

# Professor Brainstorm's Magic Ball

## About this Activity (Information for Parents and Teachers)

This is a great activity which is suitable for even very young children - but will fascinate older ones too. It looks like magic - but anyone can do it.

The activity teaches children about sorting materials by size.



## What you Need

- A transparent plastic jar with a screw top lid\*
- A small rubber 'bouncy' ball
- Uncooked rice (approx 1kg - depending on the size of the jar)

\* For obvious reasons, do not use a glass jar - or anything breakable. If you don't have a plastic jar with a screw top lid you can use a plastic drinks bottle (so long as it has a good 'snap-on' lid which will not come off easily). Or even an 'Oasis' drinks bottle will work (as these have quite a wide neck).

## The Magic Ball activity

(You can watch a video of this on Professor Brainstorm's YouTube channel - search for 'Professor Brainstorm Science')

Pour the rice into your jar until it is about 3/4 full. Now put the rubber ball in to the jar - on top of the rice - and tightly screw the lid on to the jar. The object of this activity is to get the ball to the other end of the jar - without opening the jar. The way to do this is as follows:

1. Turn the jar upside down - so the lid of the jar is at the bottom - and the ball is now underneath the rice.
2. Then simply shake the jar.
3. After a few seconds the ball should 'magically' appear at the top of the jar.

If it doesn't work straight away, keep trying – it will work eventually. (Some adults seem to struggle with this activity – but most children can do it without any difficulty. It seems that the harder you try to make the ball go up, the less it works!)

Once you have got the ball to the other end of the jar, turn the jar back over, and try again.

## How does it Work?

When we shake the contents of the jar it creates spaces at the bottom of the jar. The grains of rice can easily fall into these small spaces, but the ball is bigger so it can only occupy a large space. Gradually we get more and more rice collecting at the bottom of the jar – so effectively the ball gets pushed up. After a few seconds of shaking the ball ends up on top of all the rice grains.

### Now try this ...

You may think there is something special about a rubber ball that makes this experiment work. Perhaps it is something to do with the weight (or density) of the ball. If so try using a ping pong ball rather than a rubber ball. (This is about the same size as the rubber ball - but it is much lighter.) Or try it with a pebble. (The size isn't critical, but one about the same size as the rubber ball would be ideal.)

In each case the ball (or pebble) should rise to the top, just as it did with the rubber ball. So the weight (or mass, or density) of the ball doesn't matter. All that does matter is its size.