Solutions

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

2.1

- movement of particles from **lower to higher** concentration (against the gradient)
- using **energy from respiration**

2.2

- the energy comes from **respiration**

2.3

- the **mitochondria**

2.4

- uptake of glucose by cells lining the small intestine (or the kidney tubules)

3.1 C

- **active transport** moves particles **against** the gradient
- A and B go down the gradient; D is not a membrane process

3.2

(a)

- ions more concentrated inside: **active transport**

(b)

- the ions move **against** the concentration gradient
- which **requires energy**

3.3

- **carrier proteins** pick up the ions/molecules
- and carry them across the membrane **using energy**

3.4

(a)

- the rate of ion uptake **decreases**

(b)

- without oxygen the cells cannot carry out aerobic respiration, so less energy is released
- active transport needs energy to move ions against their concentration gradient

3.5

- active transport moves particles against (up) a concentration gradient; diffusion moves them down it
- active transport needs energy from respiration and carrier proteins; diffusion does not