

Purity, formulations and Chromatography – GCSE Chemistry

1. No.4

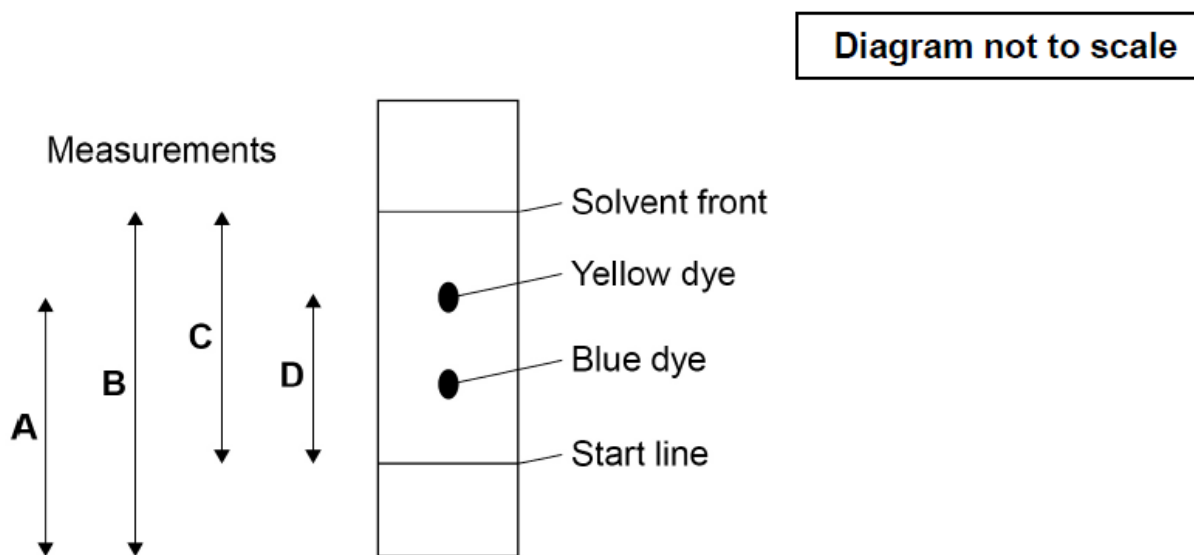
This question is about ink.

A student investigated green ink using paper chromatography in a beaker.

Figure 6 shows:

- the results the student obtained
- measurements **A**, **B**, **C** and **D** the student could make.

Figure 6



The student calculated the R_f value of the blue dye.

The student measured:

- the distance moved by the blue dye = 2.7 cm
- the distance moved by the solvent = 9.0 cm

Calculate the R_f value of the blue dye.

Use the equation:

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

[2 marks]

$R_f =$ _____

Which measurements on **Figure 6** are needed to calculate the R_f value of the yellow dye?

[1 mark]

Tick (✓) **one** box.

A and B

☐

A and C

☐

B and D

☐

C and D

☐

Paper chromatography has a stationary phase and a mobile phase.

Draw **one** line from each phase to the identity of that phase in the student's investigation.

[2 marks]

Phase	Identity
	Beaker
Mobile phase	Ink
	Paper
Stationary phase	Solvent
	Start line

The green ink contains 85% yellow dye and 15% blue dye.

Determine the simplest whole number ratio of yellow dye : blue dye in the green ink.

[1 mark]

Yellow dye : Blue dye = _____ : _____

Which word correctly describes the green ink?

[1 mark]

Tick (✓) **one** box.

Compound

☐

Element

☐

Formulation

☐

Solvent

☐

The student repeated the investigation using green ink containing 75% yellow dye and 25% blue dye.

What would happen to the R_f value of the yellow dye?

[1 mark]

Tick (✓) **one** box.

The R_f value would decrease.

☐

The R_f value would increase.

☐

The R_f value would stay the same.

☐

2. No.4

This question is about ink.

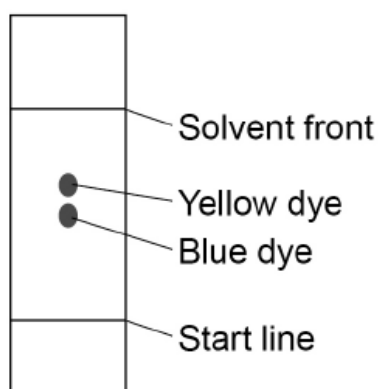
A student investigated green ink using paper chromatography in a beaker.

The student used water as the solvent.

Figure 2 shows the chromatogram obtained.

Figure 2

Diagram not to scale



The R_f value of the yellow dye = 0.60

The distance moved by the yellow dye = 5.7 cm

Calculate the distance moved by the solvent.

[3 marks]

Distance moved by the solvent = _____ cm

The green ink contains more than two compounds.

Suggest **one** reason why only two spots are seen on **Figure 2**.

[1 mark]

On the student's chromatogram, the yellow and blue spots are very close together.

Which **two** ways could increase the distance between the spots?

[2 marks]

Tick (✓) **two** boxes.

Allow the solvent front to travel further.

☐

Dry the chromatogram more slowly.

☐

Use a different solvent.

☐

Use a larger beaker.

☐

Use a larger spot of green ink.

☐

The manufacturers of the green ink always use the same proportions of yellow dye and blue dye.

Suggest **one** reason why.

[1 mark]

The R_f value of a dye depends on:

- the solubility of the dye in the solvent
- the attraction of the dye to the paper.

Which will **definitely** produce a smaller R_f value if the solvent and paper are both changed?

[1 mark]

Tick (✓) **one** box.

The dye is less soluble in the new solvent and less attracted to the new paper.

☐

The dye is less soluble in the new solvent and more attracted to the new paper.

☐

The dye is more soluble in the new solvent and less attracted to the new paper.

☐

The dye is more soluble in the new solvent and more attracted to the new paper.

☐

3. No.1.5

How could pure water be produced from drinking water that contained dissolved solids?

[1 mark]

Tick (✓) **one** box.

Chromatography

☐

Cracking

☐

Distillation

☐

Sedimentation

☐

4. No.2.2

Complete the sentence.

[1 mark]

Methane produces carbon monoxide when burning in a limited supply of

_____.