

Gas exchange in flowering plants

Revision notes · Carbon dioxide and oxygen as the waste products of respiration and photosynthesis in plants.

For Edexcel International GCSE Science (Double Award) 4SD0.

Gas exchange in flowering plants Spec 2.40B, 2.41B, 2.43B-2.45B, 2.70

Gas exchange, diffusion and stomata Spec 2.40B, 2.41B, 2.43B, 2.70

Waste products of metabolism

Metabolism is all the chemical reactions in a cell. Two of its products are waste products in a plant.

Carbon dioxide is a waste product of respiration. **Oxygen** is a waste product of photosynthesis. Both leave the plant from the leaves by diffusion through the **stomata**.

Biology only

Diffusion in gas exchange

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Diffusion is the net movement of particles from a region of higher concentration to a region of lower concentration, down a concentration gradient. Gases move into and out of leaves by diffusion, so no energy is needed to move them.

Biology only

Plants use and make both gases. Gas exchange of carbon dioxide and oxygen therefore depends on two processes at the same time.

Biology only

Gas exchange in relation to respiration and photosynthesis

Process	Takes in	Gives out	When it happens
Respiration	Oxygen	Carbon dioxide	All the time, in light and dark
Photosynthesis	Carbon dioxide	Oxygen	Only when there is light

Biology only

Gases reach the mesophyll cells through the stomata and the air spaces inside the leaf. How the structure of the leaf is adapted for gas exchange is covered in Leaf structure and adaptations.

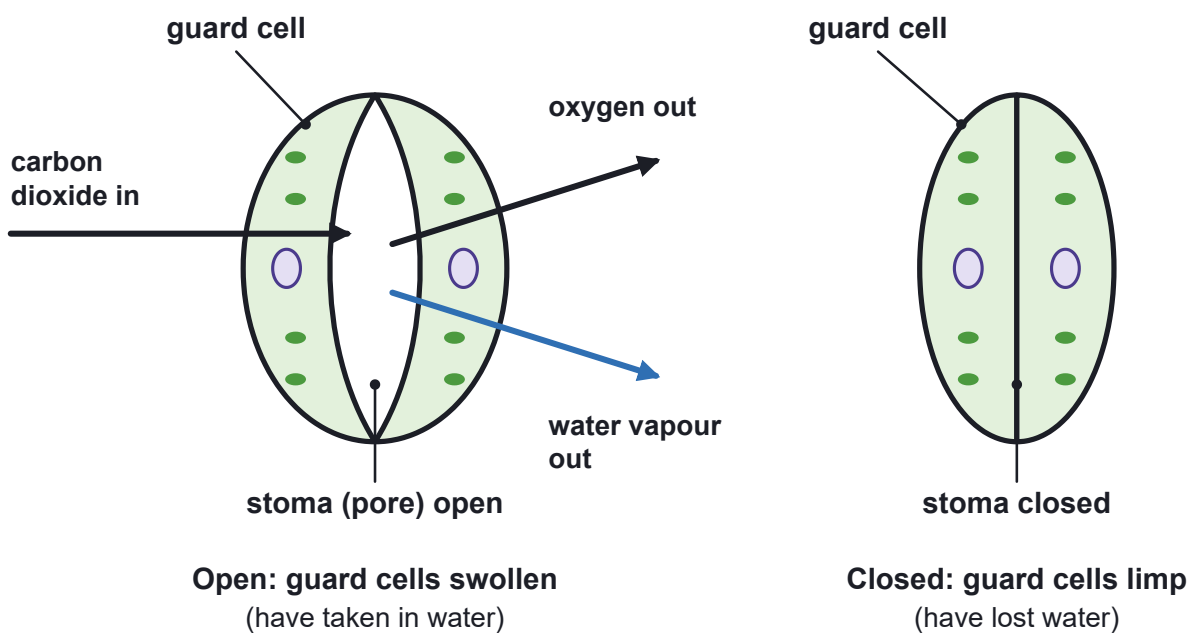
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The role of stomata

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A stoma is a pore in the leaf surface. It is surrounded by two **guard cells**. When the guard cells take in water they swell and the stoma opens. When they lose water they become limp and the stoma closes. Carbon dioxide enters and oxygen leaves through open stomata. Water vapour is also lost through them, so the plant closes its stomata when it loses too much water.

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Guard cells that take in water swell and **open** the stoma; guard cells that lose water go limp and **close** it.

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Exam tip: In the day, carbon dioxide diffuses into the leaf because photosynthesis uses it up, so its concentration inside the leaf is lower than in the air.

Quick check

1. Which gas is a waste product of photosynthesis and leaves through the stomata?

Quick check answers

Gas exchange in flowering plants

1 . Oxygen.