BIOLOGY YEAR 11 - MODULE 2 - LESSON 16

Plant Transport Systems — Xylem and Phloem

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

A 100-metre eucalyptus needs to move water from roots to leaves against gravity — with no heart, no muscles, and no energy input at all. Understanding how it manages this is one of biology's most elegant problems.

- Compare xylem and phloem — structure, contents, and direction of flow
- Compare vascular systems in plants — xylem and phloem

2. Success Criteria

By the end, you should be able to:

- Compare xylem and phloem — structure, contents, and direction of flow
- Trace the pathway of water from soil to leaf (osmosis → xylem → stomata)
- Explain the pressure-flow hypothesis for phloem transport

3. Key Terms

how it manages this
one of biology's most elegant problems

leaves against gravity
tested as a 3–5 mark mechanism question in most HSC papers

death
essential; living contents would block water flow

thin walls
adequate; lignification would prevent the flexibility needed for loading/unloading

Each step
passive diffusion or osmosis; no ATP is required

but carries whatever
dissolved in wall water including potentially harmful ions

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. 6. Explain how water moves from soil to xylem vessels in the root. In your answer, refer to osmosis, the Casparian strip, and why this pathway allows selective mineral uptake.

BAND 3 4 MARKS

2. 7. Explain cohesion-tension theory. In your answer, identify the driving force at the leaf, explain how this force is transmitted through the plant, and state what drives water uptake from the soil at the root.

BAND 4 4 MARKS

3. 8. Explain why phloem transport can occur in both directions simultaneously, while xylem transport is always unidirectional.

BAND 5 3 MARKS

6. Extend: Apply the Idea

BAND 5/6 5 MARKS

A student gives a memorised answer about Plant Transport Systems — Xylem and Phloem 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 Plant Transport Systems — Xylem and Phloem?

☐ 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 Plant Transport Systems — Xylem and Phloem?

☐ 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: Compare xylem and phloem — structure, contents, and direction of flow

BAND 3 2 MARKS

SUCCESS CRITERION 2

Prove that you can: Trace the pathway of water from soil to leaf (osmosis → xylem → stomata)

BAND 4 3 MARKS

SUCCESS CRITERION 3

Prove that you can: Explain the pressure-flow hypothesis for phloem transport

BAND 5 4 MARKS

One thing I still need help with: