

This is the **Foundation Combined Science** version. Only Foundation-level content is included. Higher Tier and Separate-only questions have been removed.

Photosynthesis and Leaf Structure (6.1–6.3)

Specification reference: 6.1

Q1. Explain how the structure of a leaf is adapted for efficient photosynthesis.

[4 marks]

Q2. Describe how a student could investigate the effect of light intensity on the rate of photosynthesis, including how to control variables.

[3 marks]

Transpiration and Plant Hormones (6.4–6.7)

Specification reference: 6.4

Q3. Explain how guard cells control the opening and closing of stomata.

[3 marks]

Total: 10 marks

Photosynthesis and Leaf Structure (6.1–6.3)

Q1 (4 marks)

Explain how the structure of a leaf is adapted for efficient photosynthesis.

- Palisade cells at top, packed with chloroplasts — close to light for maximum absorption [1]
- Transparent epidermis — allows light through to palisade cells [1]
- Spongy mesophyll with air spaces — allows CO₂ to diffuse to palisade cells [1]
- Stomata allow gas exchange; xylem supplies water; phloem removes sugar products [1]

Q2 (3 marks)

Describe how a student could investigate the effect of light intensity on the ra...

- Use pondweed (Elodea); count O₂ bubbles per minute at different distances from lamp [1]
- Control variables: temperature (water bath), CO₂ (add NaHCO₃), use same piece of pondweed [1]
- Take multiple repeats at each distance and calculate mean — increases reliability [1]

Transpiration and Plant Hormones (6.4–6.7)

Q3 (3 marks)

Explain how guard cells control the opening and closing of stomata.

- In light/water-plentiful conditions, guard cells absorb water by osmosis → become turgid → bow outward → stoma opens [1]
- In drought/darkness, guard cells lose water → become flaccid → stoma closes [1]
- This regulates gas exchange and water loss — balancing photosynthesis needs against water conservation [1]