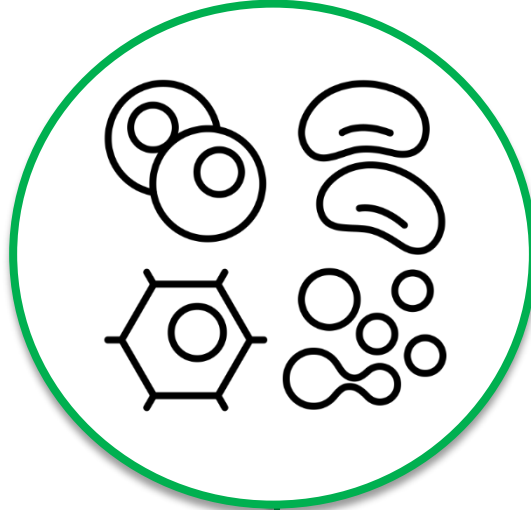


**YEAR 7  
BIOLOGY  
UNIT 1**



**In this topic you will learn about the fundamentals of biology. You will learn about what we are made of and how the structures in our body are organised, as well as other living organisms. You will learn how our bodies are designed to carry out the seven life processes and how cells are specialised to help us survive.**

**This will build on ideas from primary school that all living organisms carry out seven life processes. It will build on ideas about the human heart and blood; The impact of diet, exercise, drugs and lifestyle on the way our bodies function.**

**This topic will give you a greater level of understanding and appreciation of the human body and how we work and function – as well as other living organisms. It will help prepare for all of your future study in Biology, in GCSE and beyond.**

**Name:**

**Class:**

**Teacher:**

**Expected Performance Level:**



**RETRIEVAL ACTIVITY**

	Question	Answer	Mark
1	What energy is stored in food?		
2	What energy is stored in all moving objects?		
3	What gas is needed in a burning (combustion) reaction?		
4	What is the centre of an atom called?		
5	What is the name of the star at the centre of our solar system?		
6	What wave is fastest: light or sound?		
7	What are the three sides of the fire triangle?		
8	What are the three states of matter?		
9	What state of matter has particles that are far apart and free to move?		
10	What is the change of state called when a gas changes to a liquid?		
Score			



**ACTIVATE KNOWLEDGE**

What makes us 'alive'?

What do human beings need to survive?



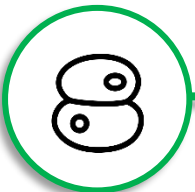
## CONTENT

Organisms are living things that carry out seven life processes.  
All living things will carry out all seven of these life processes.  
Non-living things do not carry out all of these seven life processes.



M

All living organisms can move on their own.



R

All living organisms can produce more organisms (offspring).



S

All living organisms can detect/sense changes in their environment and respond to them.



G

All living organisms can increase their mass.



R

All living organisms can break down sugar to release energy.



E

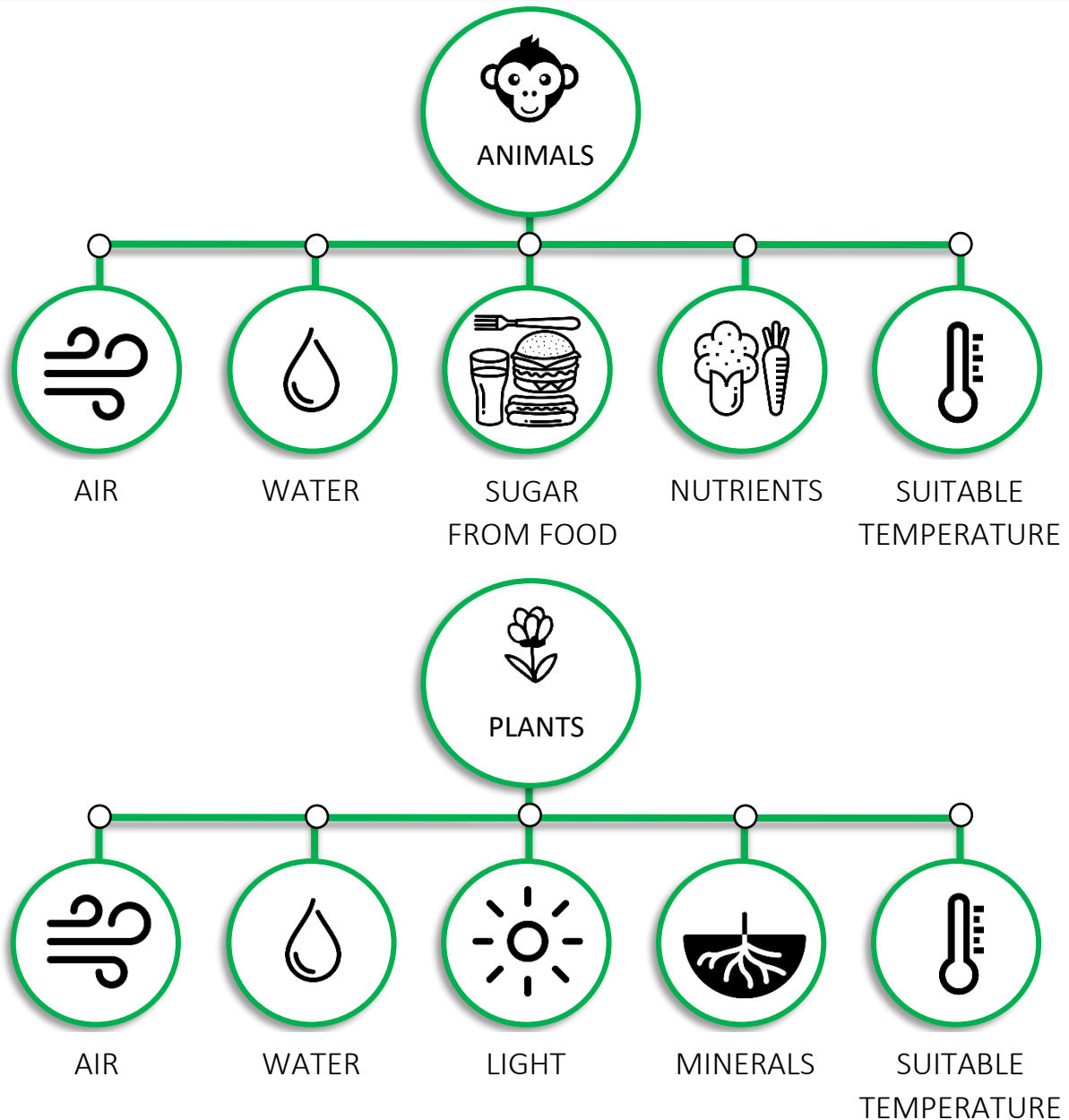
All living organisms can create waste products and get rid of them.



N

All living organisms need nutrients to help them grow.

Living organisms depend on their environment to survive. If the environment is not right, the living organism will not be able to complete the seven life processes. This could lead to the death of a living organism.



To survive, the environment an organism lives in needs to provide the specific conditions needed to complete the seven life processes. For example:

- All living organisms need sugar to complete respiration.
- Animals get their sugar from food that they eat.
- Plants make their own food. The food that they make is sugar.
- Both plants and animals need oxygen from the air to break down the sugar to release energy. Animals get the oxygen from breathing but plants do not.

Cells are the building blocks of living organisms. Different cells are needed so that living organisms can carry out the seven life processes.



**RETRIEVAL ACTIVITY**

	Question	Answer	Mark
1	What life process means living organisms can move on their own?	M	
2	What life process means living organisms produce more organisms?	R	
3	What life process means living organisms can detect/sense?	S	
4	What life process means living organisms can increase mass?	G	
5	What life process means living organisms release energy?	R	
6	What life process means living organisms get rid of waste products?	E	
7	What life process means living organisms need nutrients to grow?	N	
8	What are described as the building blocks of living organisms?		
9	What gas do living organisms need from the air for respiration?		
10	What substance do animals get from food that they need for respiration?		
Score			



**ACTIVATE KNOWLEDGE**

Respiration is one of the ..... life processes. It is needed to give living ..... energy. .... from the air is taken in by animals by ..... Plants take in oxygen but not by breathing. The oxygen is needed to break down ..... from food and release energy. Animals eat food but plants ..... their own food.



## CONTENT

An organism may be made up of a single cell or many cells working together.

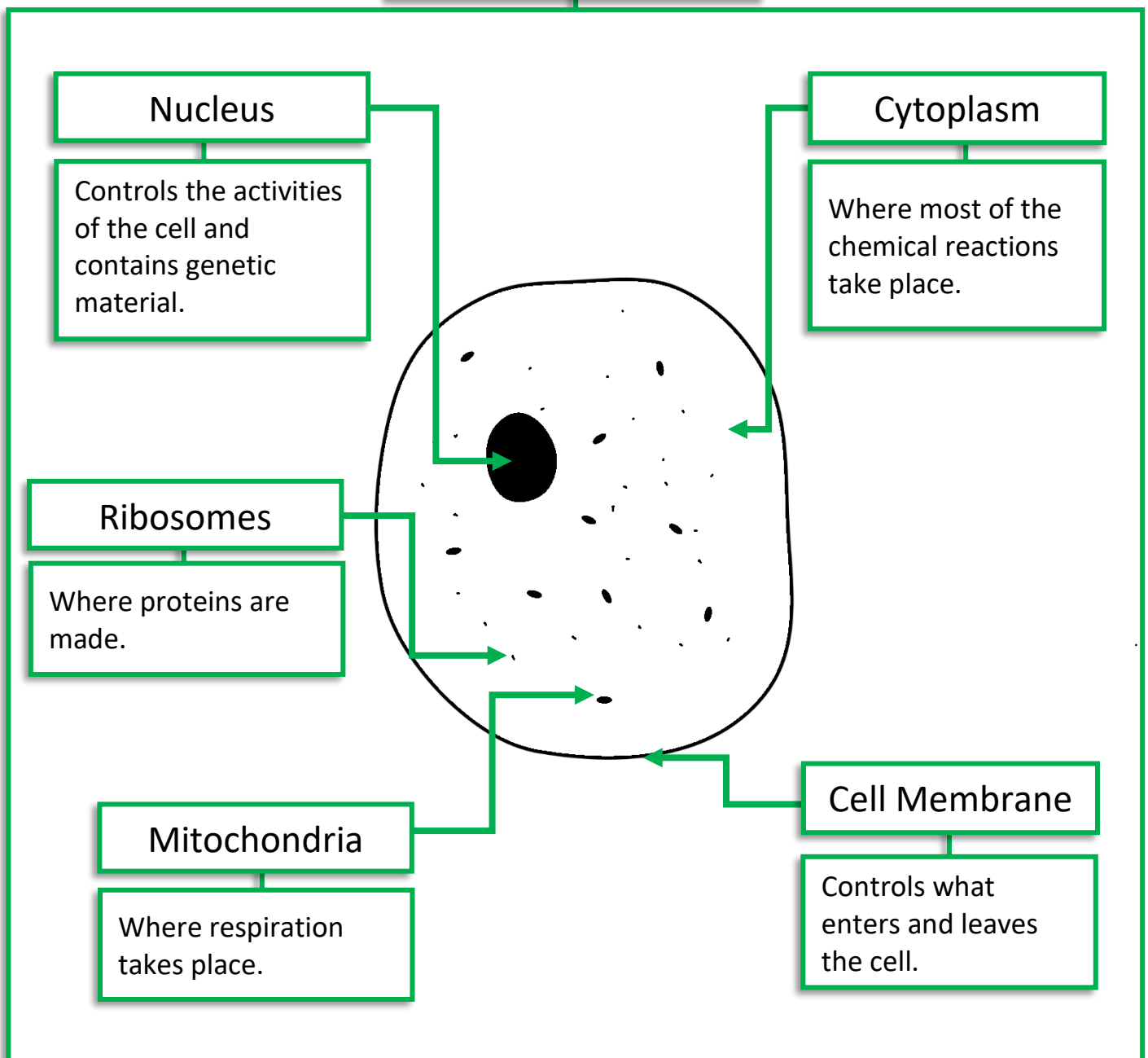
This is why cells are described as the building blocks of living organisms.

There are many different types of cells with different shapes and sizes.

Cells are made up of different parts called **organelles**.

Animal cells contain the same organelles.

### ANIMAL CELL ORGANELLES



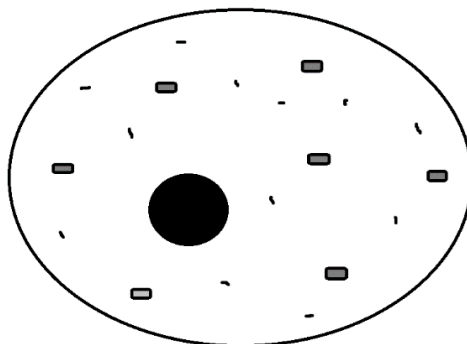
1. Match the part of the animal cell to its function.

- |  |   |
|--|---|
| Nucleus <input type="checkbox"/>       | <input type="checkbox"/> Where most of the chemical reactions take place.                   |
| Cytoplasm <input type="checkbox"/>     | <input type="checkbox"/> Where proteins are made.   |
| Cell Membrane <input type="checkbox"/> | <input type="checkbox"/> Where respiration takes place.                                     |
| Ribosomes <input type="checkbox"/>     | <input type="checkbox"/> Controls the activities of the cell and contains genetic material. |
| Mitochondria <input type="checkbox"/>  | <input type="checkbox"/> Controls what enters and leaves the cell.                          |

2. What is the name given to the parts of cells?

3. Label the animal cell below with the following key words.

*Cell Membrane, Nucleus, Mitochondria, Ribosomes, Cytoplasm*





**RETRIEVAL ACTIVITY**

	Question	Answer	Mark
1	What are the parts of a cell called?		
2	What part of a cell controls what enters and leaves?		
3	What part of a cell contains the genetic material?		
4	What part of a cell is where proteins are made?		
5	What part of a cell is where respiration happens?		
6	What gas is needed from the air for respiration?		
7	What part of a cell is where chemical reactions take place?		
8	What are all living organisms made up of?		
9	What is the job of a cell membrane?		
10	What life process occurs in the mitochondria of cells?		
Score			

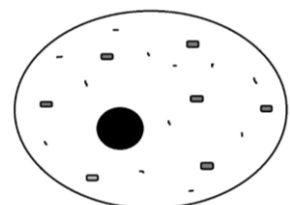


**ACTIVATE KNOWLEDGE**

What are all living organisms made up of?

What organelle controls the cell activities and contains the genetic material?

Label this organelle on the diagram:







## CONTENT

The nucleus of living organisms contains genetic information called **genes**.

The complete set of genes in an organism is called a **genome**.

A genome contains all the information needed for an individual to develop and function.

This information has been **inherited** (passed on) by parents.



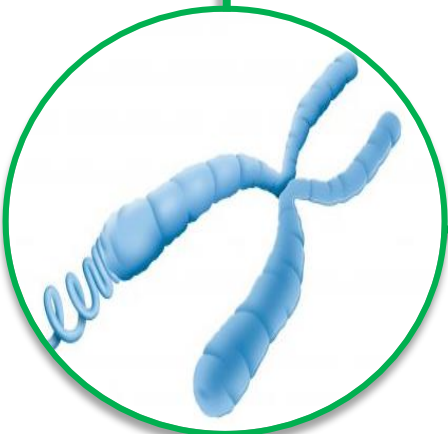
### GENES

Genes are a short sequence of DNA that provide the information needed for an individual to develop and function.



### DNA

Genes are made out of a chemical called DNA. DNA is made of two strands that wind around each other — a shape known as a double helix.



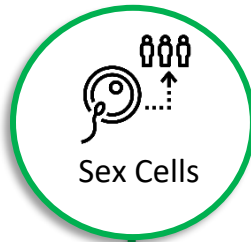
### CHROMOSOMES

Chromosomes long strands of DNA made up of genes. In each human nucleus, there are 23 pairs of chromosomes (46 in total).

**FUN FACT** Every nucleus inside a human cell contains over a metre of DNA!

## Specialised Cells

Specialised cells are different types of cells that have a specific job.



Human beings have two specialised cells whose only job is to make new life. Sex cells are called **gametes**. The sperm cells join with an egg cell during **fertilisation** to form an embryo which can then develop into a new life.

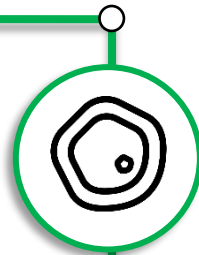


Sperm Cell

The sperm cell is the male gamete. A tail moves them towards an egg cell. Many mitochondria release lots of energy for movement.



Contains 23 chromosomes  
from the father



Egg Cell

The egg cell is the female gamete. The cytoplasm contains nutrients to help an embryo to grow. The cell membrane only lets one sperm cell enter the egg cell in fertilisation.



Contains 23 chromosomes  
from the mother

**23 PAIRS** of chromosomes in  
the offspring



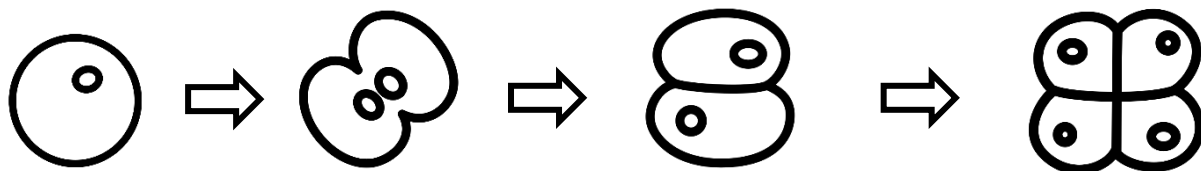
A full set of 46 chromosomes

**FUN FACT** The human genome contains about 3 billion genes. While 3 billion is a big number, a rare Japanese flower called Paris Japonica has a genome size of roughly 150 billion genes, making it 50 times the size of the human genome.

In living organisms, cells constantly reproduce. Cells must reproduce for:

- growth
- to repair damaged cells
- to replace worn-out cells

**Mitosis** is the process where cells divide and form new genetically identical cells. Each time a cell divides, it makes a copy of all its chromosomes which means that the new cell contains the exact same genetic information. It is genetically identical.



**RETRIEVAL ACTIVITY**

	Question	Answer	Mark
1	Which organelle contains the genetic information?		
2	Which organelle controls what enters and leaves the cell?		
3	Which organelle is where chemical reactions take place?		
4	What is the life process that takes place in the mitochondria?		
5	What is the name of the chemical genes are made of?		
6	What does every human body cell nucleus have 23 pairs of?		
7	What is the male gamete called?		
8	What is the female gamete called?		
9	What is the name of the complete genetic information of an organism?		
10	What is the name of the process where cells divide to make copies?		
Score			

**ACTIVATE KNOWLEDGE**

What living process is the breakdown of sugar to release energy?

What gas is needed for this life process to take place?

Where in a cell does this life process take place?

Does this life process occur in plants only, animals only or plants and animals?



## CONTENT



### Respiration

Respiration is a chemical reaction that occurs in the **mitochondria** of cells.

Respiration **releases energy** from the chemical energy stored in a sugar called **glucose**.

In order for energy to be released from glucose, it must react with **oxygen** gas.

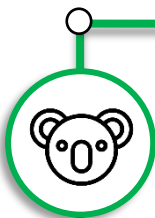
During the reaction, two waste products are made: **carbon dioxide** gas and **water**.

Respiration Equation:

Glucose + Oxygen  $\longrightarrow$  Carbon Dioxide + Water + (Energy)

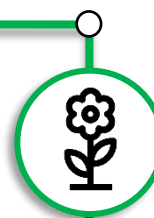
$C_6H_{12}O_6 + O_2 \longrightarrow CO_2 + H_2O + (Energy)$

How to living organisms get the reactants needed for respiration?



Animals take in glucose through food that they eat.

Animals take in oxygen by breathing.



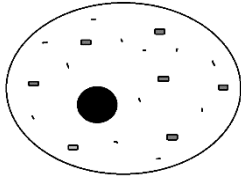
Plants make their own glucose.

Plants take in oxygen through their leaves.

Respiration is a very important life process.

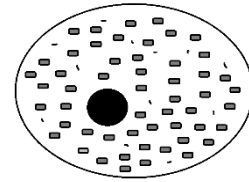
Respiration gives cells the energy they need to carry out their job and survive.

The more energy a cell needs, the more mitochondria it will have.



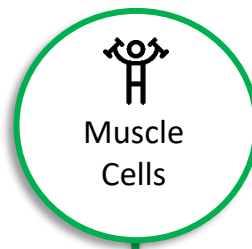
Cell with few mitochondria

Little energy needed



Cell with many mitochondria

Lots of energy needed



Muscle  
Cells

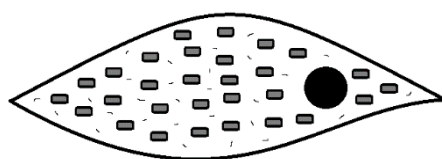
Muscles cells are specialised cells that make up our muscles.

These cells are able to contract (get shorter) and relax (return to original length).

Muscle cells contain lots of mitochondria.

This is because the muscle cells need lots of energy to help us move.

Therefore, need to carry out lots of respiration.



A muscle cell

### FUN FACTS

Muscle cells need to respire a lot because your muscle cells need lots of energy. Muscle cells make up all muscles in your body. You have over six hundred muscles in your body! Your muscles are working all the time, without you even knowing: moving your lips, blinking, digesting food, beating your heart. Over one hundred muscles are needed for you to stand up; just moving your thumb involves over ten muscles; even moving your eyes to read this page involves about twelve muscles! About 40% of you is made up of muscle. That means your muscles need 40% of the total energy we get from respiration!

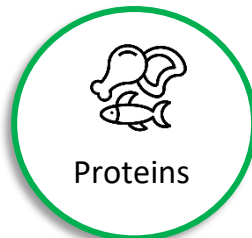
**RETRIEVAL ACTIVITY**

	Question	Answer	Mark
1	Which organelle contains the genetic information?		
2	Which organelle controls what enters and leaves the cell?		
3	Which organelle is where chemical reactions take place?		
4	What is the life process that takes place in the mitochondria?		
5	What is the name of the chemical genes are made of?		
6	What does every human body cell nucleus have 23 pairs of?		
7	What is the male gamete called?		
8	What is the female gamete called?		
9	What is the name of the complete genetic information of an organism?		
10	What is the name of the process where cells divide to make copies?		
Score			

**ACTIVATE KNOWLEDGE**

Which organelle is responsible for making proteins?

What foods are high in protein?



## Proteins

All cells are made mainly from protein.

This means that your body needs protein to make new cells when you grow, to replace old cells or repair damaged cells.

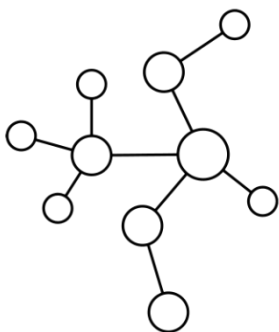
Proteins are made up of substances called **amino acids**.

Twenty amino acids make up the protein in your body.

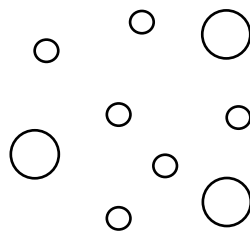
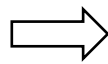
Six of these amino acids must come from your diet as the body does not make them.

These are called essential amino acids.

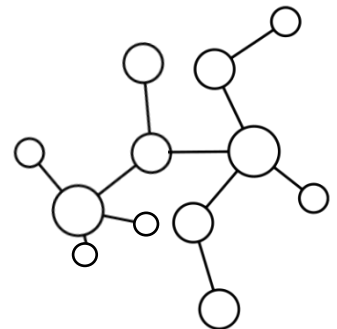
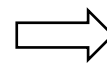
When you digest food, chemicals called **enzymes** break down protein to make amino acids. These amino acids then re-join in **ribosomes** to form the proteins that we need.



Proteins from the food we eat.



Broken down into amino acids in the body.



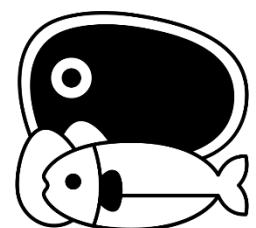
Rejoined amino acids to make protein that we need.

Some foods contain more protein than others.

Foods that contain lots of protein include meat, fish, eggs, peas, milk, cheese and beans.

Protein should make up about 10-15% of your daily food intake.

This equates to approximately 60 grams of food.







**RETRIEVAL ACTIVITY**

	Question	Answer	Mark
1	How many pairs of chromosomes are in the human body cell?		
2	What shape is a DNA molecule?		
3	What is the male gamete called?		
4	What is the female gamete called?		
5	What gas is needed in respiration?		
6	What sugar is needed in respiration?		
7	Where does respiration take place in the cell?		
8	What gas is a waste product of respiration?		
9	How are muscle cells specialised to release lots of energy?		
10	What is the total number of chromosomes in a human body cell?		
Score			



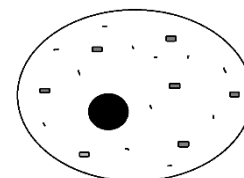
**ACTIVATE KNOWLEDGE**

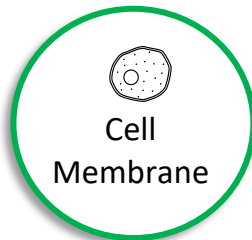
Mark with an X the cell membrane on this cell.

What is the function of a cell membrane?

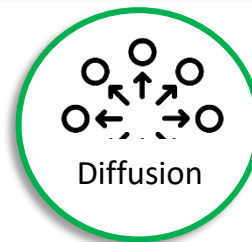
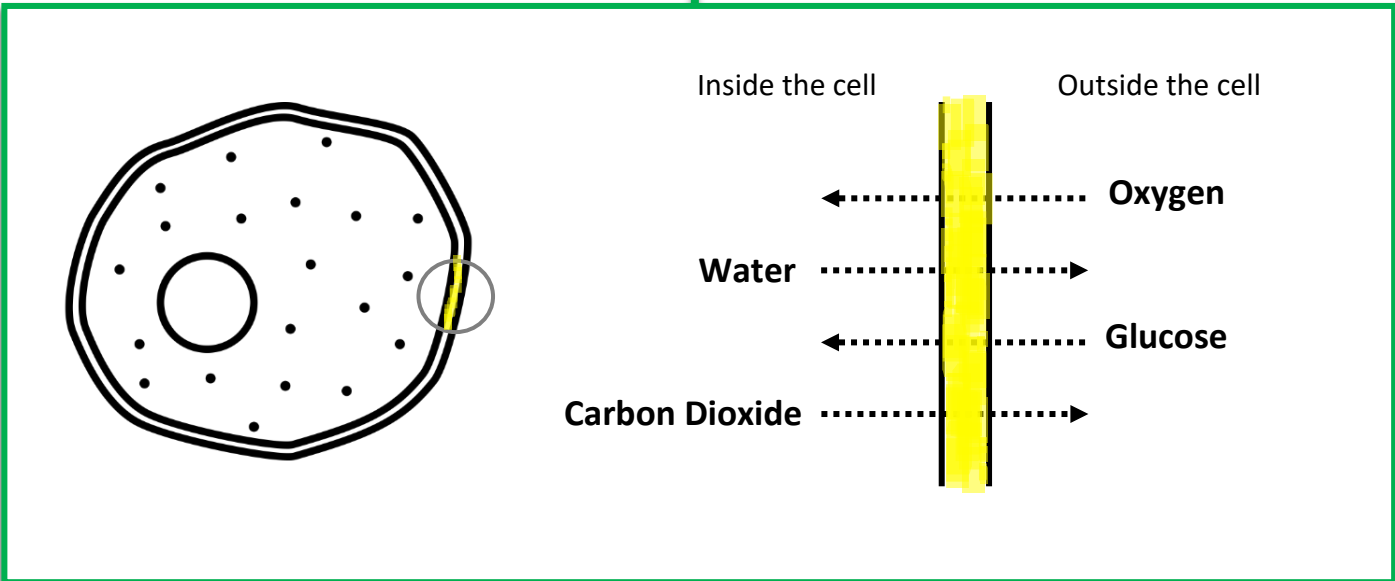
Give two substances that to move into a cell for respiration?

What gas, produced in respiration moves out of a cell?

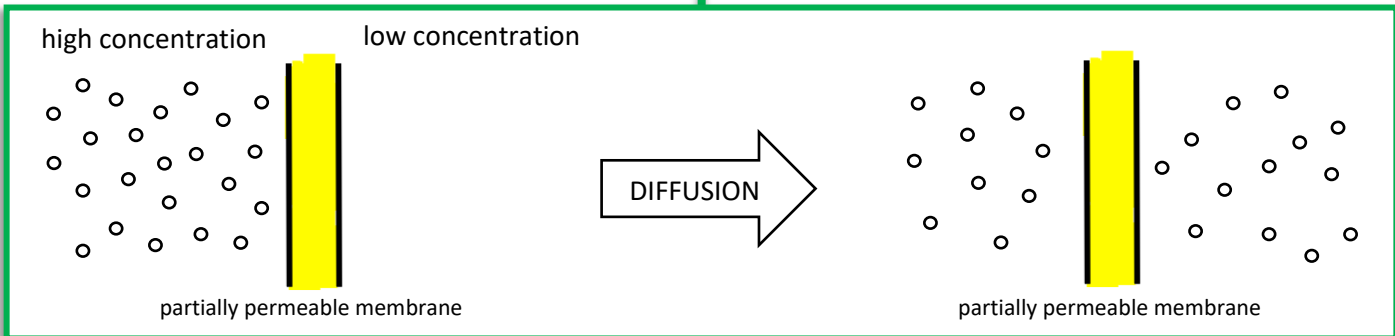


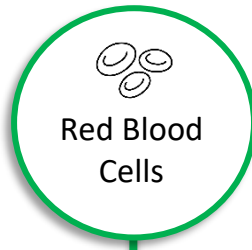


The cell membrane controls what can enter and leave a cell.  
It is made of a **partially permeable membrane**.  
This means that some substances can pass through but others cannot.



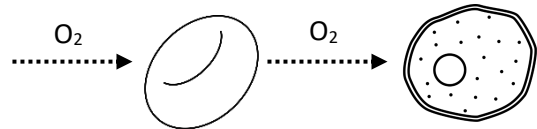
Substances move in and out of a cell by a process called **diffusion**.  
Diffusion occurs when substances move from an area of **high concentration** to an area of **low concentration** across a partially permeable membrane.



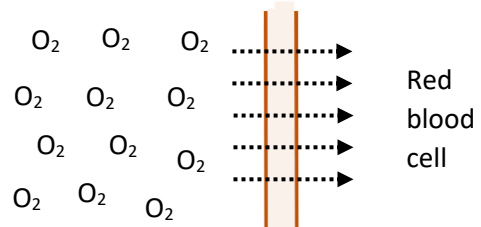


Red blood cells are specialised cells that carry oxygen to cells to use in respiration. Red blood cells have no nucleus which allows them to carry as much oxygen as possible.

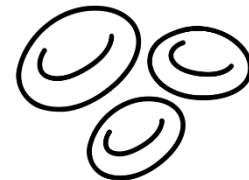
Oxygen needs to diffuse in and out of the red blood cell easily. This is so that as much oxygen can be carried to cells as quickly as possible.



Red blood cells have a very thin cell membrane which allows diffusion of oxygen in and out of the cell to happen across a short distance.



Red blood cells also have a biconcave disc shape which gives the cell a large surface area. This allows lots of diffusion of oxygen to happen across the cell membrane.



### FUN FACTS

Red blood cells travel around the body in the blood. Red blood cells make up 44% of the blood. Their only job is to deliver oxygen to the cells for respiration. A teaspoon of blood contains 25,000,000,000 (25 billion) red blood cells. Red blood cells are a biconcave shape, a disc shape pinched in the middle on both sides which give them the maximum surface area. Red blood cells do not contain most organelles including a nucleus and mitochondria. Each red blood cell survives for about four months in your body. This means that they journey around your body 150,000 times before being excreted. Red blood cells are excreted in your stool. This is one of the reasons why your stool is brown! Everyday, new red blood cells are made in your bone marrow and are sent on their way to deliver oxygen to your energy demanding cells.



**RETRIEVAL ACTIVITY**

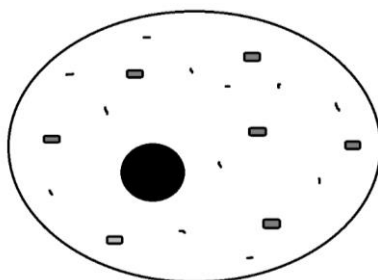
	Question	Answer	Mark
1	What is the specialised cell that carries oxygen around the body?		
2	What process moves substances in and out of cells?		
3	Complete the sentence: In diffusion, particles move from a...	_____ to _____ concentration	
4	What is the name of the process which releases energy from sugar?		
5	What is the name of the substances that make up proteins?		
6	What is the total number of chromosomes in a gamete?		
7	What are the two reactants of respiration?		
8	What are the two products of respiration?		
9	Where do most of the chemical reactions take place in a cell?		
10	What is the shape of a DNA molecule?		
Score			



**ACTIVATE KNOWLEDGE**

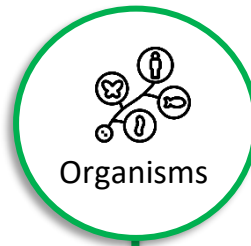
Label this cell with the following key words.

*Cell Membrane, Nucleus, Mitochondria, Ribosomes, Cytoplasm*





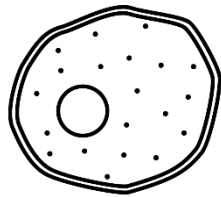
## CONTENT



Organisms

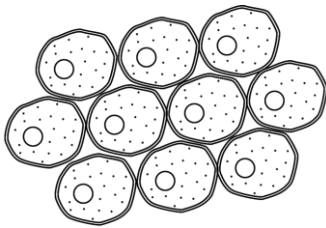
The organisation of living organisms is as follows:

INCREASING SIZE



Cells

Cells are the basic building blocks of living organisms. Cells can be specialised to do a particular job.



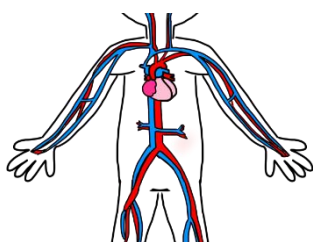
Tissues

A tissue is a group of cells with a similar structure and function, which all work together to do a particular job.



Organs

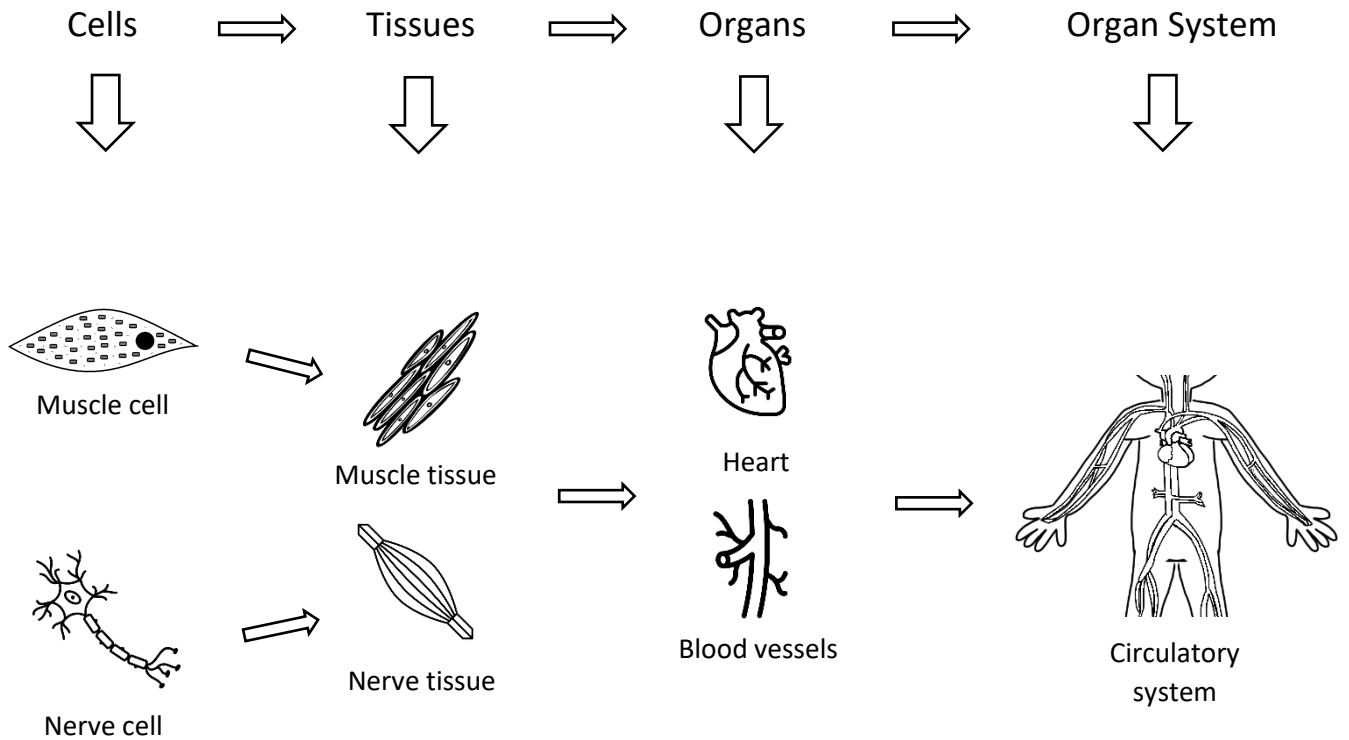
An organ is made from a group of different tissues, which all work together to do a particular job.



Organ Systems

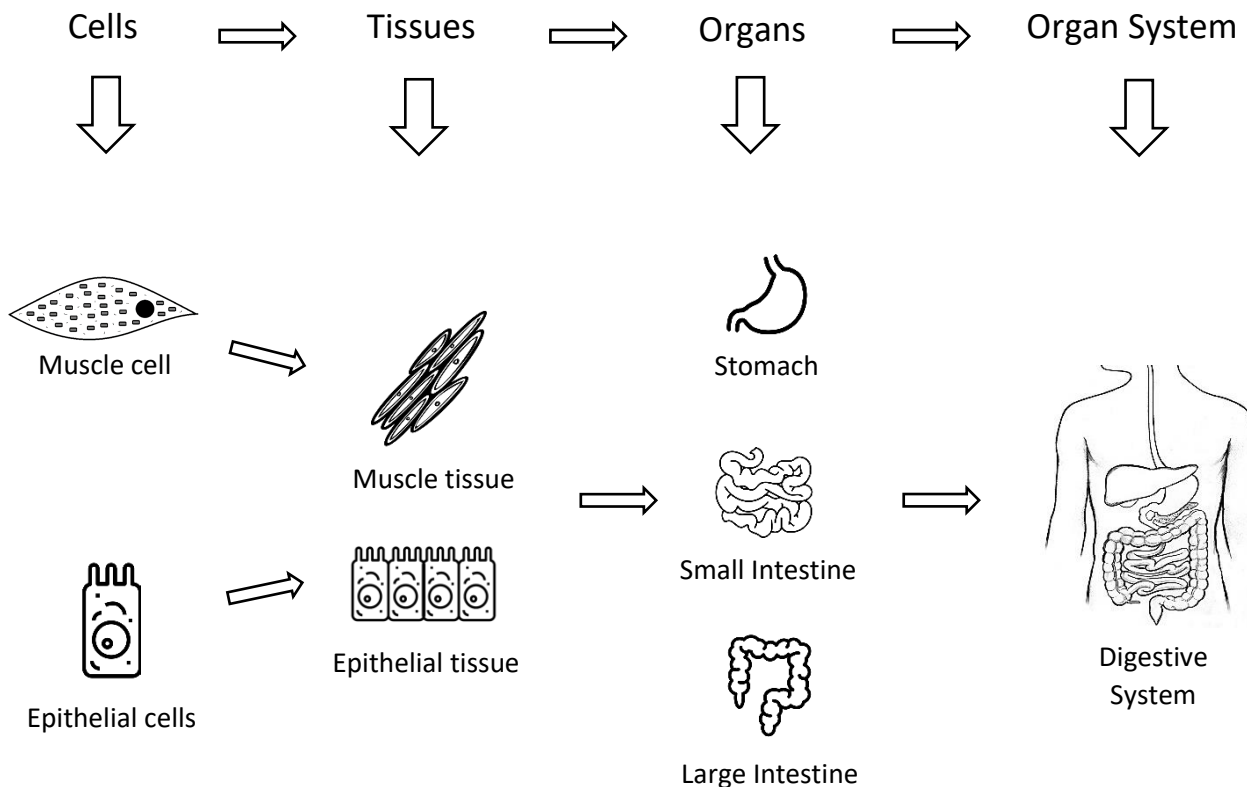
An organ system is made from a group of different organs, which all work together to do a particular job.

## Examples of organ systems: The circulatory system



NOTE: THERE ARE OTHER CELLS, TISSUES AND ORGANS THAT MAKE UP THE CIRCULATORY SYSTEM

## Examples of organ systems: The digestive system



NOTE: THERE ARE OTHER CELLS, TISSUES AND ORGANS THAT MAKE UP THE DIGESTIVE SYSTEM



**RETRIEVAL ACTIVITY**

	Question	Answer	Mark
1	What is made up of a group of the same type of cell working together?		
2	What is made up of different tissues working together?		
3	What is made up of different organs working together?		
4	What is the name of the organ system that digests food?		
5	What is the name of the organ system that causes blood to flow?		
6	What is the name of the chemicals that break down proteins?		
7	What is the name of the gas needed for respiration?		
8	What is the name of the gas produced in respiration?		
9	What organelle is where respiration takes place?		
10	What is the name of the movement of gases from high to low concentration?		
Score			



**ACTIVATE KNOWLEDGE**

Why do we breathe?

We breathe to take in \_\_\_\_\_ and give out \_\_\_\_\_.

\_\_\_\_\_ is taken in to use in the life process \_\_\_\_\_.

\_\_\_\_\_ is given out as it is produced in \_\_\_\_\_.

Respiration is the process that releases \_\_\_\_\_ from \_\_\_\_\_ (sugar).

***energy; respiration; oxygen; glucose; carbon dioxide;***



## CONTENT

The breathing system is the organ system responsible for transporting oxygen, from the air that we breathe in, to the bloodstream. The breathing system is also responsible for excreting carbon dioxide from the bloodstream.

The breathing system is made up of the following parts:

### Trachea

Also known as 'windpipe'. The tube that connects the mouth and nose to the lungs.

### Lungs

Filled with tubes that air travels along to air sacs.

### Bronchi

Where the trachea splits into two, one bronchi goes to each lung.

### Bronchioles

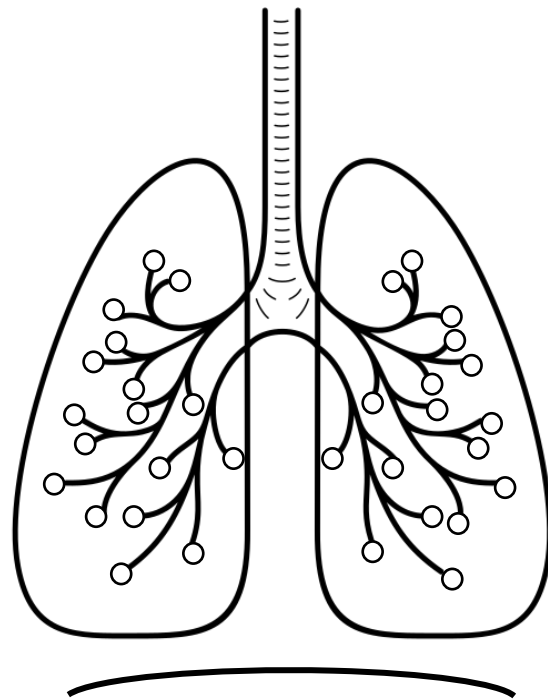
The 'branches' of tubes that split off from the bronchi in the lungs.

### Alveoli

The 'air sacs' at the end of the bronchioles where gases enter and leave the blood stream.

### Diaphragm

The muscle that moves up and down to control your breathing.



The lungs are protected by bones called the ribs.  
The ribs move in or out as we inhale and exhale.

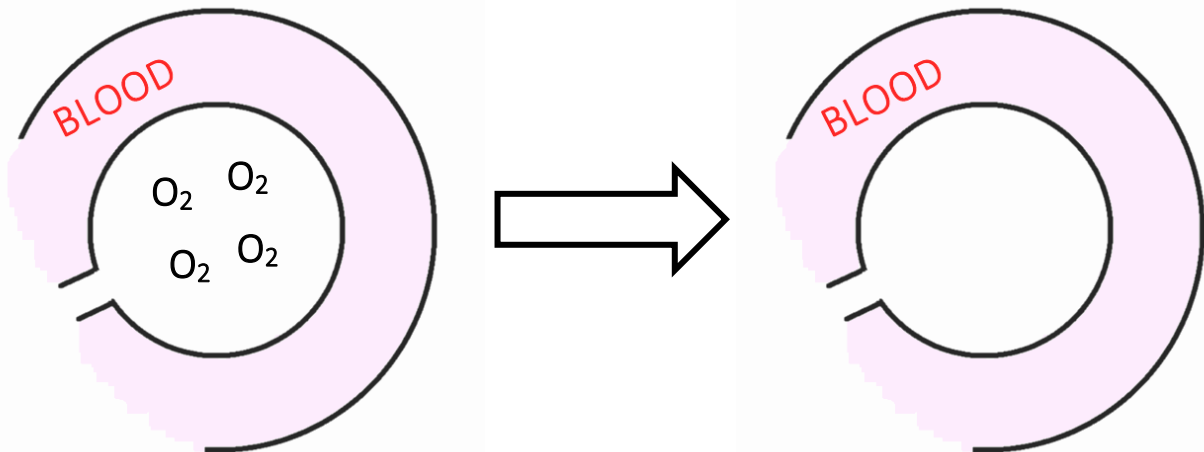




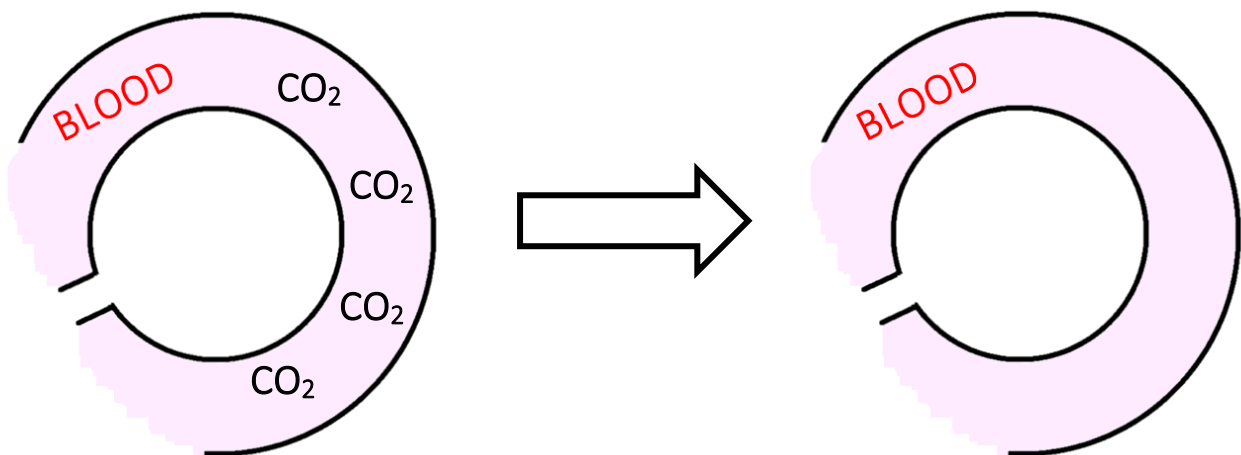
Alveoli are air sacs in the lungs responsible for moving oxygen into the bloodstream.

Each alveolus (air sac) is surrounded by blood.

After we breathe in, oxygen moves from the alveoli into the blood by diffusion.



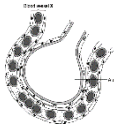
Carbon dioxide moves from the blood to the alveoli by diffusion, then we breathe out.



The walls of the alveoli are very thin to make it easier for the gases to move in and out.

### FUN FACTS

Everyday you breathe in and out about 20,000 times. That means that you take in approximately 12,500 litres of air every day (this is equivalent to over 100 balloons!). If you stretch out your airways (trachea, bronchi and bronchioles) it would reach over 1.500 miles! That is from Ashton-in-Makerfield to Rome!!



**RETRIEVAL ACTIVITY**

	Question	Answer	Mark
1	What is the tube that connects the mouth and nose to the lungs?		
2	What is the two tubes that branch off into each lung?		
3	What is the name of the many tubes that branch off in the lungs?		
4	What is the name of the air sacs in the lungs?		
5	How does oxygen get transported around the body?		
6	Name the bones that protect the lungs.		
7	How does oxygen move from the alveoli to the bloodstream?		
8	What life process is oxygen needed for?		
9	What is the name of a group of similar cells working together?		
10	What organ system is responsible for transporting oxygen into the body?		
Score			



**ACTIVATE KNOWLEDGE**

Why do we breathe?

We breathe to take in \_\_\_\_\_ and give out \_\_\_\_\_.

\_\_\_\_\_ is taken in to use in the life process \_\_\_\_\_.

\_\_\_\_\_ is given out as it is produced in \_\_\_\_\_.

Respiration is the process that releases \_\_\_\_\_ from \_\_\_\_\_ (sugar).

***energy; respiration; oxygen; glucose; carbon dioxide;***



## CONTENT

The breathing system is the organ system responsible for transporting oxygen, from the air that we breathe in, to the bloodstream. Oxygen is transported around the body in our bloodstream. The oxygen is carried to our cells where it is needed for respiration.

Respiration is the process that uses oxygen to release energy from glucose.  
The more energy that we need, the more respiration we need to do.

When we do exercise, we need lots of energy.  
Therefore, our muscle cells need lots of oxygen to do lots of respiration.

### **PREDICTION**

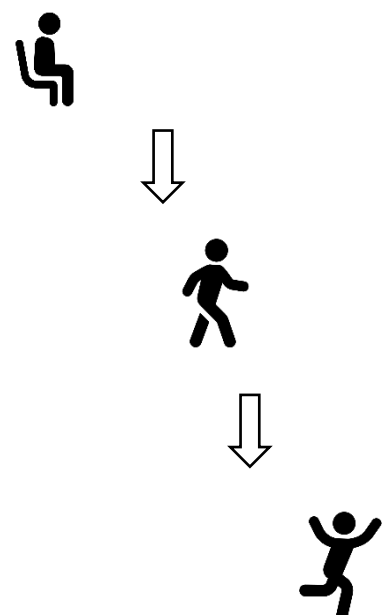
How will your breathing change when you do exercise?

When I do exercise my breathing will...

Why will your breathing change when you do exercise?  
because...

### **PRACTICAL**

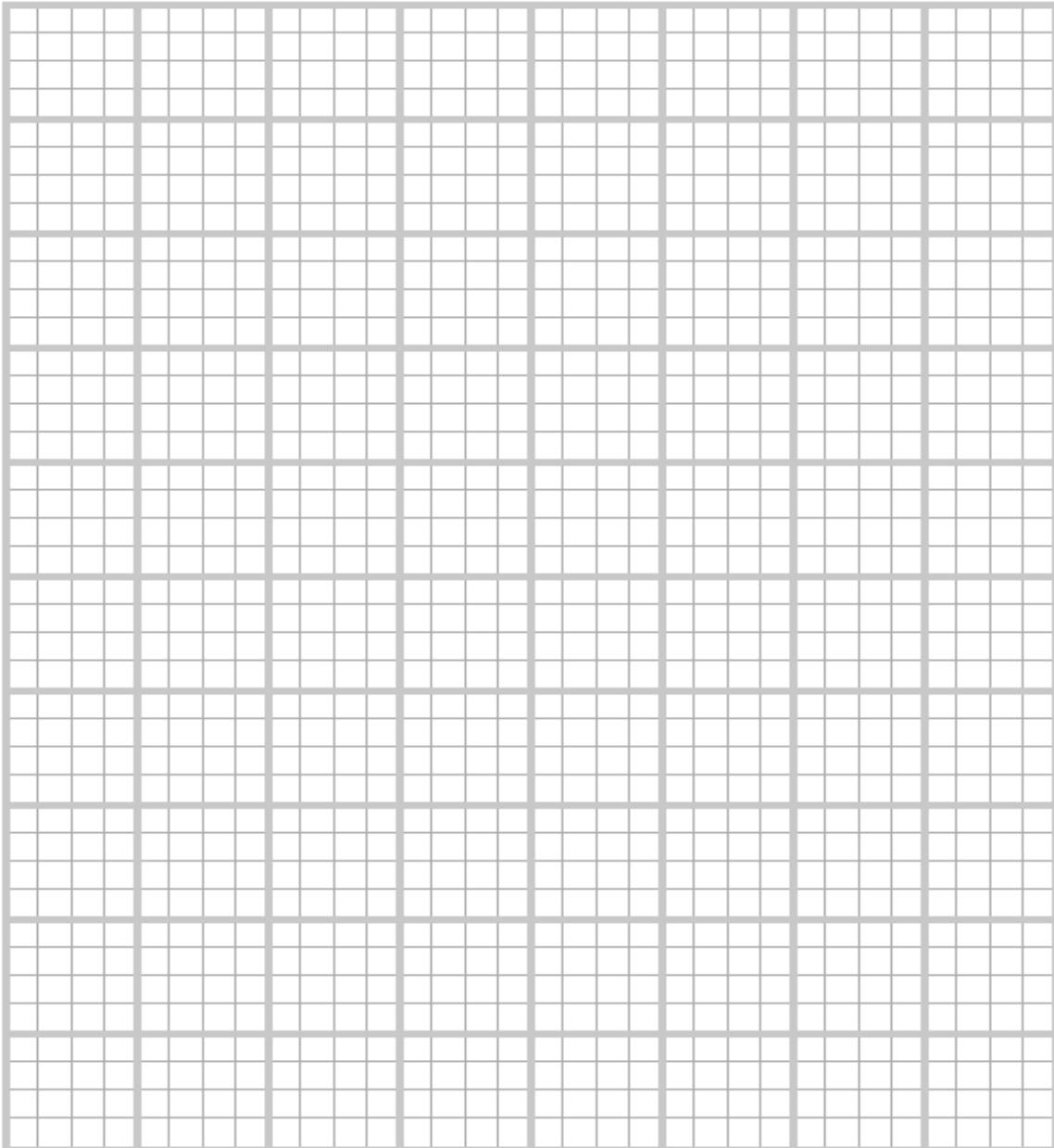
1. Sit on your chair.
2. Count the number of (NORMAL) breaths that you take in 60 seconds. Record this number in your table.
3. Walk around for one minute.
4. Count the number of (NORMAL) breaths that you take in 60 seconds. Record this number in your table.
5. Run around for one minute.
6. Count the number of (NORMAL) breaths that you take in 60 seconds. Record this number in your table.



## RESULTS TABLE

ACTIVITY	NUMBER OF BREATHS IN
Sitting	
Walking	
Running	

## GRAPH





**RETRIEVAL ACTIVITY**

	Question	Answer	Mark
1	What is made up of a group of the same type of cell working together?		
2	What is made up of different tissues working together?		
3	What is made up of different organs working together?		
4	What is the name of the muscle that controls breathing?		
5	What is the name of the air sacs in the lungs?		
6	What is the name of the chemicals that break down proteins?		
7	What is the name of the gas needed for respiration?		
8	What is the name of the gas produced in respiration?		
9	What organelle is where respiration takes place?		
10	What is the name of the movement of gases from high to low concentration?		
Score			



**ACTIVATE KNOWLEDGE**

We get \_\_\_\_\_ from food which are broken down into amino \_\_\_\_\_.

This comes from foods in our diet such as \_\_\_\_\_.

These substances are needed for \_\_\_\_\_ and replacement of \_\_\_\_\_.

We get \_\_\_\_\_ from sugars in the food that we eat.

This substance is needed for \_\_\_\_\_ to release energy.

***Respiration; cells; meat, fish and eggs; acids; glucose; protein;***



## CONTENT

The digestive system is the organ system responsible for breaking down food to be absorbed into the bloodstream. Food which has been broken down to be absorbed is called digested food. The digestive system is made up of the following parts:

### Mouth

Food is broken down by teeth when chewing.

### Oesophagus/Gullet

The tube that connects the mouth to the stomach.

### Stomach

Food is broken down and acid kills harmful bacteria you swallow.

### Small intestine

Food is broken down and digested food is absorbed into the blood.

### Large intestine

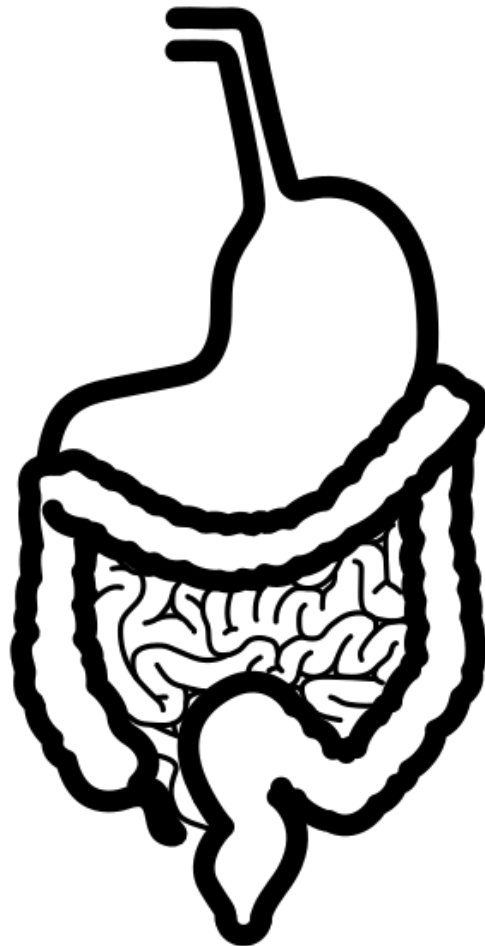
Water is absorbed from undigested food into the blood.

### Rectum

Undigested food is stored as faeces.

### Anus

Where faeces leaves the body.



**RETRIEVAL ACTIVITY**

	Question	Answer	Mark
1	Which organelle contains the genetic information?		
2	Which organelle controls what enters and leaves the cell?		
3	Which part of a cell is where chemical reactions take place?		
4	What is the life process that takes place in the mitochondria?		
5	What is the name of the chemical genes are made of?		
6	What does every human body cell nucleus contain 23 pairs of?		
7	What is the male gamete called?		
8	What is the female gamete called?		
9	What is the name of the complete genetic information of an organism?		
10	What is the name of the process where cells divide to make copies?		
Score			

**ACTIVATE KNOWLEDGE**

What does the digestive system do in the body?

What are proteins broken down into in digestion?

What are the chemicals called that break down the protein?



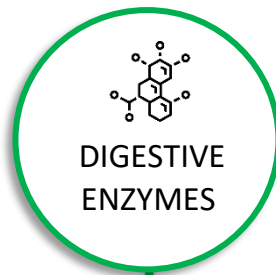
## ACTIVATE KNOWLEDGE

Match the food group to its use in the body and the examples of food.

Carbohydrates <input type="checkbox"/>	<input type="checkbox"/>	Needed for growth and repair <input type="checkbox"/>	<input type="checkbox"/>	Butter, nuts, oils, cheese. <input type="checkbox"/>
Fats <input type="checkbox"/>	<input type="checkbox"/>	Provide an energy store for the body <input type="checkbox"/>	<input type="checkbox"/>	Bread, pasta, rice, potatoes. <input type="checkbox"/>
Protein <input type="checkbox"/>	<input type="checkbox"/>	Provide an energy source for the body <input type="checkbox"/>	<input type="checkbox"/>	Meat, fish, eggs, beans. <input type="checkbox"/>

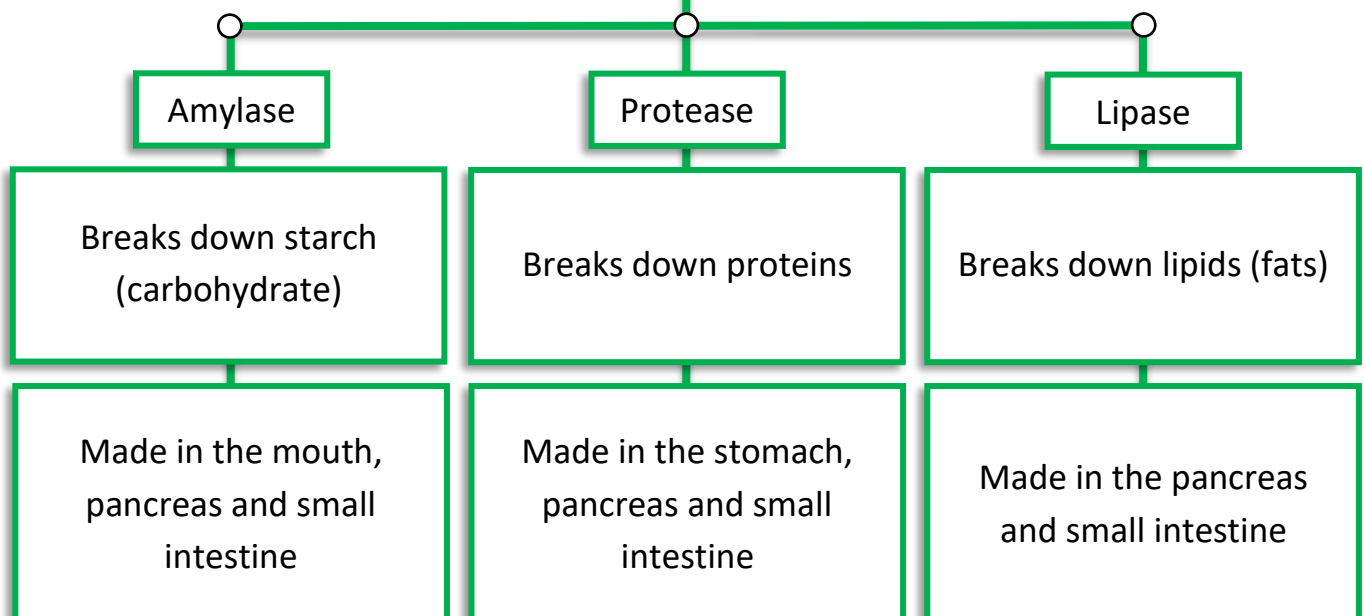


## CONTENT



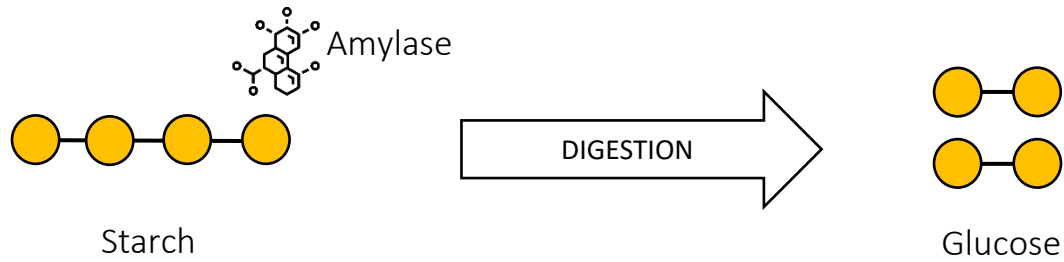
Digestive enzymes are chemicals that break down food.  
Food needs to be broken down so that it can be absorbed into the bloodstream.  
Food that has been broken down to be absorbed is called digested food.

Different types of food have different enzymes which break them down.

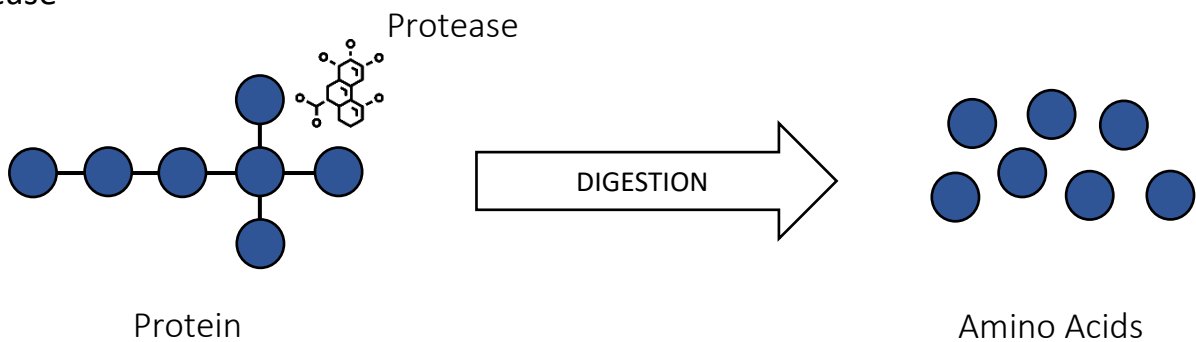




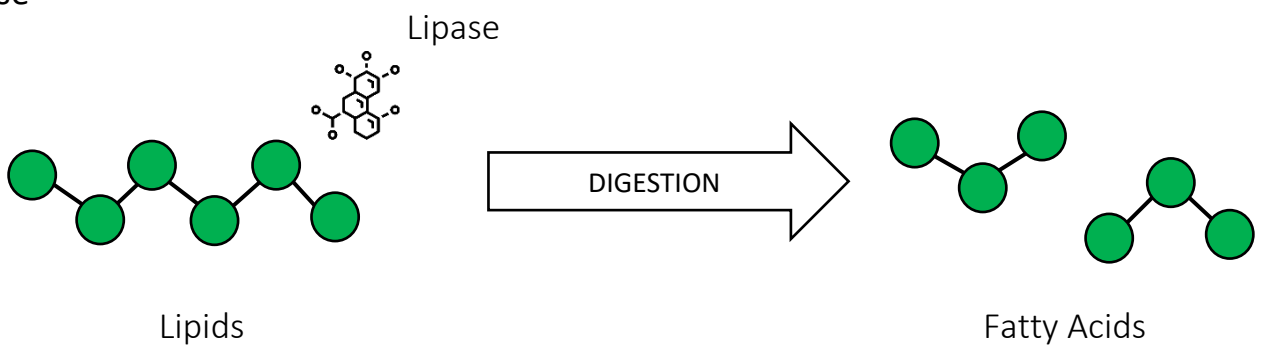
## Amylase



## Protease

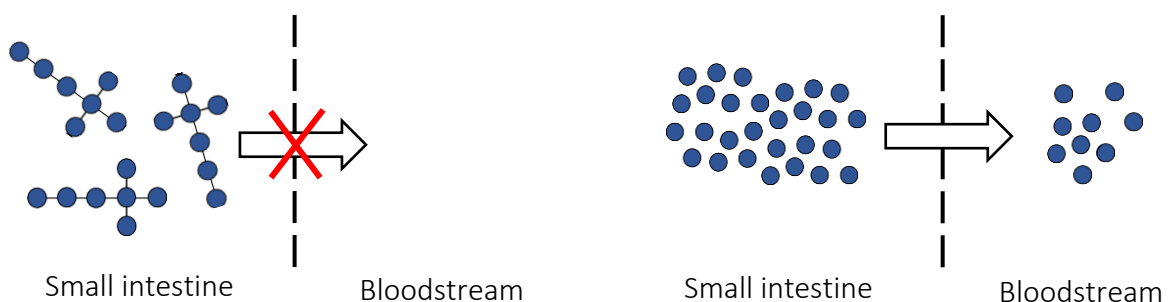


## Lipase



## Digestion

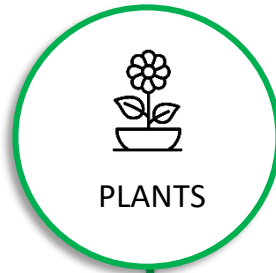
The enzymes break down the food so that it is small enough to be absorbed into the bloodstream.







## CONTENT



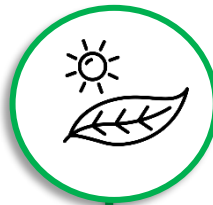
### PLANTS

Plants are living organisms.  
Plants complete the seven life processes.

Plants are different to animals because they don't have a circulatory system for them to breathe and they don't have a digestive system for them to eat and digest food.

Plants take in oxygen through holes in their leaves called **stomata**.

Plants make their own glucose using sunlight in a process called **photosynthesis**.



### PHOTOSYNTHESIS

Photosynthesis is the process where plants use sunlight to make glucose. A green chemical called **chlorophyll** found in plant leaves absorbs the sunlight.

Photosynthesis Equation:

Carbon Dioxide + Water  $\xrightarrow{\text{Sunlight}}$  Glucose + Oxygen

$\text{CO}_2 + \text{H}_2\text{O} \xrightarrow{\text{Sunlight}} \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$

Photosynthesis is important for all living organisms because it is the main source of oxygen in the atmosphere.



**RETRIEVAL ACTIVITY**

	Question	Answer	Mark
1	What life process uses oxygen to release energy from glucose?		
2	What are the products of respiration?		
3	What are the reactants in respiration?		
4	What are the reactants in photosynthesis?		
5	What are the products in photosynthesis?		
6	Where do plants get the energy from to undergo photosynthesis?		
7	What are the holes in a leaf called that let gases pass in and out?		
8	What is the green chemical called that absorbs sunlight in a leaf?		
9	What is the process where gases move from high to low concentration?		
10	What is the name of a membrane that only lets some substances through?		
Score			



**ACTIVATE KNOWLEDGE**

Identify the following organelles (parts of a cell):

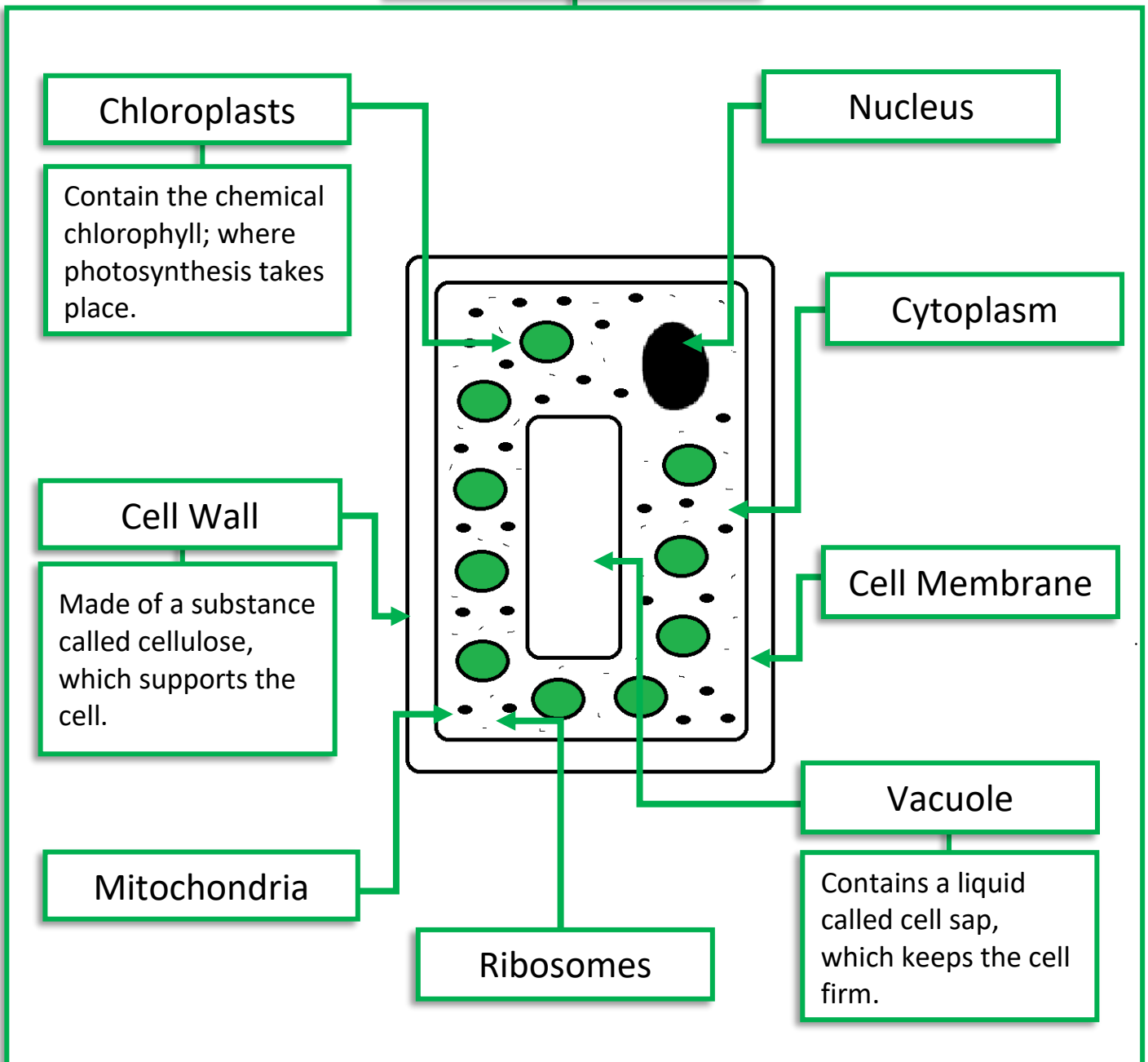
- \_\_\_\_\_ - Where most of the chemical reactions take place.
- \_\_\_\_\_ - Where proteins are made.
- \_\_\_\_\_ - Where respiration takes place.
- \_\_\_\_\_ - Controls the activities of the cell.
- \_\_\_\_\_ - Controls what enters and leaves the cell.

*Nucleus; Cytoplasm; Cell Membrane; Ribosomes; Mitochondria*



## CONTENT

### PLANT CELL ORGANELLES



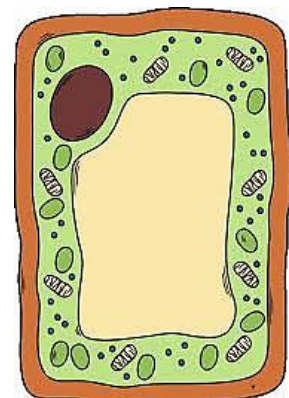
### **Palisade Cells**

Palisade cells are a specialised cell in a plant.

The palisade cells are responsible for photosynthesis.

They are well adapted for photosynthesis because:

- They are towards the tops of leaves for maximum light
- They have lots of chloroplasts





**RETRIEVAL ACTIVITY**

	Question	Answer	Mark
1	What is made up of a group of similar cells working together?		
2	What is made up of a group of different organs working together?		
3	What is the name given to a group of different tissues working together?		
4	What substance is made when protein is broken down?		
5	What enzyme breaks down lipids (fats)?		
6	What substance is made when lipids (fats) are broken down?		
7	What part of a plant cell contains chlorophyll?		
8	What part of a plant cell is a storage space for sap?		
9	What are the two products of photosynthesis?		
10	Where does the energy come from needed for photosynthesis?		
Score			



**ACTIVATE KNOWLEDGE**

Label the plant cell with the following organelles:

*Vacuole;*

*Nucleus;*

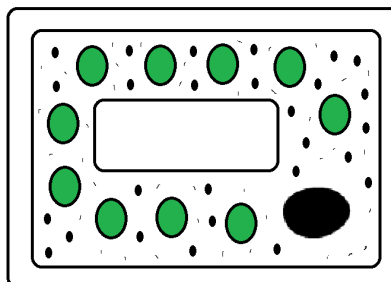
*Cytoplasm;*

*Cell Membrane;*

*Mitochondria;*

*Cell Wall;*

*Chloroplasts*



What organelle is missing?



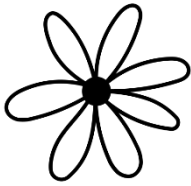
## CONTENT



### PLANT ORGANS

Plants, just like animals, are made up of cells, tissues, organs and organ systems.  
These are some main plant organs:

Flower



The flower contains structures needed for reproduction.

Leaf



The top of the leaf is filled with palisade cells used for photosynthesis.  
The bottom of the leaf contains stomata which lets gases move in and out.

Stem



The stem is used to transport water, sugar and minerals in the plant.

Root



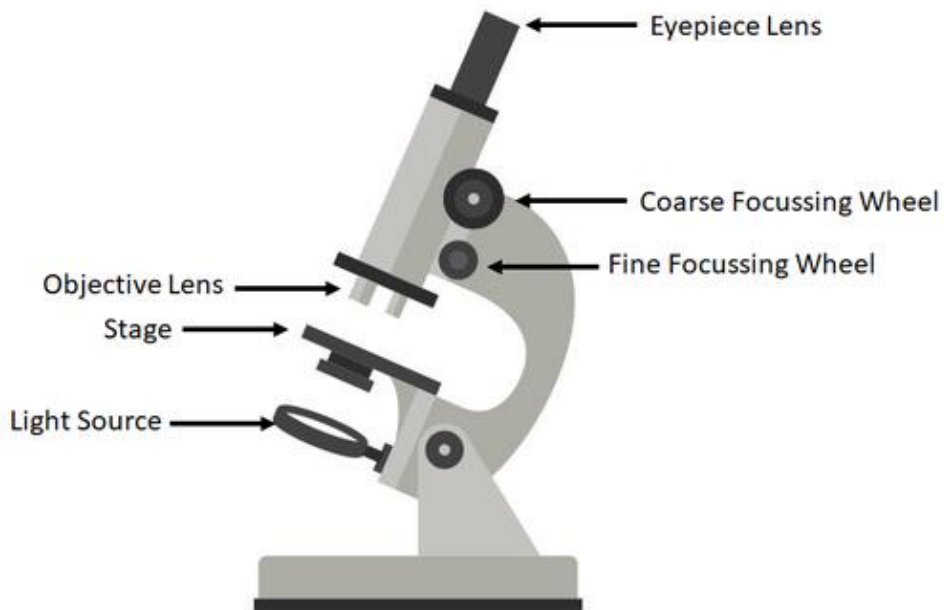
The root has root hair cells which absorb water and minerals from the soil.

# Microscopes

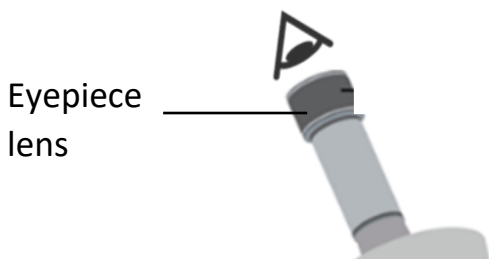
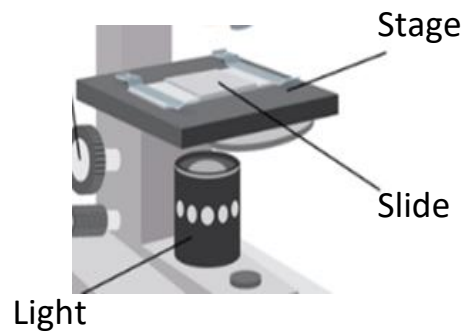
Cells are so small, you need to use a light microscope to see them.

## Light Microscopes

A light microscope uses lenses to produce a magnified image of an object.



The object is placed on a rectangular glass slide and the slide is placed on a stage with a light source below.



Light passes through the object, through the lenses and into your eye.

You can focus the image using the focusing wheel.





## Method

