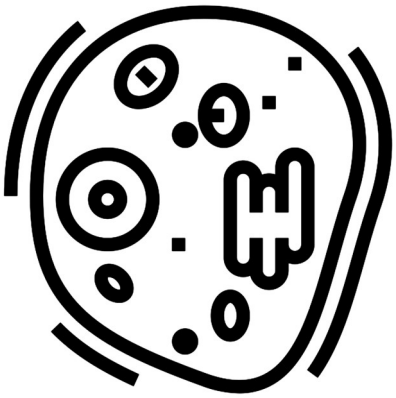
Biology -Year 7 and 8

Cell Structure



Name: _____

Lesson	Homework Task	SCAN CODE	Due
1	**Task 1 –** Watch the video, complete the quick quiz and worksheet for the 'Animal and Plant Cells' lesson on Kay Science.com. Submit worksheet answers on MS teams		
2	**Task 1 –** Watch the video, complete the quick quiz and worksheet for the 'Bacterial Cells' lesson on Kay Science.com. Submit worksheet answers on MS teams **Task 2 -** Complete the weekly quiz set on MS Teams Remember! you can revise for the quiz using Seneca! (appropriate sections will be set as an assignment)		
3	**Task 1 –** Watch the video, complete the quick quiz and worksheet for the 'Magnification II' lesson on Kay Science.com. Submit worksheet answers on MS teams		
4	**Task 1 –** Watch the video, complete the quick quiz for the 'RP Microscopes' lesson on Kay Science.com **Task 2 -** Complete the weekly quiz set on MS Teams Remember! you can revise for the quiz using Seneca! (appropriate sections will be set as an assignment)		

Key word list

Capsule	A gel-like layer around the outside of a bacterium that can protect the cell and stop it from drying out
Cell membrane	A thin semi-permeable membrane that surrounds the cytoplasm of a cell, controls what comes in and out of the cell
Cell theory	One of the five basic principles of biology, stating that the cell is the basic unit of life.
Cell wall	Wall made of cellulose around the cell, gives strength and support to plant and bacterial cells
Cell	The fundamental building block of life.
Chloroplasts	Found in plant cells only, contains chlorophyll which absorbs light for photosynthesis
Coarse Focus	This knob is the larger of two and it moves the **stage** up and down by large amounts to bring the specimen into focus using low power objective lenses.
Cytoplasm	Gel-like substance where most of the chemical reactions in the cell take place
Electron Microscope	a microscope that uses a beam of electrons instead of light, high magnification and resolution allow them to see inside cells
Eukaryotic cell	A cell that has a nucleus
Eyepiece Lens	Found at the top of the microscope, the part used to look through. It has a standard magnification of 10x
Fine Focus	This knob is smaller and is used to bring the specimen into focus when using high power objective lenses.
Flagella	Protrusions from some prokaryotic cells that helps them to move.

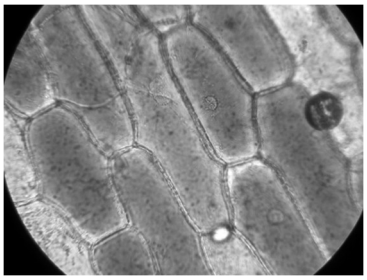
Focus	Moving the specimen closer or further away from the objective lens to make the image clearer or sharper
Light Microscope	A light microscope uses visible light to detect and magnify very small objects.
Magnification	the magnifying power of an instrument.
Magnify	make (something) appear larger than it is, especially with a lens or microscope.
Microscope	A biology laboratory instrument or tool, that scientists use to detect and magnify very small objects, and enlarging them so they can be seen.
Mitochondria	Cell organelles where respiration takes place
Nucleus	membrane-bound structure that contains the cell's hereditary information and controls the cell's growth and reproduction.
Objective Lens	The lenses used for specimen visualization. Each lens has its own magnification power: 4X, 25X, 50X,100X. There are about 1- 4 objective lenses on one microscope.
Organelles	tiny cellular structures, that carry out specific functions necessary for life.
Photosynthesis	Chemical reaction which uses light energy to convert carbon dioxide and water into glucose and oxygen, takes place in chloroplasts
Plasmid	Circular loops of DNA in bacteria which contain useful genes
Prokaryotic cell	A cell that does not have a nucleus or organelles
Respiration	A chemical reaction that releases energy from glucose
Ribosomes	cell organelles that are responsible for assembling proteins.

Stage	This is the platform section on which the specimen is placed for viewing. There are stage clips to hold the specimen slide in place.
Vacuole	Found in plant cells only, contains cell sap to give strength to the cell.

Lesson 1 – Plant and Animal Cells

By the end of this lesson you should be able to:

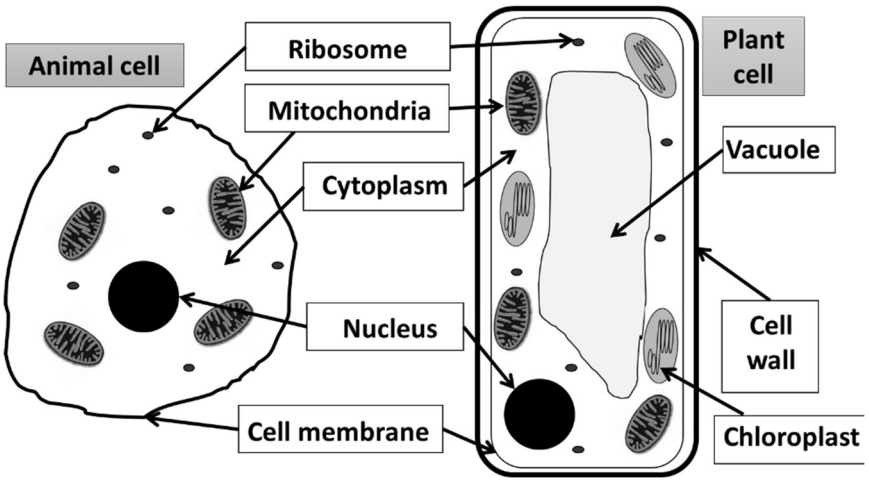
- ***Define*** *a cell*
- ***Compare*** *plant and animal cell organisation*
- ***Identify*** *examples of plant and animal cells and their organelles*



Notes:

All living things are **made** of **cells**, they are the **basic unit** (smallest living part) of all **life**.

There are organisms that are just made up of one cell, like bacteria. But large organisms like plants, animals and fungi are made up of many cells. Plants and animals are made up of **eukaryotic** cells as they have genetic material (DNA) inside a nucleus.



All cells contain smaller structures, that carry out specific functions necessary for life – they are called sub cellular structures or organelles. Plant and animal cells both contain some organelles necessary for life but plants have some

extra organelles that animal cells don't need, they help plant cells to maintain a rigid shape and carry out photosynthesis.

You need to be able to identify the structures and describe what they do:

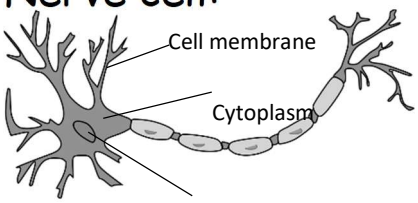
Organelle	Description	Function
Nucleus	The largest, darkest structure in a cell, usually circular in shape – can be seen with a light microscope	Controls all activities of the cell, contains DNA
Mitochondria	Oval shaped structure – can only be seen with a powerful light microscope	Where aerobic respiration takes place, releases energy for the cell to use
Ribosome	Very small circular structures in the cytoplasm – can only be seen with an electron microscope	Site of protein synthesis (where proteins are made)
Cell membrane	A thin semi-permeable membrane that surrounds the cytoplasm of a cell - can be seen with a light microscope	Controls what substances go in and out of the cell
Cytoplasm	A gel-like substance inside the cell	Where most chemical reactions take place
Cell wall (plant cell only)	Made of a tough material called cellulose this is a thicker wall found around the outside of the cell membrane - can be seen with a light microscope	Strengthens the cell, provide support
Vacuole (plant cell only)	A large sack which contains sugars and salts dissolved in water (sap)	Stores sap, helps to keep plant cells rigid to provide support

Chloroplasts (plant cell only)	Contains green pigment (chlorophyll), oval shaped structure– can be seen with a light microscope	Absorbs light for photosynthesis

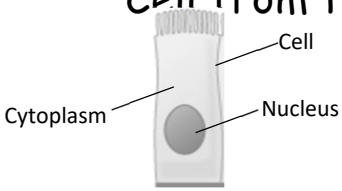
Although plant cells and animal cells all share some common features they do not all look the same. Cells play different roles as part of organisms so the organelles they have may change or their structure may look different.

You need to be able to identify animal and plant cells from their organelles and label them on diagrams.

Nerve cell:

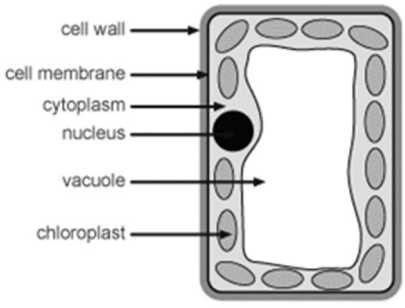


Cell from the small intestine wall:

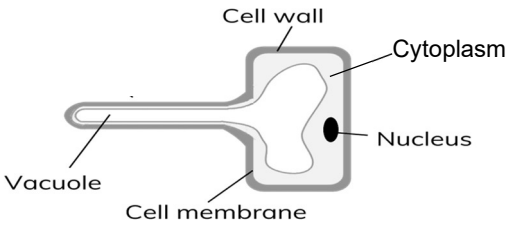


These cells are eukaryotic cells, you can tell this because they both have a nucleus. They are both animal cells – you can tell this because they both have a cell membrane but no cell wall.

Leaf cell:



Root cell:

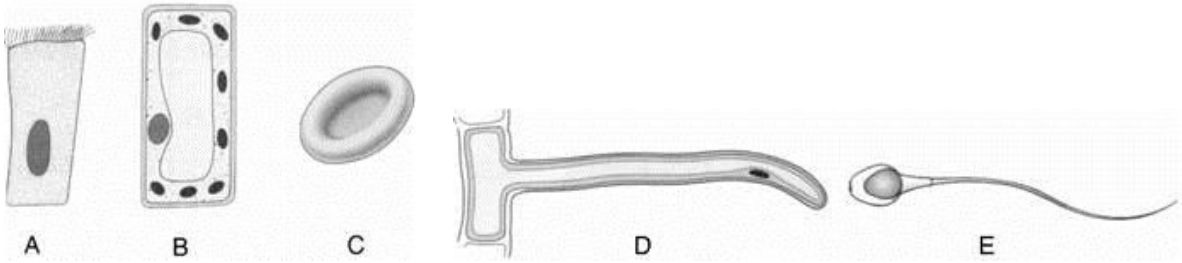


These cells are eukaryotic cells, you can tell this because they both have a nucleus. They are both plant cells – you can tell because they

both have a cell wall and a vacuole. The root cells don't have any chloroplasts but that does not mean they are not plant cells, it just means they don't need them. (Roots are underground so they cannot do photosynthesis!)

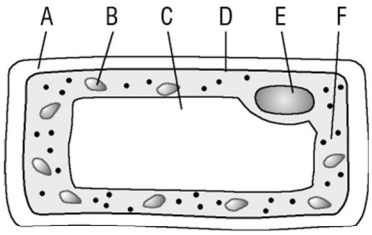
Recall Questions:

1. State the function of the nucleus.
2. State the function of the cytoplasm.
3. State the function of the cell membrane.
4. State the function of the mitochondria.
5. State the function of the ribosomes.
6. What substance makes up the cell wall?
7. State the function of the cell wall.
8. State the function of the chloroplasts.
9. State the function of the permanent vacuole.
10. State three differences between animal and plant cells.
11. Give the letters of two plant cells below and explain how you identified them as plant cells.



Worksheet:

1 The diagram is of a cell from the leaf of a plant.



(a) Name the structures **D**, **E** and **F**.

.....

.....

..... (3)

(b) (i) What is the name of structure **A**?

..... (1)

(ii) What material is structure **A** made of?

..... (1)

(c) (i) What is the name of structure **C**?

..... (1)

(ii) What is the liquid it contains called?

..... (1)

(d) Structure **B** is a chloroplast. What is its function?

.....

..... (2)

(e) Name two different structures that are found within the material labelled **F**.

.....

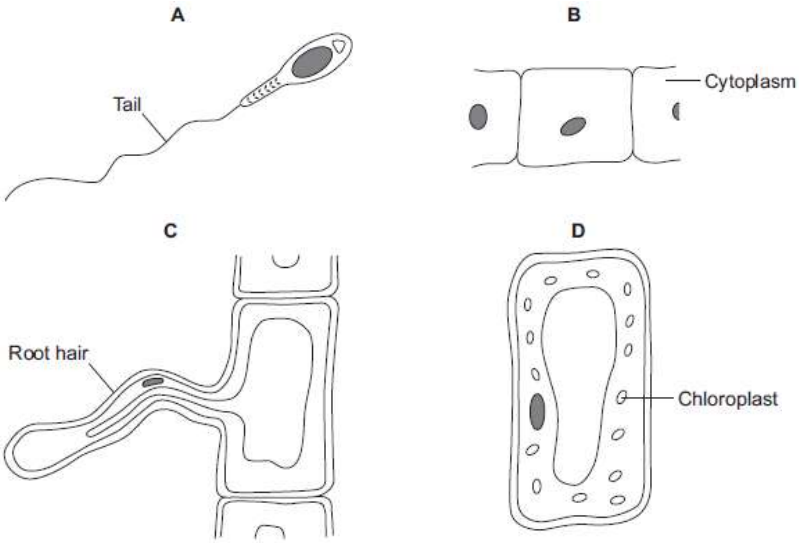
..... (2)

2 Look at the structures listed in the first column of the table below. Fill in the empty columns by putting a tick (✓) if you think it is present and a cross (✗) if you think it is absent. (6)

Structure	Animal cell	Plant cell
Nucleus		
Cytoplasm		
Cell wall		
Cell membrane		
Chloroplast		
Permanent vacuole		

Practice Exam Questions:

Q1. The diagrams show four types of cell, **A**, **B**, **C** and **D**. Two of the cells are plant cells and two are animal cells.



(a) (i) Which **two** of the cells are plant cells?

Tick (✓) **one** box.

A and **B** ☐

A and **D** ☐

C and **D** ☐

(1)

(ii) Give **one** reason for your answer.

_____

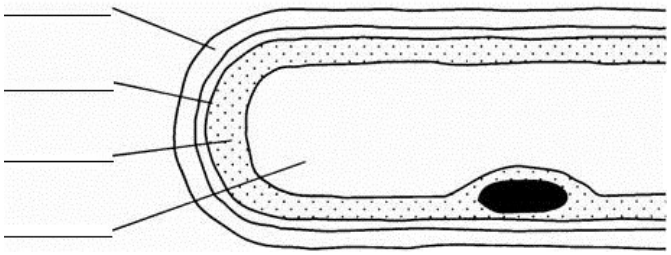
_____

_____

_____

(1)

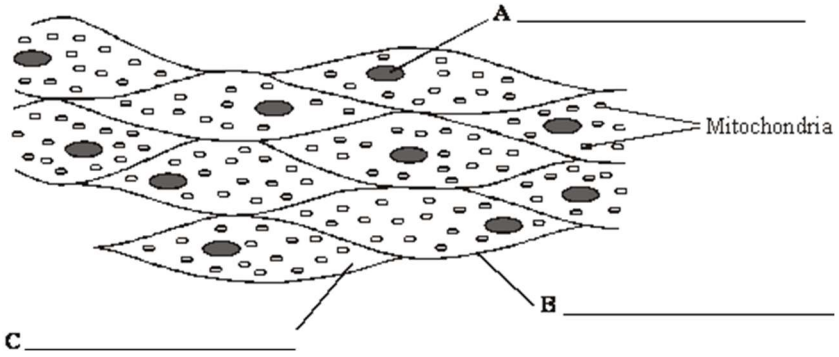
Q2. The drawing shows part of a root hair cell.



Label the parts of the root hair cell.

(4)

Q3. The diagram shows a group of muscle cells from the wall of the intestine.



(a) On the diagram, use words from the box to name the structures labelled **A**, **B** and **C**.

	cell membrane	**cell**	
wall	**chloroplast**	**cytoplasm**	**nucleus**

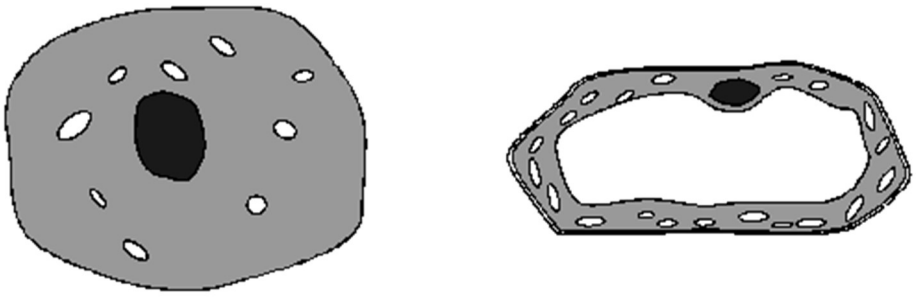
(3)

Q4. Cells called receptors detect stimuli in the environment.

The diagram shows a light receptor cell from the eye. Label structures **A**, **B** and **C**.

(3)

Q5. The diagrams show a cheek cell from a human and a leaf cell from a plan



Cheek cell

Leaf cell

(a) The two cells have a number of parts in common.

(i) On the cheek cell, label **three** of these parts which both cells have.

(3)

(ii) In the table, write the names of the **three** parts you have labelled above and describe the main function of each part.

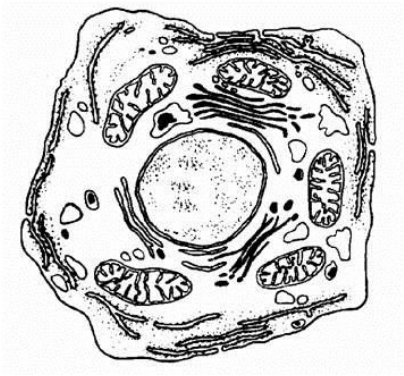
Part	Function
_____	
_____	
_____	

(3)

Q6. The drawing shows an animal cell, seen at a very high magnification using an electron microscope.

(a) (i) Label a mitochondrion [plural = mitochondria].

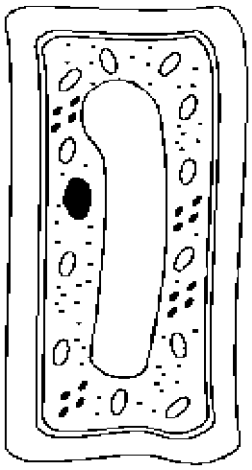
(1)



(ii) What happens in the mitochondria?

_____

_____ **(1)**



Q7. This plant cell also contains chloroplasts, a cell wall and a vacuole.

Label **each** of these parts on the diagram. **(3)**

(ii) Give the function of these parts of a plant cell.

Chloroplast function

_____

_____

_____

_____

Cell wall function

_____

_____

_____

_____

Vacuole function

_____

___

_____

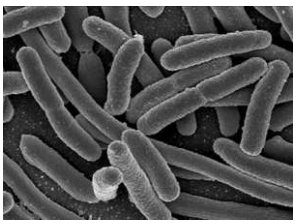
_____ **(3)**

Lesson 2 – Prokaryotes

By the end of this lesson you should be able to:

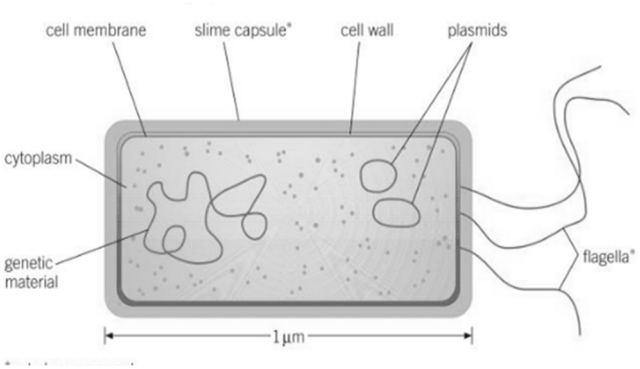
- ***Define** a prokaryote*
- ***Describe** how prokaryotes differ from eukaryotes (plant and animal cells)*
- ***Explain** why both prokaryotes and eukaryotes have similar organelles*

Notes:



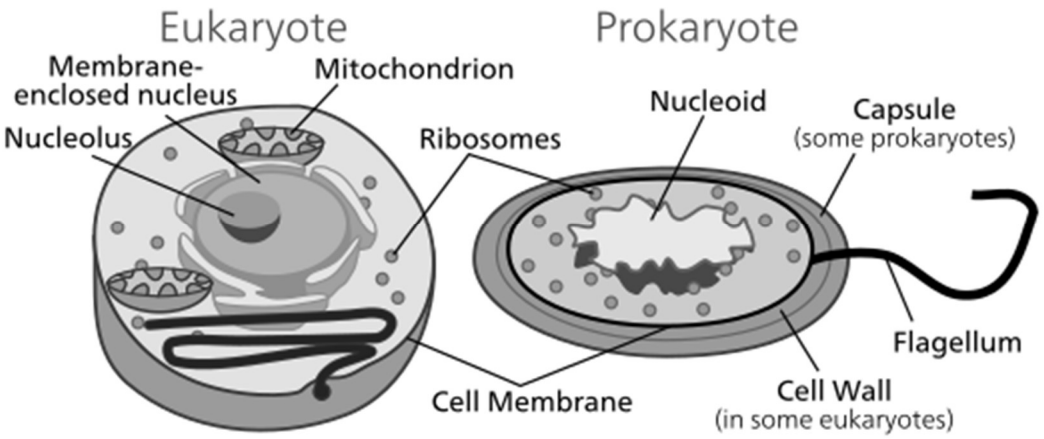
All eukaryotic cells have a nucleus which contains the DNA in structures called chromosomes. Prokaryotic cells are 10 times smaller than eukaryotic cells and they do not have a nucleus. Their genetic material can be found just in the cytoplasm. Bacteria like *Salmonella* which causes food poisoning is an example of a prokaryotic cell.

There are similarities and differences in the structures found in eukaryotic cells and prokaryotic cells:



- They have ribosomes, a cell membrane, and a cytoplasm the same as eukaryotic cells. They do not have mitochondria.
- They have a cell wall like plant cells, but it is not made of cellulose.
- They don't have chromosomes just a loop of DNA called a nucleoid found in the cytoplasm

- There may also be small loops of DNA called plasmids. These can carry useful genes which help the bacteria survive, such as antibiotic resistance.
- Some bacteria have a flagellum (pl. flagella) which can help them move or swim



- Some bacteria also have a slime capsule which protects them.

Recall Questions:

1. State the key difference between prokaryotes and eukaryotes.
2. State one organism that is prokaryotic.
3. Prokaryotes have a cell wall. True or false?
4. Some bacteria have an extra layer on top of their cell walls. What is the name of that layer?
5. Where does the genetic material of a prokaryotic cell exist?
6. What is a difference between prokaryotic and eukaryotic DNA?
7. What is the name of extra small DNA rings found in some prokaryotes?
8. What is the function of flagella?
9. State a difference between animal cells and bacteria.
10. State a similarity between plant cells and bacterial cells.

Worksheet:

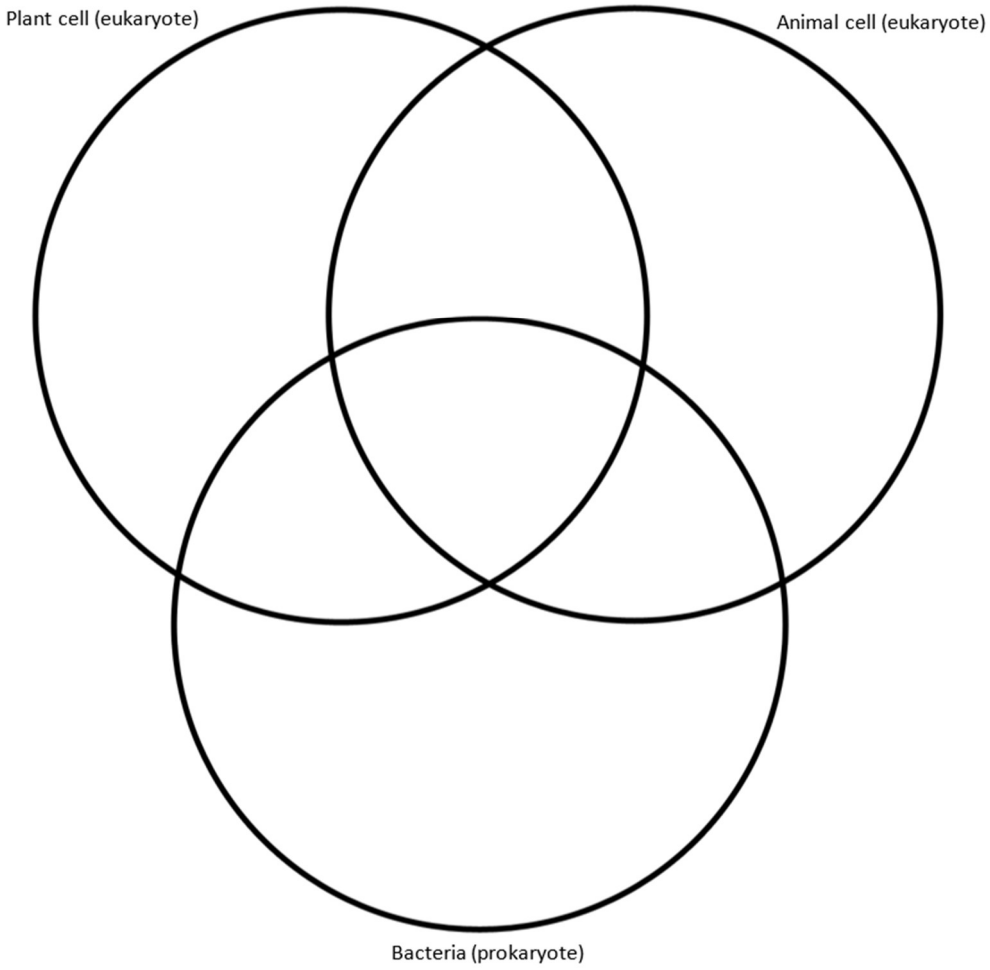
1. Give two examples of eukaryotic cells

2. Give an example of a prokaryotic cell

3. Why can't you see prokaryotic cells with a light microscope?

4. Why are plasmids useful?

5. Complete the Venn diagram below using key words for the organelles to compare the features of eukaryotic and prokaryotic cells.



Similarities	**Differences**
Similarly…	In contrast…
Equally…	However…
In the same way	On the other hand…
Just as... so does....	Alternatively…
Both... and...	In a different way…

6. Write a paragraph to compare prokaryotic and eukaryotic cells. Use your Venn diagram and the sentence starters to help you. (5 marks)

_____

_____

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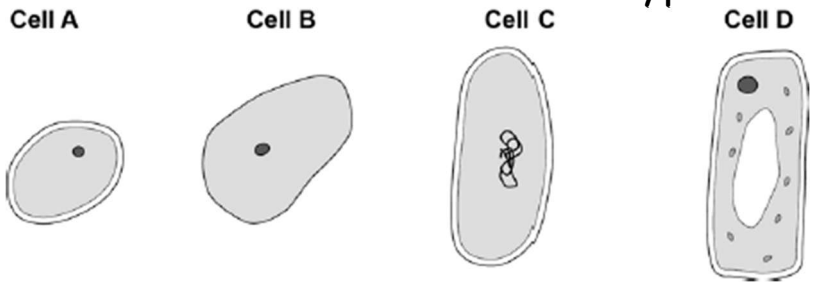
Exam Questions:

Q1. The figure below shows four different types of cell.



(a) Which cell is an animal cell?

Give **one** reason for your answer.

Cell _____

Reason

_____

_____

(2)

(b) Which cell is a plant cell?

Give **one** reason for your answer.

Cell _____

Reason

_____

_____

(2)

(c) Which cell is a prokaryotic cell?

Give **one** reason for your answer.

Cell _____

Reason

_____

_____

(2)

Q2. Food poisoning can be caused by eating food that is contaminated with *Salmonella* bacteria.

(a) Give **one** difference between a bacterial cell and an animal cell.

_____

_____

_____

_____

(1)

Q3. Some infections are caused by bacteria. The genetic material is arranged differently in the cells of bacteria compared with animal and plant cells.

Describe **two** differences.

_____

_____

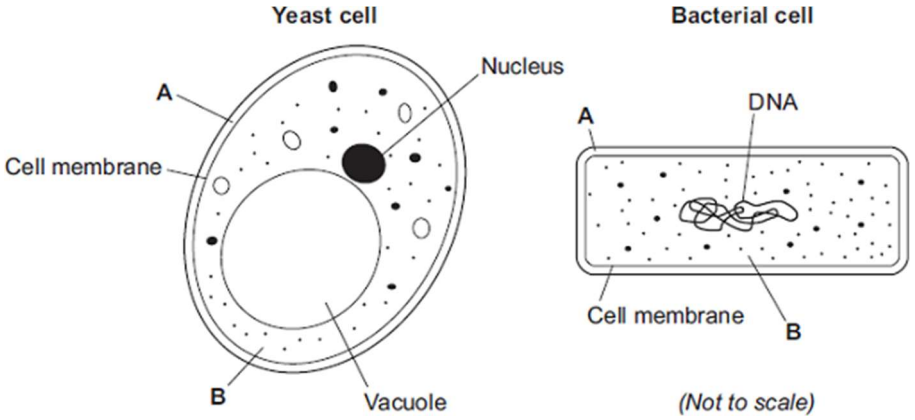
_____

_____

_____

_____ **(2)**

Q4. (a) The diagrams show the structures of a yeast cell and a bacterial cell.



(i) Both the yeast cell and the bacterial cell have structures **A** and **B**.

Name structures **A** and **B**.

A _____

B _____

(2)

(ii) The yeast cell and the bacterial cell have different shapes and sizes.

Give **one** other way in which the structure of the bacterial cell is different from the structure of the yeast cell.

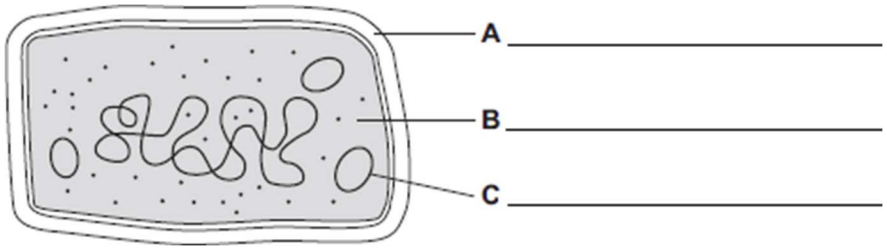
_____

_____

_____

_____ **(1)**

Q5. (a) The diagram shows the structure of a bacterial cell.



(i) On the diagram label structures **A**, **B** and **C**.

(ii) Give **one** difference between the structure of the bacterial cell and an animal cell.

_____

_____

(1)

(iii) Name **one** structure that is found in a plant cell but is **not** found in a bacterial or an animal cell.

_____

_____

(1)

Lesson 3- Required Practical 1 – Microscope

Method + Notes

1. Use a dropping pipette to put a drop of water on the microscope slide

2. Peel off a thin layer of epidermal tissue

3. Use forceps to place thin layer on the microscope slide

4. Put 2 drops of iodine solution onto the tissue

Iodine is a stain it is also an irritant. Use it to give colour to structures in the cell.

5. Carefully lower the coverslip onto the specimen using a mounted needle

6. Use paper to soak any excess liquid

7. Put the slide on the stage

8. Use the lowest power objective lens

This is because the field of view with high power would be too small making it difficult to locate the cells

9. Turn the coarse adjustment knob to move the objective lens

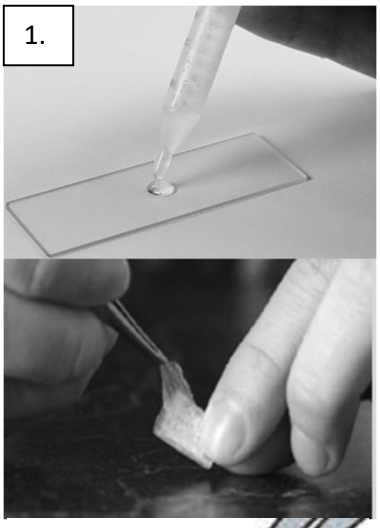
This changes the distance between the objective le and the slide

10. Turn the fine adjustment knob to bring the cells into focus

If you need to see the slide with greater magnification, change to a higher-power objective lens and refocus

11. Make a clear, labelled drawing of some cells

1.



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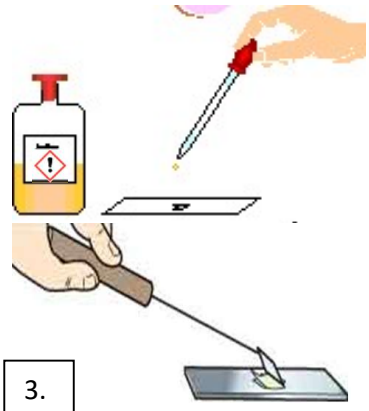

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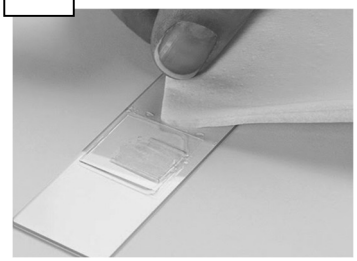
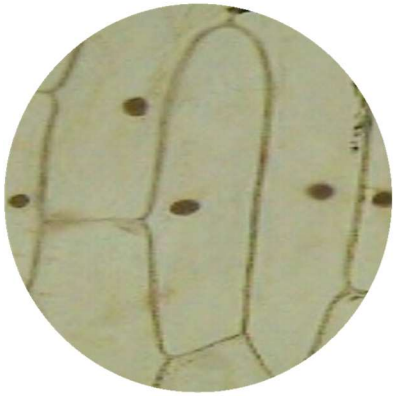


4.

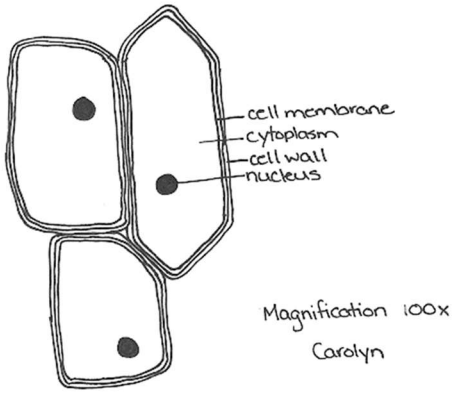
Components of the cell should be labelled and the magnification used written next to your diagram

5.

Expected Results:



What a good drawing looks like:



6.

Scan link to see a video of this practical:

Rules for drawing biological drawings:

1. Draw with a sharp pencil.
2. Use continuous lines
3. Draw label lines with a ruler and pencil
4. Never cross lines.
5. Always include magnification

Practical videos:

https://www.youtube.com/watch?v=uohe2V4yOzE&safe=active

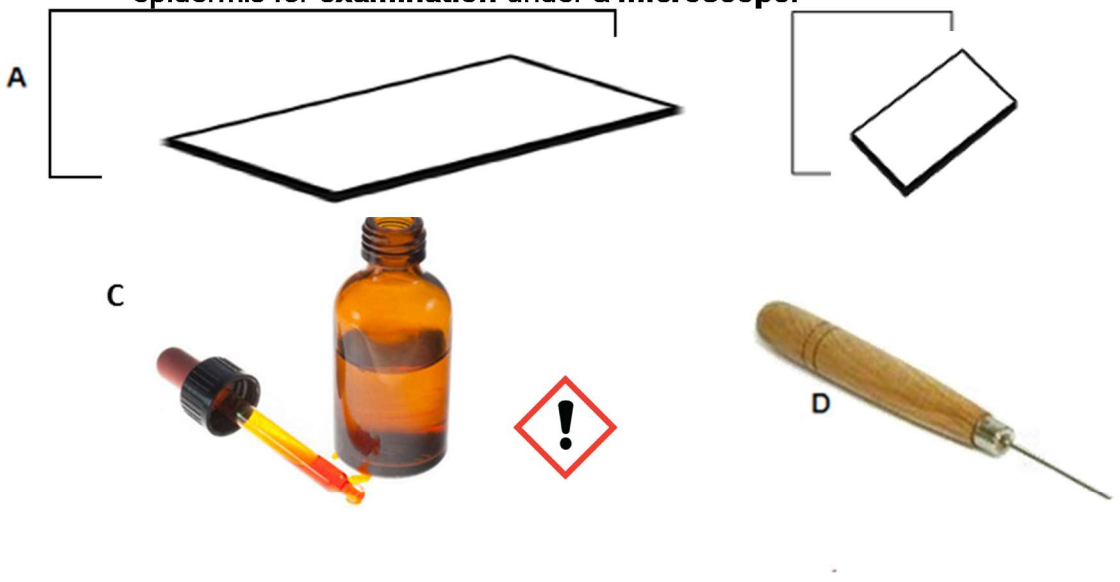
https://www.youtube.com/watch?v=dA5RfoGiupM

http://www.youtube.com/watch?v=NFVSWOaU0f0

Interactive microscope:

http://www.udel.edu/biology/ketcham/microscope/scope.html

Q1. (a) The diagrams show apparatus you could use to mount a piece of leaf epidermis for **examination** under a **microscope**.



(i) Name the pieces of apparatus labelled **A**, **B**, **C** and **D** on the diagram.

A .....

B .....

C .....

D .....

(3)

(ii) Describe how you would safely use **A**, **B**, **C** and **D** to mount a piece of leaf epidermis for examination under a microscope.

Describe what you will do with **all four pieces** of equipment

.....
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Describe two hazards of this experiment, the associated risks, and details of how you will stay safe

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.

.....

Microscopy

M1. .

a) i) Slide
ii) Coverslip
iii) Iodine (solution)
iv) (Mounted) needle **3**

Award **three** marks, maximum – for all four correct answers. Award two marks for two or three correct answers. Award one mark for one correct response.

a) (ii) Apply a best fit to students' answers within the following banding:

0-2 marks	3-4 marks	5-6 marks
Describes the use/role of one or two pieces of equipment correctly *Identifies one or more relevant hazard*	*Describes the use/role of two or three pieces of equipment correctly* *Identifies one or more relevant hazard **and** the risk or control measure to go with the hazard.*	*Describes the use/role of three or four pieces of equipment correctly* *Identifies more than one relevant hazard **and** more than one risk **and** accompanying control measure.*

Examples of relevant responses (not an exhaustive list):

Use/role of equipment:

Slide – place the epidermis on here

Coverslip – to cover the specimen

Iodine solution – to stain the sample/epidermis

Mounted needle – to position/lower the coverslip

Hazards, risks and control measures:

Hazard	Risk	Control measure
Sharp edges of glassware (slide or coverslip)	Being cut	Ensure no chips around edges
Iodine solution	Is Harmful	Do not ingest. Wash/wipe all spills. Rinse spills on skin well.
Mounted needle	Being cut/puncture wound	Ensure care is taken not to allow point of needle near to skin of self or peers

Answer scheme

Cells Booklet Mark Schemes

Lesson 1

Q1.

(a) (i) **C** and **D**

no mark if more than one box is ticked

1

(ii) any **one** from:

*do **not** allow if other cell parts are given in a list*

- (have) cell wall(s)
- (have) vacuole(s)

1

Q2.

(a) (i) (cell) membrane

1

(ii) vacuole

1

(b) any **two** from:

- (cell) wall
- chloroplast(s)

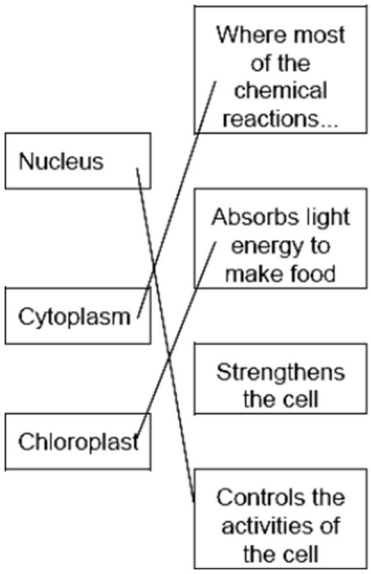
ignore chlorophyll

- vacuole

ignore cell sap

2

Q3.



1 *mark for each correct line*

mark each line from left hand box

two lines from left hand box cancels mark for that box

3

Q4.

(a) ***A*** nucleus

1

B (cell) membrane

1

C cytoplasm

1

Q5.

(a) **A** nucleus

1

B (cell) membrane

1

C cytoplasm

1

Medium

Q1.

A – (cell) membrane

B – cytoplasm

C – nucleus

Q2.

(a) (i) the three features correctly labelled on cheek cell (which are referred to in part (ii)

label lines should touch or end very close to part no marks if leaf cell labelled

nucleus

cytoplasm

cell membrane

mitochondrion

(ii) any **three** from

feature	**function**
nucleus	controls cell

Q3.

(a) (cell) wall
(cell) membrane
cytoplasm
vacuole

Q4.

(a) (i)

(ii) respiration **or** the release **or** transfer
of energy **or** it contains the enzymes
for respiration

Q5.

(i) one mark for each correctly labelled part

cell wall

cell wall: supports the cell/keeps the shape/keeps it rigid

*do **not** accept protects the cells*

(ii) vacuole: acts as reservoir for water / chemicals/(cell)/sap

3

or

keeps cell turgid/pushes content to
edge

or

maintains concentration gradient

or

allows cell elongation (not growth)

Lesson 2

Q1.

(a) **D**

any **one** from:

- has chloroplasts
- has a (large) vacuole

(b) **B**

does **not** have a (cell) wall

(c) **C**

1

any **one** from:

- genetic material is not in a nucleus

allow no nucleus

- has a single loop of DNA

Q2.

(a) any **one** from (bacterial cell):

- has a cell wall
- has plasmids

allow converse

- has a single DNA loop
- has no nucleus
- is much smaller

Q3.

(a) any **two** from:

- only one 'chromosome'

allow one strand of DNA

- circular

allow loop

- may have plasmids
- not in a nucleus / no nucleus

2

Q4.

(a) (i) A = (cell) wall

ignore cellulose

1

B = cytoplasm

1

(ii) any **one** from:

accept has DNA instead of a nucleus, but not just has DNA

- bacterial cell / it has no nucleus

allow no mitochondria

- DNA free in cytoplasm

ignore size

- has no vacuole / no vesicles

ignore strands of DNA

1

Q5.

(a) (i) **A** – (cell) wall

1

B – cytoplasm

1

C – plasmid

1

(ii) bacterium cell has cell wall / no nucleus / no mitochondria / plasmids present

accept its DNA / genetic material is not enclosed / it has no nuclear membrane

it = bacterium cell

accept converse for animal cell

ignore flagella

1

(iii) any **one** from:

- chloroplast

ignore chlorophyll

- (permanent) vacuole