STEM SUBJECTS: SCIENCE ☑ TECHNOLOGY ☐ ENGINEERING ☐ MATHS ☐

JAMES DYSON FOUNDATION

LIGHTS OUT

CHALLENGE 11

THE BRIEF

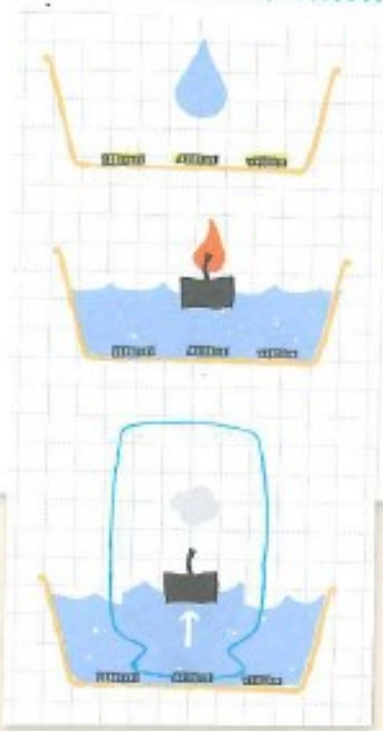
LEARN HOW FLAMES USE UP OXYGEN IN AN ENCLOSED SPACE AND CREATE A VACUUM.

MATERIALS

A large empty margarine tub, a clean jam jar, a tea light, a match, three coins.

THE METHOD

1. Place the three coins in the margarine tub to act as a stand for the jar.
2. Fill the tub with water.
3. Carefully, and with adult supervision, light the tea light.
4. Place it on the water, it should float.
5. Turn the jar upside down and place over the tea light, onto the three coins.
6. As the oxygen is used up, the flame will extinguish and the water level will rise.



HOW DOES IT WORK?

The flame heats the air in the jar and this hot air expands. Some of the expanding air escapes out from under the jar – you might see some bubbles. When the flame goes out, the air in the jar cools down and the cooler air contracts. This creates a vacuum and the water is then sucked into the jar.

Challenge designed by:
Luke, design engineer at Dyson

www.jamesdysonfoundation.com

STEM SUBJECTS: SCIENCE ☑ TECHNOLOGY ☐ ENGINEERING ☐ MATHS ☐

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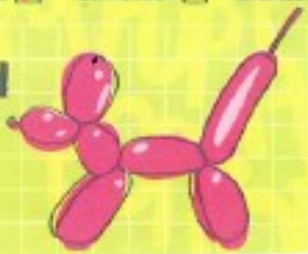
BALLOON KEBABS



CHALLENGE 12

THE BRIEF

PUSH A WOODEN SKEWER THROUGH A BALLOON WITHOUT POPPING IT, CREATING A "BALLOON KEBAB".

MATERIALS

A balloon inflated until ¾ full, a wooden skewer, cooking oil.

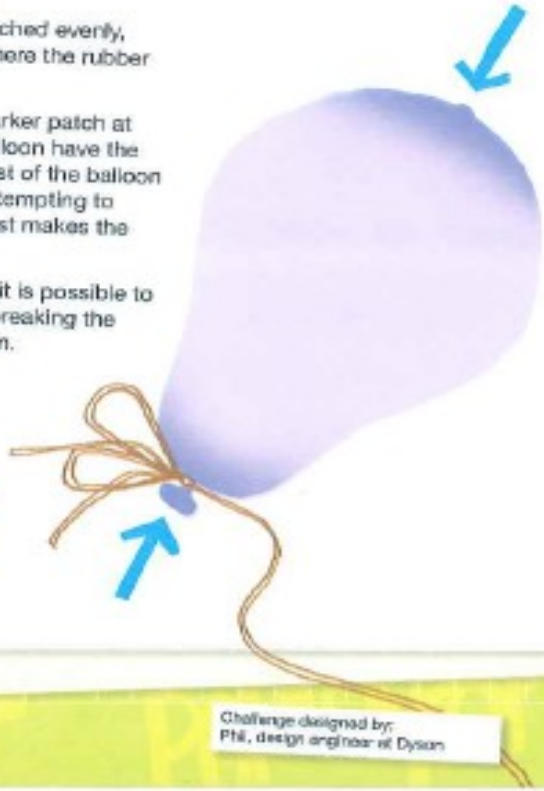
HOW DOES IT WORK?

Most of the balloon is stretched evenly, but there are two points where the rubber is least stretched.

The tied section and the darker patch at the opposite side of the balloon have the lowest surface tension. Most of the balloon is under high tension, so attempting to push the skewer through just makes the balloon pop.

At the low tension sections it is possible to make a small hole without breaking the overall surface of the balloon.

TOP TIP
Think about where the rubber is least stretched in the balloon. Use cooking oil to lubricate your skewer.



Challenge designed by:
Phil, design engineer at Dyson

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