Variety of Living Organisms

Living organisms share characteristics such as the ability to move and reproduce. There are different types of living organisms including plants, animals, fungi, bacteria and protoctists.

Characteristics of living organisms

Living organisms have the following characteristics in common:

- **Movement** - they can move and change their position.
- **Reproduction** – they can make more of the same kind of organism as themselves.
- **Sensitivity** – they can detect or sense stimuli and respond to them.
- **Growth** - they can permanently increase their size or dry mass by increasing the number or size of their cells.
- **Respiration** – they can create chemical reactions that break down nutrient molecules in living cells to release energy.
- **Excretion** – they can excrete toxic materials, waste products of metabolism, and excess substances (note that excretion is not the same as egestion).
- **Nutrition** - they can take in and absorb nutrients such as organic substances and mineral ions. These nutrients contain the raw materials or energy needed for growth and tissue repair.

The first letter of each of these characteristics makes up the acronym 'MRS GREN'. This is a good way of remembering them.

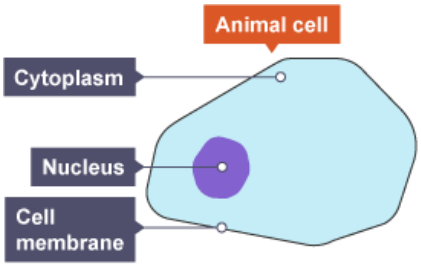
Living organisms can also control their internal conditions, such as their temperature or water content.

Animals

Animals are multicellular organisms – they consist of many cells that work together. Examples of animals include mammals (such as humans) and insects (such as houseflies and mosquitoes).

Animal cell structure

The main parts of an animal cell are the nucleus, cell membrane and cytoplasm.



Animal cells:

- do not have cell walls
- do not contain chloroplasts, so animals cannot carry out photosynthesis
- may store carbohydrate as glycogen

Animals usually have nerves or nervous systems for coordination, and they are able to move from place to place.

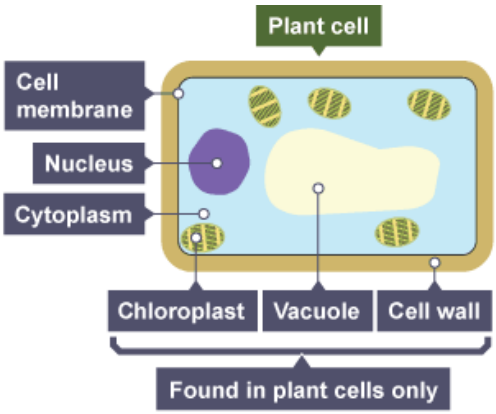
Plants

Plants are also multicellular organisms – they consist of many cells that work together. Examples include cereals (such as maize), and peas and beans.

Plant cell structure

Plant cells contain the same parts as animal cells. They also have some additional ones:

- chloroplasts
- cell wall made of cellulose
- permanent vacuole



Other features of plants

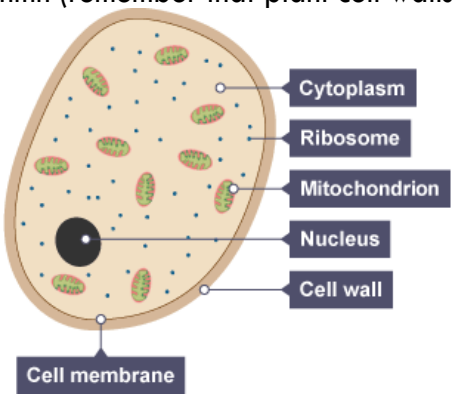
Plant cells contain chloroplasts so plants can carry out photosynthesis. They store carbohydrates as starch or sucrose.

Fungi

Mushrooms, toadstools and moulds (such as *Mucor*) are multicellular fungi. Yeast is an example of a single-celled fungus.

Fungal cell structure

Fungal cells have a cell wall made of chitin (remember that plant cell walls are made of cellulose).



A yeast cell

Some fungi are pathogens, for example the fungal infection which causes athlete's foot.

Fungal structure

Multicellular fungi, such as *Mucor*, are organised into a mycelium - which is made from thread-like structures called hyphae. The hyphae contain many nuclei.

Fungal nutrition

Fungi cannot carry out photosynthesis. Instead they use saprotrophic nutrition. They secrete enzymes onto their food so that digestion happens outside the fungal cells. They then absorb the digested organic products.

Fungal cells may store carbohydrate as glycogen (remember that plant cells store carbohydrate as starch).

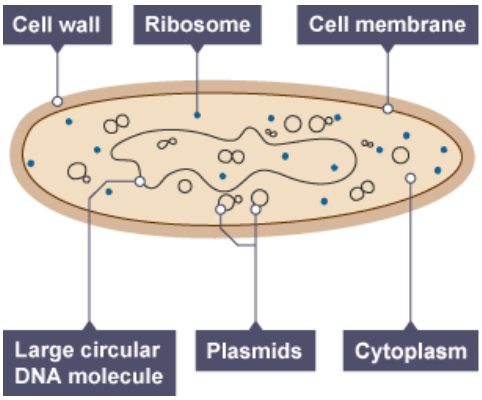
Bacteria

Bacteria are microscopic single-celled organisms. Examples of bacteria include:

- *Lactobacillus bulgaricus* (a rod-shaped bacterium used to make yoghurt from milk)
- *Pneumococcus* (a spherical bacterium that acts as the pathogen that causes pneumonia)

Bacterial cell structure

Bacterial cells have a cell wall made of polysaccharides and proteins. They do not have a nucleus, but instead they have a circular chromosome of DNA. They may also have small extra circles of DNA called plasmids.



Other features of bacteria

Some bacteria can carry out photosynthesis, but most bacteria feed from other organisms (living or dead).

Some bacteria are pathogens, for example *Pneumococcus* (which causes pneumonia).

Protoctists

Protoctists are microscopic single-celled organisms.

Some protoctists, such as *Amoeba*, have features like an animal cell. Others, such as *Chlorella*, have chloroplasts and are more like plants.

Some protoctists are pathogens. For example, *Plasmodiumis* the pathogen that causes malaria.

Viruses

Viruses are very small particles capable of infecting every type of living organism. They are parasitic and can only reproduce inside living cells. For example:

- the **tobacco mosaic virus** – this stops **chloroplasts** forming in tobacco plants and causes the tobacco leaves to become discoloured
- the **influenza virus** – this causes flu
- **HIV** (human immunodeficiency virus) – this causes AIDS

Virus structure

Virus particles have a variety of shapes. They do not have a cellular structure. Instead, they have a core of genetic material surrounded by a protein coat. Their genetic material can be DNA or RNA, but not both.

QUIZ

Tick the right answer

1. **Which part is found in plant cells but not in animal cells?**

Chloroplast Nucleus Cell membrane

2. **In fungi, what is the cell wall made from?**

Cellulose Chitin Glycogen

3. **What group does Mucor belong to?**

Insects Protoctists Fungi

4. **Which organism is used in the production of yoghurt from milk?**

Streptococcus pneumonia Lactobacillus bulgaricus Plasmodium falciparum

5. **What is a plasmid?**

A circle of DNA found in bacterial cells A type of pathogenic virus A type of cytoplasm found in protoctists

6. **Which statement about viruses is correct?**

They can only reproduce inside animal cells They only contain RNA They have a protein coat

7. **Which statement about protoctists is correct?**

Amoeba has features like a plant cell but Chlorella has features like an animal cell
Amoeba has features like an animal cell but Chlorella has features like a plant cell
Amoeba and Chlorella both have features like a plant cell

8. **What problem does tobacco mosaic virus cause?**

Discolouring of tobacco plant leaves
Changes to the leaves of other plants so they look like tobacco
Joining together of tobacco leaves to form a pattern

9. **What is the type of feeding, involving extracellular enzymes, used by fungi called?**

Autotrophic nutrition Heterotrophic nutrition Saprophytic nutrition

10. **What do animals, fungi and viruses have in common?**

They consist of cells They cannot carry out photosynthesis They do not have cell walls

Match the following words/expressions with their definition

1. Chitin.	**a.** Polymers of sugars, such as glycogen and starch, made from many simple sugar molecules joined together.
2. dry mass	**b.** The small circular genetic material present in bacterial cells and used in genetic engineering or genetic modification.
3. Glycogen	**c.** Hard and tough natural material made from glucose molecules joined together
4. Hyphae	**d.** Something that sets off a reaction in the nervous system, for example, light, heat, sound, gravity, smell, taste, or temperature. These changes in the environment are detected by receptors in an organism.
5. Mycelium	**e.** The mass of an organism after its water has been removed.
6. Plasmid	**f.** The network of hyphae produced by a fungus
7. Polysaccharides	**g.** A type of carbohydrate. Plants can turn the glucose produced in photosynthesis into starch for storage, and turn it back into glucose when it is needed for respiration.
8. Saprotrophic nutrition	**h.** Fine, branching, thread-like filaments produced by fungi.
9. Starch	**i.** Animals store glucose as glycogen in their liver and muscle tissues.
10. Stimulus	**j.** A type of feeding in which digestive enzymes are secreted outside the cell onto food material, followed by absorption of the products.

1. +	2. +	3. +	4. +	5. +	6. +	7. +	8. +	9. +	10. +

GRAMMAR <u>Quantifiers with Countable/Uncountable Nouns</u>

We use quantifiers before nouns when we want to give information about the number or amount of something. Study the table below.

Use with ...	Quantifiers and examples
Countable and uncountable nouns	*all, any, enough, less, a lot of, lots of, more, most, no, none of, some* **Informal:** *plenty of, heaps of, a load of, loads of, tons of* • We have **lots of** <u>money</u> to spend at the restaurant. • **None of** <u>the boys</u> could speak English. • Be patient. We have **loads of** <u>time</u>.
Countable nouns only	*both, each, either, a number of, few, a few, fewer, neither, several* **Informal:** *a couple of, hundreds of, thousands of, millions of* • There were very **few** <u>girls</u> at the party. • You have **a couple of** <u>minutes</u> to finish the exercise. • That laptop costs **hundreds of** <u>dollars</u>.
Uncountable nouns only	*a little, much, a bit of, an amount of* **Informal:** *a great deal of, a good deal of* • We don't have **much** <u>time</u> left. • You will be in **a great deal of** <u>trouble</u> if you don't finish your work. • The criminal had **a large amount of** <u>cash</u> on him.

Things to remember

- We use ***<u>few</u>*** to emphasise that there is a lack of something and a few to mean a sufficient number of something:
- ➔ There were ***few*** <u>people</u> at the party so we left right away. (= a lack of people/not enough people)
- ➔ There were ***a few*** <u>people</u> at the party so we decided to stay. (= some people)
- We use ***<u>little</u>*** to emphasise that there is a lack of something and ***<u>a little</u>*** to mean a sufficient amount of something:
- ➔ Hurry up! There is ***little*** <u>time</u> left. (= a lack of time/not enough time)
- ➔ We have ***a little*** <u>time</u> left, so let's continue our conversation. (= some time/enough time)
- ***<u>Some</u>*** is used in <u>positive sentences.</u>
- ➔ *I've got **some** apples in my basket and **some** water in my bottle.*
- ***<u>Any</u>*** is used in <u>questions and negative sentences</u>. When we use ***any*** in a question, the answer could be 'yes' or 'no'.
- ➔ Do you need ***any*** help? Yes thanks / No thanks

General vs. Specific Groups

Study how we use the quantifiers `few', `a few', `both', `all', `many', `most' and `much' with members of specific groups as well as groups in general.

Groups in general	Specific groups
If you are talking about members of a group of people or things **in general,** use a noun after the quantifier: • **Few** <u>people</u> know the answer to the question. • **All** <u>tigers</u> are dangerous. • **Most** <u>people</u> are not rich enough to buy a mansion.	If you are talking about a specific group of people or things, we can also add **of + group:** • **Few *of*** <u>the people</u> at the party were enjoying themselves. • **All *of*** <u>the apples</u> were rotten. • He has spent **all *of*** <u>the money</u>. • Jake has three brothers. Have you met **any *of*** <u>them</u>?

Things to remember

- With specific noun groups, you must say **the** (or **his, these, our,** etc.) ***after of***:

➔ **Most of** the people who live here are unemployed. NOT: Most of people who live here are unemployed.

- In the phrases **all of the ...** and **both of the ...,** you can **leave out of**:

➔ **All of the** people were happy with the proposal. = **All the** people were happy with the proposal

LET'S PRACTICE

Practice 1 **Circle the right alternative**

This bag is very heavy because it has got _____ books in it.

A) a little B) a lot of C) a few

2. Sarah and Ahmed have got _____ friends from America.

A) any B) much C) a few

3. Have we got _____milk in the fridge, mother?

A) many B) a few C) any

4. How _____money have you got in your purse?

A) many B) any C) much

5. My mother has got _____ friends.

A) a little B) a lot of C) much

6. We have got _____ apples and _____ oranges in the fridge.

A) a little / some B) many / a little C) a few / some

7. Are there _____ children in the school garden?

A) a little B) any C) much

8. My teacher hasn't got _____ 6th grade student this year.

A) some B) any C) a few

9. Sam, ____ there _____ milk in the fridge?

A) are / any B) is / any C) is / a few

10. How _____ cheese has she got in the basket?

A) many B) much C) any

Practice 2 **Choose between a little, a lot of, a few, few, fewer, many and much.**

DON'T CALL US, WE'LL CALL YOU!

Two years ago I moved to a new neighbourhood. There seem to be very _____ people in this area who are without telephones, so I expected to get a new phone quickly. I applied for one as soon as I moved into my new house. 'We aren't supplying _____ new phones in your area', an engineer told me. '_____ people want new phones at the moment and the company is employing _____ engineers that last year so as to save money. A new phone won't cost you _____ money, but it will take _____ time. We can't do anything for you before December. 'You need _____ patience if you're waiting for a new phone and you need _____ friends whose phones you can use as well. Fortunately, I had both. December came and went, but there was no sign of a phone. I went to the company's local office to protest. 'They told me I'd have a phone by December,' I protested. 'Which year?' The assistant asked.

Practice 3 **Make statements about the people/things using quantifiers in the left box, like in the example.**

Quantifiers	**People/things**
both any all many most much little a little few a few some any	My classmates lawyers my neighbours Smartphones vegetables sugar my free time my friends politicians clothes

1. ***All of*** *my classmates come from the same country as me.*