

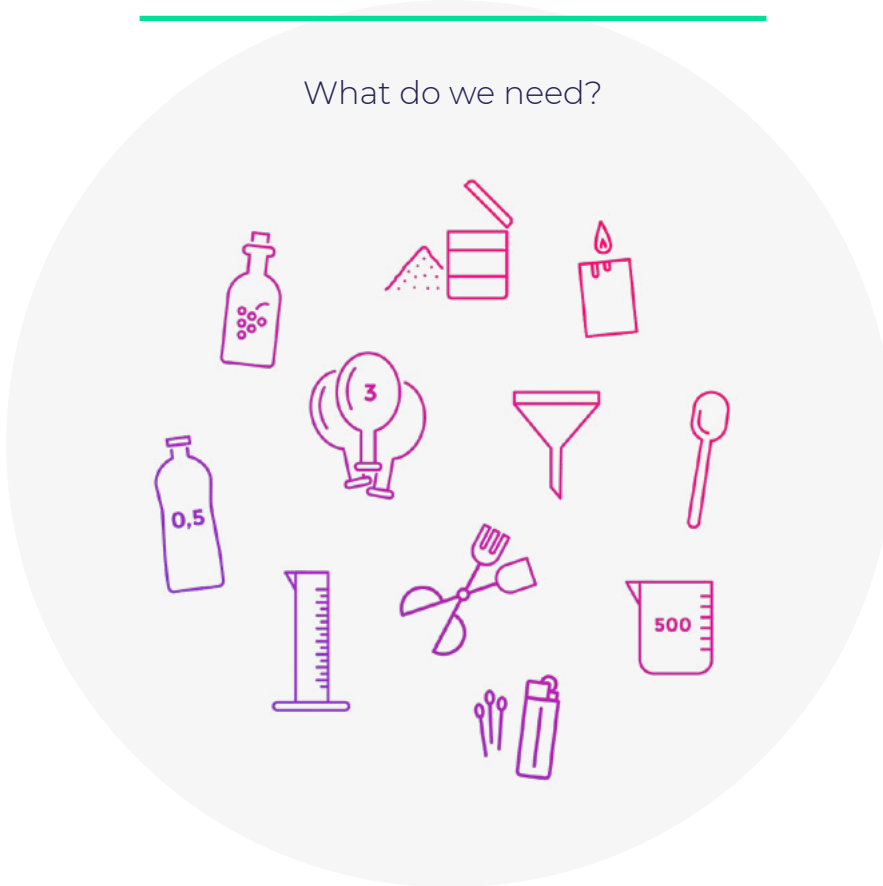


LAB 1

The mystery of the candles
that go out on their own

LET'S GET GOING!

What do we need?



MATERIALS

- Vinegar
- Bicarbonate of soda
- 6 candles



SAFETY MEASURES

- This experiment must be carried out under adult supervision.
- The candles must be lit by the teacher. The students must not touch them at all.
- It is very important to wear gloves throughout the process.

INSTRUMENTS

- 3 x 50 cl plastic water bottles
- 3 balloons
- 1 funnel
- 1 spoon
- 1 graduated 50 ml or 100 ml test tube
- 1 x 500 ml beaker
- Kitchen tongs
- Lighter or matches

PHASE 1

Mix the vinegar and bicarbonate of soda.



- 1 / Put the gloves on.
- 2 / Measure 50 millilitres of vinegar with the test tube and put it in one of the two bottles.
- 3 / Place a spoonful of bicarbonate of soda in the balloon. To make things easier, you can place the opening of the balloon around the neck of the funnel and use it to get the bicarbonate inside.
- 4 / Carefully remove the balloon from the funnel without the bicarbonate falling out.
- 5 / Place the opening of the balloon around the neck of the bottle, making sure it is centred and properly fixed, without the bicarbonate falling inside.
- 6 / Lift up the balloon and allow the bicarbonate to fall into the bottle.
- 7 / While the reaction is going on, the balloon will inflate. Hold it by its opening so the contents do not escape.
- 8 / Repeat the process using different measurements:
 - A Mix 75 millilitres of vinegar with one and a half spoons of bicarbonate.
 - B Mix 100 millilitres of vinegar with two spoons of bicarbonate.

PHASE 1

Why do the balloons inflate when the vinegar and bicarbonate are mixed? What is filling them?

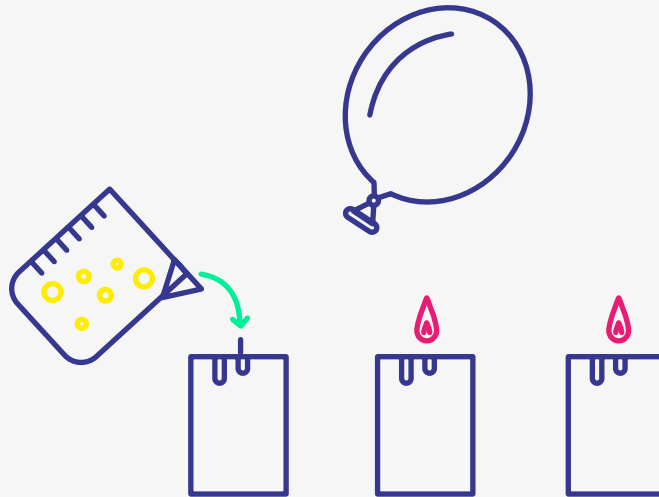
Why have some balloons inflated more than others?

What is the relationship between the quantity of vinegar and bicarbonate and the final result?

SPACE FOR ANSWER 

PHASE 2

Putting out the candles without touching them



- 1 / Place the 6 candles in a line and light them.
- 2 / Choose the most inflated balloon from the previous phase and remove it from the bottle without the gas escaping. To do this, before removing it, twist the neck a couple of times and it will be closed.
- 3 / Take the beaker and place the balloon opening just above it.
- 4 / Open the neck of the balloon carefully and let the gas out slowly until the balloon is half empty. It is very important that the gas comes out slowly. If it comes out suddenly, it will escape instead of falling into the beaker.
- 5 / Pour the invisible gas content of the beaker over the first candle until it goes out.
- 6 / When the first candle goes out, move on to the second one, and so on until you have put out all six.

PHASE 2

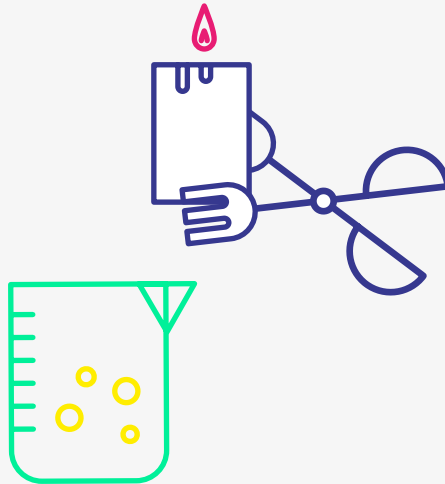
What does a candle need to stay alight?

Why does this gas put the candles out?

SPACE FOR ANSWER 

PHASE 3

The last question



- 1 / Pour the contents of one of the two other balloons you have filled with the first mixture very slowly into the beaker, as you did before.
- 2 / Light a candle and, using the kitchen tongs, place it, still lit, into the beaker.

PHASE 3

At what point did the candle go out?

Why does the gas that comes out of the balloon go to the bottom of the beaker?

SPACE FOR ANSWER 

SOLVE THE MYSTERY!

Science has helped us see something our
eyes hadn't noticed before!
Now it's time to solve the puzzle.

WHAT INVISIBLE PHENOMENON HAS PUT OUT THE CANDLES?

SPACE FOR ANSWER 

