



Universität
Basel

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Air is not nothing

Do you know what's inside this glass bottle? Nothing at all? Let's take a closer look!

What you'll need

First experiment:

- 1 bottle
- 1 balloon
- 1 drinking straw

Second experiment:

- 1 yoghurt carton
- 1 sharp-pointed knife or pair of scissors
- 2 drinking straws, one of which can fit inside the other. The wider straw should be somewhat shorter.
- 1 bottle
- play dough or modeling clay
- water

What happens and how does it work?

First experiment:

- First of all, check whether the balloon inflates properly.
- If it does, insert the balloon into the bottle so that it is hanging loosely inside the bottle neck.
- Try to inflate the balloon.
- Then insert a drinking straw between the balloon and the bottle neck, and try inflating the balloon again.

Second experiment:

- Use the knife or scissors to make a hole in the base of the yoghurt carton, just big enough for the wider drinking straw to fit snugly inside it. You might want to ask a grown-up to help you with this part.
- Push the wider drinking straw around halfway through this hole.
- Wind a thick piece of play dough or clay around the straw, pressing firmly to create an airtight seal.
- Press the yoghurt carton down onto the bottle so



that the bottle neck pushes into the play dough, creating another airtight seal.

- Now fill the yoghurt carton with water to a level considerably higher than the top of the drinking straw.
- Watch what happens.
- When the water stops flowing, push the narrow straw through the wider one until you can see it inside the bottle.
- Pull the narrow straw back out again.

What happens and how does it work?

First experiment:

- The balloon will not inflate inside the bottle.
- This is because the bottle is not actually empty – it is full of air. This air can be compressed a little, but not enough to properly blow up the balloon.
- When you push a drinking straw into the bottle, the air has a way to escape the bottle. You can now inflate the balloon.

Second experiment:

- To begin with, some water flows through the drinking straw into the bottle.
- However, at some point the water stops flowing. Here too, the water is held back by the air inside the bottle, which has nowhere to escape to (as long as the play dough or clay form an airtight seal).
- By pushing a second drinking straw through the first one, you create an escape route for the air in the bottle, allowing water to drip through the wider straw once again.
- You can use the second straw to control whether or not water flows into the bottle.
- Now you know that the bottle was not really empty, but full of air.

