

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

Photosynthesis is the process by which plants, algae and some bacteria convert light energy into chemical energy stored as glucose.

**Required Practical: Investigating the effect of light intensity on the rate of photosynthesis using pondweed (Elodea). Count O<sub>2</sub> bubbles or measure volume of O<sub>2</sub> at different distances from a lamp.**

- Word equation: carbon dioxide + water → glucose + oxygen (light energy required).
- Symbol equation:  $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$
- Occurs in CHLOROPLASTS, which contain CHLOROPHYLL — the green pigment that absorbs red and blue light.
- Chlorophyll reflects green light — this is why plants appear green.
- Products: glucose (for respiration, starch, cellulose, proteins, fats) and oxygen (released as a by-product).
- ★ **HT** Photosynthesis is an **ENDOTHERMIC** reaction — it absorbs light energy and stores it in glucose.
- The rate of photosynthesis can be measured by: counting O<sub>2</sub> bubbles, measuring O<sub>2</sub> volume, or measuring CO<sub>2</sub> consumption.

### Key Terms

<b>Photosynthesis</b>	Process converting CO <sub>2</sub> and water into glucose using light energy — occurs in chloroplasts
<b>Chlorophyll</b>	Green pigment in chloroplasts that absorbs light energy for photosynthesis
<b>Chloroplast</b>	Organelle (in plant cells) where photosynthesis occurs — contains chlorophyll
<b>Endothermic</b>	A reaction that absorbs energy from the surroundings

■ **Exam Tip:** Learn BOTH the word equation and symbol equation. Common mistake: writing O<sub>2</sub> as the input instead of output. In photosynthesis: CO<sub>2</sub> and H<sub>2</sub>O are the INPUTS; glucose and O<sub>2</sub> are the OUTPUTS.