

Solutions

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

2.1

- No

2.2

- Against the gradient (low
- high)

2.3

- The sodium-potassium pump (or any pump moving ions against the gradient)

3.1 B

- requires ATP and moves against the gradient

3.2

(a)

- Active transport

(b)

- Moving ions against their gradient does not happen spontaneously, so energy from ATP is needed to power the pump

3.3

- Oxygen moves **down** its gradient (passive, spontaneous, no energy); glucose is moved **against** its gradient, which is not spontaneous and requires ATP (active transport)