

Chromatography

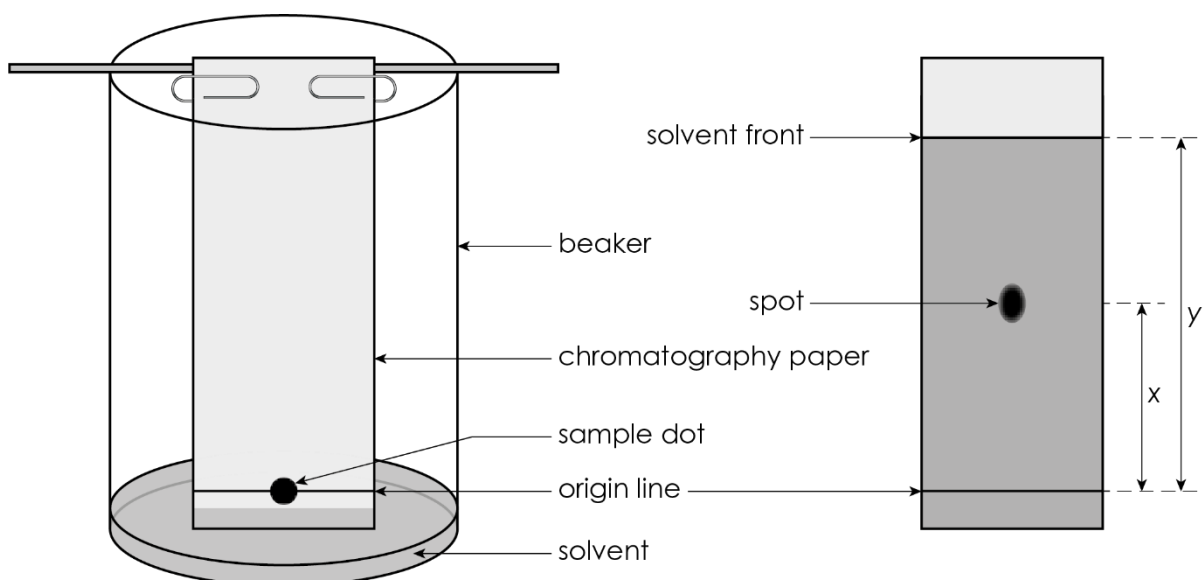
1 Which statement is correct?

Circle the correct answer.

(1 mark)

- A. Paper chromatography separates mixtures of soluble substances.
- B. Paper chromatography separates mixtures of insoluble substances.
- C. Paper chromatography separates mixtures of solvents.
- D. Paper chromatography separates mixtures with different boiling points.

2 The image shows the setup and results from an experiment used to investigate whether a substance is pure.



(a) What is the meaning of a 'pure substance' in chemistry?

(1 mark)

(b) i. Identify the stationary phase in the diagram.

(1 mark)

ii. Identify the mobile phase in the diagram.

_____ (1 mark)

(c) Is the sample likely to be a pure or an impure substance? Give a reason for your answer.

(2 marks)

(d) What is represented by each of the following on the image:

i. distance x

_____ (1 mark)

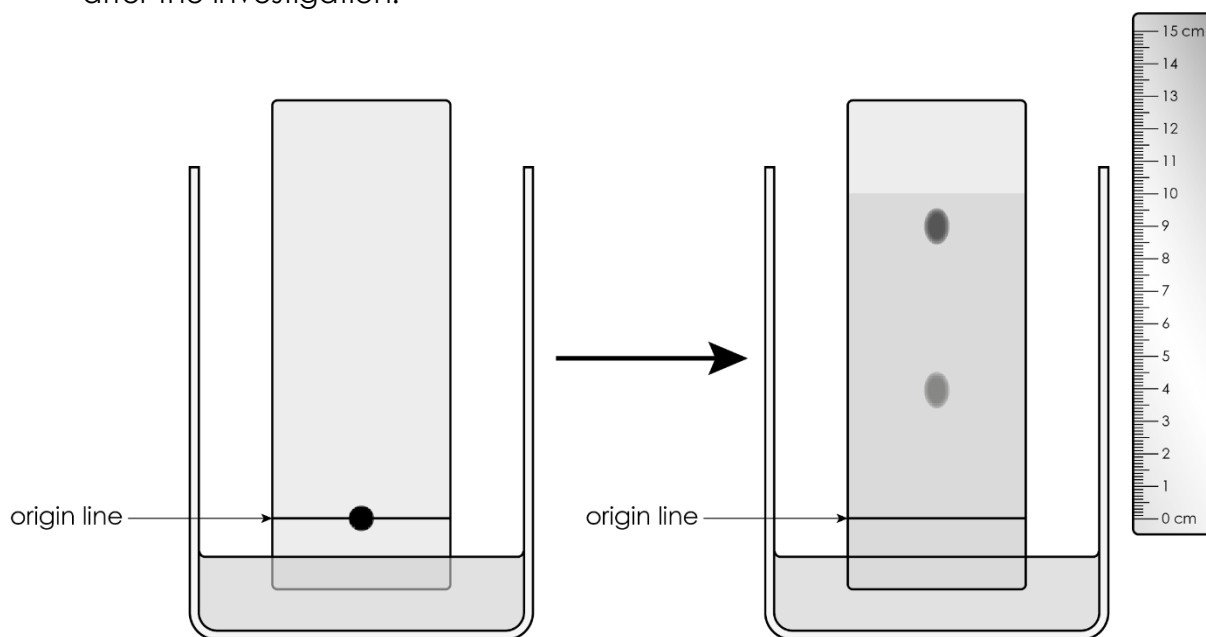
ii. distance y ?

_____ (1 mark)

(e) Write an expression for the R_f value in terms of distance x and distance y .

_____ (1 mark)

- 3 Students are using chromatography to investigate the coloured substances present in sweets. The image shows the chromatography paper before and after the investigation.



- (a) Is this sample being investigated a pure substance? Give a reason for your answer.

(2 marks)

- (b) Calculate the R_f values for each spot giving your answer as a fraction and a decimal:

i. higher spot

(2 marks)

ii. lower spot

(2 marks)

- (c) i. Which of the spots produced has the greater attraction for the chromatography paper?

_____ (1 mark)

- ii. Which of the spots produced has the greater solubility in the solvent?

_____ (1 mark)

- (d) Explain what determines how far a substance travels up the chromatography paper.

_____ (2 marks)

- 4 The table shows the distance moved by the solvent and the R_f values calculated from a paper chromatogram for three substances – **X**, **Y** and **Z**.

- (a) Complete the table to show the distance moved by each substance.

Substance	R_f value	Distance moved by solvent/cm	Distance moved by substance/cm
X	0.5	10	
Y	0.0	10	
Z	0.7	10	

(3 marks)

- (b) Suggest why substance **Y** has a R_f value of 0.0.

_____ (1 mark)

- (c) Explain how the R_f values in the table could be used to identify substances **X**, **Y** and **Z**.

(1 mark)

- (d) Explain why the three substances move different distances up the paper.

(2 marks)

[Total: 26 marks]



Which question(s) did you get wrong? Why?

What will you do next time you're asked a similar question?