

The need for transport and transport in plants

Why can a unicellular organism rely on diffusion?

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Why do multicellular organisms need a transport system?

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What is the formula for surface area : volume ratio?

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What does the xylem transport?

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What does the phloem transport?

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How is xylem adapted for its function?

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How is water absorbed by root hair cells?

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How does the root hair shape help absorption?

Small surface area : volume ratio and long diffusion distances, so diffusion alone is too slow.

It has a large surface area compared with its volume, so substances only have a short distance to diffuse.

Water and mineral ions from the roots to other parts of the plant.

Surface area $\div$ volume. A cube with 3 cm sides has $54 \text{ cm}^2 \div 27 \text{ cm}^3 = 2 : 1$.

Dead cells with no end walls form hollow tubes; lignin strengthens the walls.

Sucrose and amino acids between the leaves and other parts of the plant.

The long, thin projection gives a large surface area for absorbing water and mineral ions.

By osmosis: from the dilute soil water into the more concentrated cell sap, through the partially permeable membrane.

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Define transpiration.

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What is the transpiration stream?

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Which four factors affect the rate of transpiration?

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Why does high humidity reduce the rate of transpiration?

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What does a potometer measure?

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How do you calculate rate of water uptake from a potometer?

The continuous flow of water up the xylem to replace water lost from the leaves.

The evaporation of water from the surface of a plant.

There is less of a concentration gradient of water vapour between the leaf and the air, so diffusion is slower.

Humidity, wind speed, temperature and light intensity.

Distance moved by the air bubble $\div$ time.
Multiply distance by tube cross-sectional area for volume.

The uptake of water by a cut leafy shoot, used to measure the rate of transpiration.