



**EXAM PAPERS PRACTICE**

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## **9.1 Transport in the Xylem of Plants**

Hard



# **BIOLOGY**

## **IB HL**

# 9.1 Transport in the Xylem of Plants

## Question Paper

Course	DP IB Biology
Section	9. Plant Biology (HL Only)
Topic	9.1 Transport in the Xylem of Plants
Difficulty	Hard

EXAM PAPERS PRACTICE

Time allowed: 10  
Score: /5  
Percentage: /100

### Question 1

Which of these is **not** a function of plasmodesmata in plant cells?

- A. To allow movement of water via the symplast pathway
- B. To enable cell recognition
- C. To allow communication between cells
- D. To allow movement of nutrients between cells

[1 mark]

### Question 2

Certain plants have developed a mutualistic relationship with soil fungi, in which the plant provides sugars to the fungus for respiration.

In what way does the plant receive a benefit in return?

- A. The fungus helps to stabilise the plant's root network in poor / stony soils.
- B. The fungus acts like a sponge to retain water in dry soils after (infrequent) rainfall.
- C. The fungus fixes atmospheric nitrogen and supplies nitrate ions to the plant.
- D. The fungus accesses mineral ions in mineral-deficient soils and supplies them to the plant's roots.

[1 mark]



### Question 3

Which table gives the most accurate summary of the movement of water via the apoplast and symplast pathways?

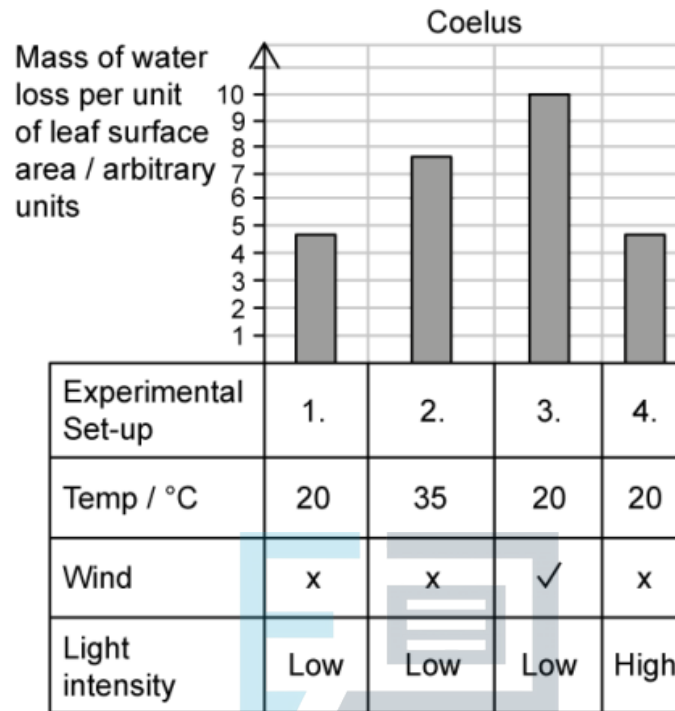
A.		<b>Apoplast pathway</b>	<b>Symplast pathway</b>
	Route travelled	Cell walls	Cytoplasm
	Speed of flow	Slow	Fast
	Method of flow	Mass flow	Osmosis
	Volume of water transported	Low	High
B.		<b>Apoplast pathway</b>	<b>Symplast pathway</b>
	Route travelled	Cell walls	Cytoplasm
	Speed of flow	Fast	Slow
	Method of flow	Mass flow	Osmosis
	Volume of water transported	High	Low
C.		<b>Apoplast pathway</b>	<b>Symplast pathway</b>
	Route travelled	Cytoplasm	Cell walls
	Speed of flow	Fast	Slow
	Method of flow	Mass flow	Osmosis
	Volume of water transported	High	Low
D.		<b>Apoplast pathway</b>	<b>Symplast pathway</b>
	Route travelled	Cell walls	Cytoplasm
	Speed of flow	Fast	Slow
	Method of flow	Osmosis	Mass flow
	Volume of water transported	High	Low

[1 mark]



#### Question 4

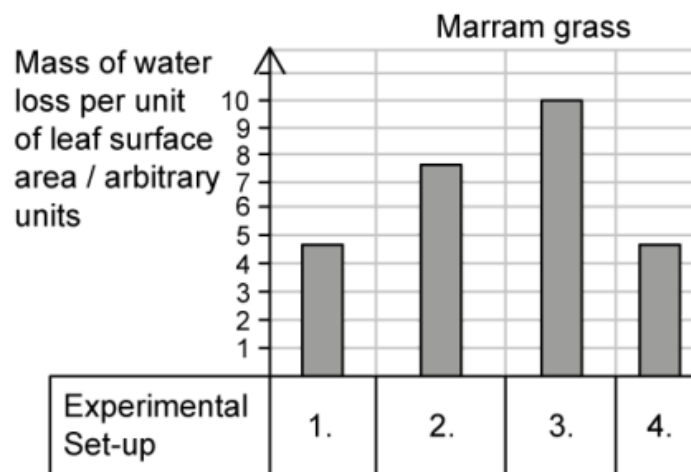
The following data were gathered from an experiment into the rate of transpiration in samples of plants in the genus *Coelus*, commonly grown by gardeners for herbaceous borders. *Coelus* grows easily in UK gardens and thrives in the relatively high rainfall that the UK experiences.



Marram grass is a xerophyte that is found on sand dunes and other fast-draining soils in coastal areas. The same experimental set-up was repeated with marram grass.

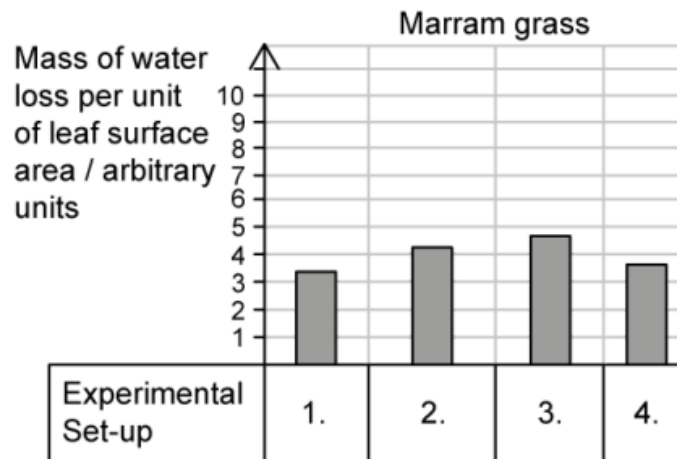
Which graph of **A – D** would be the most likely graph for a comparable experiment carried out on marram grass?

A.

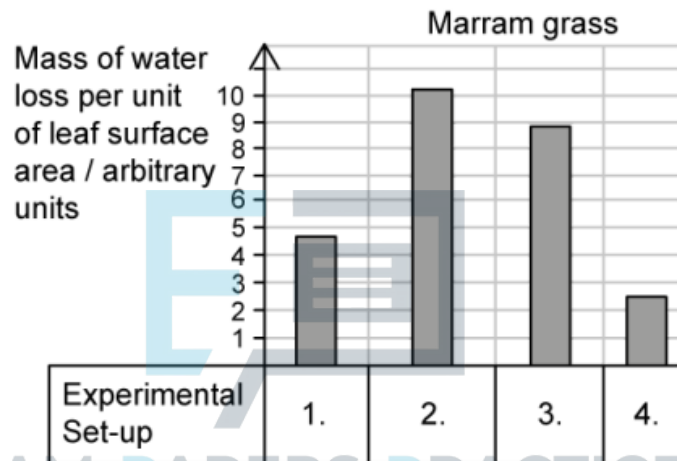




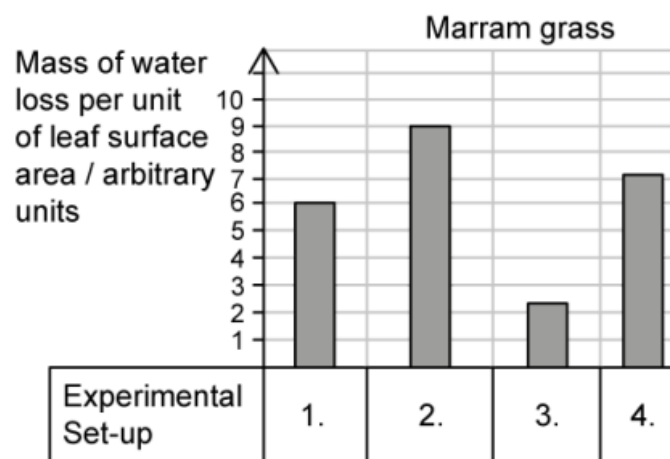
B



C.



D.

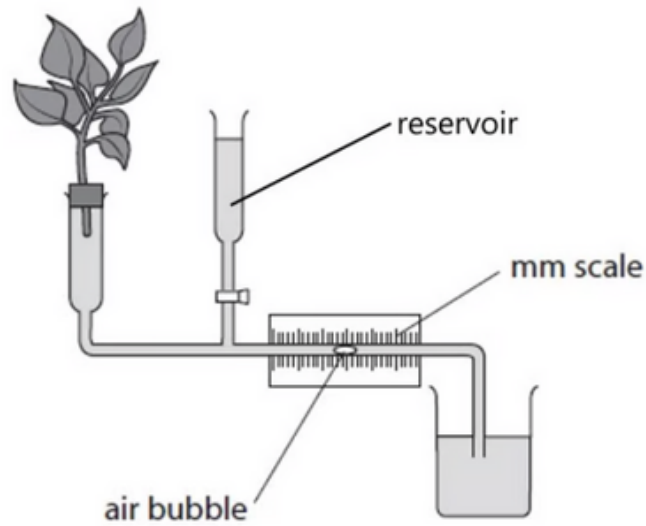


[1 mark]



### Question 5

The diagram shows a potometer set up to measure the rate of transpiration in a piece of cut plant.



For a potometer with a cylindrical capillary of the internal diameter of  $d$  mm, the bubble was measured to travel  $h$  mm in an experimental time of  $s$  seconds.

Which is the correct formula to calculate the rate of transpiration (as a volume of water uptake per unit time) in this experiment?

A.  $\frac{\pi \left(\frac{d}{2}\right)^2 h}{s}$

B.  $\frac{\pi d^2 h}{s}$

C.  $\pi \left(\frac{d}{2}\right)^2 h s$

D.  $\pi d^2 h s$

[1 mark]