

This is the **Higher Separate** version — includes all Higher Tier content (marked ★) and all Separate Science content.

Photosynthesis converts light energy into chemical energy (glucose), providing the energy base for almost all food chains.

Required Practical: Investigating light intensity and photosynthesis using pondweed.

- Equation: $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$ (light energy required, in chloroplasts)
- Limiting factors: light intensity, CO_2 concentration, temperature
- Leaf structure: palisade (packed with chloroplasts, near surface), spongy mesophyll (air spaces for CO_2), stomata (gas exchange), xylem (water in), phloem (sugar out)
- Glucose uses: respiration, starch, cellulose, proteins (+ nitrates), sucrose, lipids

Key Terms

Limiting factor	Factor in shortest supply controlling rate of photosynthesis
Chlorophyll	Green pigment absorbing light energy

■ **Exam Tip:** Know all 6 uses of glucose. List questions worth 4+ marks often ask for them all: respiration, starch, cellulose, amino acids/proteins, sucrose, lipids/oils.