

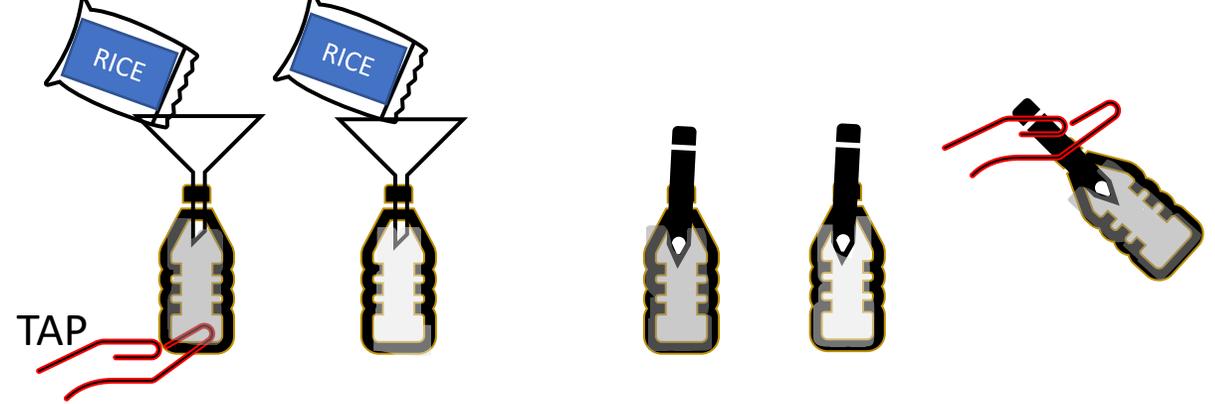
Powerful pencil

What you need:

- Two identical plastic bottles (labels removed)
- Rice
- Funnel
- Two pencils

What you do:

- Using the funnel fill one bottle with rice, to 2cm below top. Tap bottle to make rice settle and compact. Add more rice and tap again until the bottle is full almost to the top.
- Give funnel and second bottle to a friend and ask them to fill bottle with rice (do not tell them to tap bottle to compact rice).
- Push a pencil into the bottle to about half its length, ask your friend to do the same.
- Challenge your friend to pick up the bottle only using the pencil. Impossible! Now you do it.



The Science

When you insert the pencil into the bottle of packed rice, it takes up additional space inside of the bottle. Because rice is not a fluid, it cannot move up the neck of the bottle to compensate for the space that the pencil takes up. The packed rice has very little room to move so it tends to press against the sides of the bottle. The pencil gets wedged between the rice and the sides of the bottle. Friction helps to hold the pencil in the bottle as the bottle is lifted into the air.

