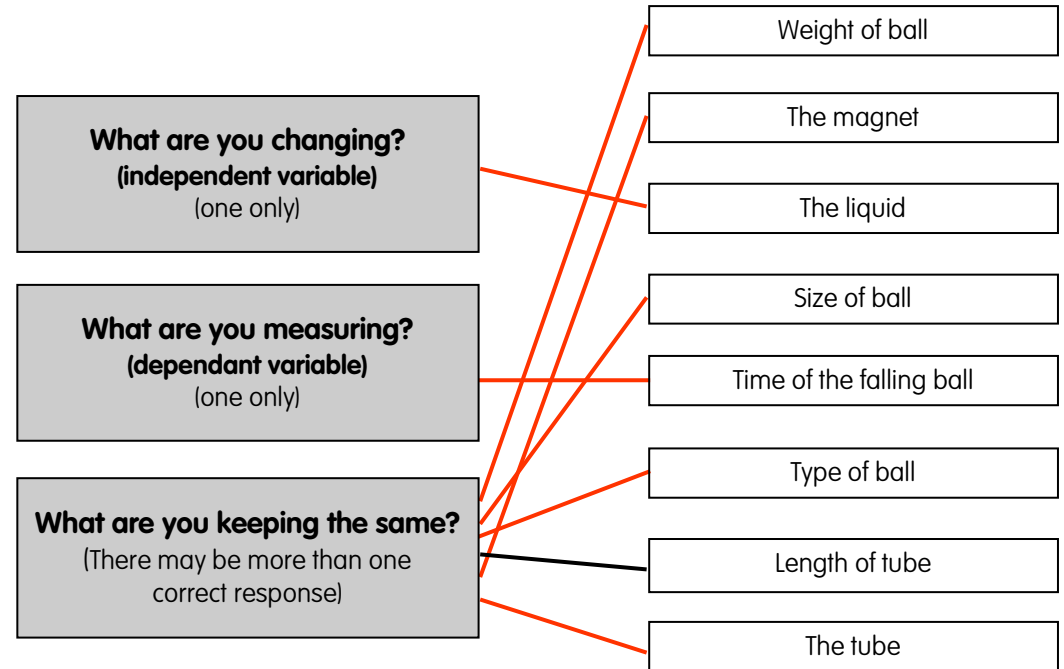
Try moving the balls up with the magnets. Is it easy for all the liquids?

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Experiment 1

You will be measuring the time taken for the balls to fall in the different liquids.

1 a) Before you start, answer the questions below by drawing arrows to the correct boxes.



b) Why is it a good idea to do the experiment more than once?

Improve reliability/ check the results are the same/ calculate an average result

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c) The liquid in tube 1 is silicone. The other liquids in the tubes are oil, water and shampoo. Which liquid do you think is in each tube?

There is silicone in tube 1

There is shampoo in tube 2

There is oil in tube 3

There is water in tube 4

Experiment 2

2 a) Measure the time it takes for the ball to drop and record your results in the table. Be careful to start and stop at the correct time.

	Time taken for the ball to drop (seconds)			
	Drop 1	Drop 2	Drop 3	Average *
Tube 1				
Tube 2				
Tube 3				
Tube 4				

* Average (mean) = (drop 1 + drop 2 + drop 3) ÷ 3

3. Can you explain why it took longer for the ball to drop through the different liquids?

Some liquids are more viscous/ thicker

Drag forces are bigger in some liquids

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4. Complete the table

Factor	Will it affect the speed? Yes/No	Explain your answer
Viscosity ("thickness" of liquid)	Yes	<i>It is harder for the ball to fall in a more viscous liquid, as the liquid offers more resistance and so drag is increased.</i>
Diameter of ball	yes	More surface area is in contact with the liquid, so bigger drag force
Weight of ball	yes	Heavier balls have a bigger force pulling them downwards
Temperature of liquid	yes	Some liquids become 'runnier' (less viscous) as they increase in temperature
Colour	no	n/a

5.

Add arrows to show the direction of the two forces - **weight** & **drag** - acting on the ball in the diagram below.

