

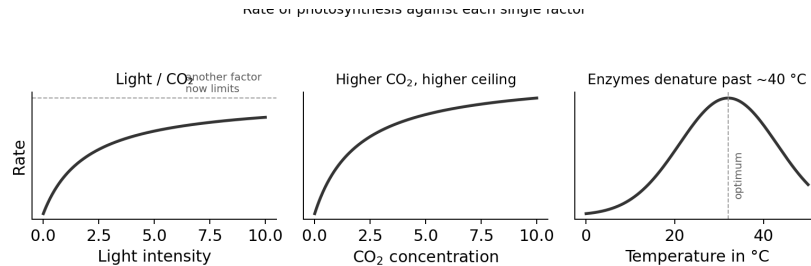
Exercise walk-through

4.2

Respiration and exercise (4.4.2)

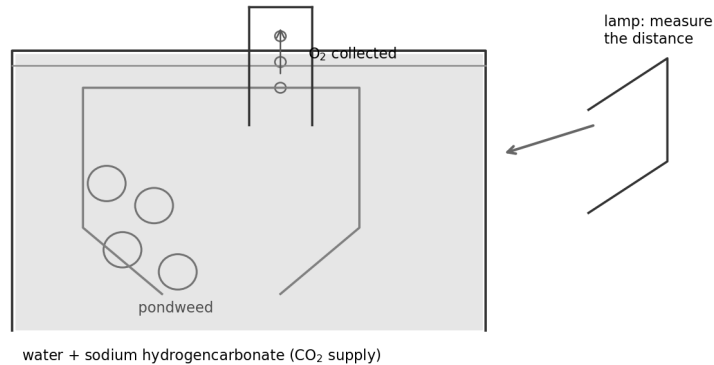
AQA · GCSE · Biology

Limiting factors



- Light, CO₂ and temperature each limit the rate.
- Light or CO₂ graph: rises then flat — another factor now limits.
- Temperature: rises to an optimum, then falls as enzymes denature.

RP6 pondweed



- Pondweed in water, lamp at measured distances.
- Count oxygen bubbles per minute; rate = bubbles ÷ time.
- Control temperature and CO₂ (sodium hydrogencarbonate); repeat and take a mean.

Exercises 2.1·2.3

2.1 State three uses of glucose in plants.

[3]

2.2 Write the word equation for anaerobic respiration in yeast cells.

[1]

2.3 Define metabolism.

[1]

Exercises 2.1·2.3

2.1 State three uses of glucose in plants. [3]

2.1 Any three: used for respiration; converted to starch for storage; converted to cellulose for cell walls; used with nitrates to make amino acids/proteins; converted to lipids/oils for storage in seeds.

2.2 Write the word equation for anaerobic respiration in yeast cells. [1]

2.2 Glucose $\rightarrow$ ethanol + carbon dioxide.

2.3 Define metabolism. [1]

2.3 The sum of all the reactions in a cell or in the body.

Exercises 3.1·3.2

3.1 Compare aerobic and anaerobic respiration in human muscle cells: location, products and energy transferred. [5]

3.2 Explain why muscles may become fatigued during intense exercise, and (HT) how the body removes the substance that builds up. [5]

Exercises 3.1·3.2

3.1 Compare aerobic and anaerobic respiration in human muscle cells: location, products and energy transferred. [5]

3.1 Aerobic: in mitochondria and cytoplasm / needs oxygen; glucose fully broken down to carbon dioxide and water; transfers much more energy. Anaerobic: cytoplasm only, without oxygen; glucose incompletely broken down to lactic acid, transferring much less energy.

3.2 Explain why muscles may become fatigued during intense exercise, and (HT) how the body removes the substance that builds up. [5]

3.2 Oxygen supply is less than the muscles' demand; anaerobic respiration transfers energy but builds up lactic acid; lactic acid causes fatigue / muscles stop contracting efficiently. (HT) Blood transports lactic acid to the liver; the liver converts it back to glucose, using the extra oxygen breathed after exercise – the oxygen debt.

Exercise 3.3

3.3 A baker adds yeast and sugar to dough and leaves it in a warm place. Explain why the dough rises. [4]

Exercise 3.3

3.3 A baker adds yeast and sugar to dough and leaves it in a warm place. Explain why the dough rises. [4]

3.3 Yeast uses the sugar for respiration; in the dough there is little oxygen, so yeast respire anaerobically – fermentation; glucose $\rightarrow$ ethanol + carbon dioxide; the CO₂ gas bubbles expand/get trapped in the dough, so it rises.