CHEMISTRY YEAR 12 - MODULE 8 - LESSON 5

Chromatography — TLC, Column & HPLC

Use this worksheet after reading the lesson to practise the key ideas and prove you can meet the success criteria.

Name _____

Date _____

Class _____

1. Key Ideas

Before a paracetamol tablet reaches a pharmacy shelf, chemists must confirm that it contains the right compound, in the right purity, with no unexpected contaminants. Chromatography does this by separating mixtures into their components and turning hidden complexity into visible evidence.

- The principle of chromatography: differential affinity for stationary and mobile phases
- Why polarity and intermolecular attraction affect movement through a chromatographic system

2. Success Criteria

By the end, you should be able to:

- The principle of chromatography: differential affinity for stationary and mobile phases
- How TLC, column chromatography and HPLC differ in scale, speed and sensitivity
- How to calculate and interpret Rf values and retention times

3. Key Terms

retention time
the time taken for a component to pass through the system and reach the detector

Why HPLC
important in pharmaceutical, food and environmental analysis

while the mobile phase
a solvent rising up the plate by capillary action

component that
more strongly attracted to the stationary phase moves more slowly

This
separation is not random

Concentration
amount per unit volume; the same amount of solute can produce different concentrations in different volumes

4. Activity: Build the Lesson Map

Use the lesson to complete the table. Keep answers brief but specific.

Prompt	Your answer
Main concept	
Important example	
Common mistake to avoid	
How this links to the next lesson	

5. Short Answer Questions

1. Explain this lesson goal in your own words: "The principle of chromatography: differential affinity for stationary and mobile phases". Use one specific example from the lesson.

BAND 3 2 MARKS

2. Apply this idea to a new example: "How TLC, column chromatography and HPLC differ in scale, speed and sensitivity". Show your reasoning clearly.

BAND 4 3 MARKS

3. Analyse why this idea matters for understanding Chromatography — TLC, Column & HPLC: "How to calculate and interpret Rf values and retention times".

BAND 5 4 MARKS

6. Extend: Apply the Idea

BAND 5/6 5 MARKS

A student gives a memorised answer about Chromatography — TLC, Column & HPLC but does not use evidence or reasoning.

Improve the answer by writing a stronger response that uses accurate terminology, a relevant example and a clear explanation.

7. Multiple Choice

1. What is the best first step when answering a question about Chromatography — TLC, Column & HPLC?

☐ A. Identify the key concept being tested

☐ B. Write every fact from memory

☐ C. Ignore the command word

☐ D. Skip examples and evidence

2. Which answer would show stronger understanding of Chromatography — TLC, Column & HPLC?

☐ A. An answer with accurate terms and reasoning

☐ B. A copied definition only

☐ C. A single-word response

☐ D. An answer with no example

3. What should you do if a question asks you to explain?

☐ A. Link the idea to a reason or cause

☐ B. List unrelated facts

☐ C. Only draw a diagram

☐ D. Write the shortest possible answer

8. Success Criteria Proof

Finish with evidence that you can do each success criterion.

SUCCESS CRITERION 1

Prove that you can: The principle of chromatography: differential affinity for stationary and mobile phases

BAND 3 2 MARKS

SUCCESS CRITERION 2

Prove that you can: How TLC, column chromatography and HPLC differ in scale, speed and sensitivity

BAND 4 3 MARKS

SUCCESS CRITERION 3

Prove that you can: How to calculate and interpret Rf values and retention times

BAND 5 4 MARKS

One thing I still need help with: