

Cell respiration: practice questions

4 questions · 10 marks · mark scheme at the back

For IB Diploma Biology SL undefined. **HL only** is additional higher level content, for HL students only.

Name

Total / 10

1 PAPER 1A STYLE**[1 mark]**

Which statement about ATP is correct?

- A. ☐ It is a nucleotide containing deoxyribose.
- B. ☐ Energy is required to hydrolyse it to ADP and phosphate.
- C. ☐ It is a nucleotide, and its hydrolysis to ADP and phosphate releases energy.
- D. ☐ It moves freely out of cells through the plasma membrane.

2 PAPER 1A STYLE**[1 mark]**

Which feature is shared by aerobic and anaerobic cell respiration in humans?

- A. ☐ Both produce carbon dioxide.
- B. ☐ Both require mitochondria.
- C. ☐ Both can use glucose as the substrate.
- D. ☐ Both produce lactate.

3 PAPER 1B STYLE

[5 marks]

A respirometer containing 3.0 g of maggots and soda lime was kept at three temperatures. The distance moved by the liquid drop in 5 minutes was recorded. The capillary tube has a cross-sectional area of 0.80 mm². The data are for practice. (a) Calculate the rate of oxygen uptake per gram at 25 °C, in mm³ g⁻¹ min⁻¹. Show your working. [2] (b) Identify the independent and the dependent variable. [1] (c) Explain the trend shown in the data. [2]

Distance moved by the drop in 5 minutes	
Temperature / °C	Mean distance moved / mm
15	11
20	17
25	24

Answer =

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4 PAPER 2A STYLE

[3 marks]

(a) State two processes in cells that use energy from ATP. [2] (b) Distinguish between cell respiration and gas exchange. [1]

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Mark scheme

One mark for each point unless a maximum is given. Words in brackets are not needed for the mark.

1. [1]

C C [1]

2. [1]

C C [1]

3. [5]

- (a) $\text{volume} = 0.80 \times 24 = 19.2 \text{ mm}^3$ [1]
- (a) $19.2 \div 5 \div 3.0 = 1.28 \text{ mm}^3 \text{ g}^{-1} \text{ min}^{-1}$ / 1.3 [1]
- (b) independent: temperature; dependent: distance moved by drop / rate of oxygen uptake (both needed) [1]
- (c) rate of oxygen uptake / respiration increases with temperature [1]
- (c) respiration is catalysed by enzymes; more kinetic energy so more frequent substrate-active site collisions [1]
- (c) (temperatures are below the optimum so) no denaturation [1]
- (c) [max 2]

4. [3]

- (a) active transport across membranes [1]
- (a) synthesis of macromolecules / anabolism [1]
- (a) movement of the whole cell (e.g. muscle contraction, flagella) / movement of chromosomes [1]
- (a) [max 2]
- (b) cell respiration produces ATP from carbon compounds inside cells, whereas gas exchange is diffusion of O_2 and CO_2 between organism and environment OWTTE [1]