

Transport in Plants

IGCSE Biology ■ Topic 8

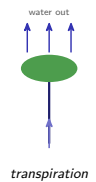
IGCSE Biology



Transport in Plants

What we will cover

- 1 Xylem & phloem
- 2 Water uptake & pathway
- 3 Transpiration
- 4 How water rises
- 5 Translocation

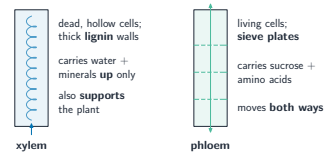


1 Tissues and water

Transport in Plants

└ Tissues and water

Xylem and phloem

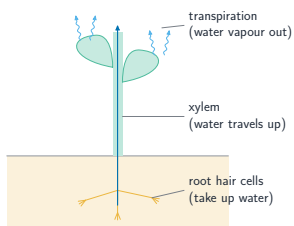


- **xylem** 木质部 – carries water and **mineral ions** 矿物质离子 up from the roots, and gives the plant **support** 支撑.
- **phloem** 韧皮部 – carries **sucrose** 蔗糖 and **amino acids** 氨基酸 to wherever they are needed.

Transport in Plants

└ Tissues and water

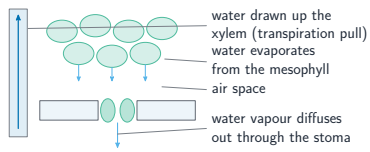
Water uptake and pathway



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

2 Transpiration

Transpiration



Transpiration 蒸腾作用 is water loss from leaves:

- water **evaporates** 蒸发 from the mesophyll
- vapour **diffuses** 扩散 out of the **stomata** 气孔

Faster when hotter, windier or drier.

How water rises

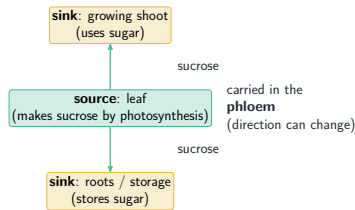
transpiration pull 蒸腾拉力

water leaving the leaf pulls more up behind it

one water column

molecules stick together; losing water too fast → **wilting** 萎蔫

Translocation



Translocation 转运 moves sucrose in the phloem from a **source** 源 to a **sink** 库.

- source – makes/stores sugar (leaves)
- sink – uses/stores it (roots)

The direction can change.

3

Recap

Worked example – what changes transpiration?

A potometer bubble moves faster when a fan is switched on. Explain why.

- Transpiration is water **evaporating** from the leaves and diffusing out of the stomata.
- Still air lets water vapour **build up** just outside the leaf.
- The fan blows that vapour away, keeping the **concentration gradient steep**.
- Faster diffusion out ⇒ faster water uptake ⇒ **the bubble moves faster**.

Wind, heat and dry air all **speed up** transpiration; high humidity slows it. Each works by changing the **water-vapour gradient** outside the leaf.

Topic 8 – key takeaways

1 Xylem

water & minerals up; dead, lignified

2 Phloem

sucrose to sources & sinks; living

3 Transpiration

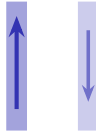
evaporate then diffuse out of stomata

4 Pull

transpiration pull draws up a water column

Check yourself

- 1 Which tissue carries water up the plant?
- 2 Where does water evaporate in a leaf?
- 3 What drives water up the xylem?
- 4 What does translocation move?



Answers 1. xylem 2. the mesophyll cells 3. the transpiration pull 4. sucrose & amino acids