Stomata and leaf gas exchange

Teacher / technician

YEAR 10 / LESSON 34 / BIOLOGY ONLY

Staff preparation and answer guidance. Keep separate from student sheets. Prepared-slide observation; no direct measurement of opening dynamics or gas-exchange rate.

Coverage and delivery

Biology only: 2.42B–2.43B. Leaf structure and stomata.

Allow about 60 minutes. Follow the student sequence and use the answers to check reasoning.

Requisition • class of 30, working in 15 pairs

Item	Per pair / setup	Class total
Microscopes / epidermal slide sets	1 set per pair	15 sets
Booklets / rulers	2 booklets and 1 ruler per pair	30 booklets; 15 rulers
Field-area calibration	teacher-supplied for chosen objective	1 verified reference per microscope type

Immediate safety

Handle slides carefully and report cracks. Keep objectives clear of the slide and use fine focus at higher power. No nail varnish, solvents or fresh human material is used.

Preparation and delivery

Read alongside the student method

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1. Inspect permanent epidermal slides for clearly resolved stomata. If comparing surfaces, obtain matched upper/lower preparations from the same species.

2. Calibrate field area using the school's microscope scale if pupils calculate density. Otherwise label results as counts per matched field and do not invent a density.

Close of lesson

• Return prepared epidermal slides to labelled boxes. Lower the microscope stage, switch off and cover the instrument as directed.

• Keep the labelled drawings and field-count record; report damaged slides to the teacher.

Check before teaching

Check the cards, reference data and quantities against this requisition. Keep the staff answer guide separate until the checking stage. Supplied numerical practice datasets are labelled examples; they are not class measurements.

Answers and teaching notes

Expected explanations • do not give as experimental observations

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- The stoma is the pore; guard cells border and regulate it.
- Different regions vary; repeat fields improve the evidence for a representative count.
- A larger field could contain more stomata simply because more surface is viewed.
- Carbon dioxide entry is facilitated, but water loss can also increase.
- No. It is a preserved structural snapshot.
- Number of stomata divided by measured field area, with units such as mm^{-2}.

References and provenance

Pearson Biology specification

Prepared 22 November 2026. Original wording, tables and questions. Sources inform the concepts and technique; the lesson scope and classroom quantities are explicitly described here. No laboratory trial or final school risk approval is claimed.