



## Möbius paper chains

Cut out some long strips of paper as if you were making paper chain decorations. Make a loop and fix the ends together with sticky tape. Take another strip and make a separate loop linked to the first, but this time twist the paper once before sticking the ends together. Add some more loops.

This is your Möbius paper chain (the mathematician August Ferdinand Möbius discovered this never-ending, one-sided shape in 1858). Draw a line along the middle of each loop all the way round. Using the scissors, cut along the line on each loop until you reach the starting point. What happens to each paper chain?

What happens if you cut the chain down the middle again? Make another chain but draw a line a third of the way in from the edge. What happens when you cut along the line this time?

You should have plenty of chains by the end of this activity to make party decorations!

### You will need

- Coloured paper
- Scissors
- Sticky tape
- Pen

### Did you know?

You have actually been doing geometry, called topology, when you were making these unusual paper chains.

The artist MC Escher used the Möbius strip shape in some of his artwork with a group of ants walking along its never-ending surface!

### Take care

Be careful when using the iron. Never leave it switched on unattended. Leave it in a safe place to cool.

## Paper-making party

Try making your own recycled paper.

- 1 Tear eight pages of newspaper into small pieces in the washing-up bowl. Soak the paper, crunching it with your fingers, in some water. In the smaller bowl, mix 1 tbsp powdered/liquid starch with 2 cups water. Add the starch/water mixture to the bowl. Mix thoroughly.
- 2 Add about 1 litre water and stir with the spoon or use your hands to make a pulp. If you want to, you can add petals, coloured paper and so on to decorate your paper.
- 3 Spread out some of the pulp onto a clean sheet of blotting paper, having first squeezed some of the water out of it into the bowl. Roll it out using the rolling pin. Then place the second piece of blotting paper on top and roll again. Change the top layer of blotting paper.
- 4 Put the iron on a low setting. With the sheet still between the blotting papers, carefully dry the paper with the iron. Trim the edges using scissors.

## Absorbency

Test the absorbency of different types of material to see which holds the most water.

In your Patrol, measure 20ml water into labelled plastic cups and insert a piece of material 5cm x 5cm into each cup. What happens to each material? Which item was the most absorbent?

Try comparing the price, absorbency and design of different materials and brands.

### You will need

- Small measuring jug
- Samples of kitchen roll, toilet rolls, paper towels, cotton wool, nappies and so on, including different brands
- Ruler
- Pen
- Scissors
- Plastic cups
- Water

### Did you know?

Nappies have a white powder inside called sodium polyacrylate, which turns into a gel on contact with liquids.

### Take it further

Find out how to clean up an oil slick and other activities through the SciZmic Go For It! support site at [www.scizmic.net](http://www.scizmic.net).

### You will need

- Old newspapers
- Washing-up bowl
- Water
- Old small bowl
- Old spoon
- Starch (powder or liquid, available from most supermarkets)
- Cup
- Measuring jug
- Blotting paper or kitchen roll
- Old rolling pin
- Iron
- Scissors
- Optional – petals, food colouring, leaves, pieces of coloured paper