

LIFE PROCESSES

Living organisms have certain life processes in common. There are seven things that they need to do to count as being alive. The phrase **MRS GREN** is one way to remember them:

- **M**ovement - all living things move, even plants
- **R**espiration - getting energy from food
- **S**ensitivity - detecting changes in the surroundings
- **G**rowth - all living things grow
- **R**eproduction - making more living things of the same type
- **E**xcretion - getting rid of waste
- **N**utrition - taking in and using food

It can be easy to tell if something is living or not. A teddy bear might look like a bear, but it cannot do any of the seven things it needs to be able to do to count as being alive.

A car can move, it gets energy from petrol (like nutrition and respiration), it might have a car alarm (sensitivity), and it gets rid of waste gases through its **exhaust** pipe (excretion). But it cannot grow or make baby cars. So a car is not alive.

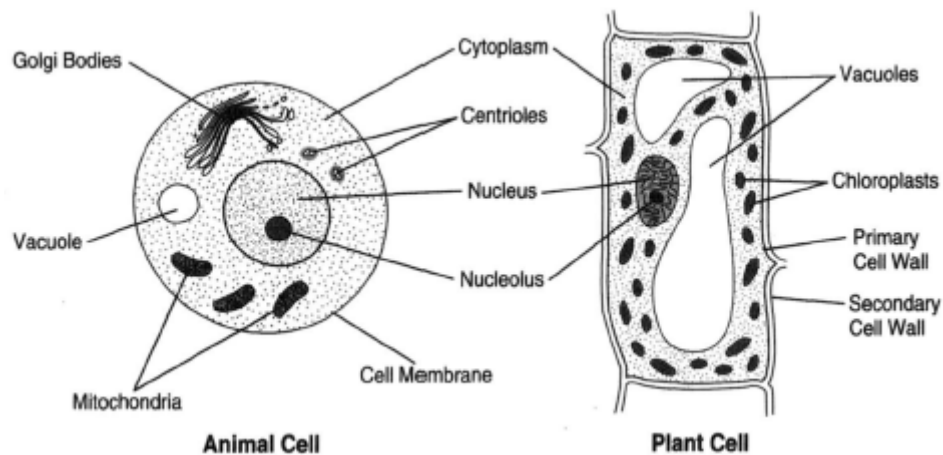
Cells

Cells are the basic building blocks of all animals and plants. They are so small; you need to use a light microscope to see them.

Animal cells and plant cells

Animal cells usually have an irregular **shape**, and plant cells usually have a regular shape. Cells are made up of different parts.

It is easier to describe these parts by using diagrams:



Animal cells and plant cells also contain tiny objects called mitochondria in their cytoplasm

Animal cells and plant cells both contain:

- **cell membrane**
- **cytoplasm**
- **nucleus**
- **mitochondria**

Plant cells also contain these parts, which are not found in animal cells:

- **cell wall**
- **vacuole**
- **chloroplasts**

The table summarizes the functions of these parts:

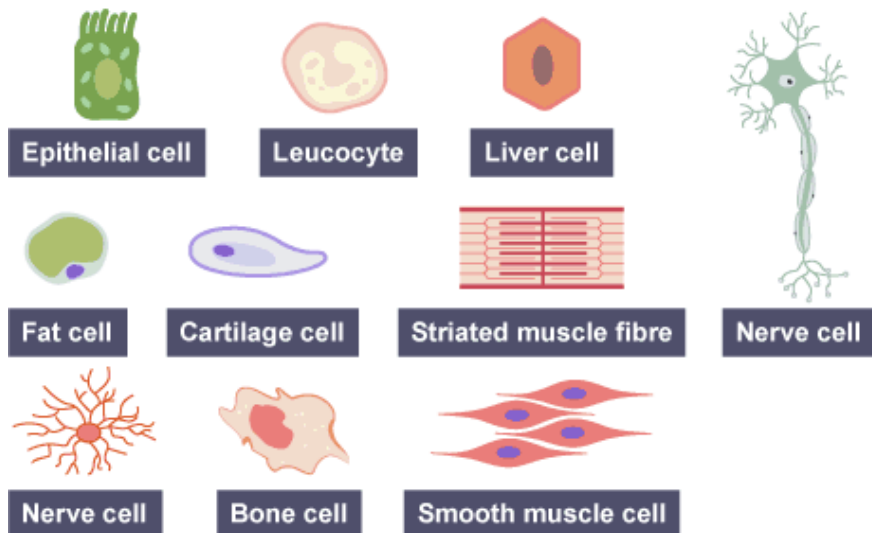
Part	Function	Found in
Cell membrane	Controls the movement of substances into and out of the cell	Plant and animal cells
Cytoplasm	Jelly-like substance, where chemical reactions happen	Plant and animal cells
Nucleus	Carries genetic information and controls what happens inside the cell	Plant and animal cells
Mitochondria	Where most respiration reactions happen	Plant and animal cells
Vacuole	Contains a liquid called cell sap, which keeps the cell firm	Plant cells only
Cell wall	Made of a tough substance called cellulose, which supports the cell	Plant cells only

Cells and their functions

Humans are **multicellular**. That means we are made of lots of cells, not just one cell. The cells in many multicellular animals and plants are **specialized**, so that they can share out the processes of life. They work together like a team to support the different processes in an organism.

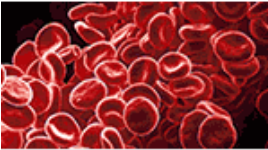
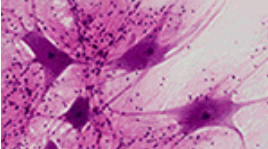
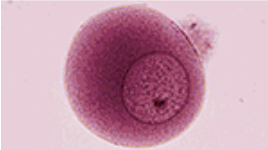



Specialized cells

The diagrams show examples of some specialized animal cells. Notice that they look very different from one another.



A selection of specialized animal cells

The tables show examples of some specialized animal and plant cells, with their functions and special features:

Image	Type of animal cell	Function	Special features
	Red blood cells	To carry oxygen	<ul style="list-style-type: none"> • Large surface area, for oxygen to pass through • Contains haemoglobin, which joins with oxygen • Contains no nucleus
	Nerve cells	To carry nerve impulses to different parts of the body	<ul style="list-style-type: none"> • Long • Connections at each end • Can carry electrical signals
	Female reproductive cell (egg cell)	To join with male cell, and then to provide food for the new cell that's been formed	<ul style="list-style-type: none"> • Large • Contains lots of cytoplasm
	Male reproductive cell (sperm cell)	To reach female cell, and join with it	<ul style="list-style-type: none"> • Long tail for swimming • Head for getting into the female cell
Image	Type of plant cell	Function	Special features
	Root hair cell	To absorb water and minerals	<ul style="list-style-type: none"> • Large surface area
	Leaf cell	To absorb sunlight for photosynthesis	<ul style="list-style-type: none"> • Large surface area • Lots of chloroplasts

Unicellular organisms

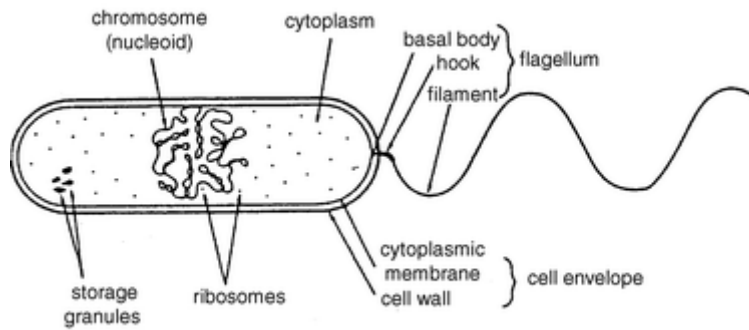
A **unicellular organism** is a living thing that is just one cell. There are different types of unicellular organism, including:

- bacteria
- protozoa
- unicellular fungi

You might be **tempted** to think that these organisms are very simple, but in fact they can be very complex. They have **adaptations** that make them very well suited for life in their environment.

Bacteria

Bacteria are tiny. A typical **bacterial cell** is just a few micrometers across (a few thousandths of a millimeter). The structure of a bacterial cell is different to an animal or plant cell. For example, they do not have a nucleus but they may have a flagellum. This is a tail-like part of the cell that can **spin**, moving the cell along.

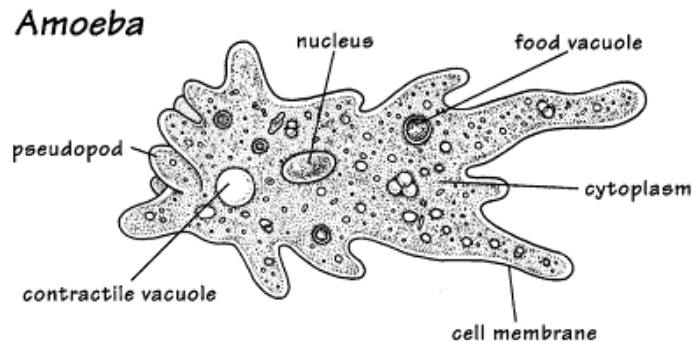


The main parts of bacteria

Protozoa

Protozoa are unicellular organisms that live in water or in **damp** places. The amoeba is an example of one. Although it is just one cell, it has adaptations that let it behave a bit like an animal:

- it produces pseudopodia (“false feet”) that let it move about
- its pseudopodia can surround food and take it inside the cell
- contractile vacuoles appear inside the cell, then merge with the surface to remove waste



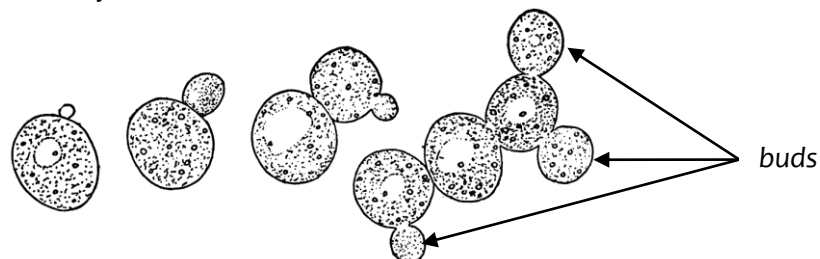
An image of an amoeba, showing several pseudopodia

Yeast

You may be familiar with fungi from seeing mushrooms and toadstools. Yeast is unicellular fungi. They are used by brewers and wine-makers because they convert sugar into alcohol and by bakers because they can produce carbon dioxide to make bread to rise.

Yeast has a cell wall, like plant cells, but no chloroplasts. This means they have to absorb sugars for their nutrition, rather than being able to make their own food by photosynthesis

Yeast can reproduce by producing a bud. The bud grows until it is large enough to split from the parent cell as a new yeast cell.



Several yeast cells showing buds

Cells, tissues, organs and systems

Multicellular organisms are organized into increasingly complex parts. In order, from least complex to most complex:

- cells
- tissues
- organs
- organ systems
- organism

Tissues

Animal cells and plant cells can form **tissues**, such as muscle tissue in animals. A living tissue is made from a group of cells with a similar structure and function, which all work together to do a particular job. Here are some examples of tissues:

- muscle
- the lining of the intestine
- the lining of the lungs
- xylem (tubes that carry water in a plant)

Organs

An **organ** is made from a group of different tissues, which all work together to do a particular job. Here are some examples of organs:

- heart
- lung
- stomach
- brain
- leaf
- root

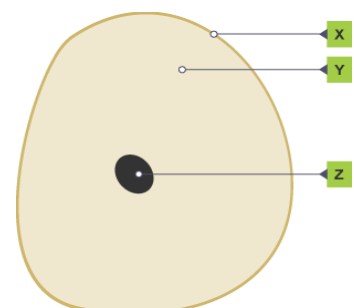
Organ systems

An **organ system** is made from a group of different organs, which all work together to do a particular job. Here are some examples of organ systems:

- circulatory system
- respiratory system
- digestive system
- nervous system
- reproductive system

READING COMPREHENSION

1. Getting rid of waste is one of the life processes. What name is given to this process?
 - a. Ingestion
 - b. Nutrition
 - c. Excretion**
2. What is shown by the labeling line X?
 - a. Cell wall
 - b. Cell membrane**
 - c. Cytoplasm



3. What is shown by the labeling line Y?
 - a. **Cytoplasm**
 - b. Nucleus
 - c. Vacuole

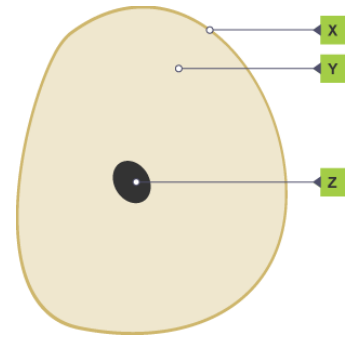
4. What is the job of the cell membrane?
 - a. **To control what substances go into and out of the cell**
 - b. To give a plant cell its shape
 - c. To control what happens inside the cell

5. Which of these is only present in plant cells?
 - a. Membrane
 - b. **Wall**
 - c. Nucleus

6. What is the job of the cell wall?
 - a. To control what substances go into and out of the cell
 - b. **To give a plant cell its shape**
 - c. It is where photosynthesis happens

7. What sort of structure is the heart?
 - a. A tissue
 - b. **An organ**
 - c. An organ system

8. Which of the following is not an organ system?
 - a. Circulatory system
 - b. Nervous system
 - c. **One-way system**



VOCABULARY

A	B	C
1. Exhaust	a. To make trial of	1) + d
2. Shape	b. Slight wetness in the air	2) +e
3. Tempted	c. To turn around repeatedly	3) +a
4. Spin	d. To draw off	4) +c
5. Damp	e. To embody in definite form	5) + b

GRAMMAR

Future: going to OR will?

Will	Example	Going to	Example
1. We use "will" when we decide to do something at the time of speaking.	A: What would you like to drink, sir? B: I will have a glass of milk, please.	1. We use "going to" to talk about a planned activity for future.	A: There is a good movie on TV tonight. B: Yes. I know. I am going to watch it.
2. We use "will" for prediction in the remote future	A: How is he, doctor? B: Don't worry. He will get better.	2. We use "going to" for prediction in the near future. The speaker is sure because there are signs about it.	She is standing at the edge of the cliff, she is going to fall.
3. We use "will" for requests, invitations and offers.	~ Will you shut the door, please? (Request) ~ Will you come to the cinema with me? (Invitation) ~ That bag looks very heavy. I will help you. (Offer)		
4. We generally use "will" for prediction with the following verbs and phrases. Believe, expect, hope, think, wonder, I'm sure, I'm afraid ...etc	I believe he will pass the exam.		

ACTIVITIES

A. Put in 'will' or 'be going to':

- A: We don't have any bread.
B: I know. I _____ (get) some from the shop.
- A: We don't have any bread.
B: Really? I _____ (get) some from the shop then.
- A: Why do you need to borrow my suitcase?
B: I _____ (visit) my mother in Scotland next month.
- A: I'm really cold.
B: I _____ (turn) the heating on.
- A: Are you going to John's party tonight?
B: Yes. Are you going too? I _____ (give) you a lift.

6. A: What are your plans after you leave university?

B: I _____ (work) in a hospital in Africa. I leave on the 28th.

7. (The phone rings)

A: I _____ (get) it!

8. A: Are you ready to order?

B: I can't decide ... Okay, I _____ (have) the steak, please.

9. A: Are you busy tonight? Would you like to have coffee?

B: Sorry. I _____ (go) to the library. I've been planning to study all day.

10. A: Why are you carrying a hammer?

B: I _____ (put up) some pictures.

B. Write the correct form of going to or will to complete the dialogue.

- LAURA: What are you doing this weekend, Jan?
- TANYA: I _____ (see) a new play tomorrow at the Royal Court theater.
- LAURA: Have you got the tickets yet?
- TANYA: NO, I _____ (get) them this afternoon, actually. Would you like to come?
- LAURA: Oh, thank you, that would be nice.
- TANYA: OK, I _____ (get) you a ticket too.
- LAURA: Great ... what time does it start?
- TANYA: Eight o'clock, but we _____ (all meet) in the Green Cafe at 7.15.
- LAURA: OK, I _____ (meet) you in the cafe, but, er... I (be) there around 7.30.
- TANYA: That's fine.
- LAURA: Oh, one other thing ... I've got no money at the moment... I _____ (pay) for the ticket on Saturday. Is that OK?
- TANYA: Yes, that's OK, no problem.
- LAURA: Great! Why don't we go eat something in the restaurant?
- TANYA: That's a good idea. I _____ (phone) the others and see if they want to come too.
- LAURA: Good, and I _____ (book) a table for us.
- TANYA: Great! I _____ (meet) you there in a moment.