

0	2
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Diffusion is an important process in animals and plants.

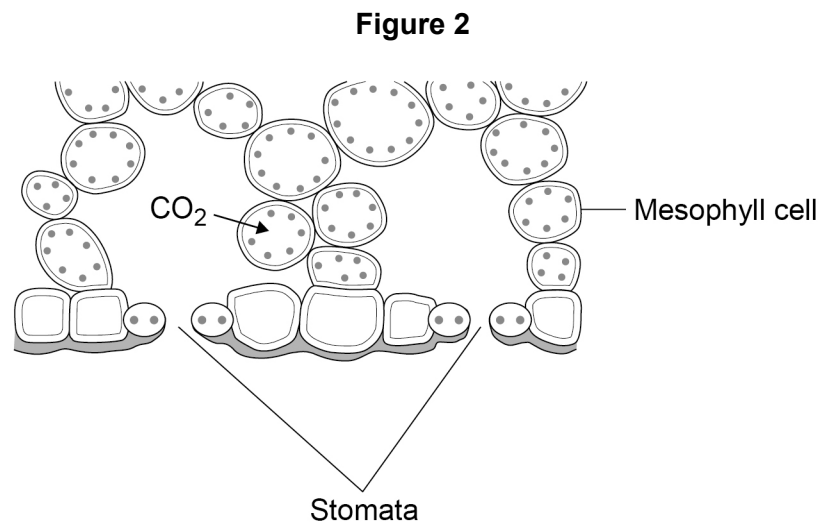
0	2	.	1
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What is meant by the term diffusion?

[2 marks]



0 2 . 2 Figure 2 shows part of a leaf.



Molecules of carbon dioxide diffuse from the air into the mesophyll cells.

Which **two** changes will increase the rate at which carbon dioxide diffuses into the mesophyll cells?

[2 marks]

Tick (✓) **two** boxes.

Decreased number of chloroplasts in the cells

Decreased surface area of cells in contact with the air

Increased carbon dioxide concentration in the air

Increased number of stomata that are open

Increased oxygen concentration in the air

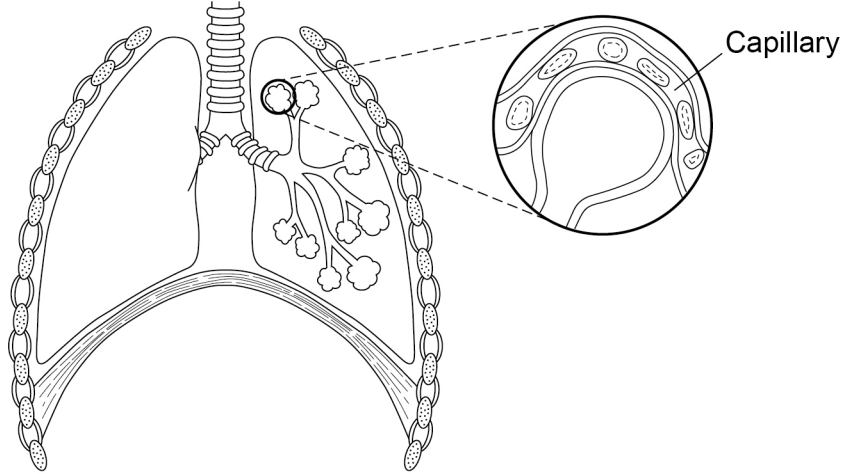
Turn over ►



0 **2** **3** Diffusion also happens in the human lungs.

Figure 3 shows the human breathing system.

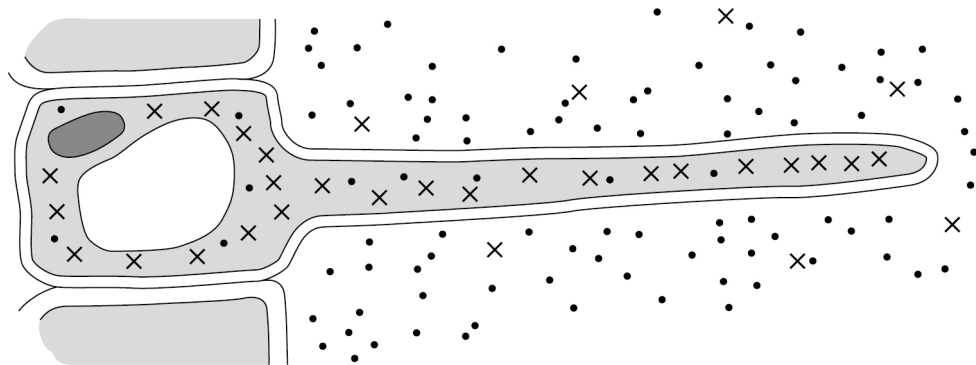
Figure 3



Explain how the human lungs are adapted for efficient exchange of gases by diffusion. **[6 marks]**

Figure 4 shows a root hair cell.

Figure 4



Key

- Water molecules
- ×× Nitrate ions

0 2 . 4

Name the process by which water molecules enter the root hair cell.

[1 mark]

0 2 . 5

Nitrate ions need a different method of transport into the root hair cell.

Explain how the nitrate ions in **Figure 4** are transported into the root hair cell.

Use information from **Figure 4** in your answer.

[3 marks]

Name of process _____

Explanation _____

14

Turn over ►



Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	movement / spreading out of molecules / particles	allow movement / spreading out of (named) substances / chemicals / gases / liquids ignore reference to membranes / cells	1	AO1 4.1.3.1
	from (an area of) high(er) concentration to (an area of) low(er) concentration	allow down / with the concentration gradient ignore along / across the concentration gradient do not accept movement from / to a concentration gradient	1	
02.2	increased carbon dioxide concentration in the air		1	AO2 4.1.3.1 4.2.3.2
	increased number of stomata that are open		1	

02.3	Level 3: Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account.	5–6	AO1 4.1.3.1 4.2.2.2 4.2.2.3
	Level 2: Relevant points (reasons/causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.	3–4	
	Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.	1–2	
	No relevant content	0	
	Indicative content <ul style="list-style-type: none"> • (many) alveoli <ul style="list-style-type: none"> • provide a large(r) surface area (: volume) • capillaries are thin <ul style="list-style-type: none"> or alveoli / capillary walls are thin or one cell thick or capillaries are close to the alveoli • which provides short diffusion path (for oxygen / carbon dioxide) • breathing (mechanism) moves air in and out <ul style="list-style-type: none"> or lungs are ventilated • to bring in (fresh) oxygen • to remove carbon dioxide • to maintain a concentration / diffusion gradient • large capillary network (around alveoli) <ul style="list-style-type: none"> or good blood supply • to remove oxygen(ated blood) quickly • to bring carbon dioxide to the lungs quickly • to maintain a concentration / diffusion gradient 		

02.4	osmosis	allow diffusion	1	AO1 4.1.3.1 4.2.3.2 4.1.3.2
02.5	active transport (because) energy is needed (to move nitrate ions) from a low(er) concentration (in the soil) to a high(er) concentration (in the root / cell)	allow (to move nitrate ions) against / up the concentration gradient allow (because) there is a lower concentration (of nitrate ions) in the soil or (because) there is a higher concentration (of nitrate ions) in the root / cell ignore reference to amount / number of nitrate ions ignore along / across the concentration gradient do not accept if reference to molecules / atoms moving	1 1 1	AO3 AO2 AO2 4.1.1.3 4.2.3.2 4.1.3.3
Total			14	