

1.3.1 Diffusion

AQA GCSE Biology (Higher) Question and answer notes

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How to use these notes

These notes cover everything you need to know for this part of the specification. They have been written in question-answer format to make them easier for you to study from.

In order to study successfully, I recommend you do the following for each question and answer:

- Read it carefully and make sure you **understand** it.
- **Memorise** the answer.
- **Practice** applying your understanding to past exam questions.

A good way to memorise information is to use **retrieval practice**. This is when you practise retrieving information from your memory. You could do this by making a flashcard for each question with the question on one side and the answer on the other. Or you could use a flashcard app. Alternatively, use a sheet of paper to cover up the answer so you can only see the question. Try to answer the question and then check how you did.

You should practise retrieving each answer from your memory until you can do it perfectly. Even once you can retrieve the answer perfectly, your ability to retrieve it will probably fade as time passes without practising. Therefore you will need to keep going back to the questions that you have previously mastered and practising them again. However, each time you re-learn the answer, the memory will be stronger and will last longer than the time before.

What is diffusion?

Diffusion is the spreading out of the particles of a substance, resulting in a net movement from an area of higher concentration to an area of lower concentration (down the concentration gradient).

What types of substance can diffusion happen to?

Diffusion can happen to any substance in a solution or any gas.

What are two examples of organisms using diffusion?

Diffusion is used in gas exchange - oxygen and carbon dioxide move between the and the bloodstream by diffusion.

Diffusion is used in excretion of urea - urea diffuses from the cells that produce it into the bloodstream so that it can be removed by the kidneys.

Which factors affect the rate of diffusion?

The rate of diffusion is affected by:

- The size of the concentration gradient
- The temperature
- The surface area of the membrane

How does the size of the concentration gradient affect the rate of diffusion?

The larger the concentration gradient, the higher the rate of diffusion.

How does the temperature affect the rate of diffusion?

The higher the temperature, the higher the rate of diffusion.

How does the surface area of the membrane affect the rate of diffusion?

The higher the surface area of the membrane, the higher the rate of diffusion.

What happens to an object's surface area to volume ratio as its size increases?

As the size of an object increases, its surface area to volume ratio decreases.

What is exchange?

Exchange is the movement of biological molecules in and out of an organism.

What is transport?

Transport is the movement of biological molecules within an organism.

Which three processes can be used to move substances over short distances?

Diffusion, osmosis and active transport can be used to move substances over short distances.

What are exchange surfaces?

Exchange surfaces are specialised structures which multicellular organisms use to carry out exchange. They are folded to give a very high surface area, allowing a high rate of exchange. Examples include lungs, gills, intestines, roots and leaves.

What are transport systems?

Transport systems are specialised systems used by multicellular organisms to move substances over long distances. Examples include the xylem and phloem in plants and the circulatory system in animals.

How does surface area to volume ratio affect exchange?

A high surface area to volume ratio is needed for an organism to be able to meet its exchange needs. This is because the rate of exchange needed depends on the volume, whereas the rate of exchange that is possible depends on the surface area.

Why do unicellular organisms not need specialised exchange surfaces?

Unicellular organisms do not need specialised exchange surfaces because they are very small, meaning that they have high surface area to volume ratios even without specialised exchange surfaces.

Why do multicellular organisms need specialised exchange surfaces?

Multicellular organisms need specialised exchange surfaces because they are large, meaning that without specialised exchange surfaces they would have low surface area to volume ratios.

What are the features of effective exchange surfaces?

The features of effective exchange surfaces are:

- A large surface area
- A thin membrane (to provide a short diffusion path)
- An efficient blood supply (in animals)
- Being ventilated (in lungs in animals).

Why do multicellular organisms need transport systems?

Multicellular organisms need transport systems because they need to move substances over large distances. Diffusion, osmosis and active transport are too slow to work effectively over these distances.

What are the main transport systems in animals and plants?

The main transport system in animals is the circulatory system. The main transport systems in plants are the xylem and the phloem.

What is transported in the circulatory system?

The circulatory system transports oxygen, carbon dioxide, glucose and other nutrients, urea, hormones and antibodies.

What is transported in the xylem?

The xylem transports water and mineral ions.

What is transported in the phloem?

The phloem transports sucrose.