**Biology Paper 1**

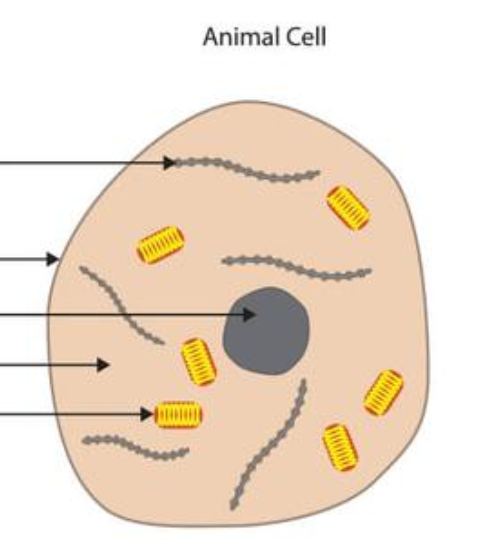
**Sample of content during year 10**

**Topics B1 – B3**

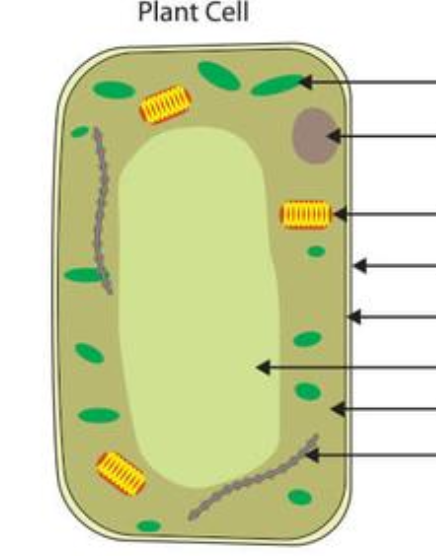
**B1 – Cells, Specialised Cells and Microscopy**

**Animal, Plant and Bacterial Cells**

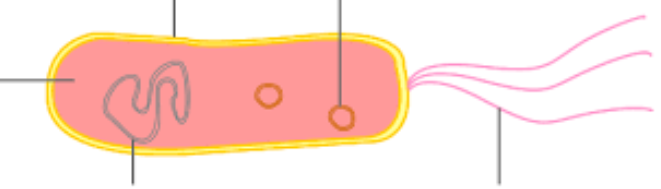
Label the animal cell below.



Label the plant cell below.



Label the bacterial cell below.



**Functions of Parts of Cells**

|  |  |
| --- | --- |
| **Part of the Cell** | **Function** |
| Nucleus |  |
| Cytoplasm |  |
| Mitochondria |  |
| Cell Membrane |  |
| Ribosome |  |
| Chloroplast |  |
| Vacuole |  |
| Cell Wall |  |

**Eukaryotes and Prokaryotes**

Eukaryotic cells are complex cells. Examples are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells.

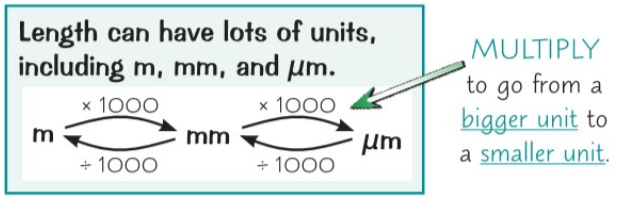
Prokaryotic cells are more simple. They do not have a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. An example is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cell.

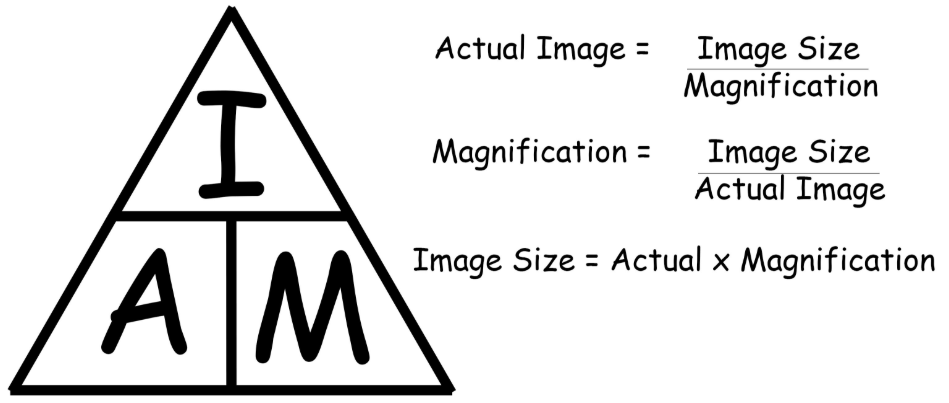
**Using a Microscope**

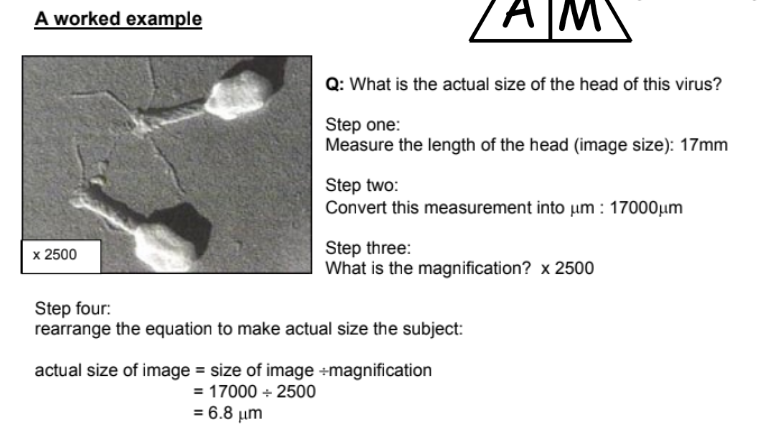
Put this method of using a light microscope into the correct order.

|  |  |
| --- | --- |
| Move the fine adjustment to get a clear image |  |
| Move the stage down until the image is roughly in focus |  |
| Clip the slide onto the stage |  |
| Twist the coarse adjustment to move the stage up to just below the objective lens |  |
| Get a bigger image by using an objective lens with a higher magnification |  |
| Start with the lowest magnification objective lens |  |

**Microscope Calculations**

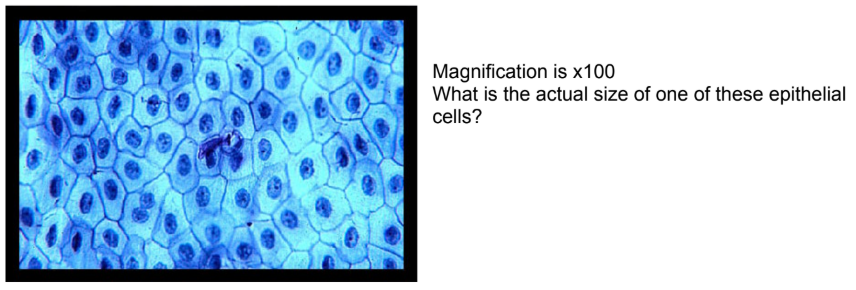






**Question 1**

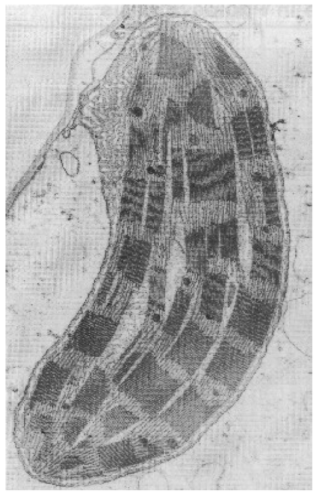
Magnification is x100. What is the **actual size** of one of these epithelial cells?



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**Question 2**

If the actual length of this chloroplast is 10μm, what is the **magnification**?



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**Specialised Cells**

1. What does **undifferentiated** mean?

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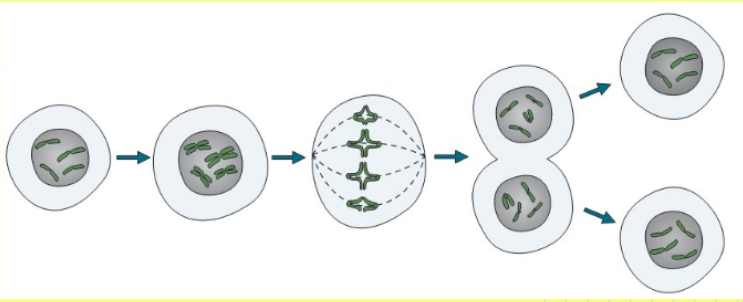
1. What does **differentiate** mean?

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**B1 – Chromosomes, Cell Division and Stem Cells** – Revision Guide Pages 15-16

**Mitosis**

Mitosis is part of the cell cycle, where cells divide. This kind of cell division is done so organisms can grow and repair themselves. Cells which have divided by mitosis are genetically identical to the parent cell.

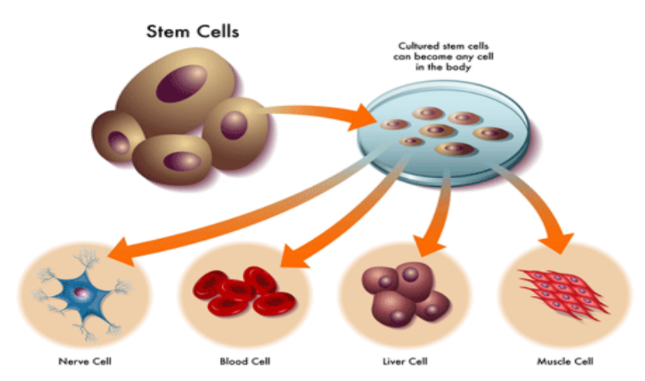


**Task** - Put the stages of the cell cycle in order. Use the diagram to help.

|  |  |
| --- | --- |
| DNA replicates to make 2 copies of each chromosome |  |
| One set of DNA is pulled to each side of the cell |  |
| The nucleus divides |  |
| The cytoplasm and cell membranes divide and two identical cells are formed |  |
| The cell grows and increase the number of mitochondria and ribosomes |  |
| The DNA lines up down the centre of the cell |  |

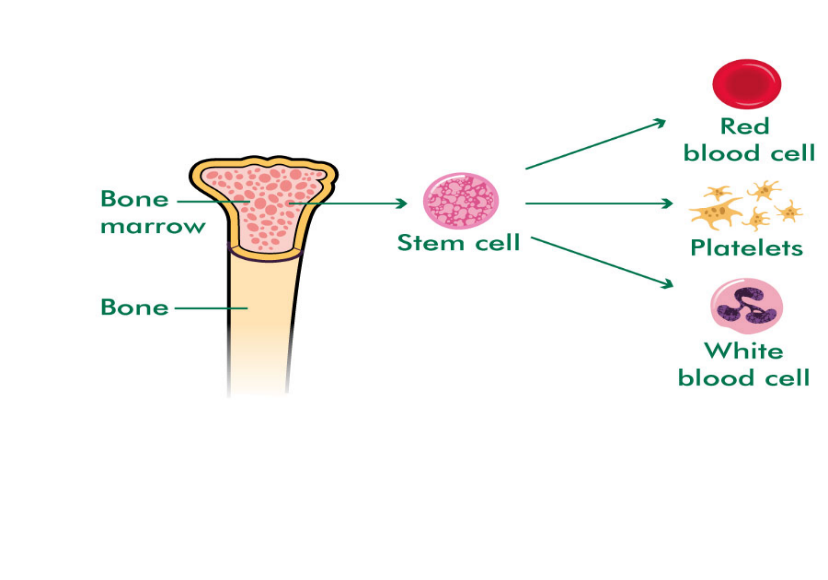
**Stem Cells – Key Facts**

A stem cell is an undifferentiated cell which can become another type of cell. There are 2 sources of stem cells in humans:

**Embryos**

**Advantages**: can become most other types of cell. Used to treat disease e.g. diabetes/paralysis. Not rejected by the body

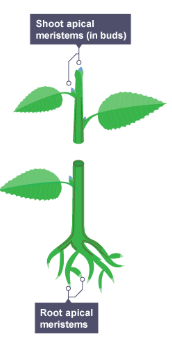
**Disadvantages**: can cause transfer of viruses, ethical issues - embryos area potential life, religious objections - should not ‘play god’.

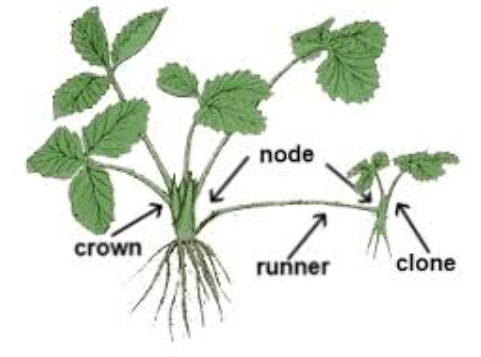
**Adult Stem Cells**

**Advantages**: can form some other types of cell e.g. blood cells from bone marrow. Not rejected by the body

**Disadvantages**: can cause transfer of viruses, can differentiate into fewer types of cells than embryos

**Plant Stem Cells – meristem tissue**

Meristem tissue can differentiate into any other type of plant cell, at any point in the plant’s life

**Advantages:** can clone rare plants to stop them from going extinct. Can clone plants which have special features, e.g. resistance to a disease or a very nice tasting fruit.

**B1 – Transporting Substances (Diffusion, Osmosis, Active Transport)**Revision Guide Pages 17 – 22

**Diffusion**

1. What is the definition of diffusion?

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1. List 4 factors that speed up the rate of diffusion.

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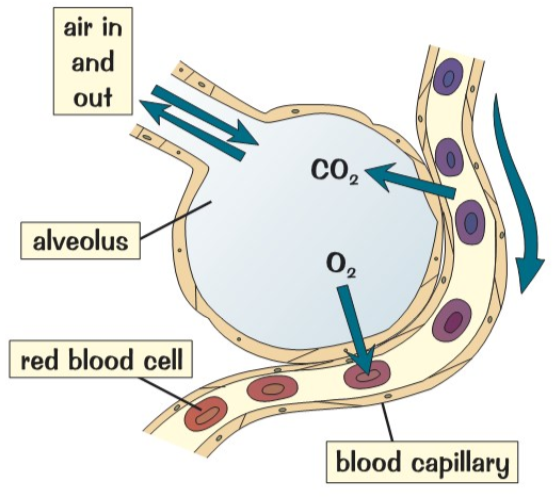
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**Diffusion – Examples in Organisms**

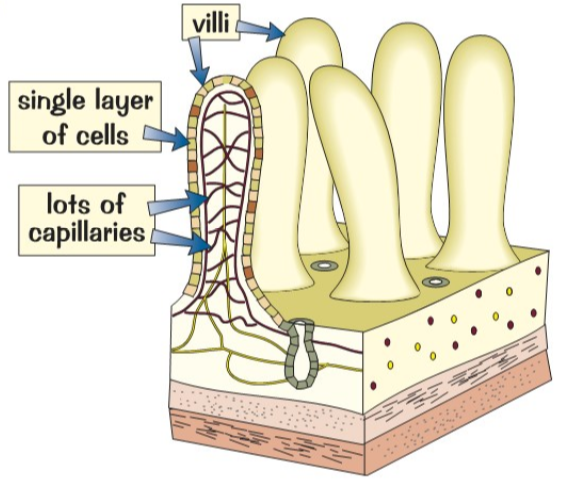
Diffusion takes place in other areas of our bodies and the bodies of plants.

For example:

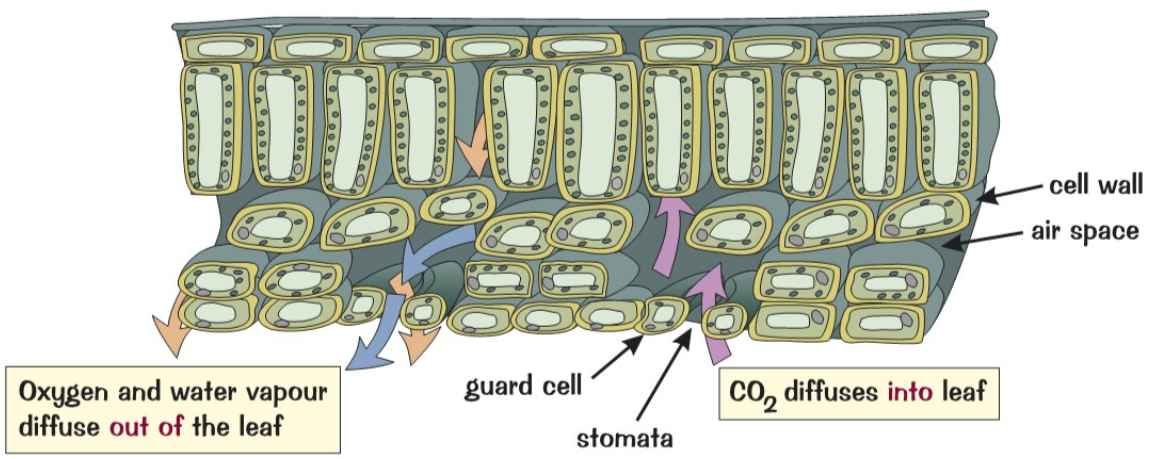
* In alveoli in our lungs



* The villi of our small intestine



* The leaves and roots of plants



**Osmosis**

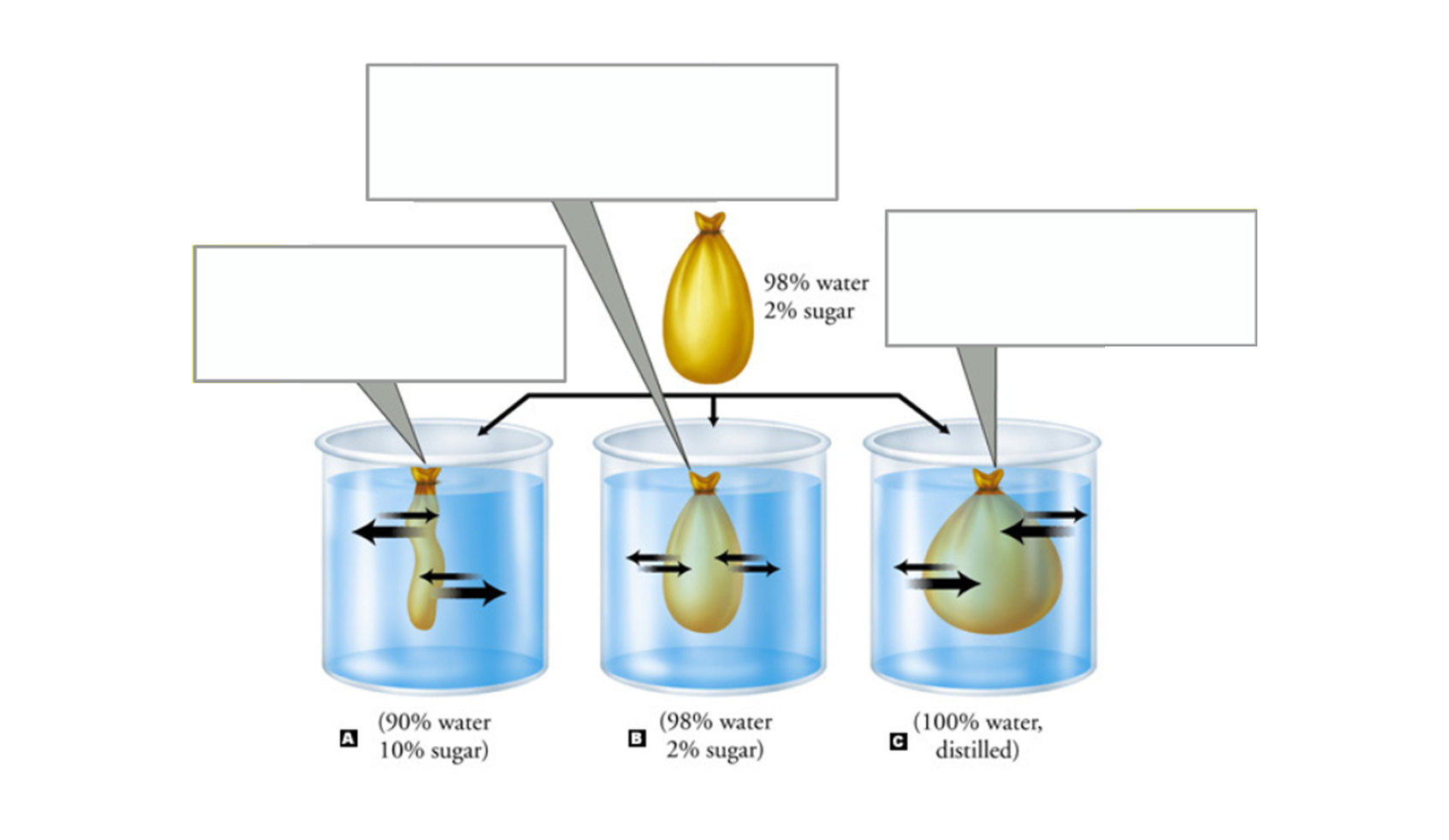
1. What is the definition of osmosis?

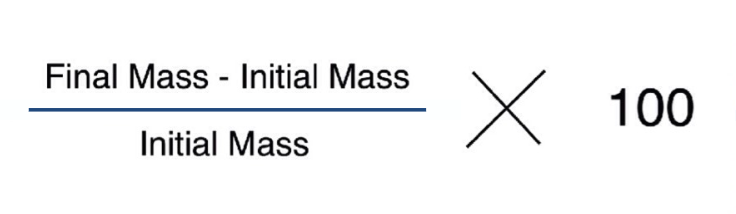
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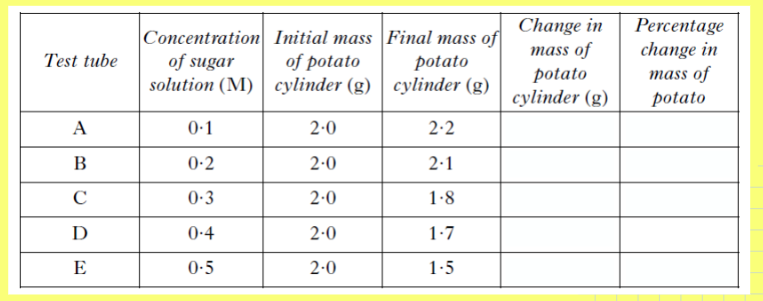
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1. Describe what is happening in each beaker.





**Change in mass = final mass – initial mass**



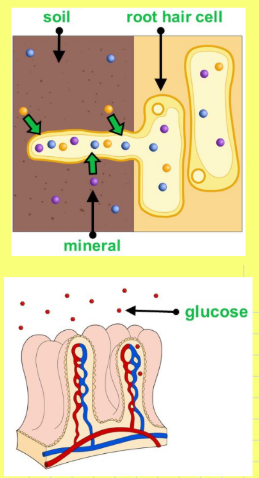
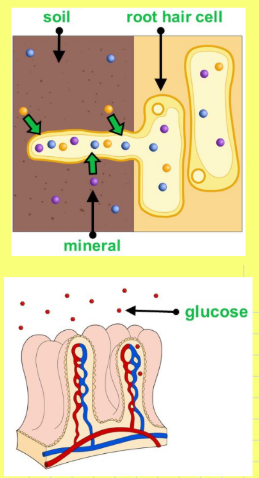
**Active Transport**

Active transport moves substances from a low to a high concentration against the concentration gradient.

This needs **energy** which comes from **respiration**.

**Examples**

* Root hair cells absorb minerals ions which are in a low concentration in the soil. Plants need ions for  
  healthy growth.
* Sugar is absorbed from a low concentration in small intestine, into the blood which has a higher sugar concentration. Sugar molecules are used for cell respiration.



Diagram

Description automatically generated

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**B2 –Enzymes**

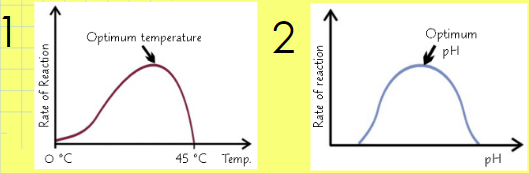
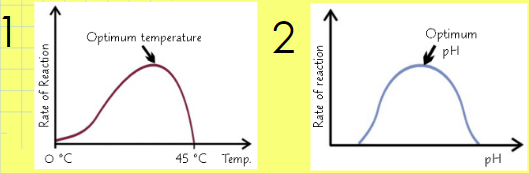
**Enzymes**

Our body has many chemical reactions going on.

Enzymes are protein molecules which can speed up reactions.

We say they are **biological catalysts**.

**Describing Graphs**

**Graph 1:** At first, the increase in temperature makes the rate of reaction \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_up to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ temperature. After this, the active site of the enzyme starts to change \_\_\_\_\_\_\_\_\_\_\_, the \_\_\_\_\_\_\_\_\_\_\_\_\_won’t fit and the enzyme is \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Graph 2:** If the pH is too low or too high the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the enzyme starts to change shape, the substrate won’t fit and the enzyme is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The pH the enzyme works best at is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pH.

**Enzymes and Digestion**

Complete the table below:

|  |  |  |  |
| --- | --- | --- | --- |
| **Enzyme** | **Breaks down...** | **Into...** | **Made in the...** |
| Carbohydrase  (e.g. \_\_\_\_\_\_\_\_) |  |  |  |
| Protease  (e.g. \_\_\_\_\_\_\_\_) |  |  |  |
| Lipase |  |  |  |

**Digestion Summary**

Use your knowledge of the digestive system to describe the journey of a cheese sandwich from mouth to anus.

**You will need to:**

* **Ensure that your journey follows the correct order of organs in the digestive system**
* **Describe what is happening to the food at each stage in the digestive system**
* **Describe what the pancreas and liver do, making sure you name the chemical and enzymes involved**

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**Food Tests – Summary Table**

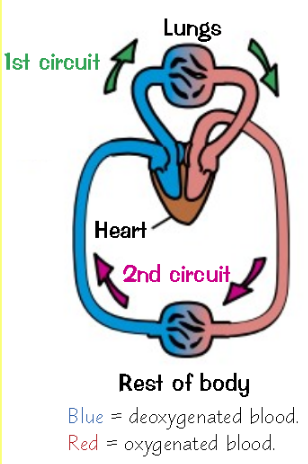
|  |  |  |  |
| --- | --- | --- | --- |
| **Food Molecule** | **Chemical Test** | **If it is present** | **If it is absent** |
| **Sugar** |  |  |  |
| **Starch** |  |  |  |
| **Protein** |  |  |  |
| **Fats** |  |  |  |

**B2 – Circulatory System, Blood and Cardiovascular Disease**

**Structure of the Heart - Key Facts**

The heart is an organ that pumps blood around the body in a double circulatory system.

The right ventricle pumps blood to the lungs where gas exchange takes place.

The left ventricle pumps blood around the rest of the body.  


1. What are pacemaker cells?

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1. Why does the left ventricle have to work harder than the rest of the heart?

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1. Why do we need valves in our heart?

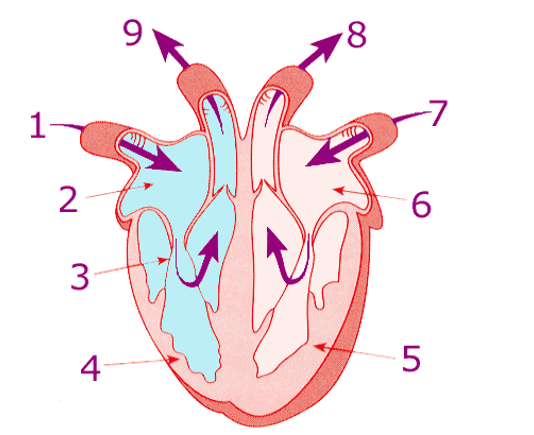
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1. What is the coronary artery?

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…………………………………………………………………………………………………………………Label the diagram of the heart.



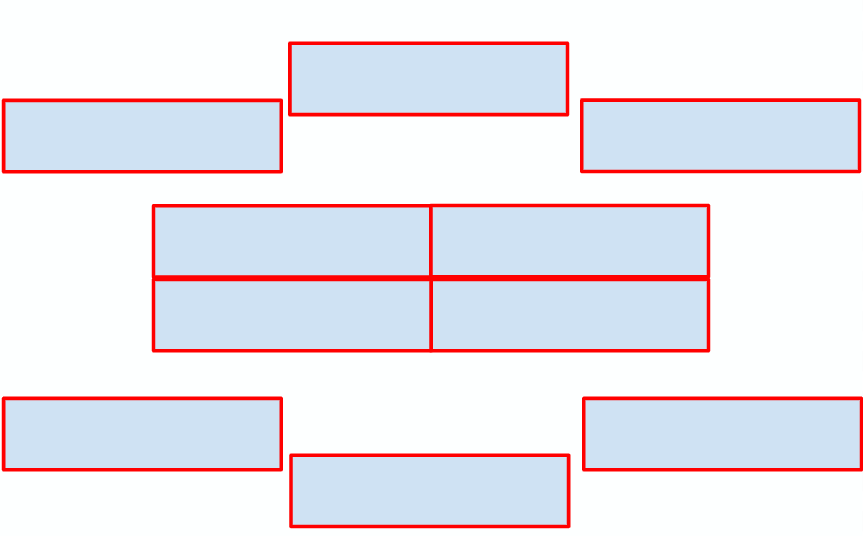
Extension: which side of the heart pumps the oxygenated blood around the body?

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Put the parts of the heart in the order they would be in on the diagram.

**Left atrium, right ventricle, pulmonary vein, right atrium, aorta, vena cava, pulmonary artery, left ventricle, lungs, body cells**

*Extension: add arrows to the diagram to show the blood flow*



Put the statements into the correct order

|  |  |
| --- | --- |
| Deoxygenated blood passes through the pulmonary artery towards the lungs |  |
| Blood emptied into the left ventricle |  |
| Oxygenated blood pumped through the aorta to the rest of the body (inc. heart) |  |
| Deoxygenated blood from the body enters the right atrium through the vena cava |  |
| The blood then empties into the right ventricle |  |
| Oxygenated blood from the lungs enters the left atrium through the pulmonary vein |  |

**Extension** **Task**

Write a description of the journey of a red blood cell around the body.

Include:

* The movement of blood through the heart and the 4 main blood vessels.
* The role of the valves
* When the blood is oxygenated or not
* Keywords: aorta, pulmonary artery, pulmonary vein, vena cava, atrium, ventricle, oxygenated

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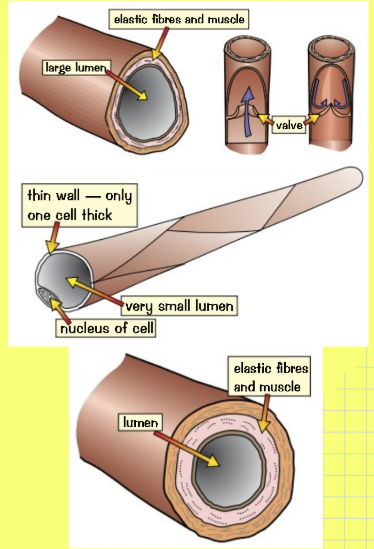
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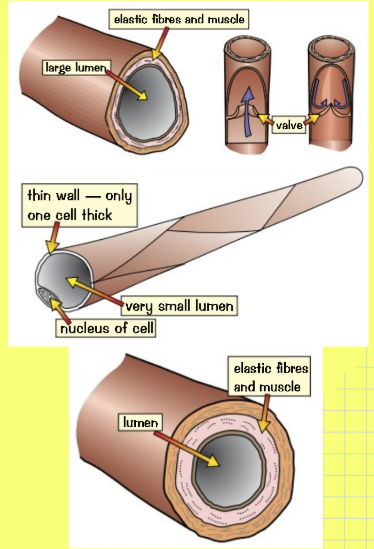
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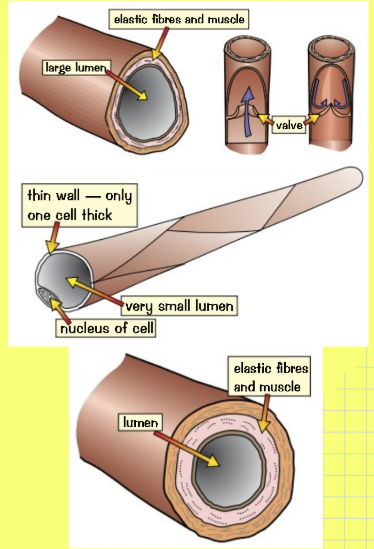
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**Blood Vessels**

1. Label each diagram: artery, vein and capillary







1. Explain how the structure of the artery is adapted to its function

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1. Explain how the structure of the vein is adapted to its function

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1. Explain how the structure of the capillary is adapted to its function

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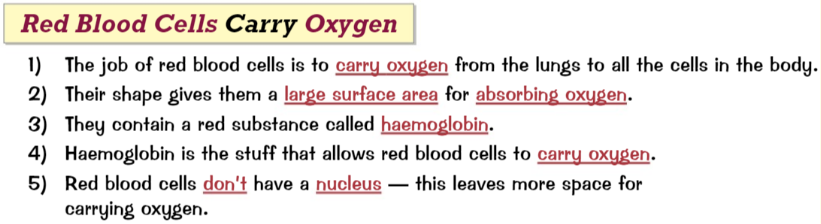
**Components of Blood**

Blood is a tissue made of plasma, in which the red blood cells, white blood cells and platelets are suspended.

Complete the table below to show the percentage of each component in blood and the function (job) of each part.

|  |  |  |
| --- | --- | --- |
| **Blood Component** | **% Composition** | **Function (job)** |
| **Red Blood Cell** |  |  |
| **White Blood Cell** |  |  |
| **Platelets** |  |  |
| **Plasma** |  |  |

**Adaptations of Red Blood Cells**



**Questions**

1. Haemoglobin is a chemical found in red blood cells. What is its function?

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1. State two adaptations of a red blood cell. For each one, state how the adaptation helps the blood cell to carry out its function

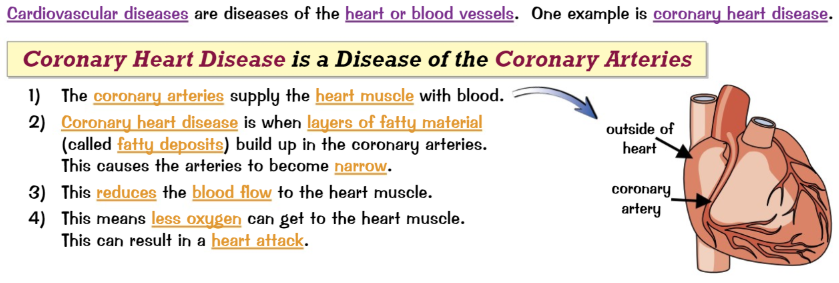
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**Coronary Heart Disease – Key Facts**



1. What is the function of the coronary artery

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1. Where is it found?

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1. What happens in coronary heart disease?

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1. What effect can this have on the heart muscle?

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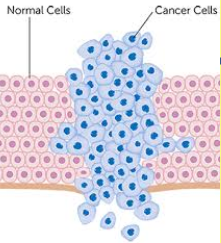
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**Coronary Heart Disease – Treatments**

|  |  |  |  |
| --- | --- | --- | --- |
| **Treatment** | **How it Works** | **Advantages** | **Disadvantages** |
| **Stents** |  |  |  |
| **Statins** |  |  |  |
| **Artificial Hearts** |  |  |  |
| **Valve Replacement** |  |  |  |

**Cancer**



1. What is **cancer**?

…………………………………………………………………………………………………………………

1. What is a **benign** tumour?

…………………………………………………………………………………………………………………

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1. What is a **malignant** tumour?

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1. How do cancers **spread**?

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1. Name 5 risk-factors for cancer   
   ***(be clear if the risk factor causes a particular type of cancer)***

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1. Why have cancer survival rates improved?

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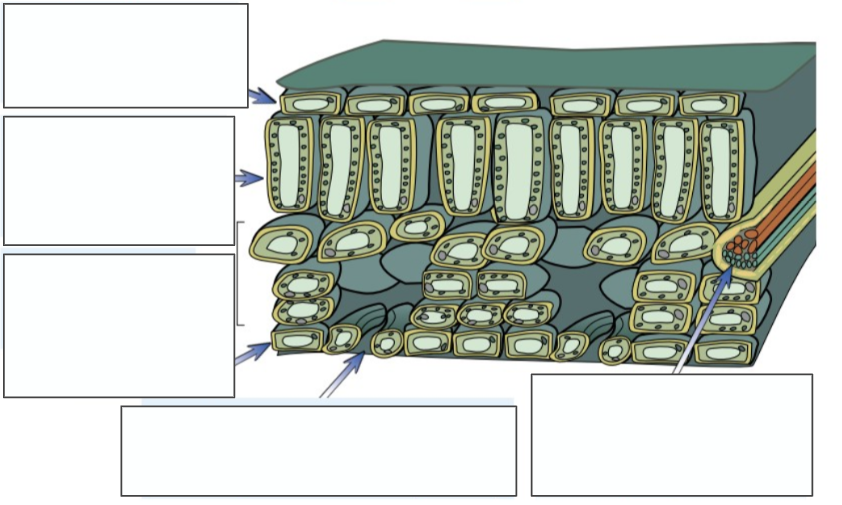
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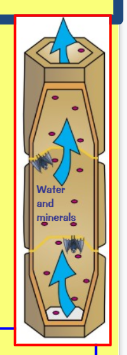
**B2 – Plant Systems** – Revision Guide Page 39-41

**Plant Tissues and Organs**

Plants are made from a range of different cells, tissues and organs.

Label the leaf diagram with the name of the tissue and how it is adapted to its function.

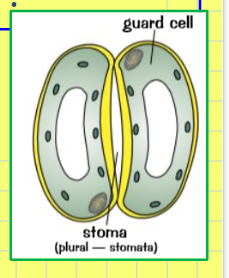


**Specialised Cells**

Xylem tubes are made of \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_. They are hollow tubes, strengthened by \_\_\_\_\_\_\_\_\_\_\_ and travel from the \_\_\_\_\_\_\_\_\_\_ to the \_\_\_\_\_\_\_\_\_\_. They carry \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_. This process of moving water is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

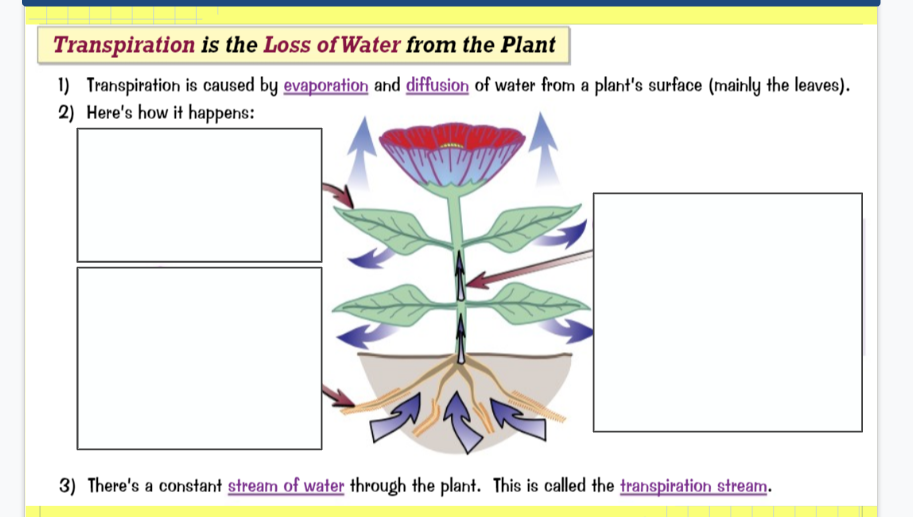


Phloem tubes are made of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_. They carry \_\_\_\_\_\_\_\_\_\_ from the \_\_\_\_\_\_\_\_\_\_\_ all around the plant to be used or \_\_\_\_\_\_\_\_\_\_\_\_\_\_. This process of moving food is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.



The guard cells change \_\_\_\_\_\_\_\_\_\_\_\_\_\_ to control the size of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_. This controls the rate of \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and water loss.

**Transpiration**



**B3 – Communicable Diseases** – Revision Guide Page 43-45

**Communicable Diseases**

1. What is a pathogen?

…………………………………………………………………………………………………………………

1. What is a communicable disease?

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1. Name the 4 types of pathogen

…………………………………………………………………………………………………………………

1. Why do bacteria make us feel ill?

…………………………………………………………………………………………………………………

1. Where are viruses found in the body?

…………………………………………………………………………………………………………………

1. How do viruses make us feel ill?

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**Spread of Disease**

Describe how diseases can spread and how we can prevent the spread of disease.

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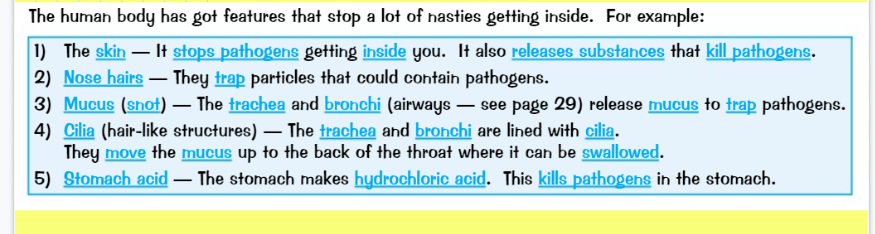
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**Treatment and Prevention**

**B3 – Natural Defence Systems** – Revision Guide Page 45-47

**Human Defence System**



What is the role of the following parts of the defence system?:

1. The skin
2. Nose hair
3. Mucus
4. Cilia
5. Stomach acid

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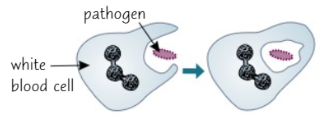
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**White Blood Cells**

There are 3 functions of white blood cells:

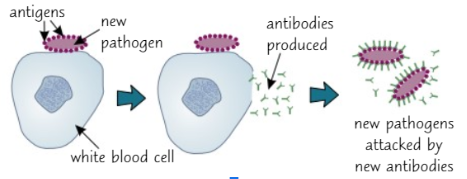
1. **Phagocytosis**



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1. **Producing antibodies**



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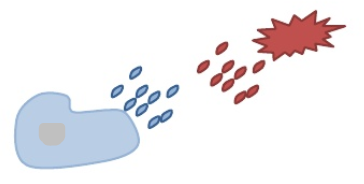
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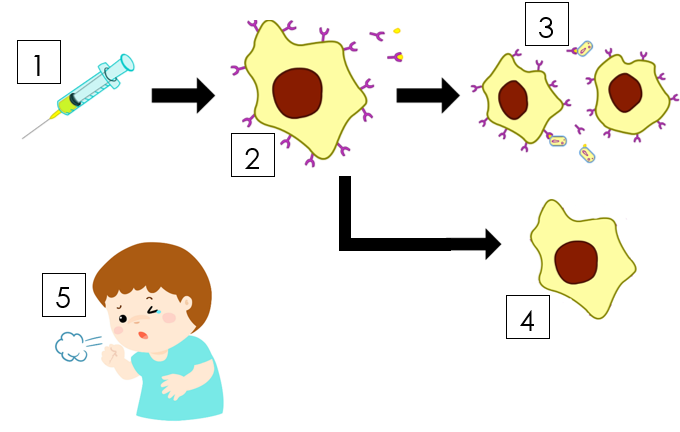
1. **Producing antitoxins**



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**Vaccination**



Describe how vaccines help to protect against future infections.

1. Vaccination given

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1. Antibodies produced

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1. Attract more white blood cells

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1. Memory cells

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1. Infection with same pathogen later on

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**Vaccination – Advantages and Disadvantages**

**Advantages**

Vaccinations have helped to control diseases which used to be common   
e.g. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

When a large disease outbreak happens, we call this an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This is stopped from happening if many people have been \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This is because the disease cannot easily \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Disadvantages**

Sometimes they do not work. We say the person has not got \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Cannot be used on people with a weakened \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_.

Sometimes you can have a bad \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the vaccine. E.g. \_\_\_\_\_\_\_\_\_\_\_\_\_ or a fever.

**B3 – Drugs** – Revision Guide Page 48-49

**Antibiotics and Painkillers**

1. What is an antibiotic?

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1. What is a pain killer?

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1. Why is it pointless to give antibiotics to someone suffering from measles?

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1. Some bacteria can no longer be treated by antibiotics. Explain why.

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1. What is the source of most drugs?

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**Examples of Drugs**

|  |  |  |
| --- | --- | --- |
| **Name of Drug** | **Where it’s produced** | **What it’s used for** |
| **Aspirin** |  |  |
| **Digitalis** |  |  |
| **Penicillin** |  |  |

**Developing Drugs**

1. New drugs are tested for toxicity, efficacy and dose. What do these words mean?

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1. What is pre-clinical testing?

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1. Who takes part in clinical trials?

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1. Why are healthy people used at the start of clinical trials?

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1. What precautions are taken at the start of clinical trials?

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1. What does the ‘optimum dose’ mean?

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1. When the drug is tested on patients, some are given a placebo. What is this and why is it given?

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1. What is a double blind trial?

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