

Cells – the Building Blocks of Life

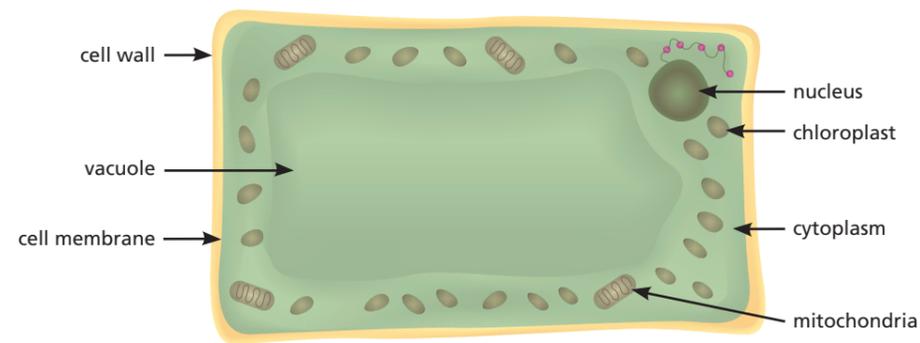
You must be able to:

- Use a microscope to help understand the functions of the cell
- Remember the differences between animal and plant cells
- Understand how substances move into and out of cells by diffusion
- Understand the organisation of cells.

Using a Light Microscope

- Cells are too small to see with the naked eye. Using a light microscope helps us to see and draw cells.

A plant cell drawn after observation with a light microscope



Key Point

Objects need to be placed on a slide, stained and covered with a coverslip, placed on the 'stage' of the microscope, illuminated and then focussed.

How Plant and Animal Cells Work

- Animal and plant cells share some features but not others.
- Different parts of animal and plant cells have different functions.

Part	Function	Animal Cells?	Plant Cells?
Membrane	Controls what enters and leaves the cell	Yes	Yes
Cytoplasm	Place where lots of chemical reactions (photosynthesis) take place	Yes	Yes
Nucleus	Stores information (in DNA) and controls what happens in the cell	Yes	Yes
Mitochondria	Release energy from food (glucose) by aerobic respiration	Yes	Yes
Cell wall	Made from cellulose and gives rigid support to the cell	No	Yes
Vacuole	Inflates the cell like air pumped into a tyre and provides support to the cell	No	Usually
Chloroplast	Contains green chlorophyll that changes sunlight energy into glucose food energy	No	Yes

Diffusion

- **Diffusion** is one of the ways that substances enter and leave cells.
- In an animal cell, oxygen and glucose diffuse through the membrane into the cell. This is because there is more oxygen and glucose outside the cell than there is inside.
- Carbon dioxide and waste products diffuse out of the cell into the blood.
- In a plant cell, carbon dioxide diffuses in. Oxygen and glucose diffuse out.

Unicellular Organisms

- **Unicellular** organisms have just one cell.
- *Euglena* has a long whip-like structure to help it move through water.
- *Amoeba* can make finger-like projections to catch food.

Organisation of Cells

- Cells of the same type carrying out the same function are usually grouped together to form a **tissue**, e.g. skin cells.
- Different types of tissue are grouped together to form **organs**, e.g. the brain.
- Different types of organs are grouped together to form **organ systems**, e.g. the nervous system.
- Different types of organ systems work together to form the organism, e.g. a human being.
- Examples of cell and organ systems include:
 - Bone cells in the skeletal system
 - Blood cells in the transport system
 - Nerve cells in the nervous system
 - Sperm cells in the reproductive system.

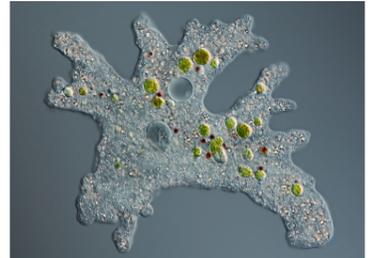
Quick Test

1. Name one structure that is found in plant cells but not animal cells.
2. Where in a cell is energy released from food?
3. Name the process where molecules move from where there are lots of them to where there are only a few.
4. Put these words in order of complexity starting with 'cell': cell, organism, organ, system, tissue.

Key Point

Diffusing substances always move from where there is a lot of the substance (high concentration) to where there is very little (low concentration).

Amoeba as seen through a microscope



Key Point

cells → tissues → organs → systems → organisms

Key Words

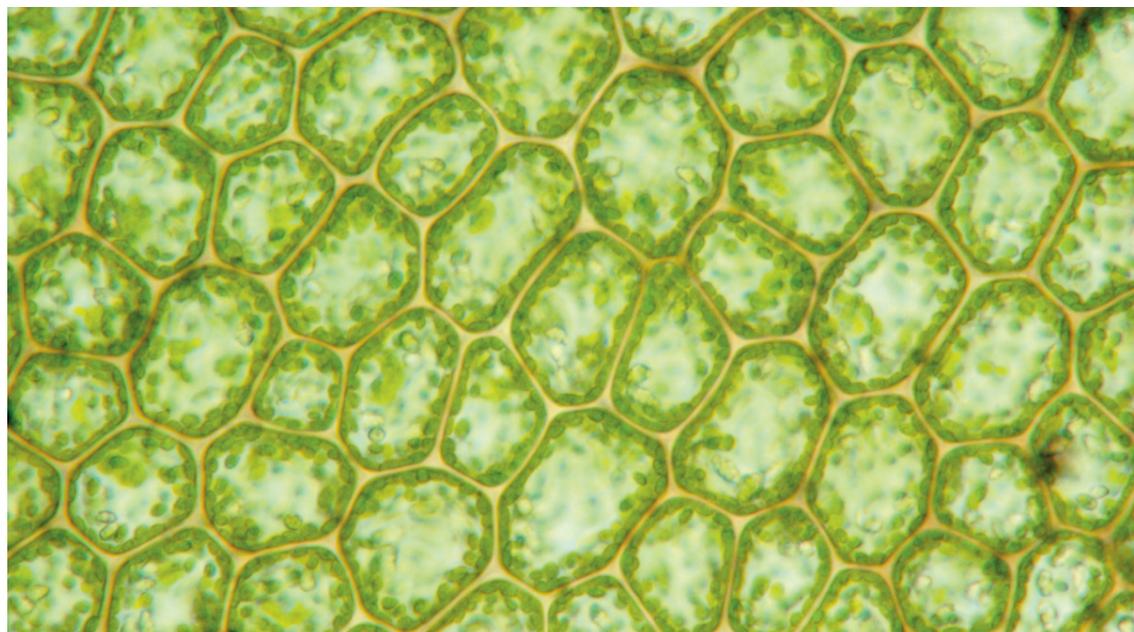
membrane
cytoplasm
nucleus
mitochondria
cell wall
vacuole
chloroplast
diffusion
unicellular
tissue
organ
organ system

Cells – the Building Blocks of Life

1 Match the part of a cell to its function.

Part of cell	Function
Membrane	Changes light energy into food energy
Cytoplasm	Inflates the cell
Nucleus	Supports the cell
Mitochondria	Releases energy from glucose
Cell wall	Stores information and controls the cell
Vacuole	Where chemical reactions take place
Chloroplast	Controls what enters and leaves a cell

2 These plant cells were seen using a microscope. Make a labelled drawing of one of them.



3 Which of these words describes how substances can enter or leave a cell?

- i) cytoplasm ii) vacuole iii) diffusion

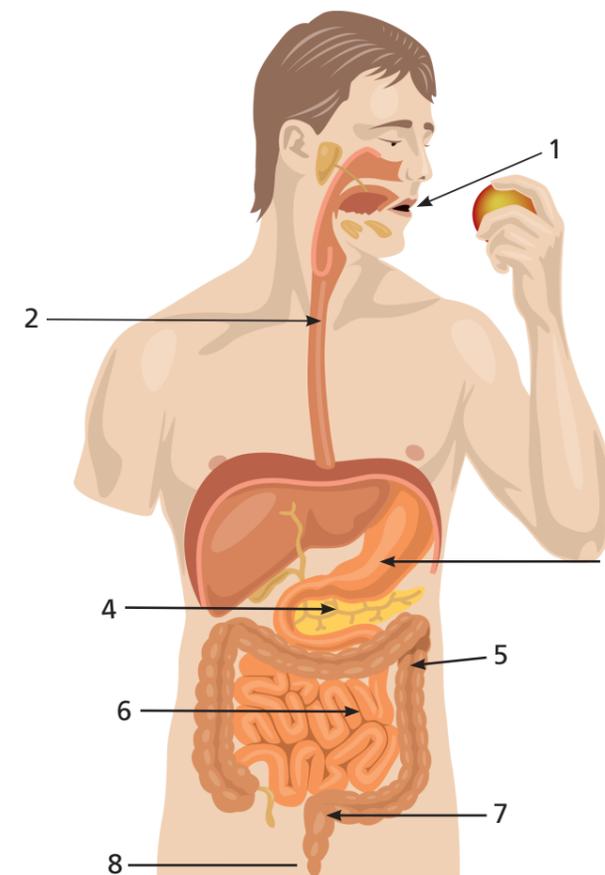
Eating, Drinking and Breathing

1 Humans need to eat a healthy diet.

a) Explain what is meant by a healthy diet. [2]

b) Write down three things that can happen if we do not have a healthy diet. Explain your three answers. [3]

2 Look at the diagram of the digestive system.



a) Give the correct names for each part 1–8. [8]

b) Explain what each of the parts you have labelled does. [8]

3 Explain the difference between feeding in animals and feeding in plants. [4]

Getting the Energy your Body Needs

1 Copy the table below and draw a straight line from each description of respiration, to the correct type of respiration.

Type of respiration	Description of respiration	Type of respiration
Aerobic	Uses oxygen	Anaerobic
	Produces lactic acid	
	Produces alcohol	
	Releases the least amount of energy	

[4]

2 Complete the following word equations:

a) for aerobic respiration



b) for fermentation in yeast



c) for anaerobic respiration in humans



3 Explain why respiration in living organisms is so important. [2]

4 The skeleton is an important structure.

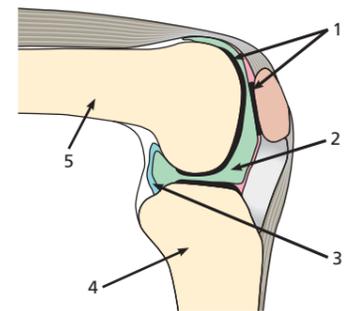
Copy the table and put a tick (✓) in the boxes next to each function performed by the skeleton.

Carries oxygen around the body	
Supports the body	
Helps with movement	
Where food is digested	
Protects some organs	
Makes red blood cells	
Where anaerobic respiration takes place	

[4]

5 Joints allow the skeleton to move. Identify the structures numbered 1–5 in the diagram of the knee joint.

[5]

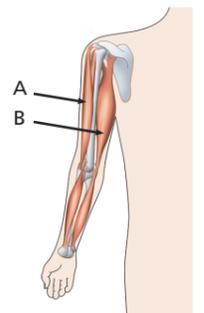


6 Look at the diagram of the human arm.

a) Explain the job done by organ A. [2]

b) Explain the job done by organ B. [2]

c) What single word best describes these two organs? [1]



Looking at Plants and Ecosystems

1 a) Complete this word equation for photosynthesis:

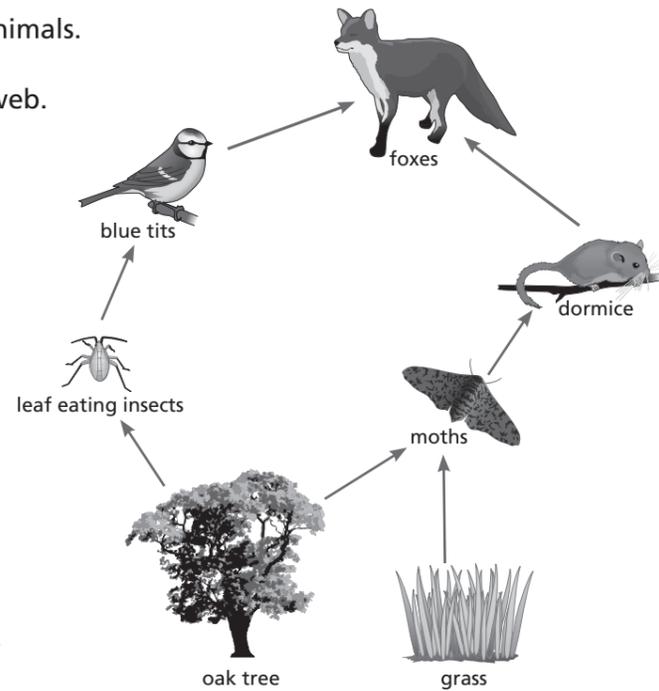


b) Write down two other things needed for photosynthesis to take place. [2]

2 Using the two gases, carbon dioxide and oxygen, show how animals and plants are dependent upon each other. [4]

5 This question is about plants and animals.

a) Look at the diagram of a food web.



A farmer uses a pesticide to kill leaf-eating insects.

Suggest what effect a reduction of leaf-eating insects would have on the numbers of **blue tits** and **moths**.

Explain your answer.

Blue tits

2 marks

Moths

2 marks

b) Both plants and animals can respire, but only plants can photosynthesise.

Read the statements about photosynthesis and respiration. Some are true. Some are false.

Put a tick (✓) in the boxes next to the true statements.
Put a cross (X) in the boxes next to the false statements.

	✓ or X
Respiration stores energy as light	
Photosynthesis uses energy from light	
Respiration breaks down large molecules to smaller molecules	
Photosynthesis creates organic molecules from inorganic molecules	
Respiration releases energy from chlorophyll	
Photosynthesis stores energy as light	

6 marks

c) Many species of plants and animals are in danger of extinction.

i) Red kites are a type of bird found in England. Some people say that red kites were once extinct in England.

Explain why this is the wrong use of the word extinction.

.....
.....

1 mark

ii) Dinosaurs once existed. Now they are extinct.

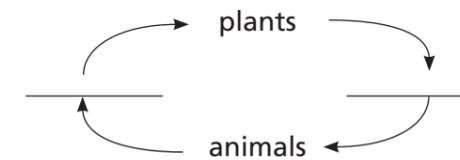
Suggest what must happen to cause species such as dinosaurs to become extinct.

.....
.....

2 marks

d) Animals and plants are interdependent.

Complete the diagram to show how animals and plants depend upon one another for **oxygen** and **carbon dioxide**. Write the name of each gas in the correct space.



1 mark

e) Many scientists are responsible for our understanding of the interdependence of plants and animals.

Which of these statements best describe how scientists work?

Put ticks (✓) in the boxes next to the **three** best answers.

Most scientific discoveries are the result of a scientist building on the work of a previous scientist	
Once a scientist has an idea they never change their mind	
Scientists never share their ideas with others	
Scientists have their results checked by other scientists	
Scientists use data from experiments to check their ideas	
Scientists never consider risk when doing experiments	

3 marks

TOTAL

17