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In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.

Diffusion is an important process in animals and plants.

The movement of many substances into and out of cells occurs by diffusion.

Describe why diffusion is important to animals and plants.

In your answer you should refer to:

- animals
- plants
- examples of the diffusion of named substances.

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Extra space

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(Total 6 marks)

Mark schemes

1 Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also apply a 'best-fit' approach to the marking.

0 marks

No relevant content.

Level 1 (1 – 2 marks)

An example is given of a named substance

or

a process

or

there is an idea of why diffusion is important eg definition.

Level 2 (3 – 4 marks)

At least one example of a substance is given

and

correctly linked to a process in either animals or plants.

Level 3 (5 – 6 marks)

There is a description of a process occurring in either animals or plants that is correctly linked to a substance

and

a process occurring in the other type of organism that is correctly linked to a substance.

examples of points made in the response

Importance of diffusion:

- to take in substances for use in cell processes
- products from cell processes removed

Examples of processes and substances:

- for gas exchange / respiration: O₂ in / CO₂ out
- for gas exchange / photosynthesis: CO₂ in / O₂ out
- food molecules absorbed: glucose, amino acids, etc
- water absorption in the large intestine
- water lost from leaves / transpiration
- water absorption by roots
- mineral ions absorbed by roots

extra information

Description of processes might include:

- *movement of particles / molecules / ions*
- *through a partially permeable membrane*
- *(movement of substance) down a concentration gradient*
- *osmosis: turgor / support / stomatal movements*

[6]

Examiner reports

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Students were required to describe why diffusion is important to animals and plants. The quality of written communication was also taken into account in the awarding of marks. Most students gave a definition of diffusion, although this was not always an accurate one. 'Cells' moving by diffusion was a common error, as was particles moving 'up' the concentration gradient. Selectively permeable membranes were often mentioned. Some students thought that diffusion was controlled by the nucleus. There was a long list of things that were incorrectly described as diffusing, including 'light', 'energy', 'chlorophyll', 'pollen' and 'seeds'.

Correct answers generally made reference to oxygen, carbon dioxide, respiration and photosynthesis. A lot of answers were confused or nonspecific, e.g. oxygen and carbon dioxide moving 'in and out' during respiration. There was a lot of confusion between breathing, gaseous exchange and respiration. Answers relating to foods diffusing from the intestine into the blood were also muddled and vague.

Almost all students attempted this question and almost all were able to get into at least Level 1 (scoring 1 or 2 marks out of the 6 available). Even very weak students attempted to include information about both plants and animals in their answer. Many students gained 2 marks by a combination of a definition of diffusion and the name of a substance that could diffuse.

To attain Level 2 (3 or 4 marks), students had to establish a link between at least one named substance and a process that involved diffusion of that substance, common examples being oxygen diffusing into the blood in the lungs during gaseous exchange (or for respiration), or carbon dioxide diffusing into a plant leaf for photosynthesis.

A very small minority of students gave clear descriptions of processes that involved diffusion and hence achieved Level 3 (5 or 6 marks). For example, carbon dioxide diffusing into a leaf through the stomata and entering chloroplasts for photosynthesis, or an equation for the process of photosynthesis would have been a suitable description. To gain full marks it was necessary to give such details for either animals or plants and, at least, to link a substance and a process for the other type of organism.