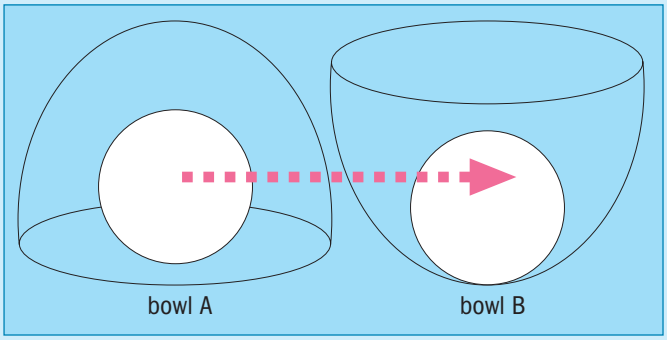
Centripetal force

Ireland

Forces acting on rotating objects

You will need...

- ✔ two circular bowls (Danone yoghurt comes in an ideal plastic container; see picture)
- ✔ a table-tennis ball or marble



Background

When going round a corner quickly in a car you feel as if you are pushed to the outside of the bend. In fact the car is exerting a force on you, called centripetal force, which makes you go round the corner with the car.

Follow these steps

1 Put the ball under one of the containers, placed face down.

2 Ask a student to move the ball from this container to the other container without touching the ball or the empty container.

So what happened?

You may have to give the student some clues. They need to move the first bowl in a circular motion, spinning the ball round fast enough that it moves up the sides of the bowl. This will allow them to lift the bowl quickly while the ball is still forced against the sides and place it over the other bowl, allowing the ball to drop into the second bowl without them having to touch either the second bowl or the ball.

Centripetal force, which keeps the ball against the sides of the first bowl, is responsible for preventing it from dropping out of the bowl until the student stops moving the bowl in a circular motion.

What next?

When a hammer thrower releases the hammer, in which direction does it go?

This experiment can also lead to a discussion about governors used in engines, such as those on steam engines (e.g. the threshing engines seen at field days).