Transpiration Translocation

GCSE Biology · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

Describe the transpiration stream. (3 marks)

Step 1 · Roots

Water enters root hair cells by osmosis.

Step 2 · Xylem

It moves up through the xylem in the stem to the leaves.

Step 3 · Leaves

Water evaporates from cells inside the leaf and water vapour diffuses out through the stomata; this pulls more water up behind it.

Answer: Root hairs → xylem → leaves → evaporation and diffusion out of stomata

Check: Transpiration is the loss of water vapour from the leaves.

2. Now try one with the steps

In a potometer, the air bubble moves 36 mm in 4 minutes. Calculate the rate of water uptake in mm/min. (1 mark)

Step 1 · Rate = distance ÷ time

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Define transpiration. [1]

2. Define translocation. [1]

3. Give four factors that affect the rate of transpiration. [4]

4. Name the piece of apparatus used to estimate the rate of transpiration. [1]

5. Give two uses of the water taken up by a plant. [2]

6. A bubble moves 24 mm in 6 minutes. Calculate the rate in mm/min. [1]

7. Explain why transpiration is slower on a humid day. [2]

8. Explain why the rate of transpiration increases with light intensity. [2]

9. Explain why a potometer does not measure transpiration exactly. [2]

10. Describe two differences between xylem and phloem transport. [2]

11. A potometer capillary has a radius of 0.4 mm. The bubble moves 25 mm in 2 minutes. Calculate the volume taken up per minute, in mm^3/min, to 1 decimal place. [3]

12. The rate of water uptake rose from 2.5 to 4.0 mm/min when a fan was switched on. Calculate the percentage increase. [2]

13. Explain why the shoot is cut and put into the potometer under water. [2]

14. Explain why sugars are translocated to the roots in summer and from storage organs to new shoots in spring. [3]

4. Before you hand it in

"Transpiration happens in the xylem."
Transpiration is evaporation and diffusion of water vapour from the leaves; the xylem carries the water up to replace it.

"Phloem carries glucose upwards only."
Phloem carries dissolved sugars (sucrose) from sources to wherever they are needed: up and down.

"Humidity increases transpiration because there is more water."
Humid air REDUCES the gradient, so transpiration slows.

Using diameter instead of radius in πr^2
Halve the diameter before squaring.