

WJEC Wales Biology GCSE

1.5 (f) to (l) - Transport in Plants

Flashcards

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Why is water important in plants? (5)



Why is water important in plants? (5)

- Used in photosynthesis
- Enables chemical reactions to take place within cells
- Transport medium for minerals, sugars etc.
- Support (turgidity)
- Cooling effect



Which structure in plants is adapted for the uptake of water and minerals?



Which structure in plants is adapted for the uptake of water and minerals?

Root hairs



How is water taken up by root hairs?



How is water taken up by root hairs?

- Lower concentration of water in root hair cell sap than in the soil
- Water diffuses down its concentration gradient into root hair cell by osmosis



Describe how water moves between
cells across the root



Describe how water moves between cells across the root

- Water entering root hair cell dilutes its cell sap
- Higher concentration of water in root hair cell sap than in the adjacent cell
- Water diffuses down its concentration gradient into the adjacent cell by osmosis



How are minerals transported into root hairs? (higher)



How are minerals transported into root hairs? (higher)

- Lower concentration of mineral ions in the soil than in the root
- Root hair cells take up mineral ions by active transport (uses energy)



Outline how plant roots are adapted for the absorption of water and minerals



Outline how plant roots are adapted for the absorption of water and minerals

Plant roots are composed of millions of root hair cells which have:

- Long hairs that extend from the cell body, increasing the surface area for absorption
- Many mitochondria which produce energy for the active transport of mineral ions



Name the two plant transport tissues



Name the two plant transport tissues

Xylem

Phloem



What is the function of the xylem?



What is the function of the xylem?

Transports **water** and **minerals** up the plant, from the roots to the leaves via the transpiration stream



Describe the structure of the xylem



Describe the structure of the xylem

Composed of dead cells laid end-to-end to form a long, hollow, continuous column



What is transpiration?



What is transpiration?

The loss of water vapour from the parts of a plant exposed to the air due to evaporation and diffusion



Where does the majority of transpiration take place?



Where does the majority of transpiration take place?

Leaves



Describe the process of transpiration



Describe the process of transpiration

- Water evaporates from the mesophyll layer and diffuses out of the stomata
- Water molecules (which have cohesive properties) are drawn up the xylem vessels to replace the water that has been lost
- This causes more water molecules to be absorbed from the soil into root hair cells



How does the transpiration stream transport mineral ions?



How does the transpiration stream transport mineral ions?

Mineral ions are dissolved in the water that is carried by the transpiration stream



What factors affect the rate of transpiration? (3)



What factors affect the rate of transpiration? (3)

- Temperature
- Air movement
- Humidity



Describe how temperature affects the rate of transpiration



Describe how temperature affects the rate of transpiration

- As temperature increases, water molecules have more KE so the rate of diffusion increases
- More water vapour diffuses out of the stomata
∴ rate of transpiration increases



Describe how air movement affects the rate of transpiration



Describe how air movement affects the rate of transpiration

- Air movement increases, high water concentration gradient maintained between the air spaces in the leaf and atmosphere
- Increased rate of diffusion of water molecules out of the stomata
- Rate of transpiration increases



Describe how humidity affects the rate of transpiration



Describe how humidity affects the rate of transpiration

- As humidity increases, water concentration gradient between the air spaces in the leaf and atmosphere decreases
- Decreased rate of diffusion of water molecules out of the stomata
- Rate of transpiration decreases



What apparatus is used to measure the rate of transpiration?



What apparatus is used to measure the rate of transpiration?

Potometer



What is assumed when measuring the rate of transpiration using a potometer?



What is assumed when measuring the rate of transpiration using a potometer?

rate of water uptake \approx rate of transpiration



What is the function of the phloem?



What is the function of the phloem?

Transports **sugars** up and down the plant from photosynthetic tissues (e.g. mature green leaves) to non-photosynthetic tissues (e.g. developing seeds)



Describe the structure of the phloem



Describe the structure of the phloem

Composed of living cells arranged in columns with perforated end plates to enable the flow of sugars



What happens to sugars at
non-photosynthetic areas of a plant?



What happens to sugars at non-photosynthetic areas of a plant?

- Used immediately in **respiration** to release energy
- Converted to starch and **stored**



In the veins of a plant, where are the xylem and phloem located in comparison to one another?



In the veins of a plant, where are the xylem and phloem located in comparison to one another?

Xylem located towards the centre with the phloem on the outside

