

Solutions

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

2.1

- a **cell wall**
- **chloroplasts**
- a **large permanent vacuole**

2.2

- found only in the bacterium: **circular DNA** and **plasmids**
- a bacterium has **no nucleus** – also acceptable: no mitochondria, no chloroplasts, no large permanent vacuole

2.3

- a neurone is very **long**, and has fine branches at its ends
- so a single cell can carry an **electrical impulse** a long way, for example from the foot to the spinal cord

2.4

- the egg cell contains **food stores** in its cytoplasm
- which feed the **embryo** until it implants and the placenta can supply it
- also acceptable: the **jelly coat**, which changes after one sperm enters so that no second sperm can get in

2.5

- from the **division of existing cells**

2.6

- a **tissue** is a group of cells of similar structure working together to do one job
- for example **muscle tissue**, or **palisade tissue** in a leaf
- an **organ** is several tissues working together to do one job
- for example the **heart**, the **stomach** or a **leaf**

3.1 B

- a **cell wall** is present in plant cells and bacterial cells, and absent from animal cells
- **A** is in plant cells only; **C** is in plant and animal cells but not bacteria; **D** is in all three

3.2

- **ciliated cell**: it has **cilia** on its surface, which beat and sweep the mucus, with its trapped particles, along the trachea
- **palisade mesophyll cell**: it is packed with **chloroplasts** and is tall, so it absorbs as much light as possible for photosynthesis

- **sperm cell:** it has a **flagellum**, which beats so the sperm can swim to the egg cell; the **acrosome** and the **mitochondria** are equally acceptable, each with its own reason

3.3

(a)

- a **tissue** is a group of cells of similar structure working together to do one job
- an **organ** is several tissues working together to do one job
- an **organ system** is several organs working together

(b)

- any one of: **palisade tissue, xylem, phloem, epidermis**
- with its function: palisade tissue carries out photosynthesis; xylem carries water; phloem carries sucrose; the epidermis covers and protects the leaf

(c)

- a leaf contains **more than one tissue** – palisade tissue, xylem, phloem and epidermis
- a tissue is only **one** kind of cell working together, so a structure built from several tissues is an organ

(d)

- its genetic material is a **loop of DNA**, loose in the **cytoplasm**
- genes are also carried on **plasmids**

(e)

- all new cells are produced by the **division of existing cells**
- the cells at the edge of the cut divide, producing new cells that fill the gap and close the wound