Solutions

Each answer shows the steps, then the **result**.

2.1

- net movement of particles from **higher** to **lower** concentration
- **down a concentration gradient**

2.2

- the energy comes from the **kinetic energy** of the particles' random movement

2.3

- oxygen, or water vapour

2.4

- a larger surface area to volume ratio gives faster diffusion into the whole volume

3.1 B

- **higher** temperature makes particles move faster, so diffusion is faster
- A and C slow it; D is false

3.2

(a)

- oxygen moves down its concentration gradient: **diffusion**

(b)

- any **two** of: larger surface area / higher temperature / steeper gradient / shorter distance

3.3

- particles move using their own **random (kinetic) energy**
- so **no extra energy from respiration** is needed

3.4

(a)

- surface area $= 6 \times 2 \times 2 = 24$ cm^2; volume $= 2 \times 2 \times 2 = 8$ cm^3
- ratio $= 24 : 8 = \mathbf{3} : \mathbf{1}$

(b)

- the 1 cm cube
- it has the larger surface area to volume ratio (6 : 1), and the acid has a shorter distance to diffuse to the centre

3.5

- particles have more kinetic energy in warm water, so they move faster
- so the dye particles spread down their concentration gradient more quickly