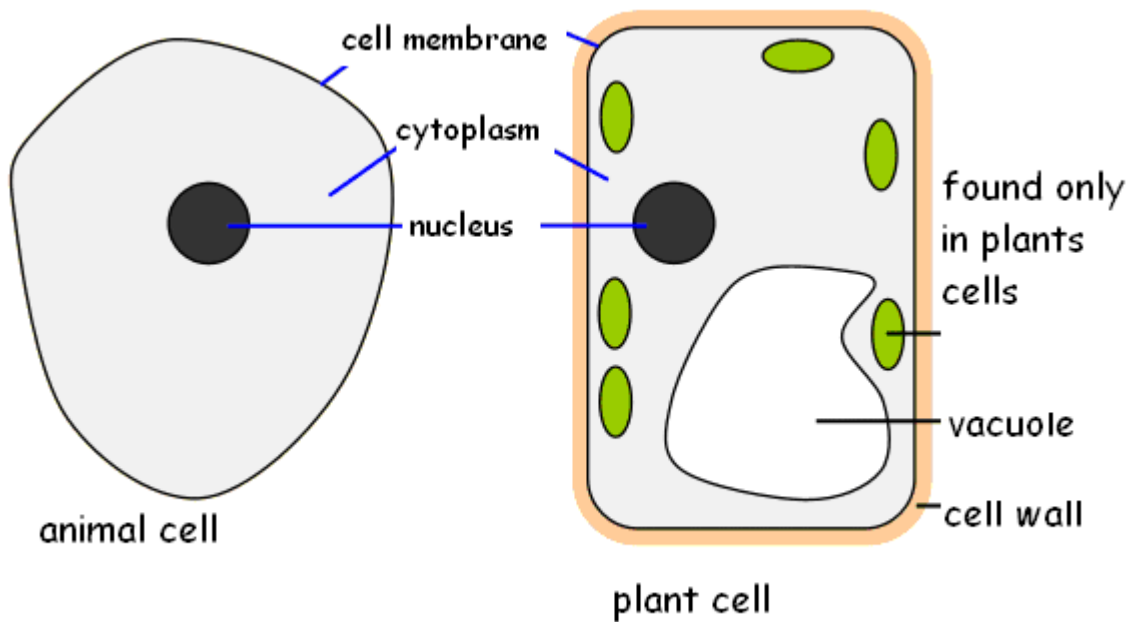
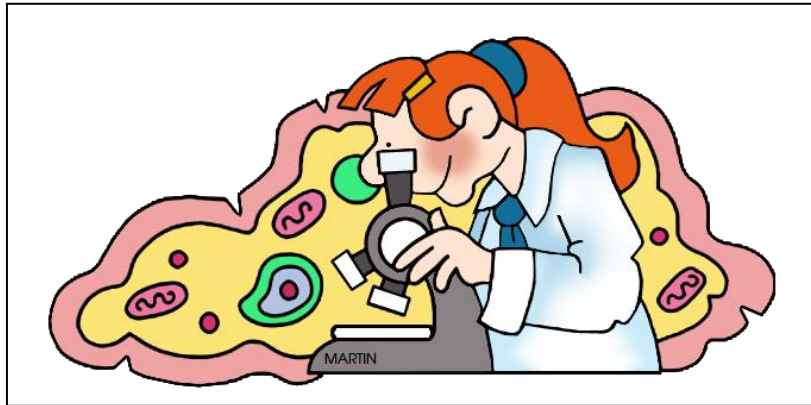


## Cell Structure



I will know I am successful if I can:

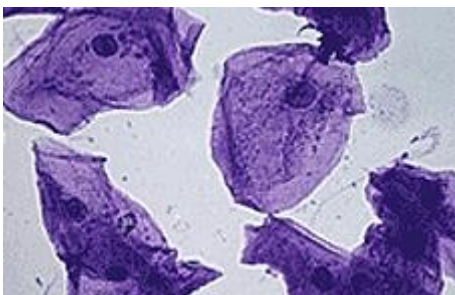
1. Label all parts of plant and animal cells and state their functions
2. State the differences between plant and animal cells
3. Calculate the size of cells using information from diagrams

## **Cells**

A **cell** is the basic unit of life, from which larger structures such as tissues and organs are made. Animals and plants are made of cells.

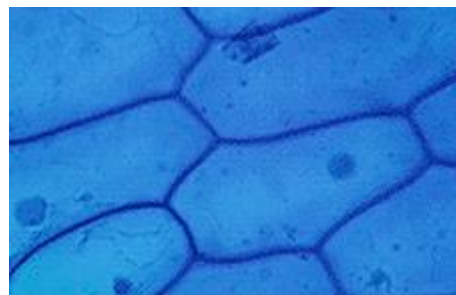
Cells are very small. These photographs show cells seen through a microscope.

### **Cheek cells**



These are cheek cells, seen through a microscope.

### **Onion cells**

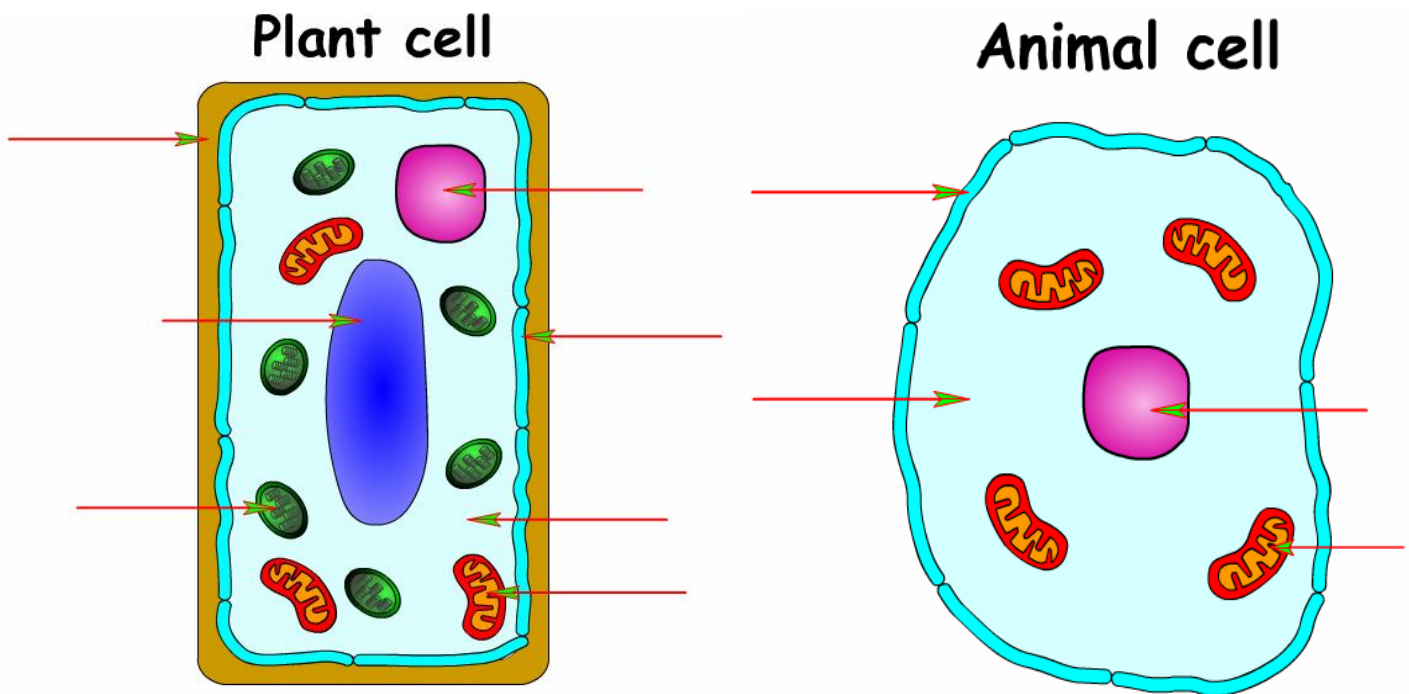


These are onion cells, seen through a microscope.

Animal cells usually have an irregular shape, and plant cells usually have a regular shape

Cells are made up of different parts.

Copy the diagrams below and label the parts (I know I said I do not like arrowheads!):



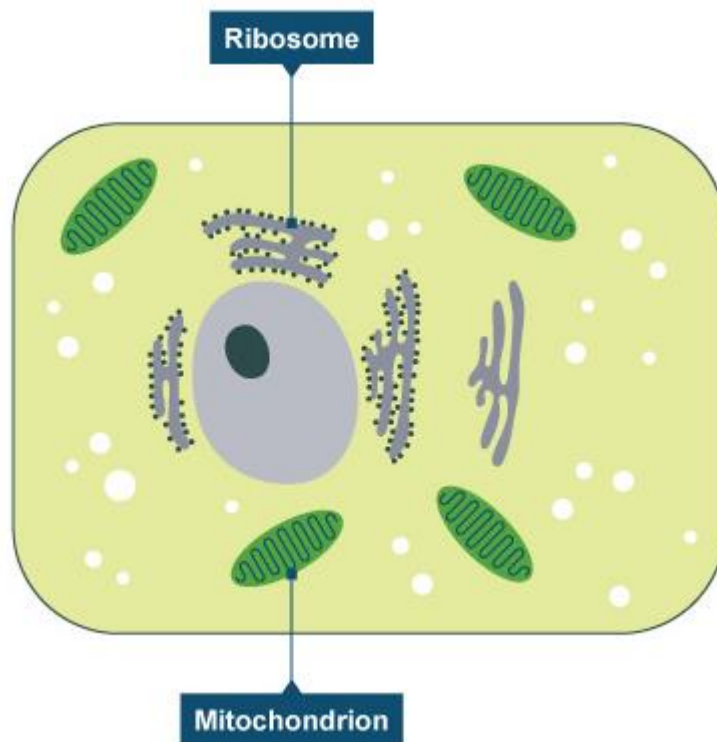
WORD BANK:

Cell membrane	Cell wall	Cytoplasm
Mitochondria	Nucleus	
Vacuole	Chloroplasts	



### **Mitochondria and Ribosomes**

Some cell structures are too small to be seen with the light microscope. **Ribosomes** are like this. They are found in the cytoplasm or attached to structures called endoplasmic reticulum and are the **site of protein synthesis**. They can only be seen using an electron microscope.



**Mitochondria** are tiny structures found in cells (one is called a mitochondrion). **Respiration**, the chemical reaction that releases energy from glucose, happens in mitochondria. This provides energy for life process such as movement and growth.



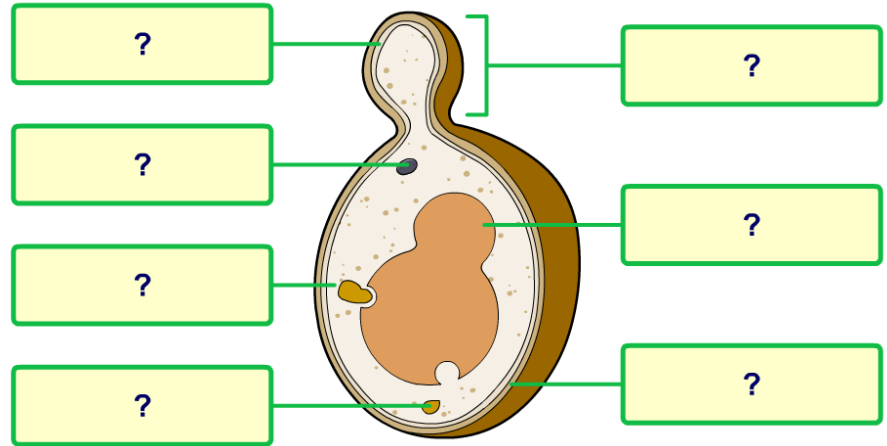
Copy the notes and complete the diagrams below:

### Yeast and bacterial cells

**Yeast** is a single celled fungus.

It does not contain chlorophyll and cannot make its own food by photosynthesis.

It reproduces by budding.



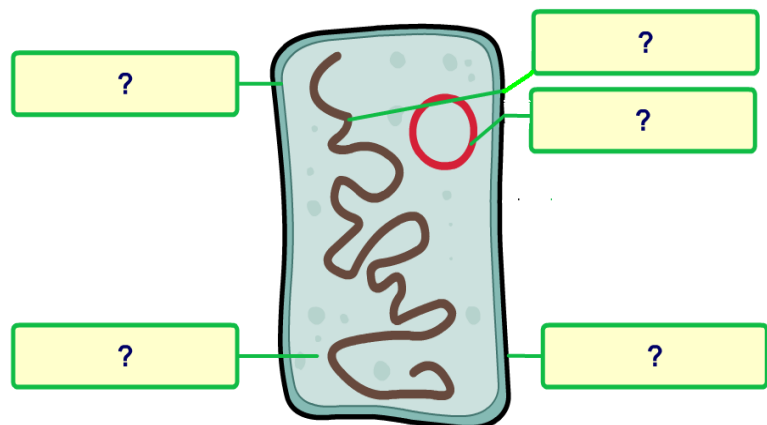
#### WORD BANK

Cell membrane	food storage granule	cell wall	nucleus
vacuole	bud	cytoplasm	

**Bacteria** are unicellular organisms.

They feed on substances in their surroundings and reproduce by dividing in two.

Bacteria do not have a nucleus but they do have a chromosome and plasmids which contain the genetic information.



#### WORD BANK

Plasmid	Cytoplasm	Genetic Material	Cell Membrane
---------	-----------	------------------	---------------



Copy and complete:

Function of the parts of cells

Cell part	Function
Nucleus	
Cell Membrane	
Cytoplasm	
Cell wall	
Chloroplasts	
Vacuole	
Mitochondria	
Ribosomes	

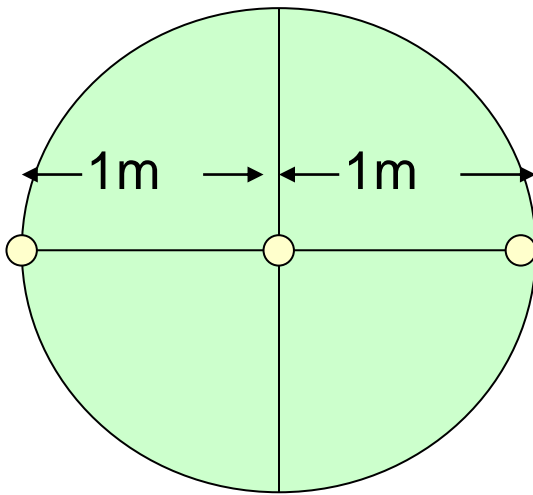
Using the information from the diagrams and table, complete the following table to show if a structure is present (✓) or absent (x)

Differences between cells

Cell part	Plant cell	Animal cell
Nucleus		
Cell Membrane		
Cytoplasm		
Cell wall		
Chloroplasts		
Vacuole		
Mitochondria		
Ribosomes		

We now know a lot about the structures and functions of parts of cells, and we know they are small. So how small are they?

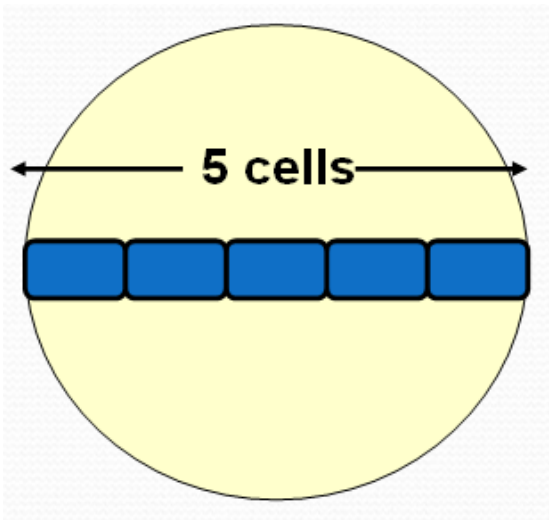
1. Measure the diameter of the field of view
2. Count how many cells are along the diameter of that field of view
3. Divide the diameter of the field of view by the number of cells



The diameter of the field of view is 2 mm.

1 millimetre (mm) = 1000 micrometres ( $\mu\text{m}$ )

1  $\mu\text{m}$  = 0.001 mm



**Calculate the length of one cell**

Length of 5 cells = 2mm or 2000  $\mu\text{m}$

Length of 1 cell =  $\frac{2}{5}$  or =  $\frac{2000}{5}$

= 0.4mm or = 400  $\mu\text{m}$

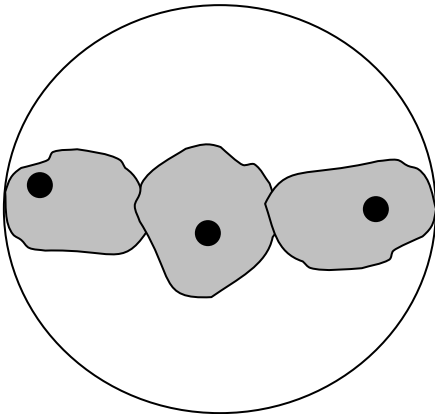
To convert from micrometers ( $\mu\text{m}$ ) into millimetre (mm) - divide by 1000

To convert from millimetre (mm) into micrometres ( $\mu\text{m}$ ) - multiply by 1000



Try the following problems

1.



The diagram shows three human cheek cells under a high power microscope. The diameter of the field of vision is 0.03mm.

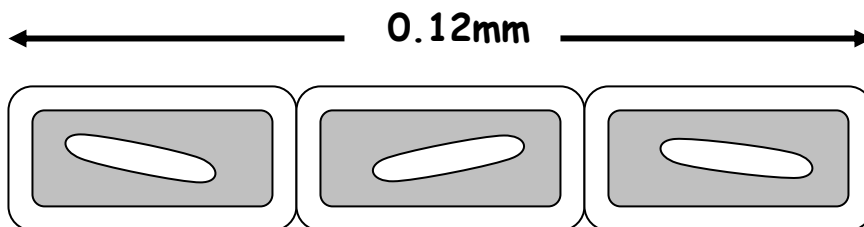
What is the average diameter of a cheek cell in micrometres?

(2)

2. The unit used to measure the size of cells is the micrometer ( $\mu\text{m}$ )

The drawing shows rhubarb epidermal cells as seen through a microscope.

The diameter of the microscope field is 0.12mm



a. Calculate the average length of a single rhubarb cell (2)

b. Given that a human cheek epithelial cell is, on average, only one quarter the length of a rhubarb epidermal cell, calculate the length of a cheek cell. (2)

c. Given that a red blood cell is  $7\mu\text{m}$  in diameter, list the three different cell types in decreasing order of size (2)



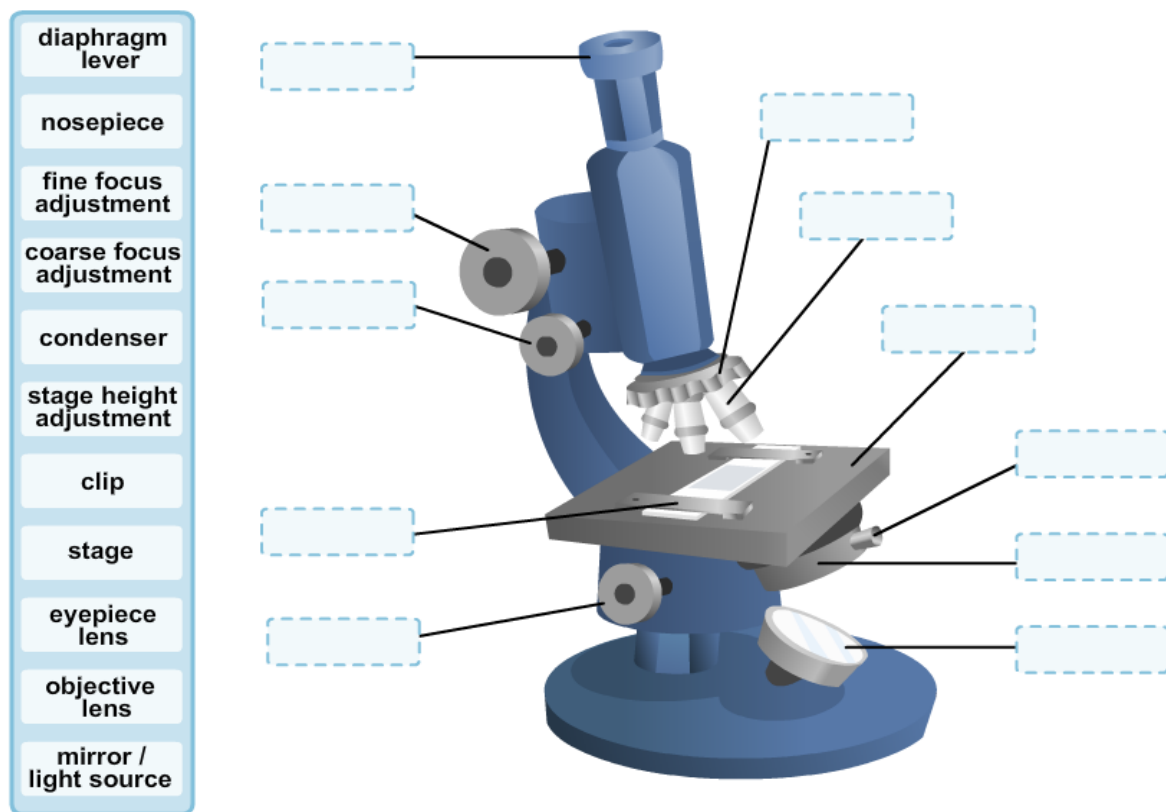


I will know I am successful if I can:

1. Identify all parts of a microscope
2. Prepare and examine microscope slides of plant and animal cells

Cells are very small and cannot be seen with the naked eye; therefore, we need to use a microscope to enlarge the structures. **Stains** are coloured dyes which are often used see the more structures clearly. Examples of stains include iodine solution and methylene blue.

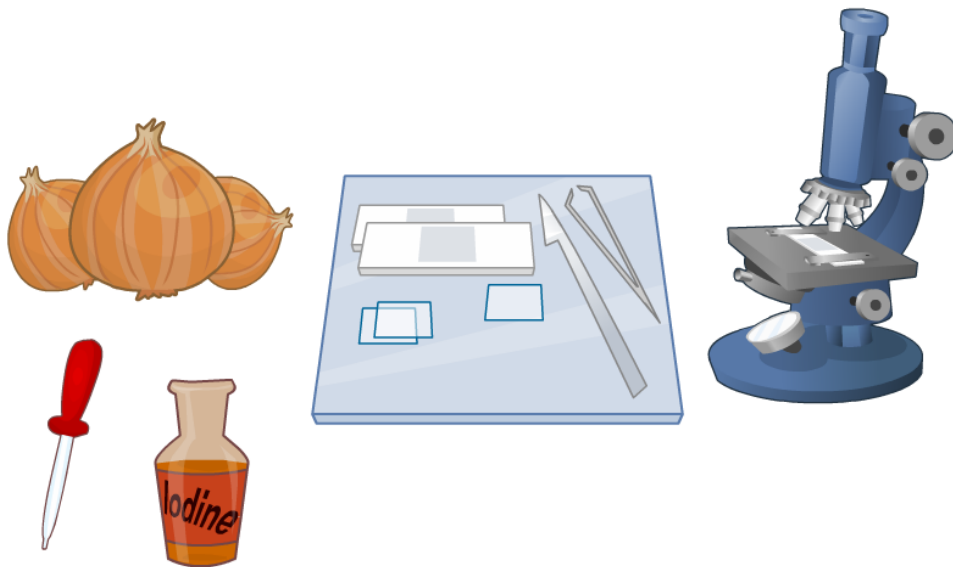
### Parts of a microscope



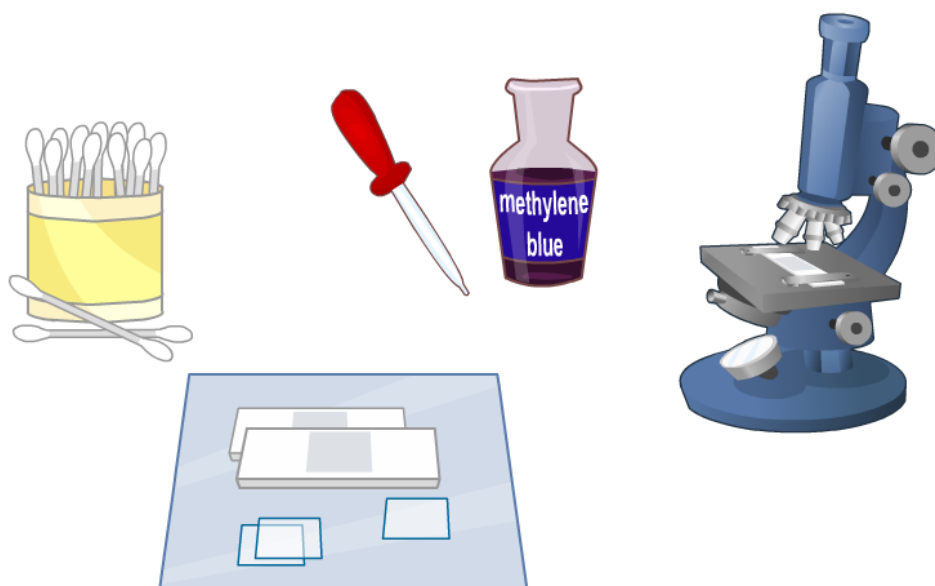


## Preparing a microscope slide

### Preparing an onion slide



### Preparing a cheek slide

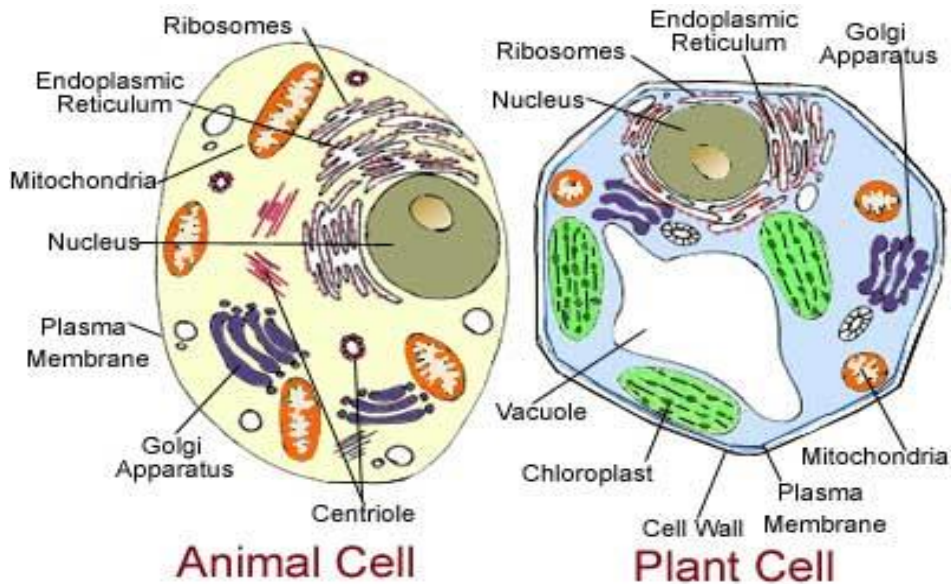




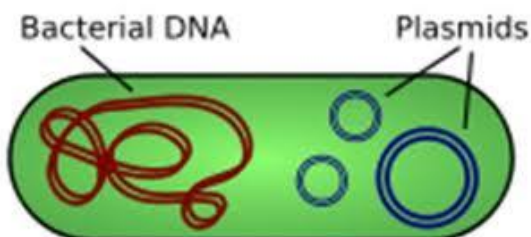
## Success Criteria for Topic 1: Cell Structure

I will know I am successful in Topic 1 if I can state the following:

- Cells contain organelles which have functions.



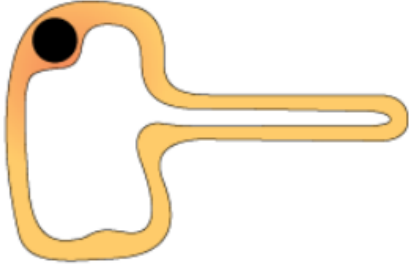
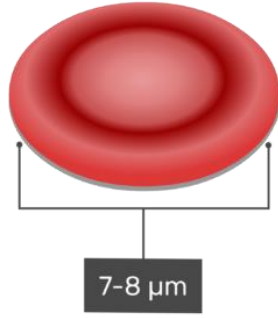

- 
- 
- Bacterial cells are different from animal and plant cells as they have no organelles which have membranes and their cell wall is chemically different.
- Fungi have a cell wall which is not made of cellulose.
- Bacteria have plasmids and circular DNA.

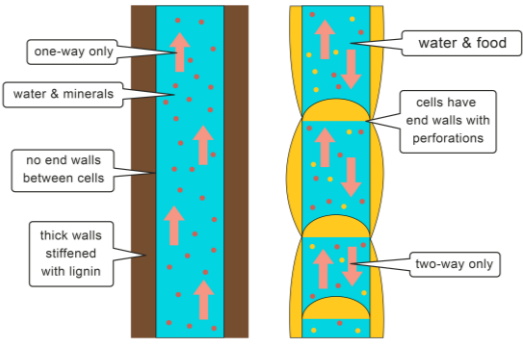
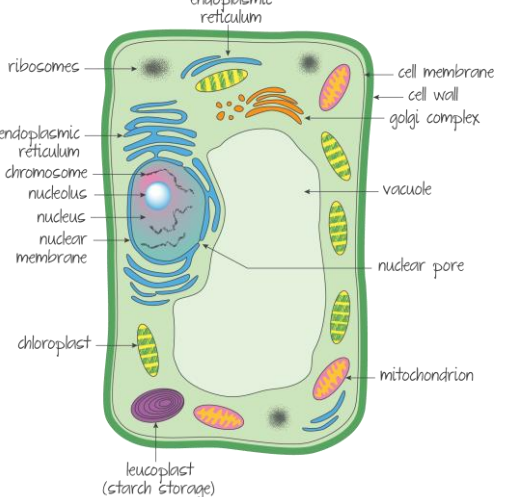
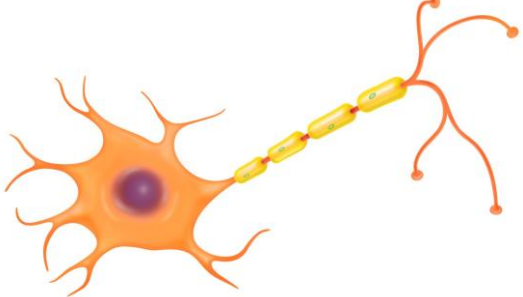


Organelle	function
mitochondria	ATP is produced here when oxygen is present
chloroplast	absorbs light energy for photosynthesis
Cell membrane	Controls movement of substances in and out of cell
vacuole	stores water and solutes to regulate water content
nucleus	controls cell activities and passes info to next generation
ribosome	where proteins are formed
plasmid	small circle of DNA found in bacteria
Cell wall	Provides shape and support to cells

I will know I am successful if I can:

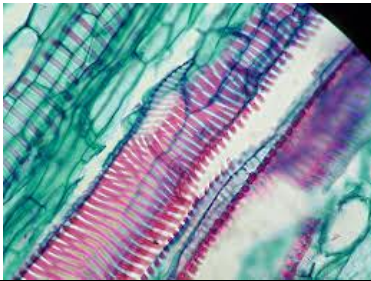
4. Give examples of specialised cells
5. Explain how their structures are related to their functions

	<p>Type of cell:</p> <p>How its structure makes it specialized:</p> <p>Extension: Suggest why it contains lots of mitochondria (not shown).</p>
	<p>Type of cell:</p> <p>Name the special protein found in red blood cells and its function:</p> <p>Extension: comment on the shape and size of red blood cells.</p>
	<p>Type of cell:</p> <p>How its structure makes it specialized:</p> <p>Extension: Name three types of muscle.</p>

	<p>Type of cells</p> <p>Left:</p> <p>Right</p> <p>State the functions of the two types of cells</p> <p>Left:</p> <p>Right</p>
	<p>Type of cell:</p> <p>How its structure makes it specialized:</p> <p>Extension: Name the organ where you would find these cells.</p>
	<p>Type of cell: Nerve cell (done for you!)</p> <p>How its structure makes it specialized:</p> <p>Extension: Name the three types of nerve cell and identify which is shown here.</p> <p>Label the dendrites, cell body and myelin sheath.</p>

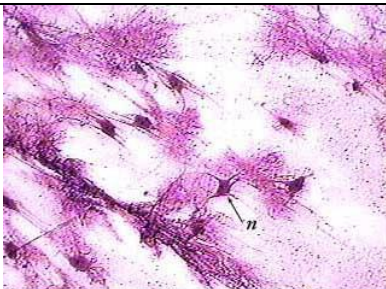
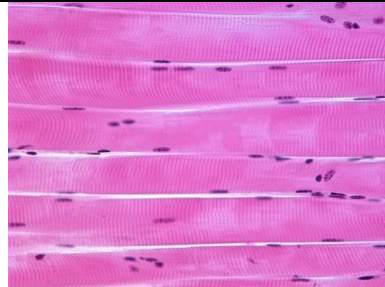
I will know I am successful if I can:

1. Define cells, tissues, organs, organ systems and organ systems
2. Give examples of each
3. Identify some types of tissues as seen under the microscope



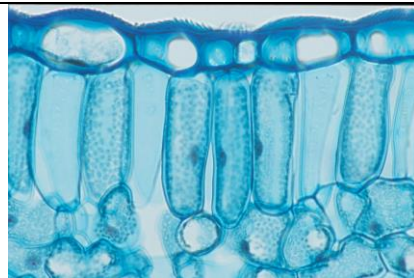
Type of tissue

Type of tissue

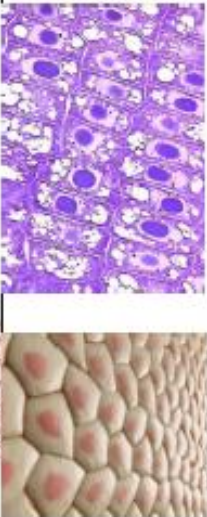

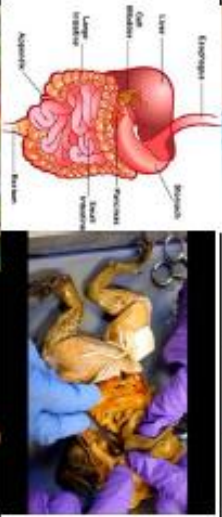


Type of tissue

Type of tissue





<p><b>Cell</b></p>		
	<p>Group of cells with similar structures, working together to perform a shared function</p>	
<p><b>Organ System</b></p>		
	<p>Living thing performing all seven life processes</p>	