

Factors affecting the rate of diffusion: practice questions

4 questions · 9 marks · mark scheme at the back

For Edexcel GCSE Biology 1BI0 and Combined Science 1SC0. **Triple only** is not in Combined Science. **Higher tier** is only on the Higher paper.

Name

Total / 9

1 **Triple only** [1 mark]

Which change would decrease the rate of diffusion across an exchange surface?

- A. ☐ Increasing the surface area
- B. ☐ Increasing the concentration difference
- C. ☐ Increasing the thickness of the membrane
- D. ☐ Increasing the surface area and the concentration difference

2 **Triple only** [2 marks]

In some lung diseases the walls of the alveoli become thicker. Explain how this affects the rate of diffusion of oxygen into the blood.

3 **Triple only** [3 marks]

A membrane has a surface area of 50 units and a thickness of 4 units. The concentration difference across it is 8 units. Use Fick's law to calculate the rate of diffusion in arbitrary units.

Answer =

4

Triple only

[3 marks]

A student says that the rate of diffusion across a membrane will double if both the surface area and the thickness of the membrane are doubled. Use Fick's law to evaluate the student's idea.

Mark scheme

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

1. [1] Triple only

C C (increasing the thickness of the membrane)

2. [2] Triple only

- diffusion distance increases (1)
- so the rate of diffusion decreases / less oxygen enters the blood (1)

3. [3] Triple only

- surface area $\times$ concentration difference = $50 \times 8 = 400$ (1)
- $\div$ thickness = $400 \div 4$ (1)
- 100 (arbitrary units) (1)

4. [3] Triple only

- rate of diffusion is proportional to surface area (1)
- and inversely proportional to thickness, so doubling both cancels out (1)
- rate stays the same, so the student is not correct (1)