

# 71. 'Smarties' chromatography

## Topic

Separation.

## Timing

30 min.

## Description

Students separate the dyes in Smarties food colouring using chromatography paper with water solvent.

## Apparatus and equipment (per group)

- ▼ 'Smarties'
- ▼ Paint brush
- ▼ 250 cm<sup>3</sup> Beaker
- ▼ Two paper clips
- ▼ Chromatography paper (approximately 200 mm x 100 mm).

## Teaching tips

Take care to avoid smudging; small intense spots are best. The paper must be labelled in pencil.

Small bottles of liquid food colouring can be purchased from supermarkets. These are water soluble and can be used as an alternative to Smarties.

Slotted chromatography paper (Whatman) is the best for this experiment.

## Background theory

Students should have a basic understanding of chromatography theory. This experiment can be a useful introduction to this separation method.

## Safety

No eating in the laboratory.

## Answers

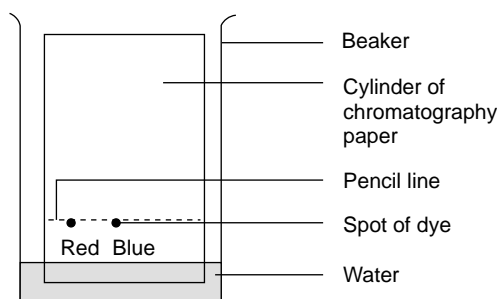
1. Some dyes are mixtures and separate on the paper, other dyes are single substances.
2. Some dyes are more soluble in water; some dyes adhere to the paper more strongly.
3. It is possible to identify all the dyes using a list of E numbers. Smarties dyes are regularly changed. A table of E numbers for dyes could be used, also access to the Smarties tube or packet.

## RS•C

# 'Smarties' chromatography

## Introduction

In this experiment dye is removed from the surface of various Smarties. A spot of each colour is put on a piece of chromatography paper and water is allowed to soak up the paper. The results show which mixtures are used to produce particular colours for the Smarties.



## What to record

Record the dyes used to make each colour.

## What to do

1. Draw a pencil line 1 cm from the bottom of the chromatography paper.
2. Use a clean paintbrush and clean water to remove the colour from a Smartie. Paint the colour in a small spot on to the line on the chromatography paper.
3. Clean the brush and paint the colour of another Smartie on a small spot about 2 cm from the previous spot. Repeat this until all the colours are on the paper.
4. Using the pencil write the name of each colour by the corresponding spot.
5. Roll the paper into a cylinder, hold in place with paper clips. Put the cylinder in a beaker containing 1 cm of water. Allow the water to rise up the paper.
6. When it reaches the top take the cylinder out of the water, carefully unroll it and examine it.

## Safety

Do not eat in the laboratory.

## Questions

1. Why do some dyes separate into different colours yet others do not?
2. Why do some dyes move further up the chromatography paper than others?
3. Look on the side of the Smarties packet for the list of coloured dyes used. Try and identify which dyes correspond to the spots on the chromatogram.