

Diffusion: practice questions

6 questions • 16 marks • mark scheme at the back

For Cambridge IGCSE Biology 0610 (and 0970, which has the same content). **Supplement** is Extended content, only examined on Papers 2 and 4.

Name

Total / 16

1 Which statement describes diffusion? [1 mark]

- A. ☐ The movement of particles from a low concentration to a high concentration using energy from respiration
- B. ☐ The net movement of water through a partially permeable membrane
- C. ☐ The net movement of particles down a concentration gradient as a result of their random movement
- D. ☐ The movement of particles using protein carriers in the cell membrane

2 (a) State the source of the energy for diffusion. [1] (b) Name one substance that leaves cells by diffusion through the cell membrane. [1] [2 marks]

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3 Describe the importance of diffusion of gases and solutes in living organisms. [3 marks]

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- 4** A student investigates diffusion into cubes of agar containing alkali and an indicator. The cubes are placed in dilute acid and the student times how long each takes to turn colourless. (a) Calculate the surface area to volume ratio of each cube. [2] (b) Use your answers to explain why the 1 cm cube turned colourless in less time. [1] **[3 marks]**

Agar cubes	
Length of side / cm	Time to turn colourless / s
1	95
2	310

Answer =

- 5** A student places a drop of dye in water at four different temperatures and measures the time taken for the dye to spread 5 cm. (a) Describe the relationship between temperature and the time taken. [2] (b) Explain this relationship. [2] **[4 marks]**

Time for dye to spread	
Temperature / °C	Time / s
10	480
20	300
30	190
40	120

6 A flatworm is a small, thin and flat animal with no blood system. Explain how its shape allows oxygen to reach all of its cells. **[3 marks]**

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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. [2]

- kinetic energy (of random movement of molecules / ions) (1) ignore 'heat energy'; reject 'energy from respiration'
- carbon dioxide / urea (1) allow other correct example, e.g. oxygen in a leaf cell

3. [3]

- oxygen diffuses into cells for respiration (1)
- carbon dioxide diffuses out of cells / carbon dioxide diffuses into leaf cells for photosynthesis (1)
- digested food / glucose / amino acids (solutes) diffuse from the gut into the blood (1)
- urea (waste solute) diffuses out of cells into the blood (1)
- Max 3

4. [3]

- 1 cm cube: $6 \text{ cm}^2 \div 1 \text{ cm}^3 = 6$ (1)
- 2 cm cube: $24 \text{ cm}^2 \div 8 \text{ cm}^3 = 3$ (1)
- it has the larger surface area to volume ratio / the acid has a shorter distance to diffuse to the centre (1)

5. [4]

- as temperature increases, the time taken decreases (1)
- correct use of data, e.g. 480 s at 10 °C to 120 s at 40 °C (1)
- particles have more kinetic energy at higher temperature (1)
- so they move faster, so diffusion is faster / rate of diffusion increases (1)

6. [3]

- short distance for oxygen to diffuse (1)
- large surface area compared with its volume (1)
- oxygen diffuses down a concentration gradient fast enough to supply all the cells (1)