

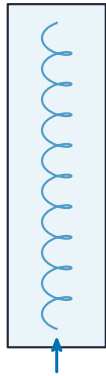
Exercise walk-through

8.2

Water uptake

IGCSE Biology

Xylem and phloem



xylem

dead, hollow cells;
thick **lignin** walls

carries water +
minerals **up** only

also **supports**
the plant



phloem

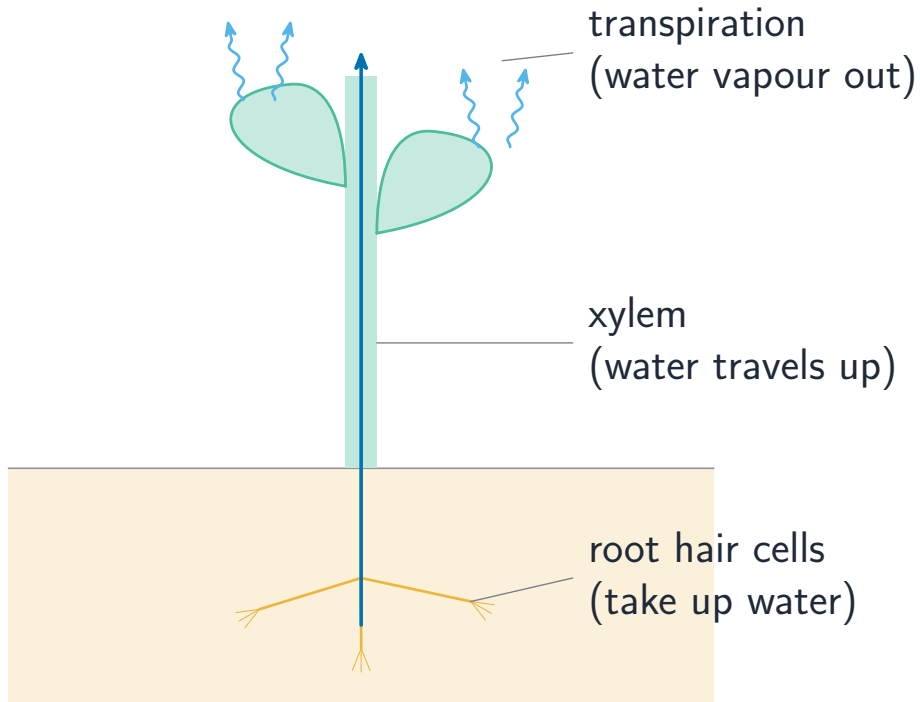
living cells;
sieve plates

carries sucrose +
amino acids

moves **both ways**

- **xylem** – carries water and **mineral ions** up from the roots, and gives the plant **support**.
- **phloem** – carries **sucrose** and **amino acids** to wherever they are needed.

Water uptake and pathway



- Water **evaporates** from the wet surfaces of the mesophyll cells into the **air spaces** inside the leaf.
- The water vapour then **diffuses** out of the leaf through the **stomata**.

How water gets in, and what happens when it runs out

root hair cells	long thin extensions giving an enormous surface area for ab-sorption
the pathway	root hair → root cortex → xylem → stem → leaf → evaporation from the mesophyll
showing it	stand a plant or a white flower in water containing a coloured stain ; the stain travels up the xylem and shows the route
the xylem tube	cells joined end to end with no walls across , making one long continuous pipe
forces of attraction	between water molecules pull the whole column up as water evaporates at the top
wilting	when water is lost faster than it is taken up, cells go soft and leaves and stems droop

Transpiration rate rises with **temperature**, **wind speed** and **light**, and falls with humidity. All four change how fast water leaves the leaf.

Exercises 2.1·2.2

2.1 Name the cells through which water enters a plant. [1]

2.2 State the water pathway from the soil to the leaf. [2]

Exercises 2.1·2.2

2.1 Name the cells through which water enters a plant. [1]

2.1

- water enters through **root hair cells**
-

2.2 State the water pathway from the soil to the leaf. [2]

2.2

- **root hair cell → root cortex → xylem → mesophyll**

Exercise 3.1

3.1 Root hairs speed up water uptake because they:

[1]

☐

A make food

B give a large surface area

C contain chloroplasts

D store starch

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3.1 B

- root hairs give a **large surface area** for uptake
- A, C and D are leaf jobs

Exercise 3.2 (a)

3.2 A white flower is placed in water containing a coloured stain.

(a) State where the stain will appear in the plant.

[1]

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3.2 A white flower is placed in water containing a coloured stain.

(a) State where the stain will appear in the plant.

[1]

(a)

- the stain appears in the **veins (xylem)** / the petals

Exercise 3.2 (b)

3.2 A white flower is placed in water containing a coloured stain.

(b) Explain why this shows the route taken by water.

[2]

Exercise 3.2 (b)

3.2 A white flower is placed in water containing a coloured stain.

(b) Explain why this shows the route taken by water.

[2]

(b)

- the stain is carried **up the xylem** with the water
- the coloured parts **show the path** the water took