InkBiology

QUESTION WORKBOOK

Phloem and translocation: pumped at the ends, flowing in the middle

Plant transport and mineral nutrition · Unit B08

AQA 3.3.4.2 · OCR A 3.1.3 · Edexcel A Topic 4.1–4.4 · CAIE 7.2

6 questions · 18 marks

PRINT EDITION

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SECTION A · Short, 1 to 2 marks

A1 Name the two membrane proteins in a companion cell that together load sucrose into a sieve tube element. [2]

A2 Give one reason why sucrose rather than glucose is the sugar transported in the phloem. [1]

SECTION B · Standard, 3 to 5 marks

B1 Explain how the loading of sucrose at a source and its removal at a sink together produce the pressure difference that mass flow depends on. [5]

B2 Ringing a woody stem makes the tissue above the cut swell and grow rich in sugars, and sap flows for hours from the stylet of an aphid whose body has been cut away. Evaluate these two results as support for the mass flow hypothesis. [4]

B3 Describe how a potato tuber changes from a sink in late summer into a source in the following spring. [3]

B4 A metabolic poison applied to the middle of a stem, far from any loading or unloading, stops translocation. Suggest why this result does not by itself disprove the mass flow hypothesis. [3]