*This is the **Foundation Separate** version — Higher Tier content has been removed.*

The rate of photosynthesis is controlled by limiting factors. The factor in shortest supply at any given time limits the rate, regardless of how much of the other factors are present.

Required Practical: Investigating effect of light intensity on photosynthesis using pondweed. Use different distances from lamp. Add NaHCO■ to ensure CO■ is not limiting. Control temperature with a water bath.

- Three main limiting factors: light intensity, CO■ concentration, temperature.
- Light intensity: more light → more energy available → faster rate. Above a point, another factor becomes limiting.
- CO■ concentration: CO■ is a reactant. More CO■ → faster rate up to a limit.
- Temperature: higher temp → enzymes more active → faster reactions. But above ~45°C, photosynthesis enzymes DENATURE → rate drops sharply.
- Greenhouse growers control all three factors: artificial lighting, CO■ generators, heating — to maximise year-round yield.

■ **Sep** Water can also limit photosynthesis if plants become water-stressed — stomata close to conserve water, reducing CO■ entry.

Key Terms

Limiting factor	The factor in shortest supply that controls the rate of a reaction — increasing other factors has no effect

■ **Exam Tip:** In a graph where rate plateaus: the plateau means ANOTHER factor is now limiting, not the one being changed. You must identify what that other factor is. Common mistake: saying "maximum rate reached" without specifying the new limiting factor.