

# Exercise walk-through

Transpiration ■ 8.3

eXercise

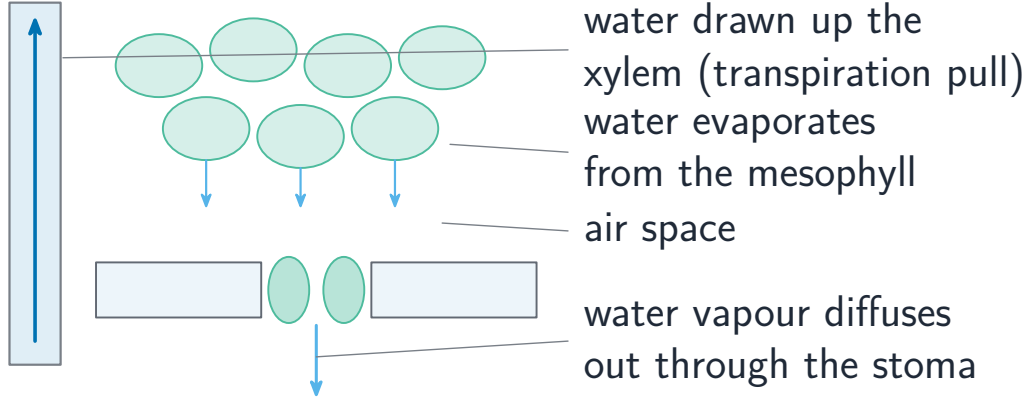
## You must be able to

- describe transpiration (evaporation then diffusion out of the stomata)
- explain how temperature, wind and humidity affect the rate
- describe how the transpiration pull moves water up the xylem

## Method — Transpiration

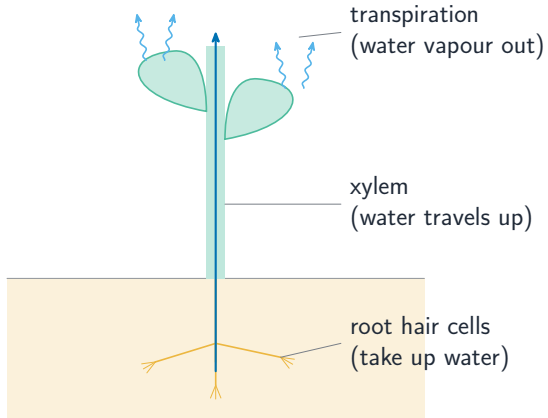
- **faster when:** hotter (more evaporation), windier (vapour carried away), drier air.
- **transpiration pull:** water leaving the leaf pulls a column of water up the xylem.

## Method — Transpiration



*Water evaporating from the mesophyll and diffusing out of a stoma*

## Method — Transpiration



*Transpiration pulls water up the xylem pathway*

## Practice 2.1 ■ 1 mark

Define transpiration.

## Solution 2.1

### Worked steps

the loss of water vapour from the leaves (of a plant) **B1**.

## Practice 2.2 ■ 1 mark

State the effect of higher wind speed on transpiration rate.

## Solution 2.2

### Worked steps

it increases the rate **B1**.

## Exam-style 3.1 ■ 1 mark

Transpiration is fastest in conditions that are:

- A** cold, still and humid
- B** hot, windy and dry
- C** cold and dark
- D** warm and very humid

## Solution 3.1

**A** cold, still and humid

**B** hot, windy and dry



**C** cold and dark

**D** warm and very humid

### Worked steps

**B.** Hot, windy and dry conditions give the fastest transpiration.

## Exam-style 3.2 ■ 2 marks

Water vapour is lost from the leaves.

- (a) Describe the two steps by which water leaves the leaf.
- (b) Explain why a higher temperature increases the rate of transpiration.

## Solution 3.2

Method: Transpiration

### Worked steps

- (a) water evaporates from the wet mesophyll cells into the air spaces **M1**; the water vapour diffuses out through the stomata **A1**.
- (b) higher temperature makes water evaporate faster from the mesophyll **M1**, so more diffuses out **A1**.

## Exam-style 3.3 ■ 2 marks

Explain how the transpiration pull moves water up the xylem.

## Solution 3.3

Method: Transpiration

### Worked steps

as water leaves the leaf it pulls more water up behind it **M1**; the water molecules stick together and are drawn up the xylem as a column **A1**.