

Leaves and Stomata

KS3 Biology · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

Give three ways a leaf is adapted for photosynthesis.

Step 1 · Shape

Broad and flat — a large surface area to absorb light.

Step 2 · Thickness

Thin — short distance for carbon dioxide to diffuse to cells.

Step 3 · Inside

Palisade cells packed with chloroplasts near the top surface, and veins bringing water.

Answer: Broad, thin, and full of chloroplasts (plus stomata and veins)

Check: Each adaptation helps capture light or get raw materials in.

2. Now try one with the steps

What are stomata and what do guard cells do?

Step 1 · Stomata

Step 2 · Guard cells

Step 3 · Why

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. What are the tiny pores on a leaf called? [1]

2. Which cells open and close the stomata? [1]

3. Which gas enters a leaf through the stomata during the day? [1]

4. Which gas leaves the leaf in daylight? [1]
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5. Why are leaves broad and flat? [1]
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6. Why are leaves thin? [1]
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7. In which layer does most photosynthesis take place? [1]
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8. What is the job of the waxy cuticle? [1]
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9. Why does the spongy layer have air spaces? [1]
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10. Why do stomata usually close at night? [2]
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11. Counts of stomata in four fields of view: 20, 24, 22, 18. What is the mean? [1]
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12. A mean of 21 stomata were seen in a field of view of 0.25 mm^2 . What is the stomatal density per mm^2 ? [2]
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13. Explain why the upper epidermis has no chloroplasts. [2]
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14. Cacti have very few stomata and thick waxy stems. Suggest why. [2]
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4. Before you hand it in

"Stomata let water in."

Stomata let CO₂ in and let O₂ and water vapour OUT. Water travels up from the roots in the xylem.

"The stomata are the guard cells."

The stoma is the hole; guard cells are the two cells around it.

"Leaves only take in gases in the day."

At night, with stomata partly open, leaves take in a little oxygen for respiration and release carbon dioxide.