

Foundation Separate version — Higher Tier (★) questions removed.

**Q1. Define diffusion and state whether energy is required.**

[2 marks]

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**Q2. Describe how THREE factors affect the rate of diffusion.**

[3 marks]

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**Q3. Explain how the alveoli in the lungs are adapted for efficient gas exchange by diffusion.**

[4 marks]

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**Total: 9 marks**

**Q1 (2 marks)**

*Define diffusion and state whether energy is required.*

- Net movement of particles from a region of HIGH concentration to a region of LOW concentration (down a concentration gradient) [1]
- Passive process — no energy (ATP) required [1]

**Q2 (3 marks)**

*Describe how THREE factors affect the rate of diffusion.*

- Steeper concentration gradient → faster diffusion [1]
- Higher temperature → more kinetic energy → faster diffusion [1]
- Larger surface area → faster diffusion [1] — accept: shorter/thinner membrane

**Q3 (4 marks)**

*Explain how the alveoli in the lungs are adapted for efficient gas exchange by diffusion.*

- Large total surface area — millions of tiny alveoli [1]
- Thin walls — one cell thick, minimises diffusion distance [1]
- Dense capillary network — continuously removes O<sub>2</sub> and delivers CO<sub>2</sub>, maintaining steep concentration gradient [1]
- Moist lining — gases dissolve before diffusing [1]