

## THE BRIEF

MAKE AN EGG FIT INTO A BOTTLE WITHOUT BREAKING IT.

## MATERIALS

An uncooked egg, a pan of boiling water (with adult supervision), a glass of vinegar, a thick necked bottle.



## THE EXPERIMENT

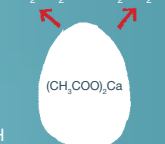
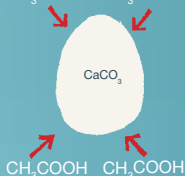
Boil an egg in a pan of water for 10 minutes and carefully remove its shell.

Or, if you fancy a challenge, submerge the egg in a glass of vinegar for up to two days. When you take it out, the shell will have changed state and the egg will be surprisingly rubbery.

Heat the bottle in hot water – use gloves (or a tea towel) when handling the hot bottle. Rest the egg on the neck. As the air inside the bottle cools, it contracts and sucks the egg down.

**TOP TIP**  
Try lubricating the egg with kitchen oil or washing up liquid.

x 2 DAYS



## HOW DOES IT WORK?

Eggs are rich in protein. When heat is applied, chemical bonds within the protein molecules are broken, and new bonds are formed between adjacent molecules. This creates a network of inter-connected proteins which causes the egg to go hard.

Vinegar contains acetic acid ( $\text{CH}_3\text{COOH}$ ) that dissolves the calcium carbonate ( $\text{CaCO}_3$ ) shell but leaves behind the egg's springy membrane.