Full Higher Separate content. ★ = Higher Tier. ◆ = Separate Science only.

Q1. Explain how the alveoli are adapted for efficient gas exchange.

[4 marks]

★ HIGHER TIER

Q2. ★ Explain why surface area to volume ratio is important for gas exchange in organisms.

[3 marks]

Total: 7 marks

Q1 (4 marks)

Explain how the alveoli are adapted for efficient gas exchange.

- Large total surface area (millions of alveoli) [1]
- Thin walls (one cell thick) — short diffusion distance [1]
- Dense capillary network — maintains concentration gradient [1]
- Moist lining — gases dissolve before diffusing [1]

Q2 (3 marks) [★ HT]

★ Explain why surface area to volume ratio is important for gas exchange in organisms.

- Small organisms have large SA:V ratio — diffusion sufficient over short distances [1]
- Large organisms have small SA:V ratio — diffusion too slow for internal cells [1]
- Specialised exchange surfaces needed — large area, thin membrane to maximise rate [1]