

Chromatography: teacher guidance

These **Knowledge check** worksheets provide a series of questions to assess learners' knowledge and understanding of this topic at the end of a period of teaching or as revision. They are available at Foundation and Higher level and as fully editable versions so you can adapt them to suit learners' needs. Use for individual student work in class or at home. Find the full set of answers below.

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.
- **In context worksheets** ask learners to apply their knowledge to interesting contexts from everyday life, helping them develop their skills and prepare for examination, including calculation questions to practise mathematical skills within a genuine chemical context, rsc.li/4aWUSUJ.

Answers

Foundation tier

- 1 (a) **B.** A substance that contains one type of element or compound only. [1 mark]
(b) **A.** chromatography [1 mark]
(c) **A.** Chromatography separates mixtures of soluble substances. [1 mark]
- 2 (a) the chromatography paper [1 mark]
(b) the solvent [1 mark]
(c) The sample dot is initially above the solvent line so that the sample does not dissolve into the solvent in the bottom of the beaker. [1 mark]
(d) i. Yes, the sample is a pure substance. [1 mark]
ii. The sample only produces one spot. [1 mark]
(e) **B.** the distance travelled by the spot [1 mark]
(f) **A.** the distance travelled by the solvent [1 mark]

- 3 (a) i. There are two different substances. [1 mark]
 ii. The sample produces two spots. [1 mark]
- (b) i. distance travelled by solvent = 10 cm [1 mark]
 ii. distance travelled by higher spot = 9 cm [1 mark]
 iii. R_f value = $\frac{9}{10}$ [1] = 0.9 [1] [2 marks]
- (c) R_f value = $\frac{4}{10}$ [1] = 0.4 [1] [2 marks]
- (d) identify; solvent; R_f values [3 marks – 1 per word]

[Total: 21 marks]

Higher tier

- 1 **A.** Chromatography separate mixtures of soluble substances. [1 mark]
- 2 (a) A pure substance in chemistry is a substance that contains one type of element or compound only. [1 mark]
- (b) i. the chromatography paper [1 mark]
 ii. the solvent [1 mark]
- (c) The substance is likely to be a pure substance [1] because it has only produced one spot on the chromatography paper. [1] [2 marks]
- (d) i. Distance **x** is the distance travelled by the spot. [1 mark]
 ii. Distance **y** is the distance travelled by the solvent. [1 mark]
- (e) $R_f = \frac{\text{distance } x}{\text{distance } y}$ [1 mark]
- 3 (a) The substance is not a pure substance [1] because it has produced more than one spot on the chromatography paper [1]. [2 marks]
- (b) i. $R_f = \frac{9}{10}$ [1] = 0.9 [1] [2 marks]
 ii. $R_f = \frac{4}{10}$ [1] = 0.4 [1] [2 marks]
- (c) i. the lower spot [1 mark]
 ii. the higher spot [1 mark]

(d) The distance travelled up the chromatography paper depends on the attraction of the substance to the paper and the attraction to the solvent. [1]
The proportion of these attractions determines the distance travelled. [1] [2 marks]

4 (a)

Substance	R_f value	Distance moved by solvent/cm	Distance moved by substance/cm
X	0.5	10	5
Y	0.0	10	0
Z	0.7	10	7

[3 marks – 1 mark per correct answer]

(b) Substance Y is not soluble in the solvent. [1 mark]

(c) The R_f values can be compared with R_f values of known substances in the same solvent. [1 mark]

(d) The different dissolved substances in a mixture have different levels of attraction to the chromatography paper and solubility [1], this causes them to move up the paper at different rates. [1] [2 marks]

[Total: 26 marks]