Chromatography: teacher guidance

These **In context** worksheets ask learners to use their knowledge of chromatography in an applied context, building their confidence and capability to face exam questions. Calculation questions are included to give opportunities to practise mathematical skills within this topic. The worksheets are available at Foundation and Higher level and as fully editable versions, giving you the flexibility to select the questions most relevant to a particular lesson.

Also available to assess this topic:

- **Review my learning worksheets**: available with three levels of scaffolded support to help build confidence in every learner. Use before, during or after teaching the relevant topic to understand progress and identify misconceptions, **rsc.li/44igB7V**.
- **Knowledge check worksheets: select from Foundation and Higher level** to assess learners' knowledge and understanding of this topic at the end of a period of teaching or as revision, **rsc.li/4cfg89o**.

Answers

Foundation tier

1 (a) i. the solid

ii. the solvent

(b) **B.** To prevent the stationary phase (silicon dioxide) from leaving the column

(c) solvent; a; b; c; separated

(d) Component **c** is most attracted to the solvent.

(e) Component **a** is most attracted to the solid in the column.

(f) The pure substances are components **a**, **b** and **c**.

(g) $R_f = \frac{15}{21} = 0.71$

2 (a) **B.** The mixture and a solvent were added to a column containing a solid substance and allowed to filter down.

(b) 1. Instrumental methods are more accurate.

2. Instrumental methods are quicker.

(c)

	Paper chromatography	Liquid chromatography
uses a stationary and a mobile phase	✓	✓
separates a mixture into pure substances	✓	✓
pure substances can be collected	x	✓

Higher tier

1 (a) the solid

(b) the solvent

(c) **D.** Different components have different attractions to the mobile and stationary phases.

2 (a) i. The mixture of components has not been separated at **Time 1**.

ii. Component **a** has been separated from components **b** and **c** at **Time 2**.

iii. All three components have been separated at **Time 3**.

(b) Each pure sample can be collected using the tap in the column and allowing the sample to run into a container.

(c) Two differences are (for example):

- Paper chromatography uses paper as the stationary phase, whereas liquid chromatography uses a solid substance in a column.
- The solvent and substances rise up the paper in paper chromatography, whereas the solvent and substances filter down the solid in the column in liquid chromatography.
[Learners may have other valid differences.]

(d)

Component	Distance moved by component/cm	Distance moved by solvent/cm	R_f value
a	3	21	**0.14**
b	10	21	**0.48**
c	15	21	**0.71**

3 (a) Answers should include:

- Chromatography columns are packed with a solid.
- A sample of the mixture of peptides and a solvent are added to the column.
- The mixture and the solvent filter down the column.
- Different peptides filter down at different rates depending on their attraction for the solvent (mobile phase) and for the solid (stationary phase), and are separated in the column.
- The tap at the bottom of the column is used to run off the pure peptides.

(b) 1. Instrumental methods are more accurate.

2. Instrumental methods are quicker.