EGG IN A BOTTLE

USE AIR PRESSURE TO PUSH AN EGG INTO A BOTTLE, NO FINGERS REQUIRED!

SAFETY:

- Matches should only be handled by an adult or under adult supervision.
- Do not perform near flammable materials.
- Be careful with hot water.
- Check for egg allergies before conducting this experiment.

WHAT YOU NEED

- A hard-boiled egg (peeled)
- A glass bottle or jar with a neck slightly smaller than the egg
- A strip of sturdy paper (10–15 cm long)
- Matches or a lighter
- OPTIONAL: vegetable oil/ Vaseline/ water

WHAT TO DO

1) OPTIONAL: Rub a little vegetable oil/ Vaseline or water around the inside edge of the bottle mouth.
2) Place the egg (small end down) on the bottle's opening. Check that it sits snugly without falling in. Remove the egg.
3) Light the strip of paper with matches or a lighter and drop it into the bottle.
4) Quickly put the egg back on top of the bottle. The flam should go out fairly quickly.
5) Watch the egg wiggle and then get pushed inside as the air in the bottle cools.
6) Once you get the hang of this, can you get the egg out without breaking it? Hint: blow air into the bottle!

ALTERNATIVE (IF YOU DON'T WANT TO USE AN EGG, OR MATCHES/A LIGHTER

WHAT YOU NEED

- A water balloon
- A glass bottle or jar
- Hot water.
- A container of cold water (use some from the fridge, or add some ice cubes), large enough to mostly submerge your bottle
- OPTIONAL: vegetable oil/ Vaseline/ water

WHAT TO DO

1) Rub a little vegetable oil/ Vaseline or water around the inside edge of the bottle mouth.
2) Fill the balloon with water so it is slightly larger than the mouth of the bottle.
3) Fill the bottle with hot water; this will heat the bottle. Leave it sit for a minute or two.
4) Empty the water from the bottle (be careful- the glass will be hot!). The air inside will then be heated by the hot bottle.
5) Quickly place the water balloon on top of the bottle.
6) Cool the bottle by placing it in a container of cold water. The balloon will be pushed into the bottle.

WHAT'S HAPPENING?

When the flame (or hot water) heats the air inside the bottle, the air molecules move faster and spread out, so the air takes up a larger space than just what's available inside the bottle. Some of the heated air escapes out the top of the bottle. This is why you may see the egg or water balloon wiggle.

When the flame goes out (or the bottle is plunged into cold water), the air inside the bottle cools down quickly. Colder air molecules slow down and pack closer together, taking up less space. Because some of the heated air escaped and the remaining air has cooled down, the air molecules inside the bottle are now less densely packed than the air molecules outside. This means the air pressure inside the bottle is lower than the air pressure outside.

Air always tries to move from areas of high pressure to low pressure, so the outside air pushes hard on the bottle from all directions, including on the egg (or water balloon)—forcing it into the bottle!