9 Gas exchange – Part 2

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English	**Write it 3 times** (English)		
alveoli			
diffusion			
capillaries			
surface area			
concentration gradients			
oxygen			
carbon dioxide			

Recall

From Part 1 you know air reaches the **alveoli** deep in the lungs. Here we see how the gases actually cross into the blood.

- Gases move by **diffusion** (from the Cell membranes sheet) – high to low concentration.
- Each alveolus is wrapped in tiny blood **capillaries** .

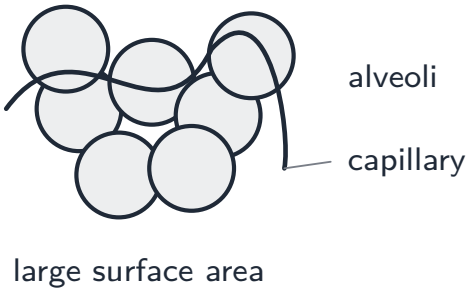
New ideas

Read these first, then do the Practice.

1 A good exchange surface

The alveoli are excellent for swapping gases because they have:

- a very large total **surface area** (millions of tiny sacs),
- very **thin** walls – the alveolus wall and the capillary wall are each only **one cell thick**,
- a rich blood supply,
- a **moist** lining, so gases dissolve before crossing.

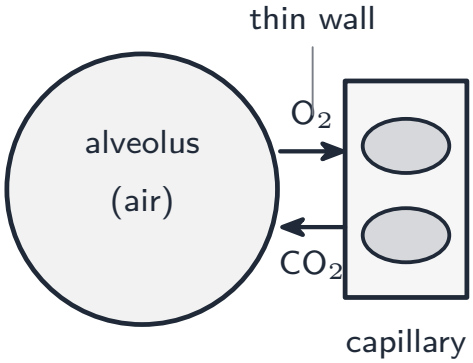


large surface area

2 Diffusion of the gases

Gases diffuse down their **concentration gradients** :

- **oxygen** is high in the alveolar air and low in the blood, so it diffuses **into** the blood.
- **carbon dioxide** is high in the blood and low in the air, so it diffuses **out** to be breathed out.



3 Keeping it fast

Breathing keeps fresh air in the alveoli, and the flowing blood keeps carrying the gases away. Both keep the concentration gradients **steep**, so gas exchange stays fast.

Watch out: gases cross the alveolus by *diffusion* down a concentration gradient. The

> alveoli are efficient because of a *large* surface area, *thin* (one-cell) walls, a rich blood supply and a moist lining – and breathing plus blood flow keep the gradient steep.

Practice

Try these in order.

9.1 State two features of the alveoli that make them good for gas exchange. [2]

9.2 In which direction does (a) oxygen, (b) carbon dioxide diffuse at the alveolus? [2]

9.3 The alveolus wall and capillary wall are each one cell thick. Explain why this helps gas exchange. [2]

9.4 By what process do the gases cross the alveolus wall? [1]

9.5 Explain how breathing and the flow of blood keep the concentration gradients steep. [2]

9.6 Suggest why having millions of tiny alveoli is better than one large air sac. [2]

9.7 Challenge. In the disease emphysema, the walls between alveoli break down, merging them into fewer, larger sacs. Explain why this makes gas exchange less efficient. [2]