

Exercise walk-through

Gas exchange in humans ■ 11.1

eXercise

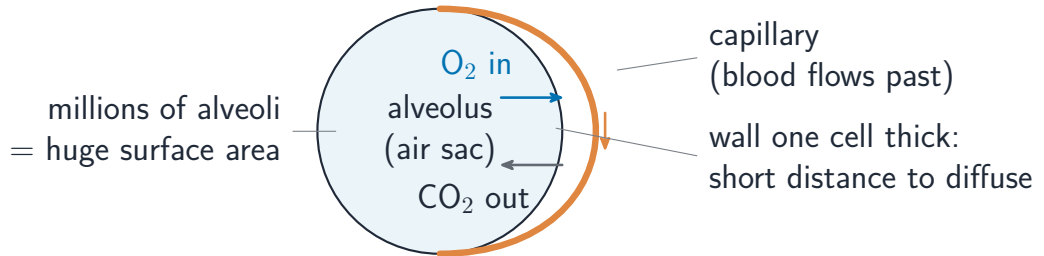
You must be able to

- give the four features of a gas exchange surface
- explain how the alveoli are adapted
- describe breathing in/out and compare inspired and expired air

Method — Alveoli and breathing

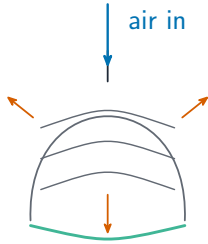
- expired air: less O , more CO , more water vapour. Limewater tests for CO .

Method — Alveoli and breathing

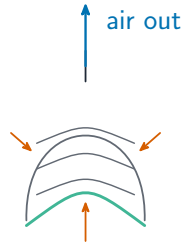


An alveolus: O₂ in, CO₂ out, across a one-cell wall

Method — Alveoli and breathing



breathing in
thorax bigger,
pressure lower



breathing out
thorax smaller,
pressure higher

green = diaphragm orange arrows = movement

Breathing in (thorax bigger) vs breathing out (thorax smaller)

Practice 2.1 ■ 2 marks

State two features of a good gas exchange surface.

Solution 2.1

Method: Alveoli and breathing

Worked steps

any two of: large surface area; thin surface; good blood supply; good ventilation

B1 **B1**.

Practice 2.2 ■ 1 mark

State how expired air differs from inspired air in carbon dioxide.

Solution 2.2

Worked steps

expired air contains more carbon dioxide **B1**.

Exam-style 3.1 ■ 1 mark

During breathing in, the diaphragm:

A relaxes and domes up

B contracts and flattens

C stays still

D moves sideways

Solution 3.1

A relaxes and domes up

B contracts and flattens 

C stays still

D moves sideways

Worked steps

B. The diaphragm contracts and flattens when breathing in.

Exam-style 3.2 ■ 1 mark

Oxygen passes from the alveoli into the blood.

- (a) Name the process.
- (b) Explain two ways the alveoli are adapted for fast gas exchange.

Solution 3.2

Method: Alveoli and breathing

Worked steps

(a) diffusion **B1**.

(b) millions of alveoli give a large surface area **M1**; each wall is one cell thick / has a good blood supply, so exchange is fast **A1**.

Exam-style 3.3 ■ 2 marks

Describe how you could use limewater to show that expired air contains more carbon dioxide.

Solution 3.3

Method: Alveoli and breathing

Worked steps

bubble inspired and expired air through separate tubes of limewater **M1**; the lime-water with expired air turns cloudy faster (more CO) **A1**.