

0 1

Chromatography can be used to separate components of a mixture.

A student used paper chromatography to analyse a black food colouring.

The student placed spots of known food colours, A, B, C, D and the black food colouring on a sheet of chromatography paper.

The student set up the apparatus as shown in Diagram 1.

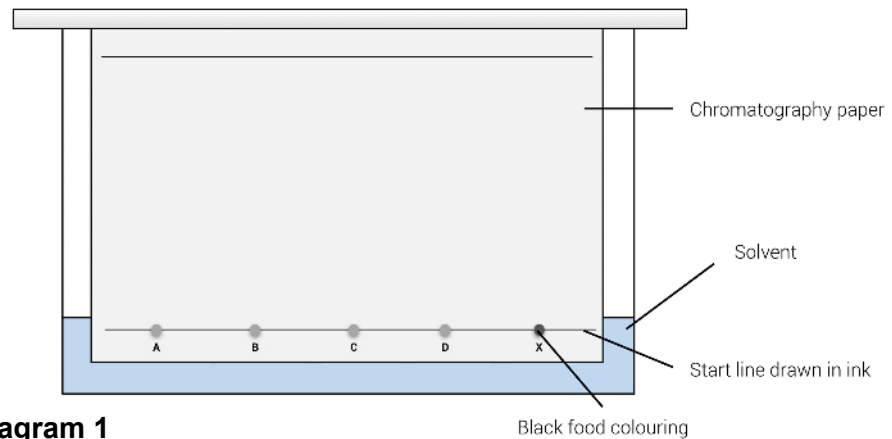


Diagram 1

The student made two errors in setting up the apparatus. Identify the two errors and describe the problem each error would cause.

[4 marks]

start line drawn in ink [1]

so it will run / dissolve in the solvent / split up [1]

allow mixes with the spots

spots under solvent or solvent above spots / start line [1]

so they will mix with solvent or wash off paper or colour the solvent or dissolve in the solvent [1]

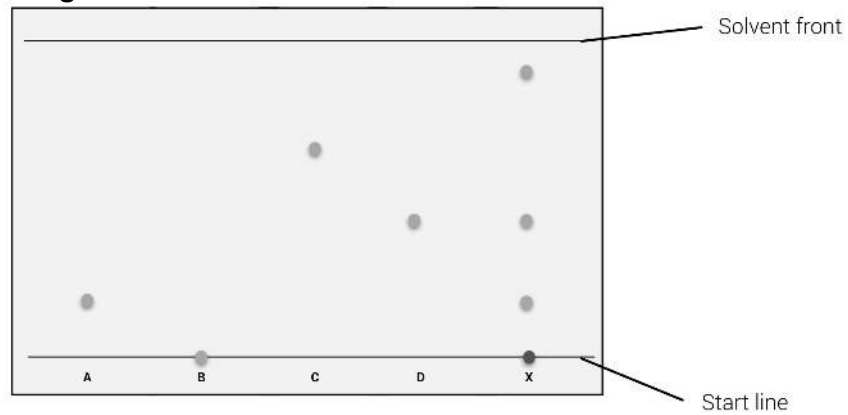
Questions continue on the next page

0 1 . 1

A different student set up the apparatus without making any errors.

The chromatogram in Diagram 2 shows the student's results.

Diagram 2



0 1 . 2

What do the results in **Diagram 2** tell you about the composition of the black food colouring? **[2 marks]**

contains A and D [1]

and one other (unknown substance) [1]

(if no other marks awarded, an answer saying it is made up of three colours gains 1 mark)

0 1 . 3

Use **Diagram 2** above to complete **Table 1** below. **[2 marks]**

Table 1

	Distance in mm	
Distance from start line to solvent front	37 or 38	[1]
Distance moved by food colour D	16 (allow 17 - 18)	[1]

0 1 . 4

Use your answers in part 1.3 to calculate the R_f value for food colour D.

REMEMBER :

$R_f = \frac{\text{distance moved by substance}}{\text{distance moved by solvent}}$

R_f value = 0.40 [1 mark]
allow ecf from (b)

ignore units (Total 9 marks)

End