

Diffusion

KS3 Biology · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

Someone sprays perfume at the front of a classroom. Explain why people at the back smell it a little later.

Step 1 · Where is the concentration high?

Perfume particles start in a high concentration near the spray.

Step 2 · What do the particles do?

They move randomly and collide with air particles, spreading out.

Step 3 · Net movement

Overall they move from high to low concentration until spread evenly through the room — diffusion.

Answer: Perfume particles diffuse from high to low concentration

Check: Diffusion in air is slow over metres, which is why there is a delay.

2. Now try one with the steps

Which way does oxygen diffuse between an air sac in the lung and the blood?

Step 1 · Compare concentrations

Step 2 · Apply the rule

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Complete the definition: diffusion is the net movement of particles from an area of _____ concentration to an area of _____ concentration. [1]

2. Do particles need energy from the cell to diffuse? [1]

3. Name ONE gas that diffuses INTO animal cells. [1]

4. Name ONE substance that diffuses OUT of animal cells. [1]

5. Which part of the cell do substances diffuse through to get in or out? [1]

6. State TWO factors that make diffusion faster. [2]

7. Why does a tea bag work faster in hot water than in cold? [2]

8. In a leaf, carbon dioxide diffuses into the air spaces during the day. Explain why. [2]

9. Explain why diffusion eventually seems to stop. [2]

10. What is the surface area of a cube with 3 cm sides, in cm^2 ? [1]

11. A 3 cm cube has a surface area of 54 cm^2 and a volume of 27 cm^3 . Its surface area : volume ratio is ? : 1. What is the missing number? [2]

12. Dye took 90 s to spread at 30°C and 150 s at 10°C . How many seconds faster was it at 30°C ? [1]

13. Explain why a large animal like a cow cannot rely on diffusion alone to get oxygen to all its cells. [3]

14. Planning: name the independent and dependent variables in an investigation of how temperature affects the rate of diffusion of dye in water. [2]
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4. Before you hand it in

"Particles diffuse because they want to spread out."

Particles move randomly. More of them happen to move from where they are crowded to where there are few, so the net movement is from high to low concentration.

"When diffusion finishes, the particles stop moving."

They keep moving, but equal numbers move each way, so there is no NET movement.

"Diffusion only happens in gases."

Dye in water, glucose in blood and oxygen into cells all diffuse. It does not happen in solids because the particles cannot move about.

Saying oxygen moves 'from low to high' into blood.

Always state where the concentration is high and where it is low, then say particles move from high to low.