

Question 1

Question	Answers	Extra information	Mark
01.1	cytoplasm	If more than one box is ticked, award no marks.	1
01.2	leaf	If more than one box is ticked, award no marks.	1
01.3	cell wall, chloroplasts, vacuole	If more than one box is ticked, award no marks.	1
01.4	Any one from: <ul style="list-style-type: none"> • controls the cell • contains the genetic information 	Do not allow brain of the cell. Allow chromosomes or DNA for genetic information.	1
01.5	Any two from: <ul style="list-style-type: none"> • (it has) no nucleus • (it has) plasmid(s) • (it has) a flagellum/flagella • (it has) no mitochondria 	Accept circular DNA/DNA loop. Accept DNA free in the cytoplasm.	2
Total			6

Question 2

Question	Answers	Extra information	Mark
02.1	muscle cell → cardiac muscle → heart → circulatory system	If more than one box is ticked, award no marks.	1
02.2	A	If more than one box is ticked, award no marks.	1
02.3	to release energy for muscle contraction	Do not allow produce/ make/ create energy. Allow so the muscles can move.	1 1
02.4	red blood cell		1
02.5	one muscle contracts the other muscle relaxes		1 1
Total			7

Question 3

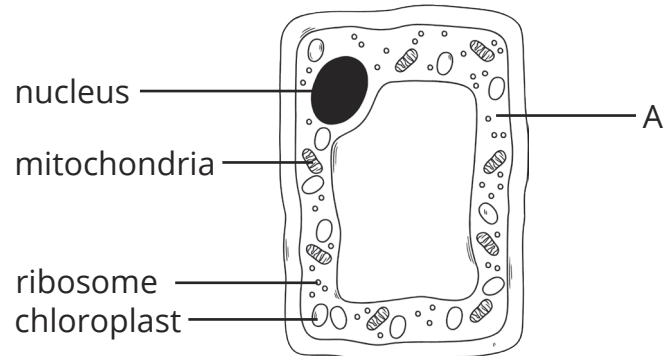
Question	Answers	Extra information	Mark
03.1	Level 3: There is a clear and detailed description of the steps, including the correct names for each part of the microscope.		5 - 6
	Level 2: Most of the steps are described. Some parts of the microscope may not be named.		3 - 4
	Level 1: There are simple statements that give some steps of the method. Two marks can be given for two correct statements.		1 - 2
	No relevant content.		0
	Indicative content: <ul style="list-style-type: none"> • place the blood sample/cells onto a slide • place the slide on the stage • centre the blood sample/cells/slide/specimen and fasten the stage clips • turn on light on the microscope or angle the mirror • turn the objective lens to the lowest magnification • look down the eyepiece lens • use the focusing wheel(s) to bring the blood sample/cells/specimen into focus • turn the objective lens to a higher magnification 		
03.2	Any two from: <ul style="list-style-type: none"> • support to hold the body upright • support to keep organs in place • protect important organs • movement 	Allow correctly named organ.	2
03.3	ball and socket (joint)		1

03.4	<ul style="list-style-type: none">• the ligaments hold the bones together		1
	<ul style="list-style-type: none">• the cartilage protects/ cushions/covers the ends of the bones		1
	<ul style="list-style-type: none">• the fluid keeps the cartilage slippery		1
	<ul style="list-style-type: none">• to prevent (the ends of) the bones rubbing together	Allow to prevent damage to the bone.	1
Total			13

0 1

Figure 1 shows a plant cell.

Some parts of the cell have been labelled.

Figure 1

0 1 . 1

What is the name of part A?

Tick **one** box.

[1 mark]

cell membrane cell wall cytoplasm vacuole

0 1 . 2

In which part of the plant would you find the cell in **Figure 1**?Tick **one** box.

[1 mark]

leaf petal root seeds

0 1 . 3 Which three parts found in a plant cell are **not** present in animal cells?

Tick **one** box.

[1 mark]

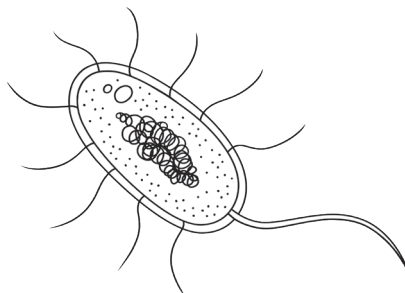
- cell membrane, chloroplasts, cytoplasm
- cell membrane, chloroplasts, vacuole
- cell wall, chloroplasts, cytoplasm
- cell wall, chloroplasts, vacuole

0 1 . 4 Give one function of the nucleus.

[1 mark]

0 1 . 5 **Figure 2** shows a different type of cell.

Figure 2



Give **two** pieces of evidence that suggest the cell in **Figure 2** is a bacterial cell.

[2 marks]

1. _____

2. _____

0 2

Cardiac muscle is one type of muscle found in the body.

0 2 . 1

What is the correct order of these structures from the simplest level of organisation to the most complex?

Tick **one** box.

[1 mark]

cardiac muscle → muscle cell → heart → circulatory system

cardiac muscle → muscle cell → circulatory system → heart

muscle cell → cardiac muscle → heart → circulatory system

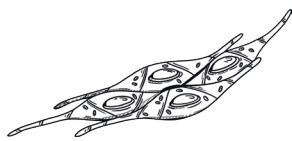
muscle cell → cardiac muscle → circulatory system → heart

0 2 . 2

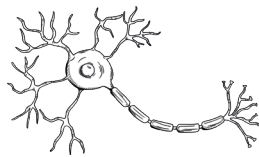
Which diagram shows a muscle cell?

Tick **one** box.

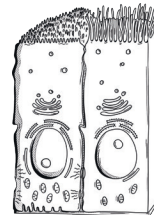
[1 mark]



A



B



C



D

0 2 . 3

Explain why muscles cells contain many mitochondria.

[2 marks]

0 2 . 4

Muscles require a lot of oxygen when they are in use.

Name the type of cell that carries oxygen to the muscles.

[1 mark]

0 2 . 5 Skeletal muscles can work in pairs to move parts of the body.

These pairs of muscles are called antagonistic muscles.

Explain how antagonistic muscles work together.

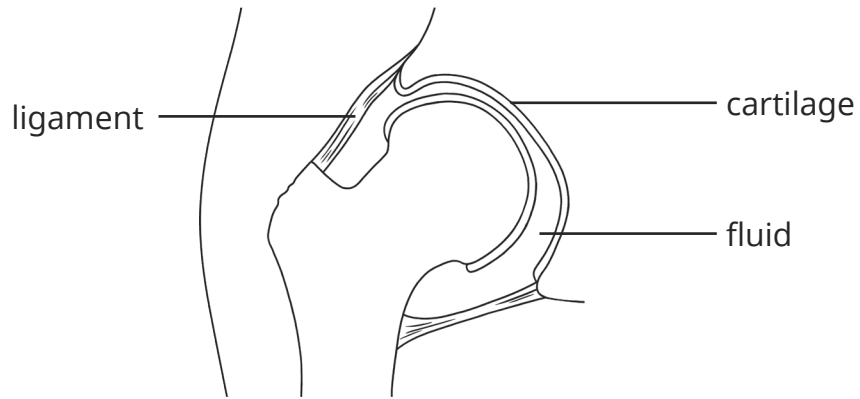
[2 marks]

7

03.3

Figure 3 shows a hip joint.

Figure 3



What type of joint is a hip joint?

[1 mark]

03.4

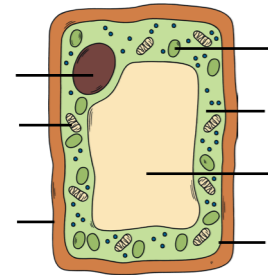
The ligament, fluid and cartilage of the joint are labelled in **Figure 3**.

Explain the role of these structures in the joint.

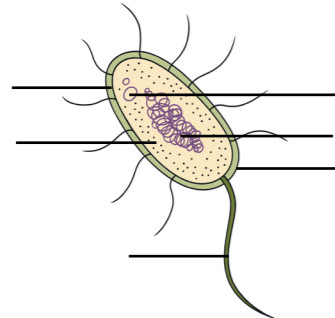
[4 marks]

Cells and Organisation (Foundation) Revision Mat

Label the cells using words from the boxes.



cell membrane mitochondria permanent vacuole
cell wall cytoplasm nucleus chloroplast



cell membrane cytoplasm
circular DNA cell wall
flagellum plasmid

Name the sub-cellular structure that carries out each function.

Controls the movement of substances into and out of the cell.

A jelly-like substance that fills the cell, where most chemical reactions occur.

Controls the activities of the cell. It contains genetic material (DNA), which is packaged into structures called chromosomes.

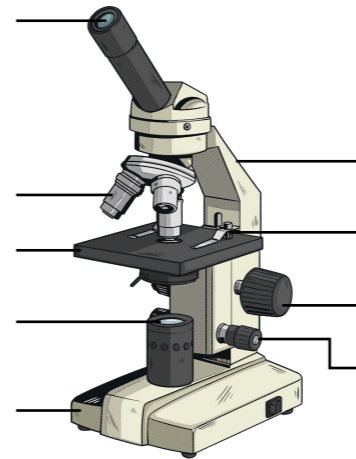
Complete the table to identify which sub-cellular structures are found in animal cells.

Sub-Cellular Structure	Animal Cell	Plant Cell
nucleus		✓
circular DNA		✗
mitochondria		✓
chloroplasts	✗	✓
cell wall		✓
cell membrane		✓
cytoplasm		✓
flagellum		✗
permanent vacuole		✓
plasmids		✗

Explain why animal cells do not need chloroplasts.

Compare how genetic material is packaged in plant cells and in bacterial cells.

Label the light microscope using the words in the box.



eyepiece lens stage arm fine adjustment knob
light source stage clips base coarse adjustment knob
objective lens

Describe how you would use the microscope to view a pre-prepared slide of blood cells.

Muscle cells and sperm cells both contain lots of mitochondria. Explain why.

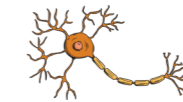
Name each type of cell, then draw **one** line from each cell to its adaptation.



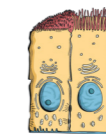
Biconcave shape to give it a large surface area for the diffusion of oxygen.



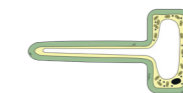
Long fibres to carry electrical impulses up and down the body.



Cilia to waft mucus along the airways.



Contains bands of protein that change shape to contract and relax.



Contains lots of chloroplasts for photosynthesis.

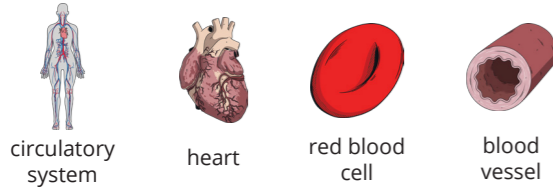


Long protrusion to fit between grains of soil to absorb water.



Tail-like structure and lots of mitochondria to release energy for movement.

The illustrations show four structures that make up the circulatory system. i



Name each **level of organisation** in the correct order from smallest to largest.

smallest

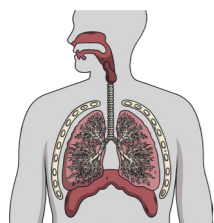
↓

↓

↓

largest

Name each organ system and complete the descriptions of their function. j



Name: _____

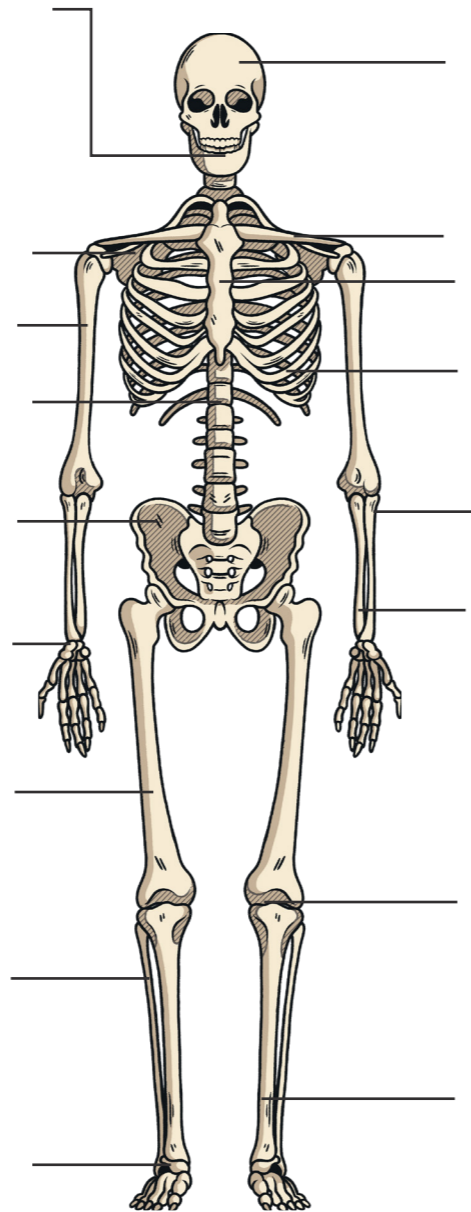
Function: Takes in _____ from the air and removes _____ from the blood.



Name: _____

Function: Breaks down and absorbs _____.

Label the parts of the skeleton using the words from the box. k

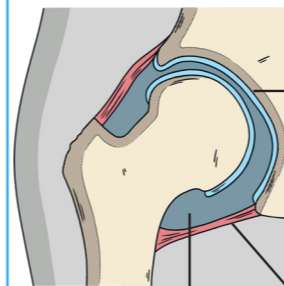


- | | | |
|----------|---------|-----------|
| cranium | sternum | radius |
| clavicle | ribs | tibia |
| ulna | patella | mandible |
| scapula | humerus | vertebrae |
| pelvis | carpals | femur |
| fibula | talus | |

Describe the four functions of the skeleton. l

- Support: _____
- Protection: _____
- Movement: _____
- Making blood cells: _____

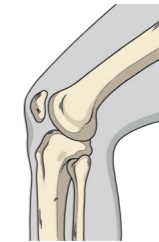
Name and describe the function of each part of the joint. m



_____ is a strong, smooth tissue that covers the ends of the bones to _____

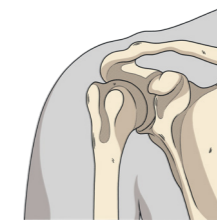
_____ in the joint _____ hold keeps the _____ slippery to _____

Name each joint and give an example of where in the body you would find each type. n



Joint: _____

Example in body: _____



Joint: _____

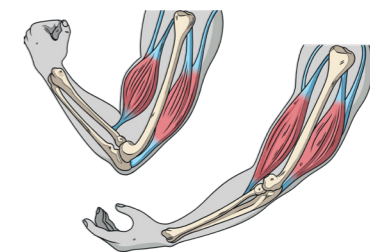
Example in body: _____

Complete the sentences using words from the box. o

- | | | | |
|--------------|-----------|------|---------|
| antagonistic | contracts | push | shrink |
| biomechanics | expands | pull | relaxes |

Muscles can't _____, they can only _____.

A pair of muscles that work together are called _____ muscles.

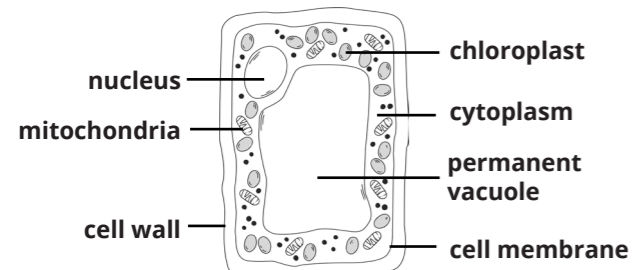


When one muscle _____, the other muscle _____. The joint is pulled in one direction causing movement.

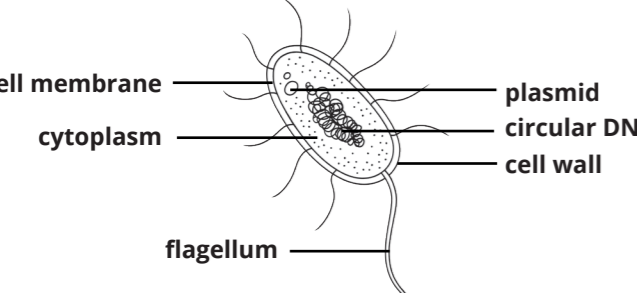
The combination of muscles, bones and joints making us move is called _____.

Cells and Organisation (Foundation) Revision Mat Answers

Label the cells using words from the boxes. a



cell membrane mitochondria permanent vacuole
cell wall cytoplasm nucleus chloroplast



cell membrane cytoplasm
circular DNA cell wall
flagellum plasmid

Name the sub-cellular structure that carries out each function. b

Controls the movement of substances into and out of the cell.

cell membrane

A jelly-like substance that fills the cell, where most chemical reactions occur.

cytoplasm

Controls the activities of the cell. It contains genetic material (DNA), which is packaged into structures called chromosomes.

nucleus

Complete the table to identify which sub-cellular structures are found in animal cells. c

Sub-Cellular Structure	Animal Cell	Plant Cell
nucleus	✓	✓
circular DNA	✗	✗
mitochondria	✓	✓
chloroplasts	✗	✓
cell wall	✗	✓
cell membrane	✓	✓
cytoplasm	✓	✓
flagellum	✗	✗
permanent vacuole	✗	✓
plasmids	✗	✗

Explain why animal cells do not need chloroplasts. d

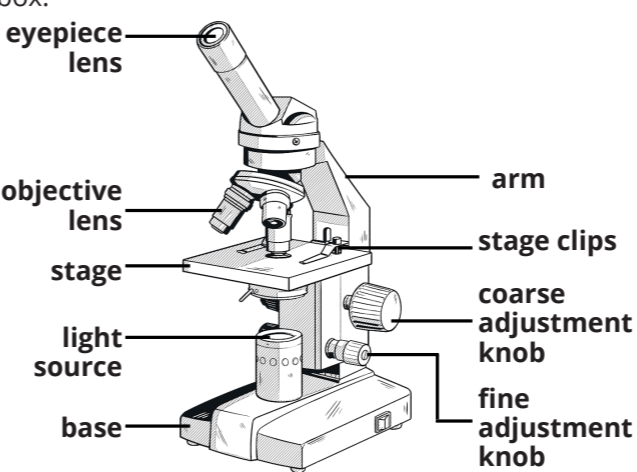
Animals can catch or collect food to eat, which means that they don't need to produce their own food by photosynthesis.

Compare how genetic material is packaged in plant cells and in bacterial cells. e

In plant cells, genetic material is packaged into structures called chromosomes in the **nucleus**.

In bacterial cells, most of the DNA is free in the **cytoplasm**. They may also have additional genes on small rings of DNA called **plasmids**.

Label the light microscope using the words in the box. f



eyepiece lens stage arm fine adjustment knob
light source stage clips base coarse adjustment knob
objective lens

Describe how you would use the microscope to view a pre-prepared slide of blood cells.

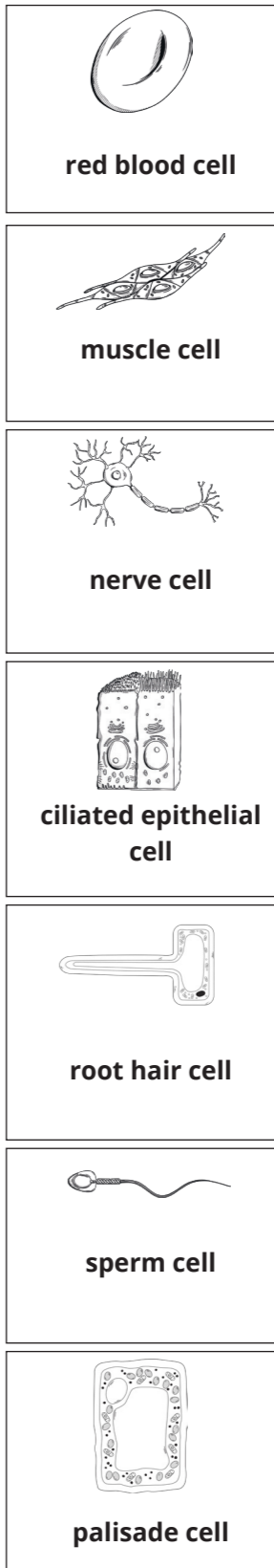
- **Plug in the microscope and turn on the light.**
- **Place the slide on the stage and hold it in place with the stage clips.**
- **Turn to the objective lens with the lowest magnification.**
- **Look down the eyepiece lens and use the adjustment knobs to focus the specimen.**
- **Increase the magnification by turning to a higher power objective lens, then use the fine adjustment knob to bring the cells back into focus.**

Muscle cells and sperm cells both contain lots of mitochondria. Explain why. g

A sperm cell contains lots of mitochondria to release energy so it can move towards the egg cell for fertilisation.

A muscle cell contains lots of mitochondria to release energy for muscle contraction.

Name each type of cell, then draw **one** line from each cell to its adaptation. h



red blood cell Biconcave shape to give it a large surface area for the diffusion of oxygen.

muscle cell Long fibres to carry electrical impulses up and down the body.

nerve cell Cilia to waft mucus along the airways.

ciliated epithelial cell Contains bands of protein that change shape to contract and relax.

root hair cell Contains lots of chloroplasts for photosynthesis.

sperm cell Long protrusion to fit between grains of soil to absorb water.

palisade cell Tail-like structure and lots of mitochondria to release energy for movement.

Question 1

Question	Answers	Extra information	Mark
01.1	Level 3: There is a clear and detailed description of the steps, including the correct names for each part of the microscope.		5 - 6
	Level 2: Most of the steps are described. Some parts of the microscope may not be named.		3 - 4
	Level 1: There are simple statements that give some steps of the method. Two marks can be given for two correct statements.		1 - 2
	No relevant content.		0
	Indicative content: <ul style="list-style-type: none"> • place the dinoflagellate onto a slide/into a Petri dish/ suitable container • place the slide on the stage • centre the dinoflagellate/slide/specimen and secure with the stage clips • turn on the microscope lamp or angle the mirror • turn the objective lens to the lowest magnification • look down the eyepiece lens • use the focusing wheel(s) to bring the dinoflagellate/ specimen into focus • turn the objective lens to a higher magnification 		
01.2	the site of (aerobic) respiration/ where respiration takes place	Allow correct equation for aerobic respiration. Do not allow anaerobic respiration.	1
01.3	Any one from: <ul style="list-style-type: none"> • it does not have a (cell) wall • it has a flagellum or tail to help it move/swim • it has a pusule for taking in food 	Accept it can move or swim. Accept it has a tail. Accept it takes in food or eats. Accept it has a mouth-like structure.	1

01.4	Any one from: <ul style="list-style-type: none">• it has a chloroplast• it has a vacuole	Accept chlorophyll.	1
01.5	in the dinoflagellate, (the genetic material) is stored in the nucleus	Assume 'it' refers to the genetic material.	1
	in a bacterial cell, (the genetic material) is free in the cytoplasm	Allow it has (circular) DNA <u>instead of a nucleus.</u> Allow (the genetic material) is not in a nucleus.	1
Total			11

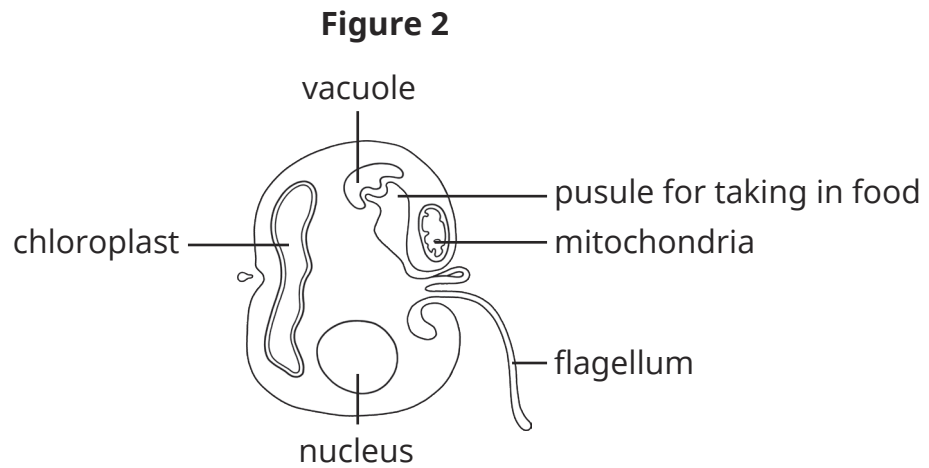
Question 2

Question	Answers	Extra information	Mark
02.1	to release energy	Do not allow produce/ make/create energy.	1
	(so) the <u>cilia</u> can move		1
02.2	tissue		1
02.3	(sperm cells) do not work together		1
02.4	reproductive system		1
02.5	(the cilia can) carry/move the egg cell (through the tubes)		1
Total			6

Question 3

Question	Answers	Extra information	Mark
03.1	to protect organs or to keep organs in place	Allow named organ protected by the ribs.	1
03.2	to make/help you move or to support the body	Allow named movement that involves the legs.	1
03.3	the elbow is a hinge joint (so) can move forwards and backwards the shoulder is a ball and socket joint (so) can move in all directions		1 1 1 1
03.4	cartilage protects/cushions/covers the ends of the bones fluid reduces friction in the joint without them the (ends of the) bones will rub against each other	Allow acts as a shock absorber. Allow keeps the cartilage slippery.	1 1 1
Total			9

0 1 . 2 **Figure 2** shows a different type of cell.



Dinoflagellates are made of only single cells and live in water.

They have features of both plants and animals.

Give the function of the mitochondria.

[1 mark]

0 1 . 3 Give **one** piece of evidence that suggests the dinoflagellate is an animal cell and **not** a plant cell.

[1 mark]

0 1 . 4 Give **one** piece of evidence that suggests the dinoflagellate is a plant cell and **not** an animal cell.

[1 mark]

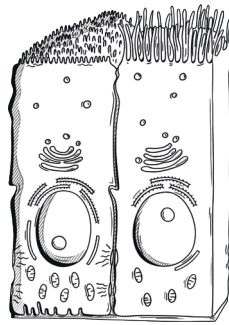
01.5

Describe how the location of the genetic material in the dinoflagellate is different to the location of the genetic material in a bacterial cell.

[2 marks]

11

0 2

Figure 3 shows some ciliated epithelial cells.**Figure 3**

0 2 . 1

Explain why a ciliated epithelial cell has many mitochondria.

[2 marks]

0 2 . 2

Many ciliated epithelial cells line the upper part of the respiratory system.
Give the word that describes this group of cells.

[1 mark]

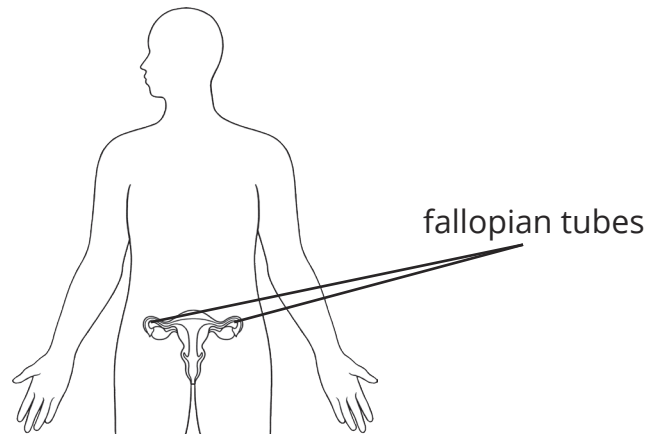
0 2 . 3

Why can this word **not** be used to describe a group of sperm cells?

[1 mark]

0 2 . 4

Ciliated epithelial cells are also found in the fallopian tubes. **Figure 4** shows the location of the fallopian tubes.

Figure 4

Fallopian tubes carry egg cells from the ovaries, where they are made, to the uterus, where a baby will develop if an egg is fertilised.

Name the organ system in which the fallopian tubes are found.

[1 mark]

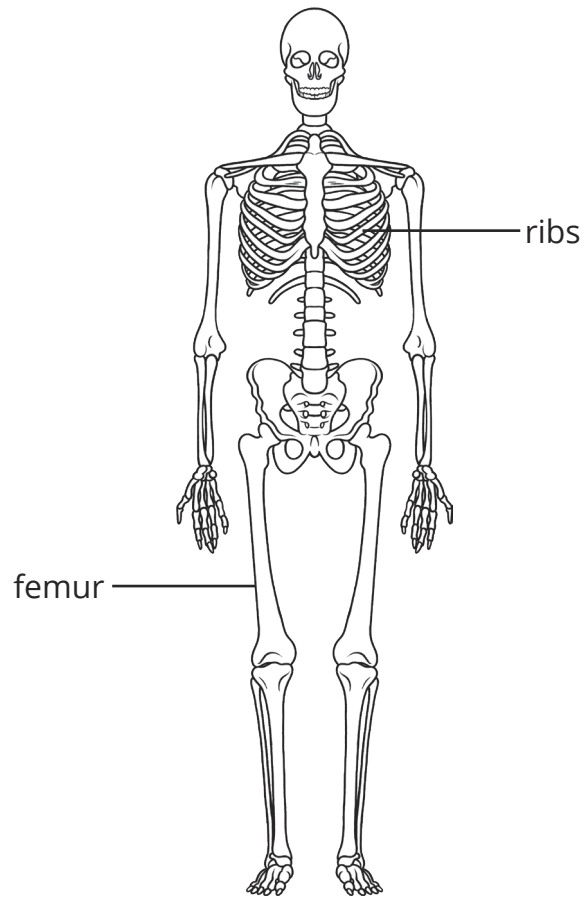
0 2 . 5

Suggest why ciliated epithelial cells line the fallopian tubes.

[1 mark]

6

03

Figure 5 shows the skeleton.**Figure 5**

The skeleton has multiple functions.

03.1

What is the function of the ribs?

[1 mark]

03.2

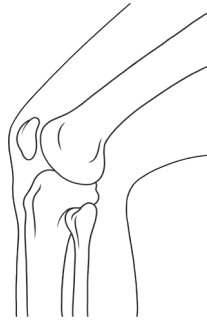
What is the function of the femur?

[1 mark]

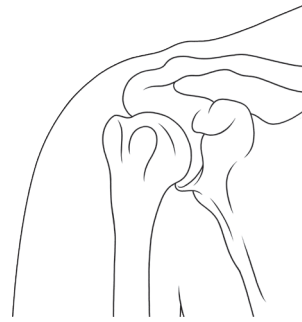
03.3

Figure 6 shows the knee joint and the shoulder joint.

Figure 6



knee joint



shoulder joint

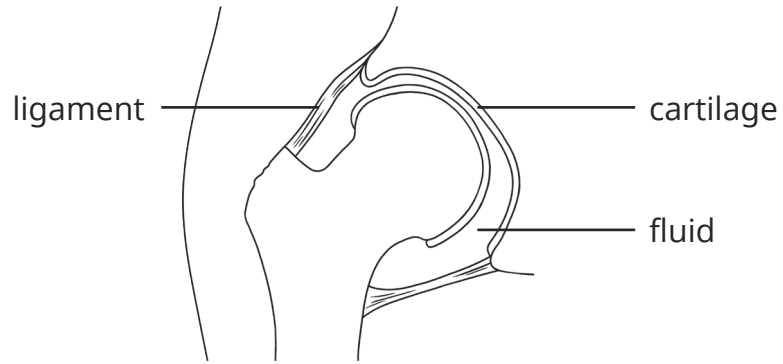
Describe the difference in movement between the two joints.

You should name the types of joint in your description.

[4 marks]

03.4 **Figure 7** shows a hip joint.

Figure 7



The hip can be affected by osteoarthritis, which results in the loss of cartilage and fluid in the joint.

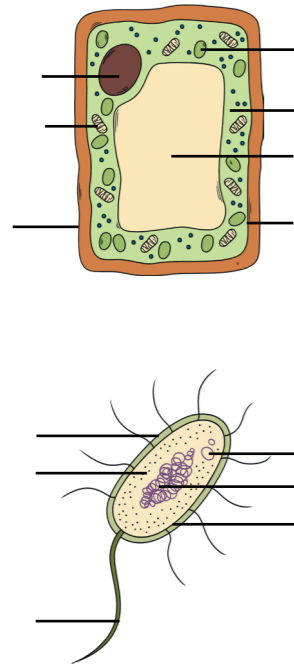
Explain why people with osteoarthritis in the hip joint experience pain and a grinding sensation when they move the joint.

[3 marks]

Cells and Organisation (Higher) Revision Mat

Label the cell parts.

a



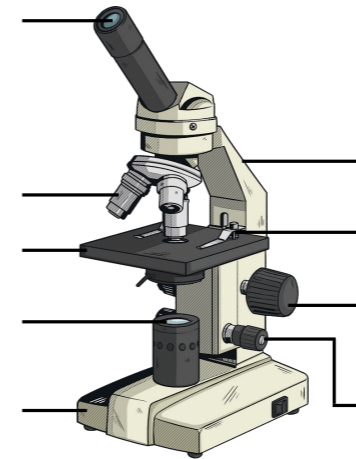
There are three sub-cellular structures found in plant cells that are **not** found in animal cells.

c

Name these structures, describe the function of each and explain why they are not needed in animal cells.

Label the parts of the microscope.

f



Describe how you would use the microscope to view a pre-prepared slide of blood cells.

Name three specialised cells that are adapted to have a large surface area. Describe their adaptations and explain why they are needed.

h

Give the function of each sub-cellular structure.

b

cell membrane _____

cytoplasm _____

nucleus _____

Compare how genetic material is packaged in plant cells and in bacterial cells.

d

Bacterial cells often have one or more flagella. One type of specialised animal cell also has a flagellum.

e

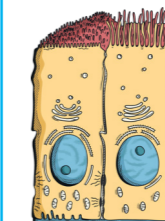
Describe the role of the flagellum and explain which specialised cell is adapted to have one.

Name three types of specialised cell that contain lots of mitochondria. Explain why each cell has this adaptation.

g

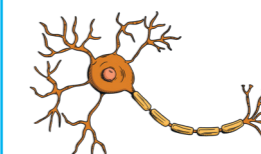
Name each cell type and explain how it is adapted to its function.

i



Name: _____

Adaptations: _____



Name: _____

Adaptations: _____

Write down the four levels of organisation in order from the smallest to the largest. Give the definition of each level. **j**

Name: _____

Definition: _____

Name: _____

Definition: _____

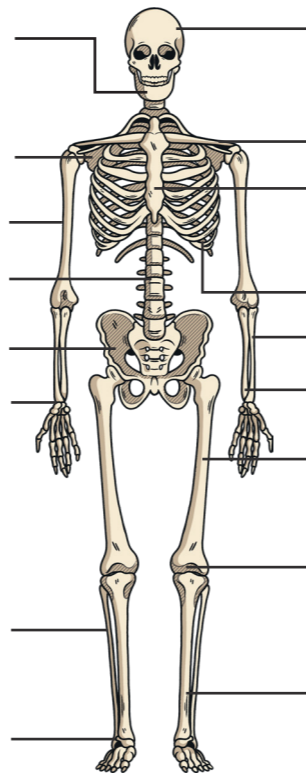
Name: _____

Definition: _____

Name: _____

Definition: _____

Label the parts of the skeleton. **k**



Describe four functions of the skeleton. **m**

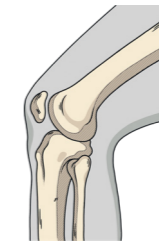
1. _____

2. _____

3. _____

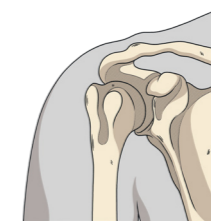
4. _____

Name each joint and give an example of where in the body you would find each type. **o**



Joint: _____

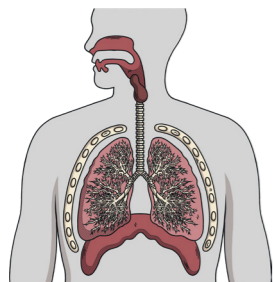
Example in body: _____



Joint: _____

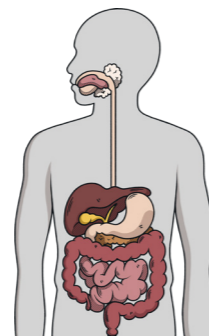
Example in body: _____

Name each organ system and complete the descriptions of their function. **l**



Name: _____

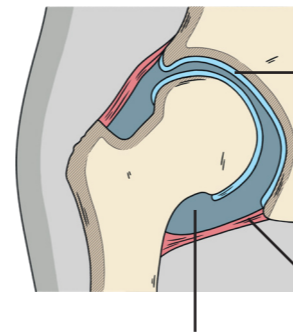
Function: _____



Name: _____

Function: _____

Name and describe the function of each part of the joint. **n**



Complete the sentences: **p**

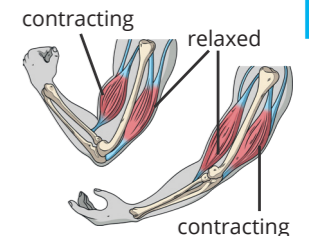
Muscles can't _____, they can only _____.

A pair of muscles that work together are called _____

muscles. The combination of muscles, bones and joints

making us move is called _____.

The diagram shows a pair of muscles working together. Describe how the muscles work to bend the arm at the elbow.



Cells and Organisation (Higher) Revision Mat Answers

Label the cell parts. a

The diagram shows two cells. The top cell is a plant cell with labels: nucleus, chloroplast, mitochondria, cytoplasm, permanent vacuole, cell wall, and cell membrane. The bottom cell is a bacterial cell with labels: cell wall, cytoplasm, plasmid, circular DNA, cell membrane, and flagellum.

c

There are three sub-cellular structures found in plant cells that are **not** found in animal cells. Name these structures, describe the function of each and explain why they are not needed in animal cells.

Plants have a cell wall and permanent vacuole that help to provide support for the plant.

Animals get this support from their skeletal systems instead.

Plant cells contain chloroplasts. Chloroplasts contain a pigment called chlorophyll, which absorbs light to provide energy for photosynthesis so plants can make their own food.

Animals can catch or collect food to eat, which means that they don't need to make it themselves.

Give the function of each sub-cellular structure. b

cell membrane

Controls the movement of substances into and out of the cell.

cytoplasm

A jelly-like substance that fills the cell, where most chemical reactions occur.

nucleus

Controls the activities of the cell. It contains genetic material (DNA), which is packaged into structures called chromosomes.

d

Compare how genetic material is packaged in plant cells and in bacterial cells.

In plant cells, genetic material is packaged into structures called chromosomes in the nucleus.

In bacterial cells, most of the DNA is free in the cytoplasm. They may also have additional genes on small rings of DNA called plasmids.

e

Bacterial cells often have one or more flagella. One type of specialised animal cell also has a flagellum.

Describe the role of the flagellum and explain which specialised cell is adapted to have one.

The flagellum allows the cell to move. A sperm cell is a specialised animal cell which has a flagellum to allow it swim to the egg cell and fertilise it.

Label the parts of the microscope. f

The diagram shows a microscope with labels: eyepiece lens, objective lens, stage, light source, base, arm, stage clips, coarse adjustment knob, and fine adjustment knob.

Describe how you would use the microscope to view a pre-prepared slide of blood cells.

- **Plug in the microscope and turn on the light.**
- **Place the slide on the stage and hold it in place with the stage clips.**
- **Turn to the objective lens with the lowest magnification.**
- **Look down the eyepiece lens and use the adjustment knobs to focus the specimen.**
- **Increase the magnification by turning to a higher power objective lens, then use the fine adjustment knob to bring the cells back into focus.**

g

Name three types of specialised cell that contain lots of mitochondria. Explain why each cell has this adaptation.

A sperm cell contains lots of mitochondria to release energy so it can move towards the egg cell for fertilisation.

A muscle cell contains lots of mitochondria to release energy for muscle contraction.

A ciliated epithelial cell contains lots of mitochondria to release energy to move the cilia.

h

Name three specialised cells that are adapted to have a large surface area. Describe their adaptations and explain why they are needed.

A root hair cell has a long protrusion that increases the surface area for the absorption of water and minerals into the cell.

A red blood cell has a biconcave shape that increases the surface area for the diffusion of oxygen into the cell.

A palisade cell is long and tall to give a large surface area to maximise the absorption of light to provide energy for photosynthesis.

i

Name each cell type and explain how it is adapted to its function.

The diagram shows a ciliated epithelial cell with cilia on its top surface and a nerve cell with a cell body and branching dendrites.

Name: **ciliated epithelial cell**
Adaptations: **Cilia help to waft mucus with trapped dust and microorganisms away from the lungs.**

Name: **nerve cell**
Adaptations: **Long fibres allow it to carry electrical impulses up and down the body. Branching dendrites at each end connect to other nerves or muscles.**

Write down the four levels of organisation in order from the smallest to the largest. Give the definition of each level. j

Level 1: **cell**

Definition: **The smallest unit of a living organism. It contains structures needed to carry out life processes.**

Level 2: **tissue**

Definition: **A group of cells of the same type.**

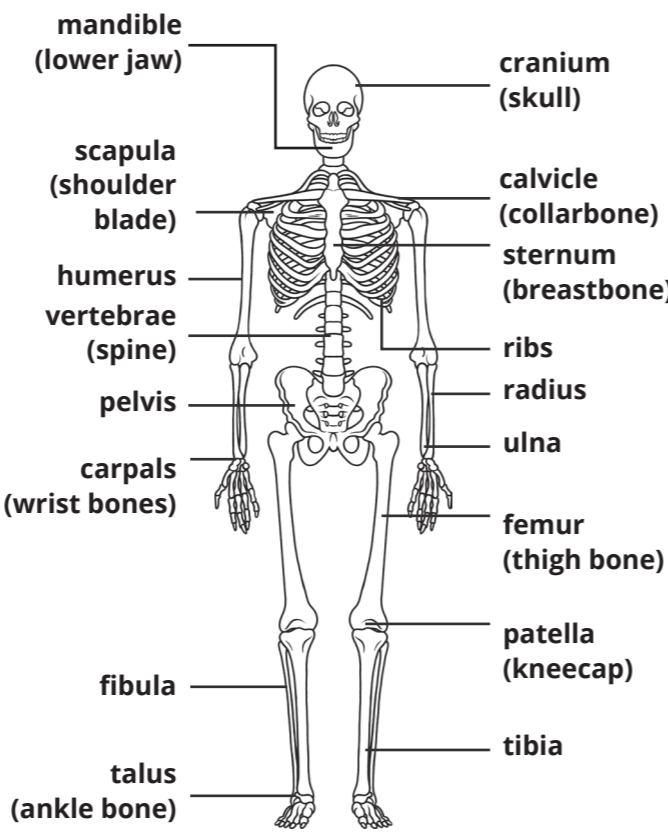
Level 3: **organ**

Definition: **A group of different tissues working together to carry out a job.**

Level 4: **organ system**

Definition: **A group of different organs working together to perform a particular function**

Label the parts of the skeleton. k



Labels on the left side of the skeleton:

- mandible (lower jaw)
- scapula (shoulder blade)
- humerus
- vertebrae (spine)
- pelvis
- carpals (wrist bones)
- fibula
- talus (ankle bone)


Labels on the right side of the skeleton:

- cranium (skull)
- clavicle (collarbone)
- sternum (breastbone)
- ribs
- radius
- ulna
- femur (thigh bone)
- patella (kneecap)
- tibia


Describe four functions of the skeleton. m

- Support - The skeleton provides a frame to hold your body upright and keep your organs in place.**
- Protection - Bones are hard and strong to protect important organs such as the heart and the brain.**
- Movement - Your bones and muscles work together to allow your body to move.**
- Making blood cells - Red blood cells and white blood cells are made in the bone marrow.**

Name each joint and give an example of where in the body you would find each type. o



Joint: **hinge joint**
Example in body: **knee or elbow**



Joint: **ball and socket joint**
Example in body: **shoulder or hip**

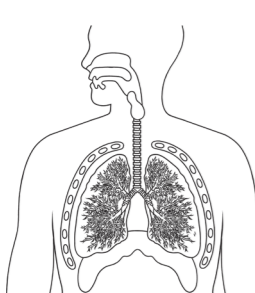
Complete the sentences: p

Muscles can't **push**, they can only **pull**.

A pair of muscles that work together are called **antagonistic** muscles.

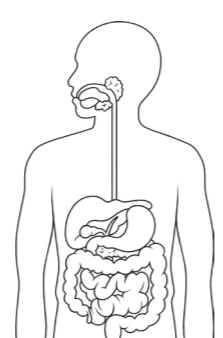
The combination of muscles, bones and joints making us move is called **biomechanics**.

Name each organ system and complete the descriptions of their function. l



Name: **respiratory system**

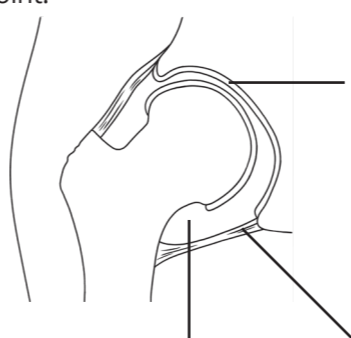
Function: **Takes in oxygen from the air and removes carbon dioxide from the blood.**



Name: **digestive system**

Function: **Breaks down and absorbs food molecules.**

Name and describe the function of each part of the joint. n

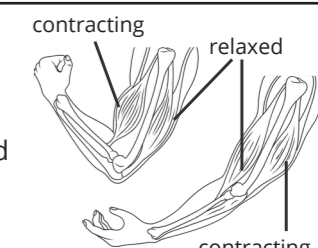


Cartilage is a strong, smooth tissue that covers the ends of the bones to protect them from damage.

Fluid in the joint keeps the cartilage slippery to reduce friction.

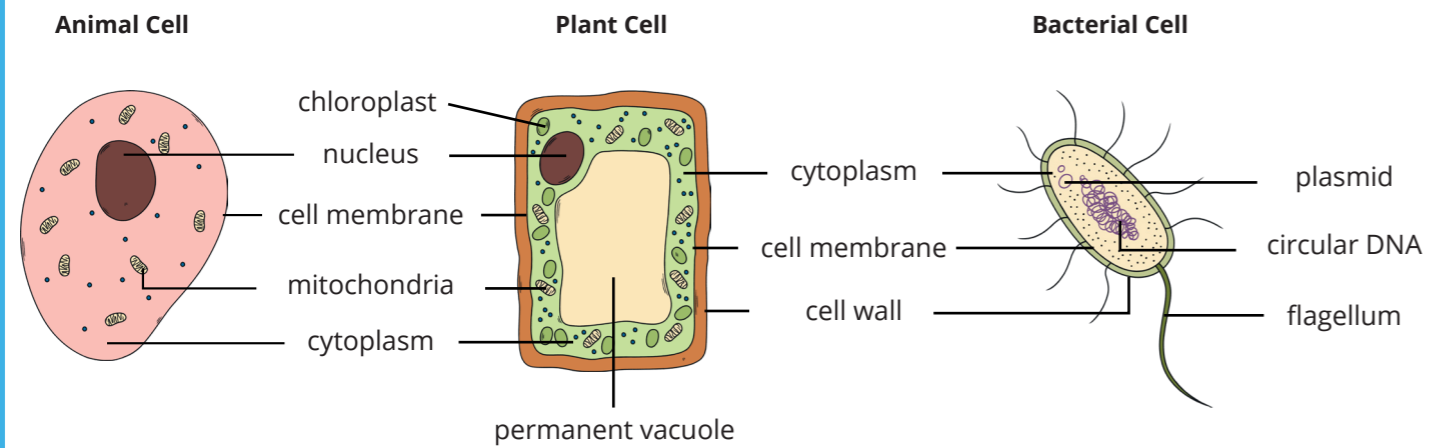
Ligaments hold the bones together.

The diagram shows a pair of muscles working together. Describe how the muscles work to bend the arm at the elbow. q



The top muscle/bicep contracts, the other/bottom muscle/tricep relaxes. The joint is pulled upwards causing the arm to bend.

KS3 Cells and Organisation Knowledge Organiser



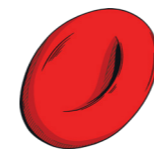
The components of a cell each have different functions.

Sub-Cellular Structure	Function
nucleus	Controls the activities of the cell. It contains genetic material (DNA), which is packaged into structures called chromosomes.
circular DNA	The DNA of bacteria found free in the cytoplasm.
mitochondria	Contain the enzymes needed for aerobic respiration, which releases energy for the cell.
chloroplasts	Contain a pigment called chlorophyll, which absorbs light to provide energy for photosynthesis.
cell wall	Helps to strengthen the cell and provides support for the plant.
cell membrane	Controls the movement of substances into and out of the cell.
cytoplasm	A jelly-like substance that fills the cell, where most chemical reactions occur.
flagellum	A tail-like structure that allows bacteria to move around.
permanent vacuole	Filled with cell sap to keep the cell rigid to support the plant.
plasmids	Plasmids are small rings of DNA that code for specific features, such as antibiotic resistance.

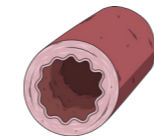
Different cell types contain different sub-cellular structures.

Sub-Cellular Structure	Animal Cell	Plant Cell	Bacterial Cell
nucleus	✓	✓	✗
circular DNA	✗	✗	✓
mitochondria	✓	✓	✗
chloroplasts	✗	✓	✗
cell wall	✗	✓	✓
cell membrane	✓	✓	✓
cytoplasm	✓	✓	✓
flagellum	✗	✗	✓
permanent vacuole	✗	✓	✗
plasmids	✗	✗	✓

Levels of Organisation



A **cell** is the smallest unit of a living organism. It contains structures needed to carry out life processes.



A **tissue** is a group of cells of the same type.

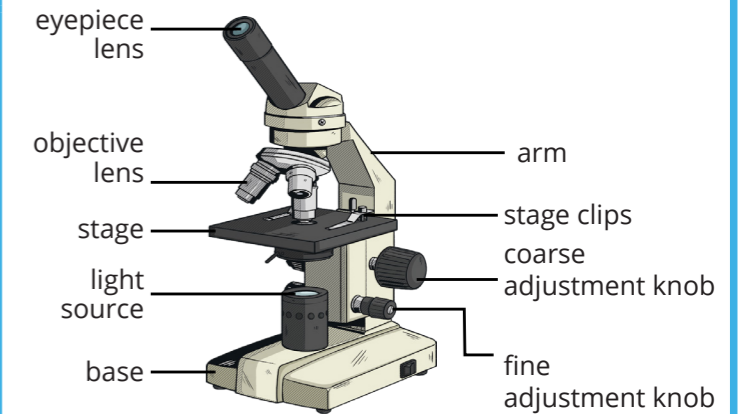


An **organ** is a group of different tissues working together to carry out a job.



An **organ system** is a group of different organs working together to perform a particular function.

Parts of a Light Microscope



Using a Light Microscope

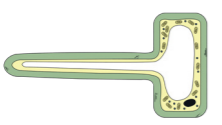
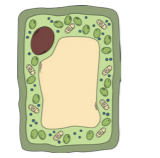


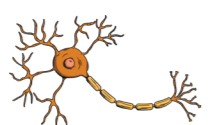
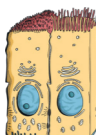

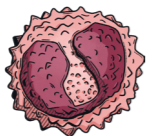
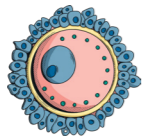
- Plug in the microscope and turn on the light.
- Place the slide on the stage and hold it in place with the stage clips.
- Turn to the objective lens with the lowest magnification.
- Look down the eyepiece lens and use the adjustment knobs to focus the specimen.
- Increase the magnification by turning to a higher power objective lens, then use the fine adjustment knob to bring the cells back into focus.

Organ System Functions

Organ System	Function
musculoskeletal system	Muscles and bones working together support and move the body.
reproductive system	Produces sperm (males) and eggs (females). In females, this is where the foetus develops.
respiratory system	Takes in oxygen from the air and removes carbon dioxide from blood.
immune system	Protects the body against infections.
digestive system	Breaks down and absorbs food molecules.
circulatory system	Transports substances around the body.

Specialised Cells

Each function carried out by the organism is performed by different cells. Each type of cell has slightly different features.

Name	Diagram	Functions	Adaptions
root hair cell		To absorb water and minerals from the soil.	Long protrusion fits between grains of soil and provides a large surface area for the absorption of water and minerals into the cell.
palisade cell		To carry out photosynthesis and make food for the plant.	Lots of chloroplasts to absorb light energy for photosynthesis. Its tall, long shape gives the cell a large surface area to maximise the absorption of light.
sperm cell		To travel to and fuse with an egg cell for fertilisation.	Long tail for movement to the egg and lots of mitochondria to release energy to allow the sperm to move.
muscle cell		To help the body to move.	Contains bands of protein that change shape to contract and relax the muscle. Lots of mitochondria to provide energy for muscle contraction.
nerve cell		To carry nerve impulses around the body.	Long fibres carry electrical impulses up and down the body and branching dendrites at each end connect to other nerves or muscles.
ciliated epithelial cell		To move mucus away from the lungs.	Tiny hairs called cilia to help waft mucus along the airways. Lots of mitochondria release energy for the cilia to move.
red blood cell		To transport oxygen around the body.	Biconcave shape increases the surface area for the diffusion of oxygen. No nucleus so that there is more room for haemoglobin, which binds oxygen molecules.
white blood cell		To fight pathogens which cause disease.	Some can change shape to squeeze out of blood vessels and engulf pathogens. Some can produce antibodies or antitoxins.
egg cell		To be fertilised by the sperm cell.	The cytoplasm contains nutrients for the developing embryo. The membrane changes after fertilisation to stop any more sperm getting in.

The Skeleton

The skeleton has several functions:

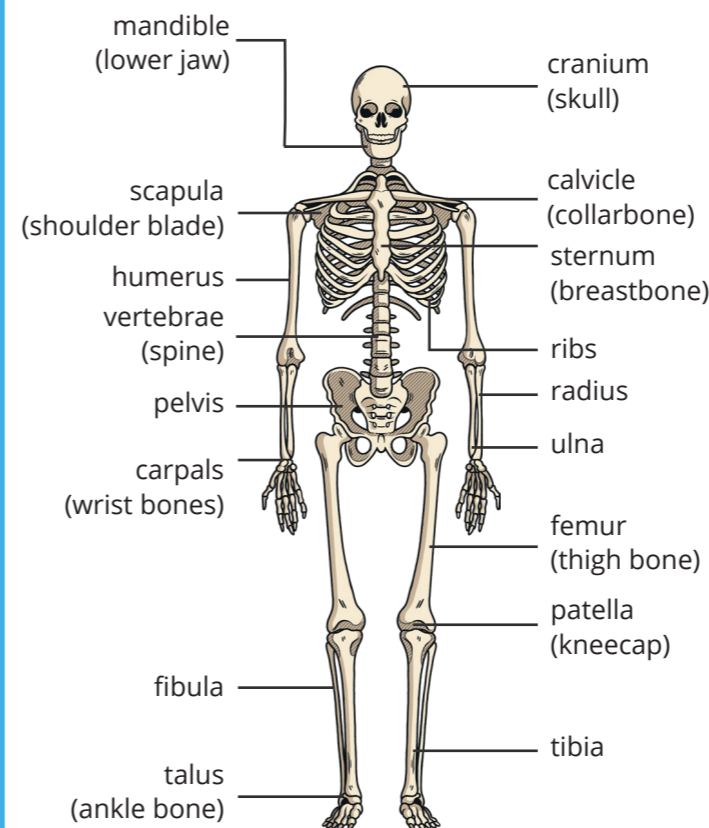
Support – The skeleton provides a frame to hold your body upright and keep your organs in place.

Protection - Bones are hard and strong to protect important organs such as the heart and the brain.

Movement - Your bones and muscles work together to allow your body to move.

Making blood cells – Some bones contain a soft tissue called bone marrow. Red blood cells and white blood cells are made in the bone marrow.

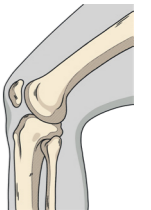
The adult body contains around 206 bones. Some are shown below:



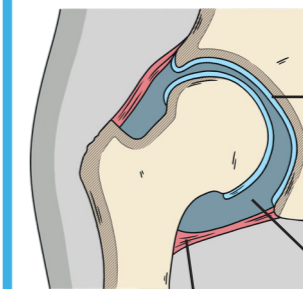
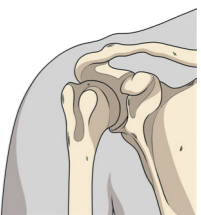
Joints

Joints are found where bones meet. Sometimes these joints are fixed but most joints are flexible to allow the body to move.

A **hinge joint** allows backwards and forwards movements. Knees and elbows are hinge joints.



A **ball and socket joint** allows movement in all directions. Shoulders and hips are ball and socket joints.



Cartilage is a strong, smooth tissue that covers the ends of the bones to protect them from damage.

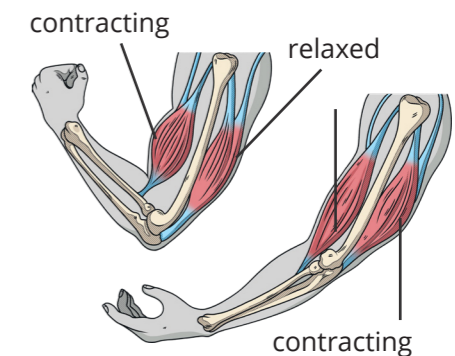
Ligaments hold the bones together.

Fluid in the joints keeps the cartilage slippery to reduce friction.

Muscles

Muscles can't push, they can only pull.

A pair of muscles that work together are called **antagonistic muscles**.



This combination of muscles, bones and joints making our bodies move is called **biomechanics**.

KS3 Cells and Organisation Progress Sheet

To show how confident you are with each statement, either colour the squares red, amber or green or tick the box.

I can...	Red	Amber	Green
Label the parts of a light microscope.			
Describe how to use a light microscope to view a specimen.			
Label a diagram of an animal cell.			
Label a diagram of a plant cell.			
Give the function of each sub-cellular structure.			
Explain the difference in structure of a plant cell and an animal cell.			
Label a diagram of a bacterial cell.			
Identify some specialised cells in both plants and animals.			
List the adaptations of each specialised cell.			
Explain how the adaptations support the function of each specialised cell.			
Give the definitions of cell, tissue, organ and organ system.			
Explain the hierarchy of organisation.			
Identify six organ systems.			
Describe the function of each organ system.			
Identify the main bones in the skeleton.			
Describe the main functions of the skeleton.			
Name two different types of joint.			
Describe the movement of the two types of joint.			
Identify the different tissues that connect bones and muscles.			
Explain how antagonistic muscle pairs work.			
Explain why some organs contain muscle tissue.			

Revision Methods

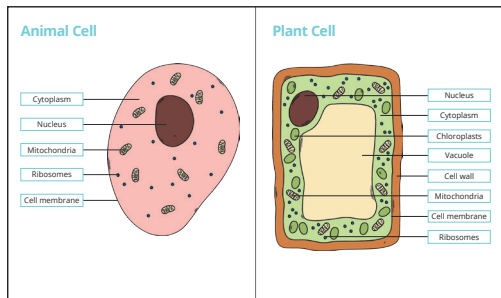
Just reading through your book or a knowledge organiser is not an effective way to revise. Instead, you should do something with the information. Choose one of the revision methods below or see if you can come up with your own way to use the content from this topic.

Make some flash cards.



Write down key words, questions or equations on one side of a card. On the other side, write the definition or answer. Use them to test yourself or ask a friend or family member to test you.

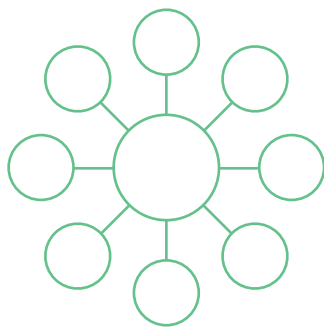
Make a poster.



Turn your notes into posters with lots of colour and illustrations. Summarising the key information in a different way is an effective way of learning information and your brain will remember the colours and pictures more easily.

Handy hint: Add your title after you have written all the information so you don't waste too much time trying to make it look nice!

Draw spider diagrams or mind maps.



Write the topic or a key word in the centre of your page. Add everything you know about the topic in subtopics around the centre. Colour and pictures will help to make the information more memorable.

Write a song or rap.



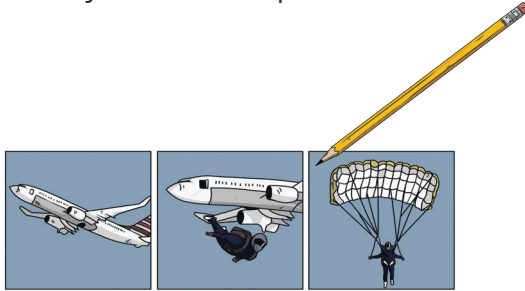
Are there any songs that you have stuck in your head? Change the lyrics to the information you need to learn. You could even record your song and listen back. Singing the facts along to music can make the information more memorable.

Plan a lesson.



You could plan a lesson to teach to a primary school class or a friend or family member. Not only will you be reinforcing the information for yourself, but you'll be helping someone else to revise too.

Write a story or comic strip.



Take the key words or facts that you need to learn and turn them into a story or a cartoon. The more imaginative or silly your story, the more likely you are to remember the ideas. This is a great method if you have to learn a sequence of events in a process.

Write a quiz.

	Questions
1	A B C D
2	A B C D
3	A B C D
4	A B C D

Write a quiz to test yourself or a friend on the key facts from the topic. You could even ask a friend or family member to test you using the questions. If you want to be really creative, you could turn it into a gameshow with a group of friends!