

GROW A PLANT  
IN A JARCHALLENGE  
23

## THE BRIEF

GROW A PLANT IN A JAR TO SEE ITS ROOT SYSTEMS.

## MATERIALS

A glass jar, a dried butter bean, some cotton wool and water.



**TOP TIP**  
Check on your plant every day. Measure the plant and create a bean chart to track progress.

## THE METHOD

- 1 Fill the jar  $\frac{3}{4}$  full with cotton wool.
- 2 Place the bean on one side of the jar so you can easily see it.
- 3 Pour water into the jar until the cotton wool is damp but not wet.
- 4 Place the jar on the windowsill, or somewhere it has access to sunlight.
- 5 Once your plant has sprouted leaves and is beginning to outgrow the jar, remove it and examine the roots.



## HOW DOES IT WORK?

The roots of plants provide two main functions: they anchor the plant, and they absorb water and minerals from the soil. In this case, there's no soil – so the plant draws all the minerals it can get from the water.

The stem of the plant conducts water and minerals from the soil to the rest of the plant.



Challenge designed by:  
Karen, microbiologist at Dyson

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BOAT POWERED BY A  
CHEMICAL REACTION CHALLENGE  
24

## THE BRIEF

BUILD A BOAT POWERED BY A CHEMICAL REACTION.

## MATERIALS

Small plastic bottle, sticky tape, two ice lolly sticks, two corks, scissors (with adult supervision), drinking straw, vinegar, baking soda. Somewhere to sail it – such as a bath tub or sink.



## THE METHOD

Tape the corks and ice lolly sticks together to form a rectangle.

Tape the bottle to the middle of the rectangle so it hangs down between the corks.

Make a hole in the end of the bottle so it will sit below the water.

Push the drinking straw through the hole so the end inside the bottle touches the inside wall.

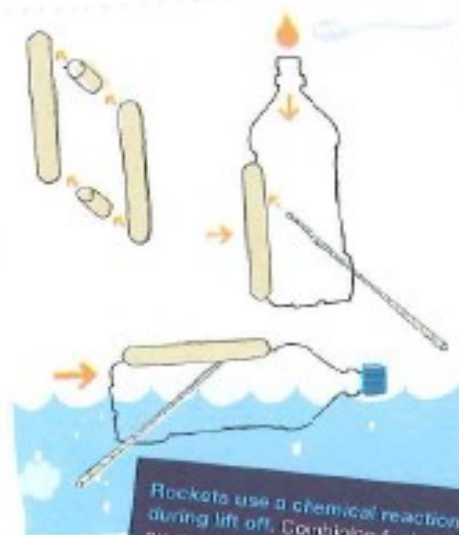
Pour in vinegar and add bicarbonate of soda. Screw the bottle top back on tightly.

With a thumb covering the end of the drinking straw, shake the bottle.

Once the reaction starts, drop the boat in the water and watch it propel forward.

## HOW DOES IT WORK?

When the vinegar and baking soda come into contact, a chemical reaction occurs and carbon dioxide is released. This causes pressure to build and the boat to be propelled across the water.



Rockets use a chemical reaction during lift off. Combining fuel and oxygen causes combustion and exhaust gases are released. These gases exit the engine nozzle at high speed and push the rocket skyward.

DESIGN  
ICONS

Challenge designed by:  
Rob, engineering reliability manager at Dyson