

MAKE A  
PERISCOPECHALLENGE  
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## THE BRIEF

DESIGN AND BUILD YOUR OWN PERISCOPE  
TO SEE AROUND CORNERS.

## MATERIALS

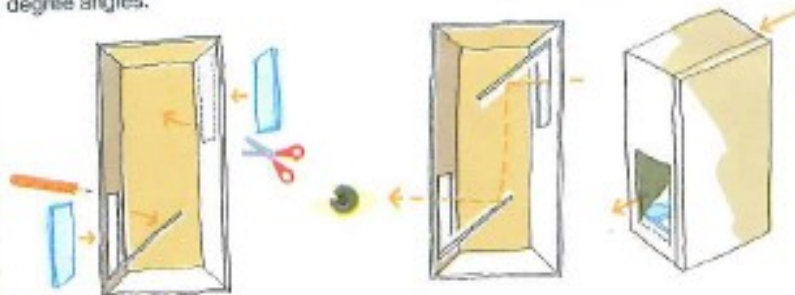
Shoebox, two small mirrors,  
a pencil, scissors (with  
adult supervision), tape  
and PVA glue.

## THE METHOD

Remove the box lid.

Place one mirror on the side and  
near the bottom of the shoebox and  
trace around it. Place the second  
mirror at the opposite end of the  
shoe box and trace around that too.Cut out the traced sections to make  
a door flap. Slant the doors at 45  
degree angles.Tape the mirrors onto the slanted  
doors.Adjust the mirrors. Keep moving them  
into place until you can see out of the  
top hole when you look in through the  
bottom hole.Seal the mirrors into place  
using PVA glue.

Glue the shoebox lid back on.



## HOW DOES IT WORK?

Light reflects away from a mirror at the same  
angle that it hits the mirror. In your periscope,  
light hits the top mirror at a 45 degree angle  
and reflects away at the same angle, which  
bounces it down to the bottom mirror. The  
reflected light hits the second mirror at a 45  
degree angle and reflects away at the same  
angle, into your eye.Challenge designed by:  
Guy, design engineer at DysonCOLOURED  
CARNATIONSCHALLENGE  
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## THE BRIEF

CREATE MULTI-COLOURED FLOWERS.

## MATERIALS

White carnations, two  
colours of food dye,  
plastic cups, water and  
scissors (with adult  
supervision).

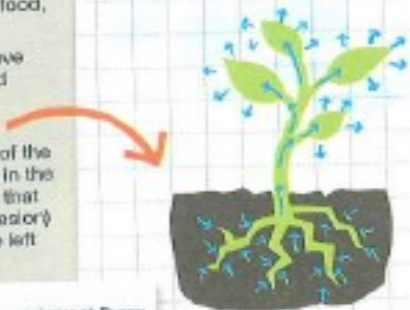
## THE METHOD

Use the scissors to cut the stem of the  
carnation in half lengthways.Take two cups and fill them with water.  
Add a different coloured food dye to  
each cup.Put the split stems of the carnation into  
the cups and leave overnight.The next morning you should find that  
your flower has changed colour.

What do you notice about the petals?



## HOW DOES IT WORK?

Plants need a transport system to move food,  
water and minerals around.There are two things that combine to move  
water through plants - **transpiration** and  
**cohesion**.Water evaporating from the leaves  
(transpiration) draws water up the stem of the  
plant to replace what is lost. This works in the  
same way as sucking on a straw. Water that  
evaporates from the leaves "pulls" (cohesion)  
other water behind it up to fill the space left  
by the evaporating water.Challenge designed by:  
Aden, science teacher and former design engineer at Dyson