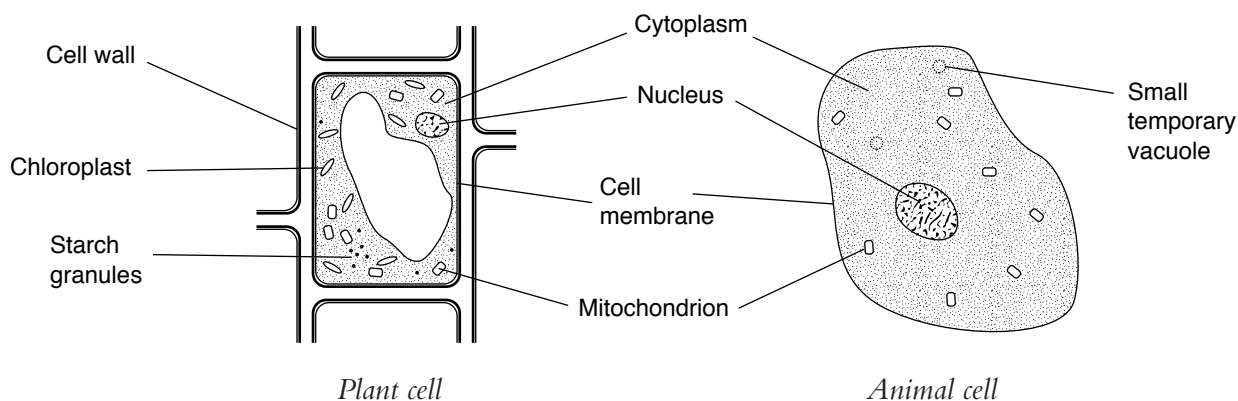


Cells

Most living things are made up of **cells**. Cells are the building blocks of organisms in the same way that bricks are the building blocks of houses.

Nearly all living cells have three features in common:

- A **nucleus**. This is bounded by a **nuclear membrane** and contains threadlike **chromosomes** made of the chemical DNA. The nucleus:
 - controls all the activities of the cell
 - contains genetic information (carried in the chromosomes) which is passed on from the parent cell to daughter cells when the cell divides.
- **Cytoplasm**. A jelly-like material outside the nucleus and occupying most of the cell. The cytoplasm:
 - is where most of the cell's chemical reactions take place
 - contains membrane-bound structures called **organelles** which have specific functions. For example, organelles called mitochondria are responsible for respiration.
- A **cell membrane**. This is a partially permeable membrane enclosing the cytoplasm. The cell membrane:
 - forms the boundary of the cell
 - controls the passage of substances in and out of the cell.



In addition, the following structures are found in plant cells only:

- **Cell wall**. This is a rigid wall of cellulose surrounding the cell membrane. It gives shape and support to the cell.
- **Sap vacuole**. A large, fluid-filled space in the cytoplasm and bounded by a thin membrane. It pushes the cytoplasm out against the cell wall and makes the cell turgid.
- **Chloroplasts**. These are organelles found in many plant cells. They contain the green pigment **chlorophyll** which traps light energy. Chloroplasts are the site of **photosynthesis** in plant cells.

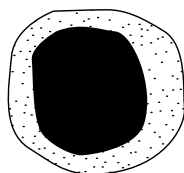
Questions

- 1 The table below summarises the basic differences between plant and animal cells. Insert these words or phrases in the correct places in the table. Each word or phrase may be used more than once: Have, Do not have, Never, Often.

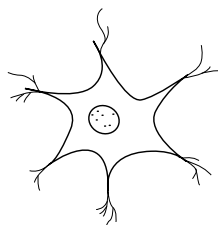
Plant cells:	Animal cells:
..... a cell wall	 a cell wall
..... have a large permanent sap vacuole	Vacuoles, if present, are small and temporary
..... contain chloroplasts	 contain chloroplasts
..... contain starch granules	 contain starch granules

- 2 The illustrations below show four cells.

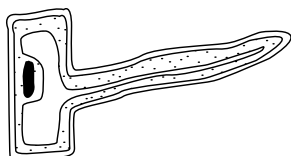
A



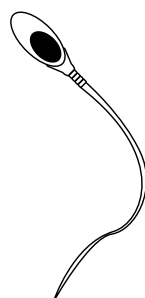
B



C



D

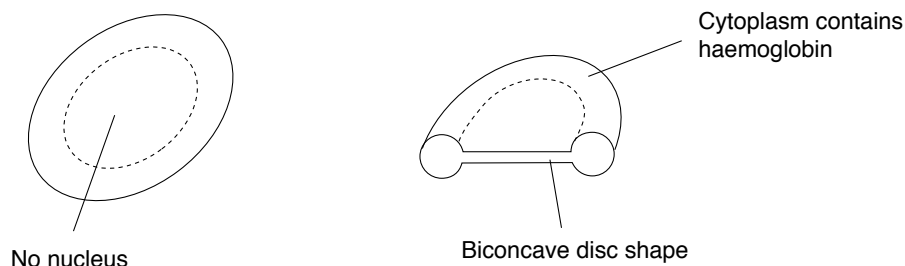


Note: The cells are not drawn to scale

- a Which cell belongs to a plant? _____
- b Give two reasons for your answer to part a:

- c Name three features that all four cells have in common.

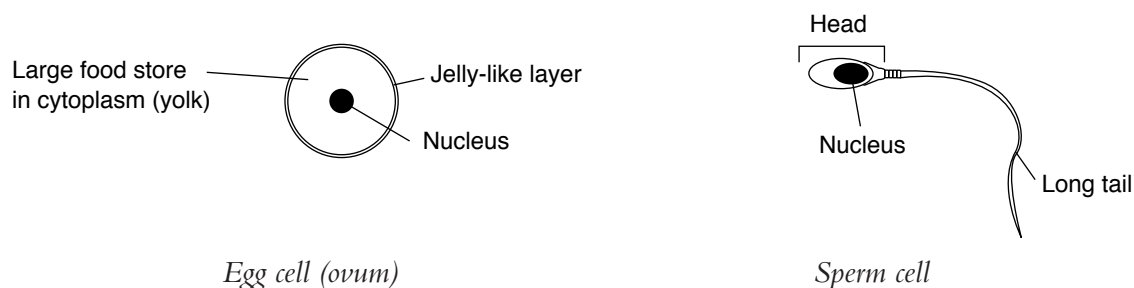
3 The illustrations below show a labelled red blood cell complete and cut in half.



In the table below explain how each feature helps the red blood cell carry out its function.

Feature	How this feature helps the cell to carry out its function
Biconcave disc shape	
Cytoplasm containing haemoglobin	
No nucleus	

4 The diagrams below show an egg cell (ovum) and a sperm cell from a human. The cells are not drawn to scale.



In the table below explain how each feature helps the cell carry out its function.

Feature	How this feature helps the cell to carry out its function
Sperm cell: Long tail	
Egg cell (ovum): Large food store in cytoplasm	
Jelly-like layer	

Answers

1

Plant cells:	Animal cells:
Have (1) a cell wall	Do not have (1) a cell wall
Often (1) have a large permanent sap vacuole	Vacuoles, if present, are small and temporary
Often (1) contain chloroplasts	Never (1) contain chloroplasts
Often (1) contain starch granules	Never (1) contain starch granules

Total 7 marks

- 2 a C belongs to a plant. (1)
- b C has a cell wall and a large vacuole. Both are features of plant cells. (2)
- c Cells A–D all have a nucleus, cytoplasm and a cell membrane. (3)

- 3 The red blood cell's function is to transport oxygen:

Feature	How this feature helps the cell to carry out its function
Biconcave disc shape	This gives the cell a large surface area so that it can absorb more oxygen (2)
Cytoplasm containing haemoglobin	The pigment haemoglobin combines with oxygen (1)
No nucleus	Without a nucleus there is more space to pack haemoglobin into the cytoplasm and so carry more oxygen (2)

Total 5 marks

4

Feature	How this feature helps the cell to carry out its function
Sperm cell:	
Long tail	The tail enables the sperm to swim to meet the ovum (2)
Egg cell (ovum):	
Large food store in cytoplasm	Provides energy for the growth of the fertilised ovum (zygote) (2)
Jelly-like layer	Helps prevent fertilisation by more than one sperm (2)

Total 6 marks