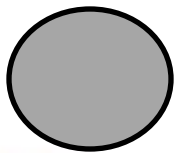


# Organisation

## Biology Paper 1



Content you will **NOT** be assessed on



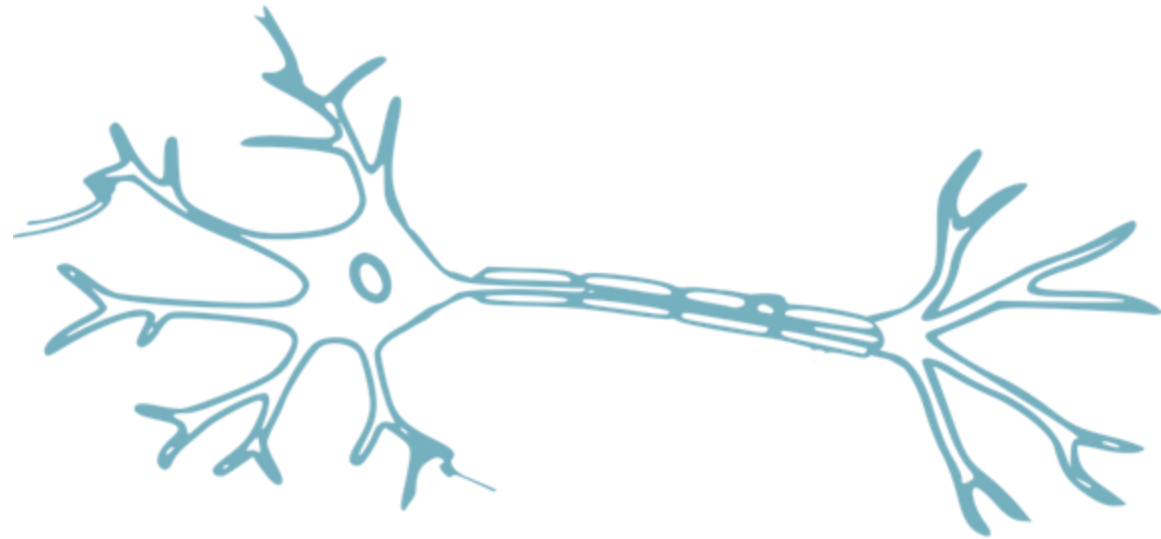
# 2.1 Principles of Organisation

## Cells

Cells are the basic building blocks of all living organisms. Examples of cells include blood cells, nerve cells and muscle cells.

Smallest

Cells



Largest

CS/F

CS/H

SS/F

SS/H



# 2.1 Principles of Organisation

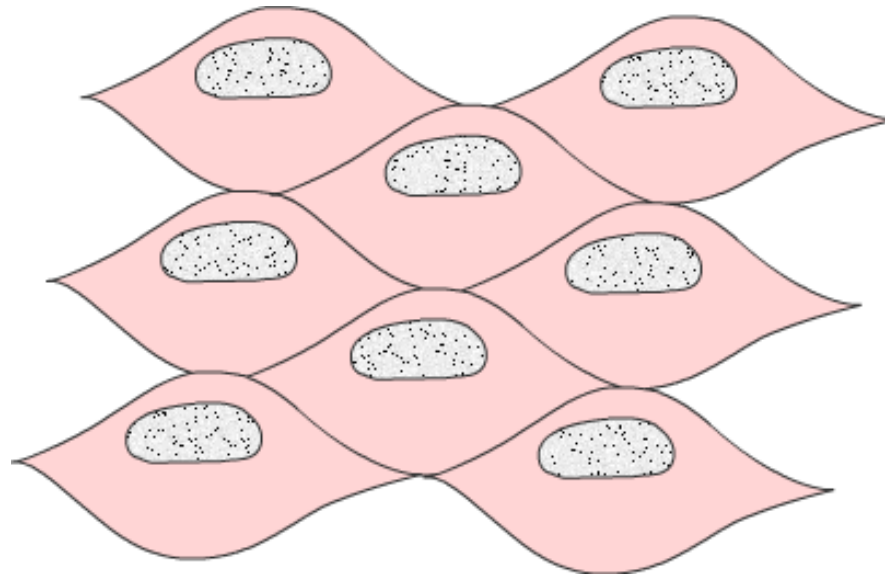
## Tissues

A tissue is a group of cells with a similar structure and function. Examples of tissues include epithelial tissues that cover organs, muscle tissue and glandular tissue that secrete substances.

Smallest

Cells

Tissues



Largest



# 2.1 Principles of Organisation

## Organs

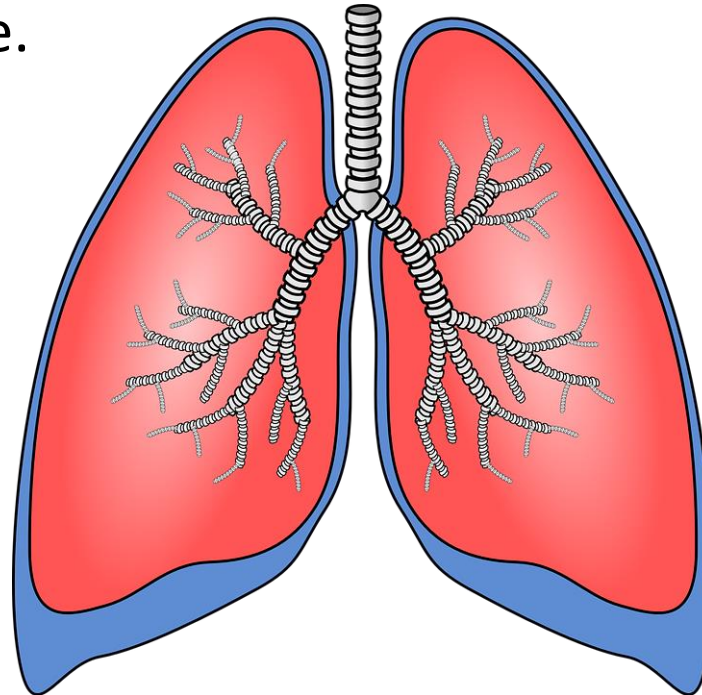
Organs are aggregations of tissues performing specific functions. Examples of organs include the stomach, the liver, the small intestine and the large intestine.

Smallest

Cells

Tissues

Organs



Largest

CS/F

CS/H

SS/F

SS/H



# 2.1 Principles of Organisation

## Organ Systems

Organs are organised into organ systems, which work together to form organisms. Examples of animal organ systems include the digestive system and the circulatory system.

Smallest

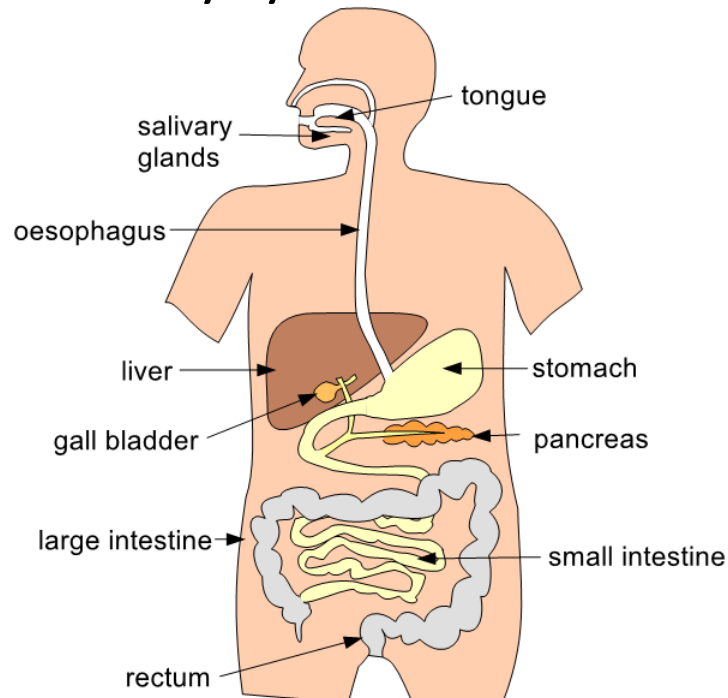
Cells

Tissues

Organs

Organ System

Largest



CS/F

CS/H

SS/F

SS/H



# 2.1 Principles of Organisation

## Organism

An individual animal, plant, or single-celled life form made up of organ systems.

Smallest

Cells

Tissues

Organs

Organ System

Organism

Largest



CS/F

CS/H

SS/F

SS/H



# 2.2.1 Human Digestive System

Think

Pair

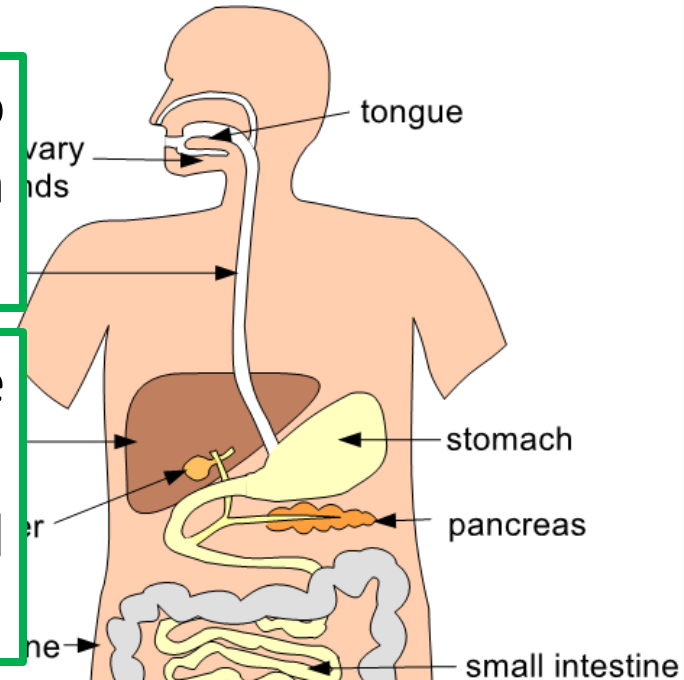
Share

What is the role of the digestive system?

The function of the digestive system is to break down large insoluble substances in our food into smaller soluble ones.

These smaller substances can then be absorbed by diffusion in the small intestine into our blood stream and used by the body.

The products of digestion are used to build new carbohydrates, lipids and proteins. Some glucose is used in respiration.



## 2.2.1 Human Digestive System

Nutrient	What the Body Uses it For	Examples of Food it is Found In
Carbohydrates such as sugars and starch		
Proteins		
Lipids (Fats)		





## 2.2.1 Human Digestive System

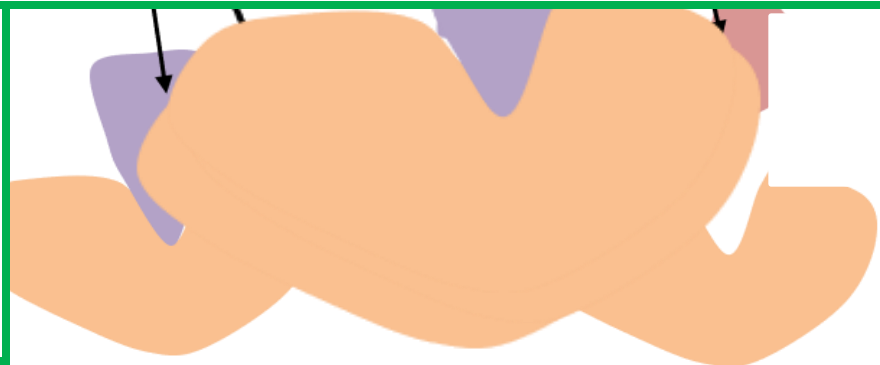
Think  
Pair  
Share

What are enzymes and how do enzymes work?  
Products

This is known as the lock and key model.

It is known as this because it explains how a specific substrate will fit the active site of an enzyme like a key fitting a lock.

The products leave the active site while the enzyme remains unchanged.



CS/F

CS/H

SS/F

SS/H



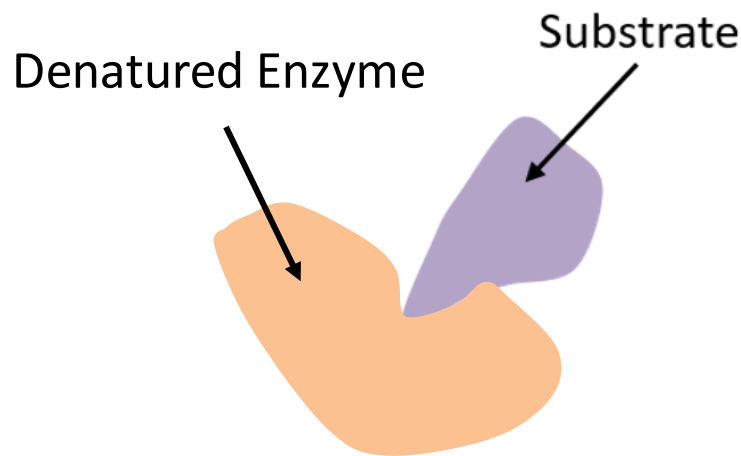
## 2.2.1 Human Digestive System

Think  
Pair  
Share

What does it mean if an enzyme is denatured?

Key Term	Definition
Denatured	

An enzyme can be denatured by high temperatures or a change in pH.



CS/F

CS/H

SS/F

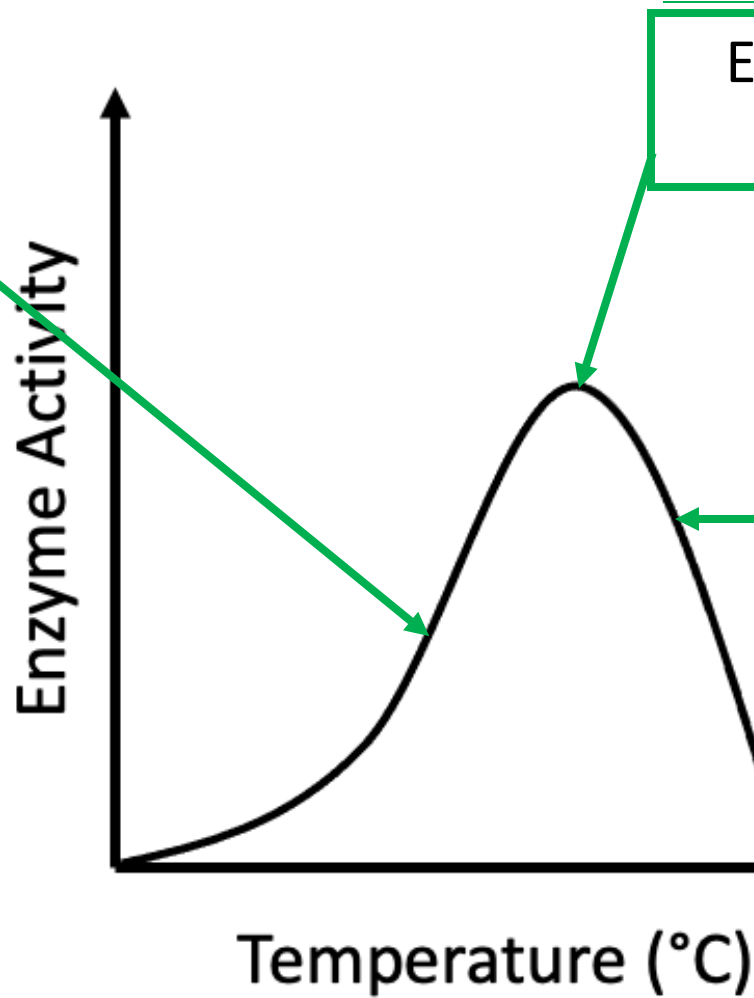
SS/H



# 2.2.1 Human Digestive System

As the temperature increases the rate of enzyme activity increases.

This is because particles are moving faster and so collisions are more likely.



Enzymes optimum temperature.

As the temperature continues to increase the rate of enzyme activity decreases.

The high temperature has caused a change in the shape of the active site.

CS/F

CS/H

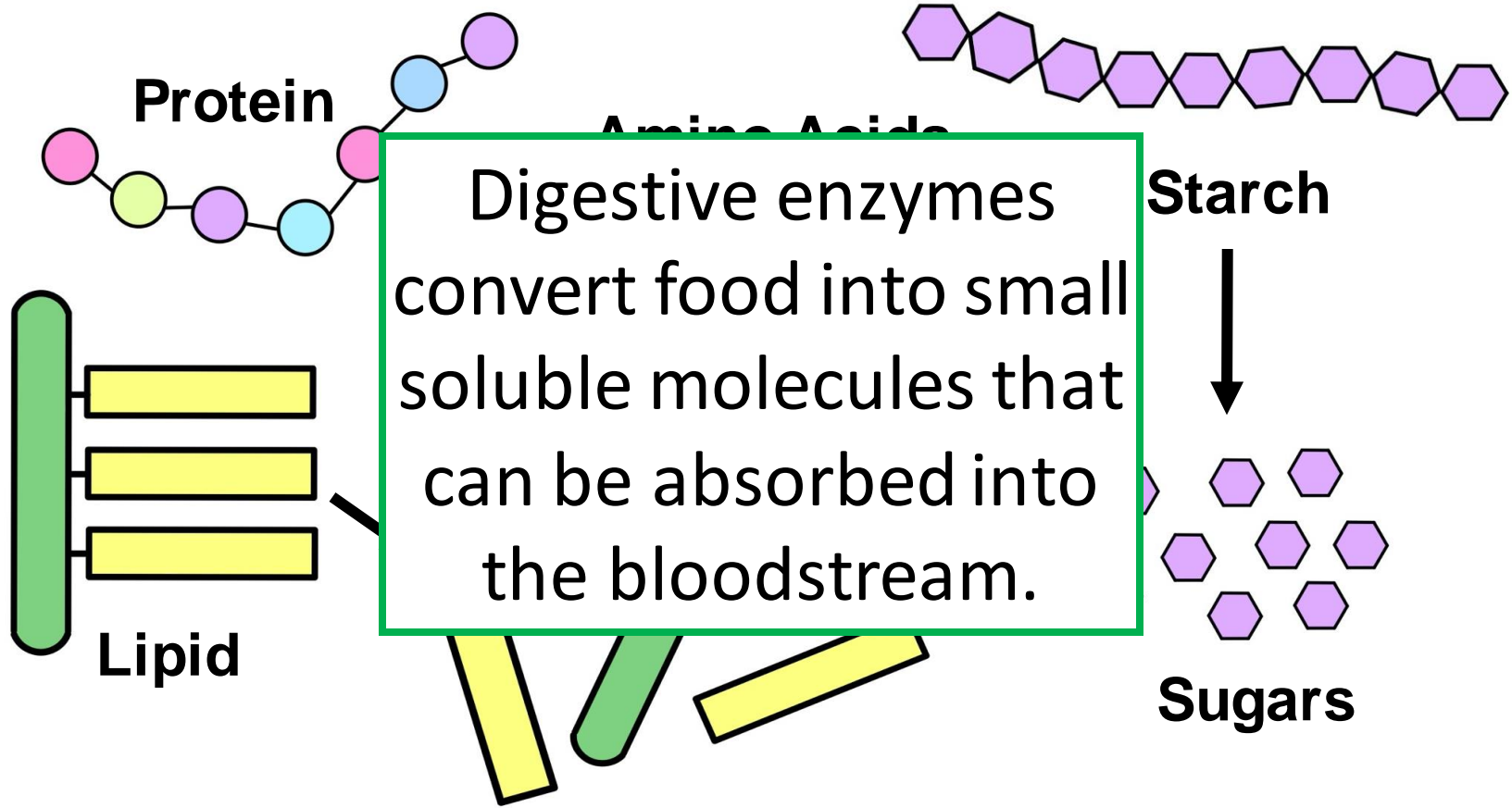
SS/F

SS/H

# 2.2.1 Human Digestive System

Think  
Pair  
Share

What is the role of digestive enzymes?



Fatty Acids and Glycerol

CS/F   CS/H   SS/F   SS/H

# 2.2.1 Human Digestive System

Enzyme	Site of Production	Substance it Breaks Down	What Substance is Broken Down Into	Word Equation for Reaction	Optimum pH for Enzyme
Amylase					
Lipase		<p>Lipid Starch</p>	<p>Fatty Acids and Glycerol</p>		

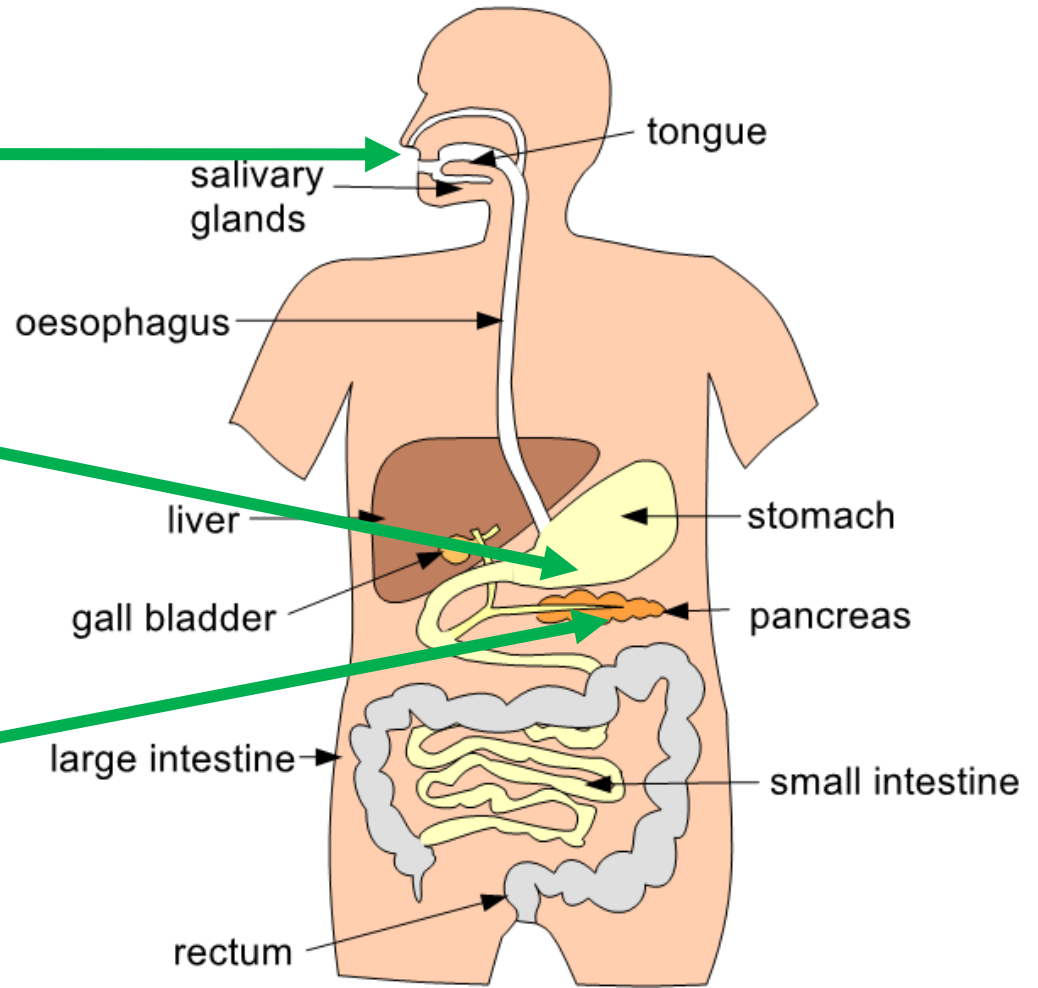
- CS/F
- CS/H
- SS/F
- SS/H

# 2.2.1 Human Digestive System

**Salivary Glands**  
Secretes **amylase**

**Stomach**  
Secretes **protease**

**Pancreas**  
Secretes the three enzymes **amylase, protease and lipase**



CS/F   CS/H   SS/F   SS/H

# 2.2.1 Human Digestive System

Think  
Pair  
Share

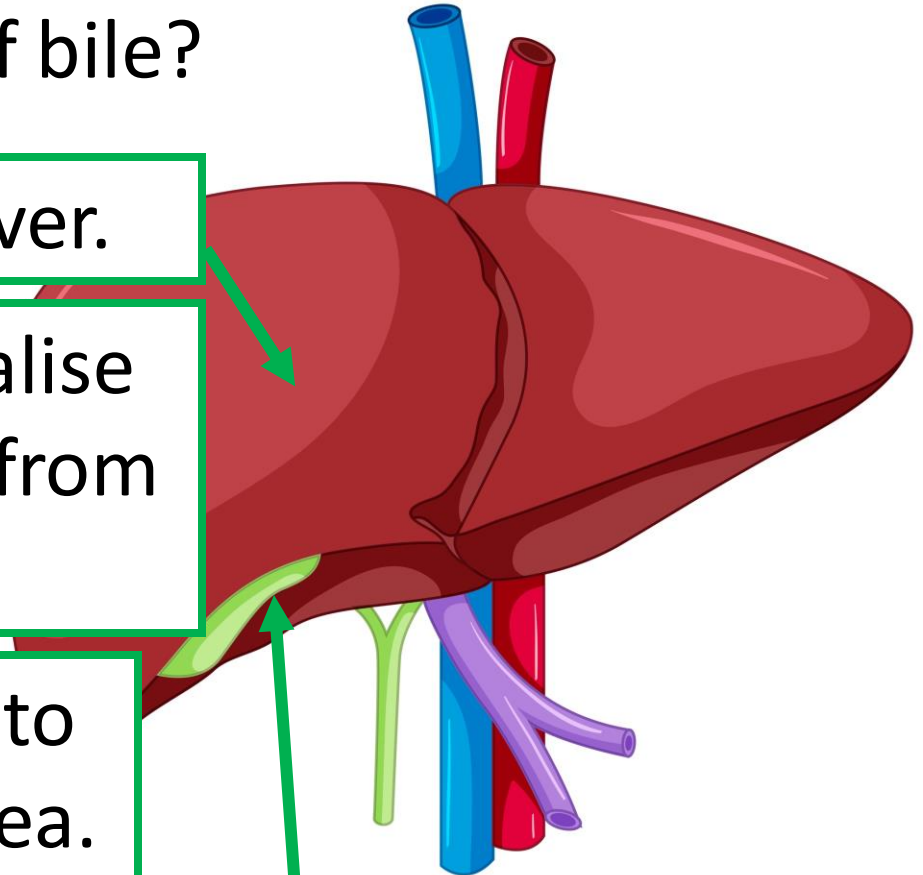
What is the role of bile?

Bile is made in the liver.

It is alkaline to neutralise the hydrochloric acid from the stomach.

It also emulsifies fats to increase its surface area.

It is stored in the gall bladder.



CS/F

CS/H

SS/F

SS/H

# Exam Practice

L2

Describe **two** ways that the mouth can break down starchy foods.

**Teeth chew the food**

---

**Salivary glands release amylase**

---

---

---

(2)

Which gland produces:

(i) amylase;

**Salivary gland/pancreas/small intestine**

---

(1)

(ii) lipase?

**Pancreas/small intestine**

---

(1)





# Exam Practice

L2

Describe how the **protein** is digested.

---

**Protease enzymes..**

---

**..are released by the stomach/small intestine/pancreas**

---

**Proteins broken down into amino acids**

---

**Mechanically broken down by teeth/churning stomach**

Describe how starch is digested. (3)

**Amylase enzymes..**

**..are released by the salivary glands/small intestine/pancreas**

**Starch broken down into glucose**

**Lipase enzymes.. ..are released by the small intestine/pancreas**

**Lipids broken down into fatty acids and glycerol**



# Exam Practice

L2

Different parts of the human digestive system help to break down molecules of fat so that they can be absorbed into the body.

Describe how.

To gain full marks you should refer to:

- the enzyme and where the enzyme is produced
- the products of digestion
- any other chemicals involved.

**Mechanical breakdown by mouth/stomach**

---

**Lipase released by.. pancreas/small intestine**

---

**Fats broken down into fatty acids and glycerol**

---

**Digestion takes place in the small intestine**

---

**Liver produces... ..bile**

---

**Neutralises stomach acid.. ..optimising pH for lipase activity**

---

**Emulsifies fats.. ..increasing surface area**

---

# 2.2.1 Human Digestive System

Think  
Pair  
Share

## How do you test for starch?

Iodine can be harmful.

Ac

Wear Goggles

If there is no starch the sample doesn't change colour.

If there is starch the sample turns blue/black.

- CS/F
- CS/H
- SS/F
- SS/H

# 2.2.1 Human Digestive System

Think  
Pair  
Share

## How do you test for glucose?



Add Benedict's Reagent to the food sample.

**Benedict's can be harmful.**



If there is no glucose the sample doesn't change colour.

If there is glucose the sample turns red, brown, orange, yellow or green.

- CS/F
- CS/H
- SS/F
- SS/H

# 2.2.1 Human Digestive System

Think  
Pair  
Share

How do you test for protein?

**Biuret Reagent is an irritant.**

**Wear Goggles**

If there is no protein the sample doesn't change colour.

If there is protein the sample turns purple.

The diagram shows a test tube containing a yellowish liquid. A pipette is shown adding a drop of blue liquid (Biuret reagent) to it. To the right, a beaker contains a purple liquid, indicating a positive result for protein. A large green rounded rectangle contains safety warnings: a red diamond with a black exclamation mark and a blue sign that says 'Wear Goggles' with an icon of a person wearing goggles.

- CS/F
- CS/H
- SS/F
- SS/H

# Exam Practice

L2

The chemical composition of fatbergs can be tested.

Describe how a sample from a fatberg could be tested for fat and for protein.

Test for fat Add Sudan III and shake

Positive result for fat Lipids stained red

Test for protein Add Biuret

Positive result for protein Purple colour

(4)



# Exam Practice

Four foods were tested for starch, sugar and protein.

The table shows the results.

Food	Test for starch: colour after iodine test	Test for sugar: colour after Benedict's test	Test for protein: colour after Biuret test
A	Blue-Black	Brick red	Blue
B	Orange	Blue	Lilac
C	Blue-Black	Yellow	Blue
D	Orange	Orange	Lilac

(a) Give **three** conclusions about food **D**.

1 **Doesn't contain starch**

---

2 **Contains sugar**

---

3 **Contains protein**

---

# Exam Practice

**L2**

Describe how you would test a sample of food to show it contains protein.

Give the reason for any safety precautions you would take.

---

**Grind up the food and add water to make a solution**

---

**Add biuret**

---

**Positive result: purple colour**

---

**Biuret is an irritant**

---

**Wear safety goggles**

---

---

---

---





# Exam Practice

**L3**

Describe how a student could test cow's milk to show whether it contains protein and different types of carbohydrate.

---

**Test for protein add Biuret**

---

**Positive result: purple colour**

---

---

**Test for starch: Add iodine**

---

**Positive result: blue/black colour**

---

---

**Test for glucose: Add Benedicts and heat**

---

**Positive result: red/orange/yellow/green colour**

---

**(6)**

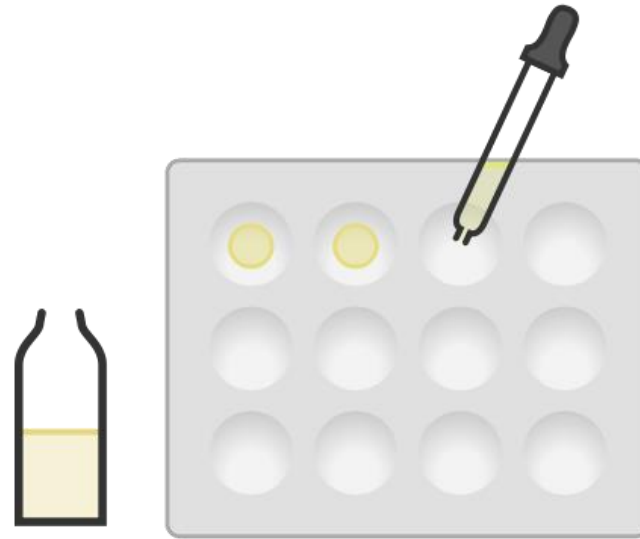


## 2.2.1 Human Digestive System

Think  
Pair  
Share

How can we investigate the effect of pH on enzyme activity?

1.  
Add a few drops of iodine solution to each dimple in a spotting tile.



CS/F

CS/H

SS/F

SS/H



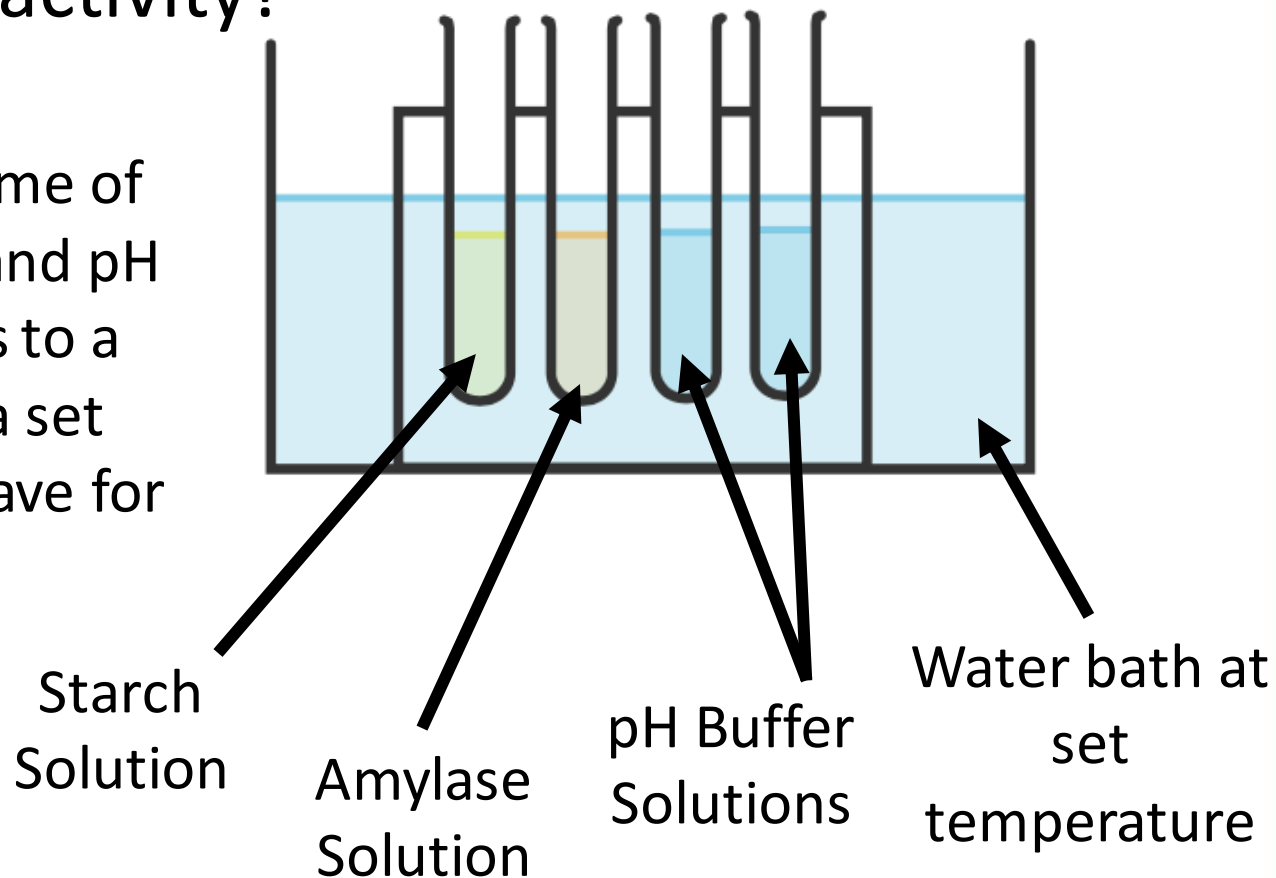
## 2.2.1 Human Digestive System

Think  
Pair  
Share

How can we investigate the effect of pH on enzyme activity?

2.

Add a fixed volume of starch, amylase and pH buffer solutions to a water bath at a set temperature. Leave for 5 minutes.



CS/F

CS/H

SS/F

SS/H



## 2.2.1 Human Digestive System

Think  
Pair  
Share

How can we investigate the effect of pH on enzyme activity?

3.

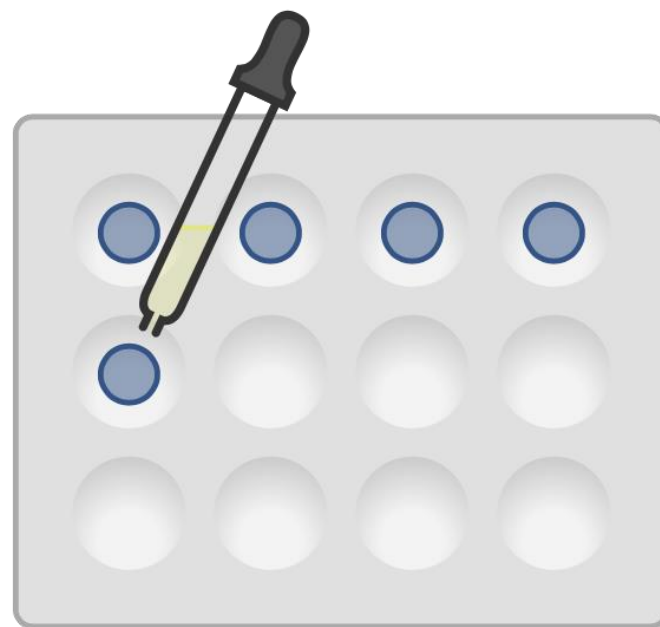
Mix the starch solution and amylase solution together.

4.

Every 30 seconds add a few drops to the spotting tile. Repeat until the iodine does not turn blue/black.

5.

Repeat for different pH's or different temperatures.



CS/F

CS/H

SS/F

SS/H

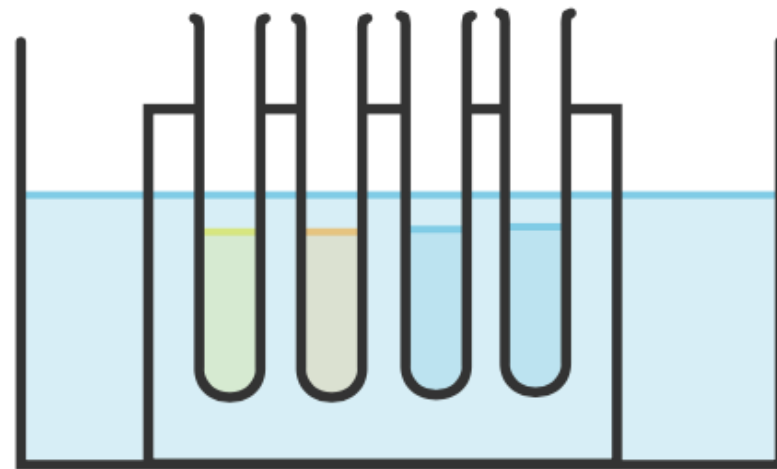
## 2.2.1 Human Digestive System

Think  
Pair  
Share

How can we investigate the effect of pH on enzyme activity?

### Why Use a Water Bath?

All the solutions we use are put into a water bath to start so that everything has a chance to equilibrate and get to the same temperature



CS/F

CS/H

SS/F

SS/H



## 2.2.1 Human Digestive System

Think

Pair

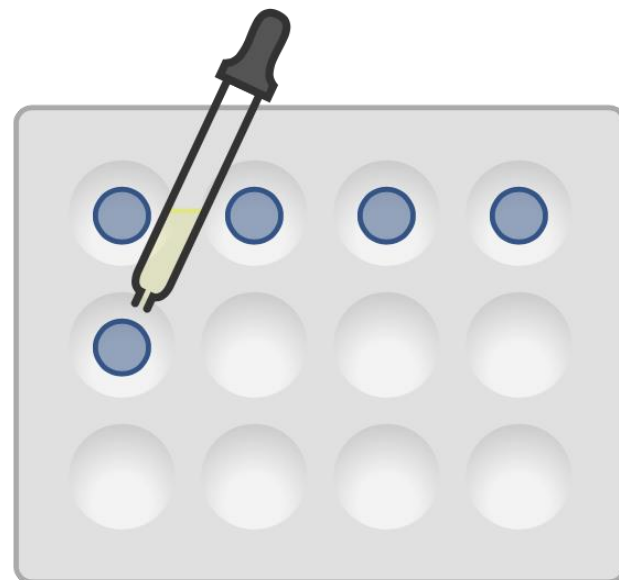
Share

How can we investigate the effect of pH on enzyme activity?

### Problems of the Method

The results of this experiment are subjective because it is someone's opinion when they think the colour has started to change blue/black.

One piece of equipment that could be used instead is a colorimeter which measures the amount of percentage of light that can pass through the solution.



CS/F

CS/H

SS/F

SS/H



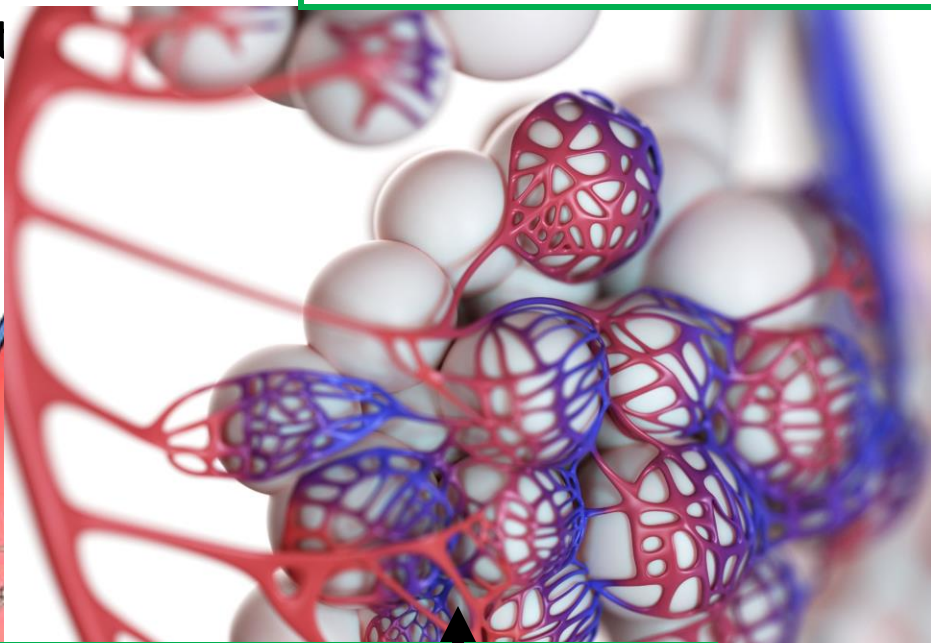
# 2.2.1 Heart and Blood Vessels

## The Lungs

### Alveoli

Little air sacs where the lungs and blood

The human **respiration** exchange oxygen and carbon dioxide pass in and out to happen.



the windpipe.  
out of the lungs

into the bronchi  
passageways in  
gs

### Capillary Network

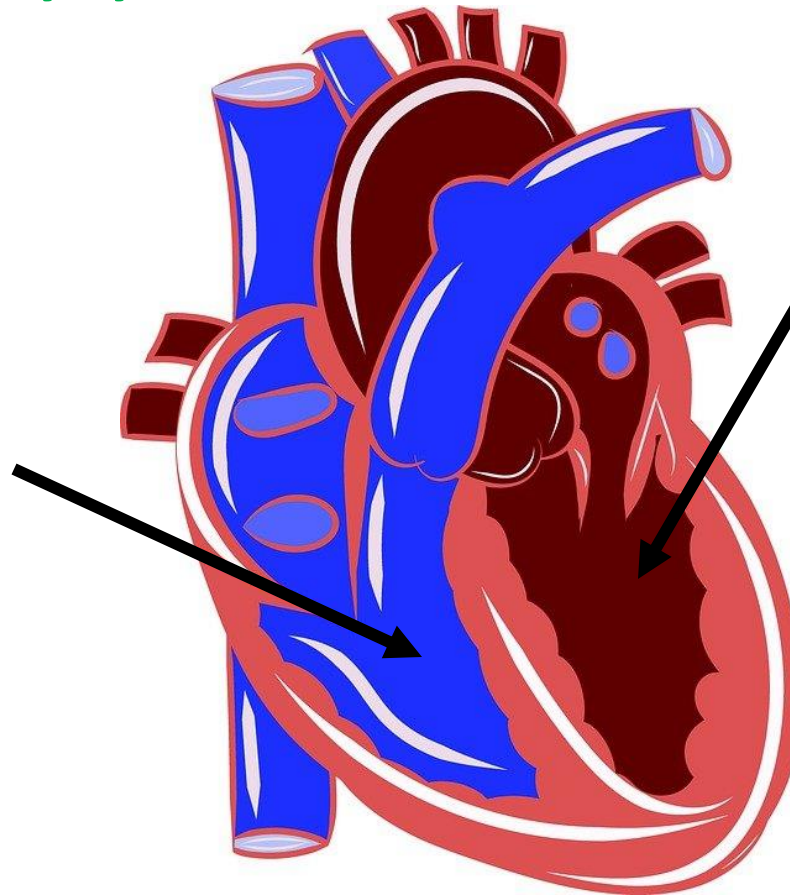
Surround each of the alveoli to provide a rich blood supply

- CS/F
- CS/H
- SS/F
- SS/H

## 2.2.1 Heart and Blood Vessels

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

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



The **left ventricle** pumps **deoxygenated** blood around the rest of the body

CS/F

CS/H

SS/F

SS/H

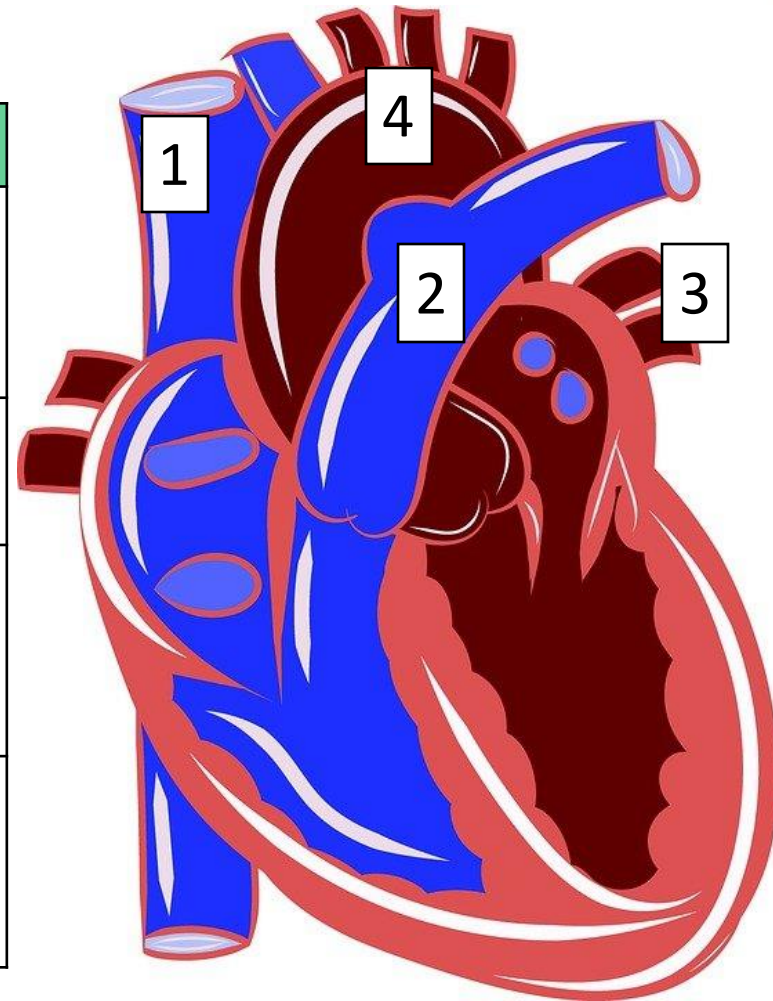




# 2.2.1 Heart and Blood Vessels

## The Heart

Blood Vessel		Function
1	Vena Cava	Vein which returns blood from the head, neck and upper limbs
2	Pulmonary Artery	Transports deoxygenated blood to the lungs
3	Pulmonary Vein	Transports oxygenated blood from the lungs back to the heart.
4	Aorta	Artery that carries blood from the heart to the rest of the body



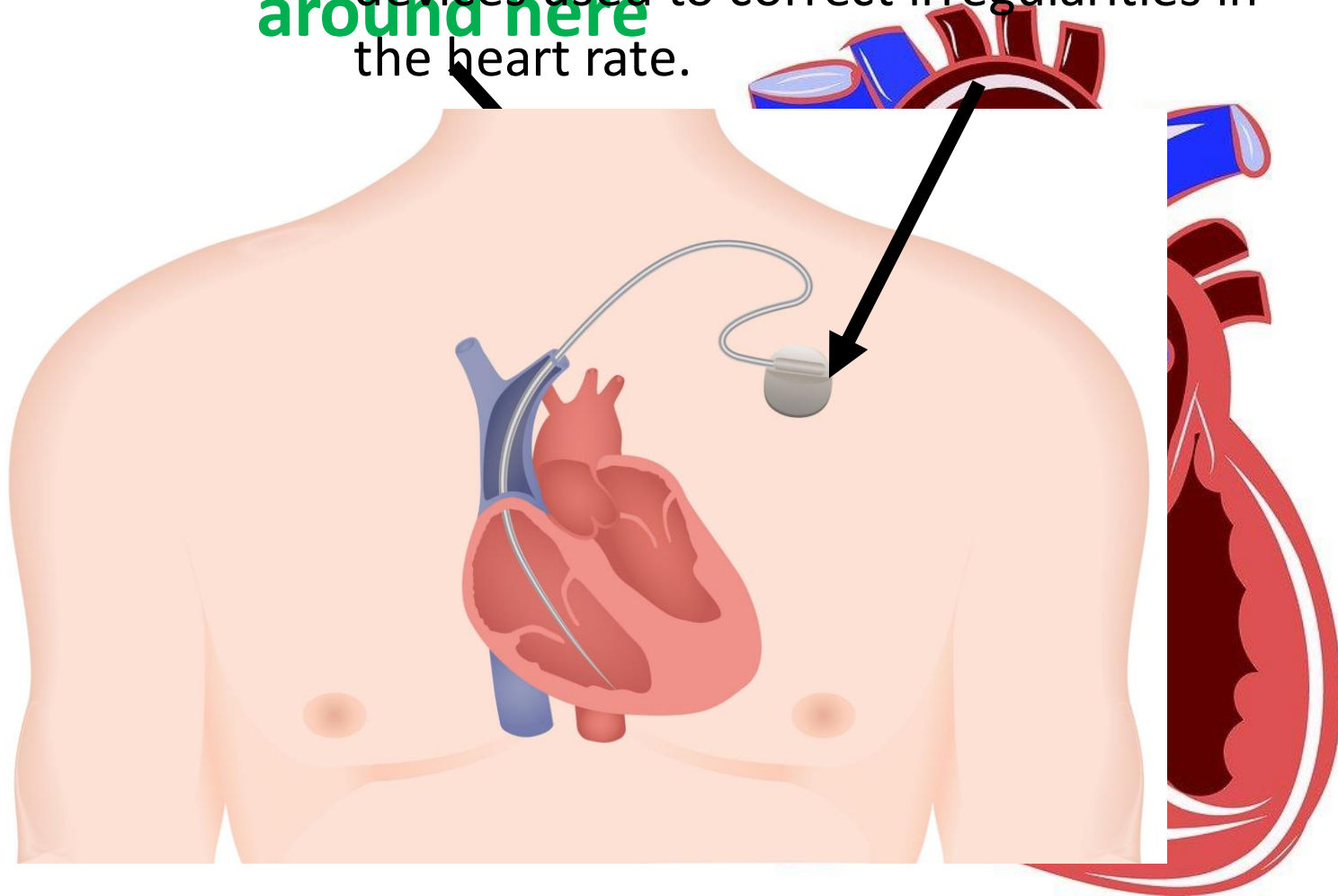
# 2.2.1 Heart and Blood Vessels

## The Heart

Artificial pacemakers are electrical devices used to correct irregularities in the heart rate.

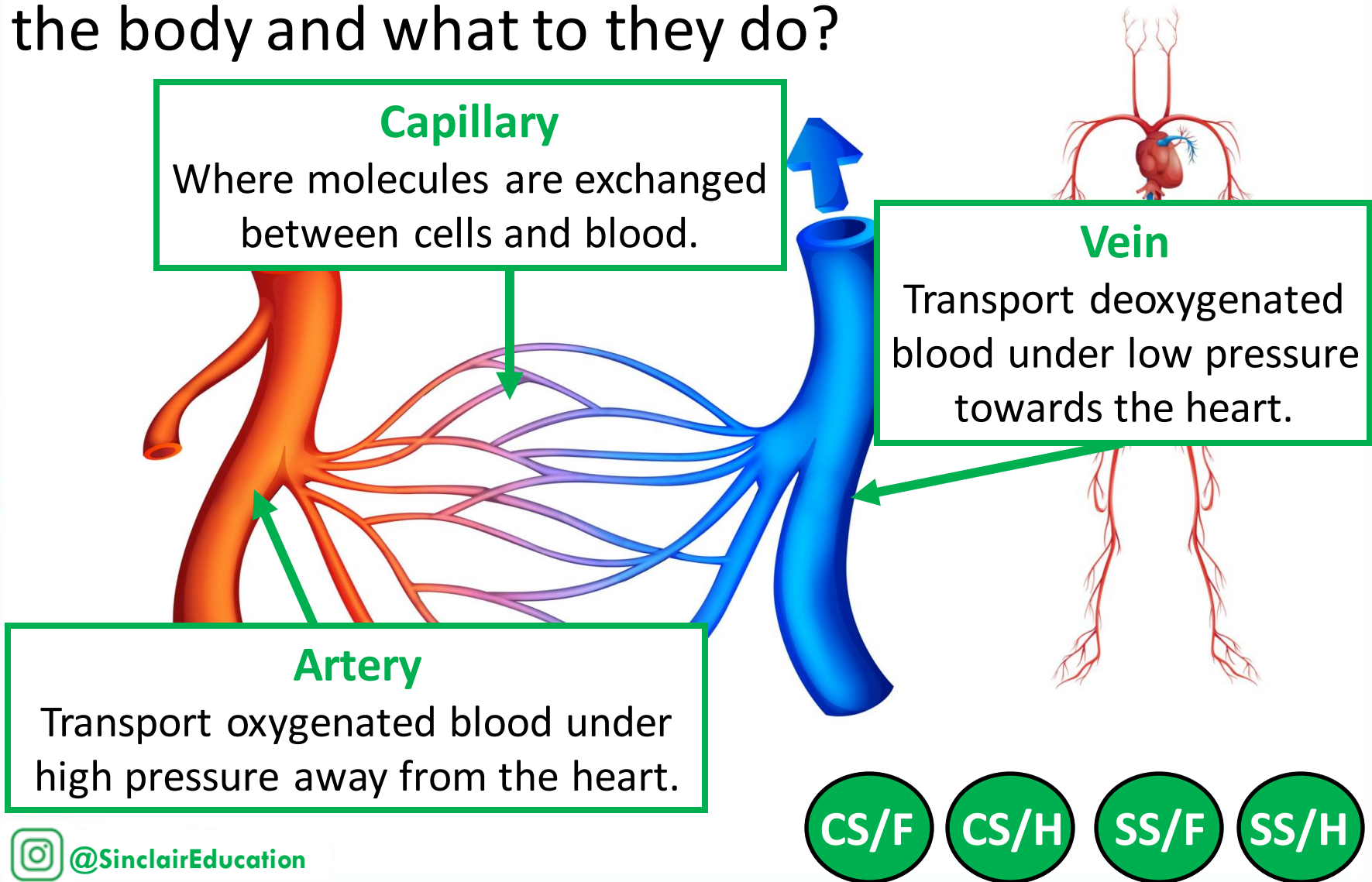
Pacemakers are located around here

- The natural pacemaker is located in the right atrium and act as a



# 2.2.1 Heart and Blood Vessels

What are the different types of blood vessels in the body and what do they do?



# 2.2.1 Heart and Blood Vessels

Function and adaptations of different blood vessels.

Blood Vessel	Function	Structure
Artery		

Artery



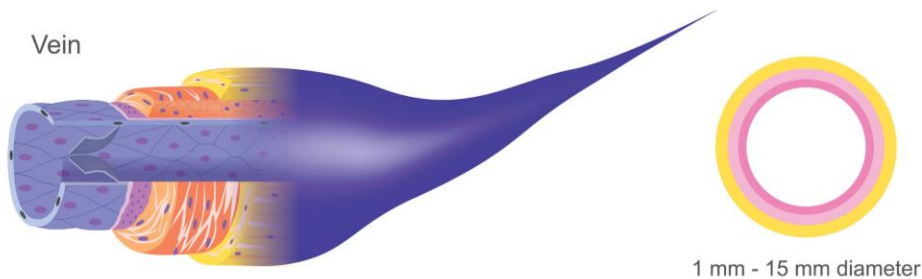
0.1 mm - 10 mm diameter



# 2.2.1 Heart and Blood Vessels

Function and adaptations of different blood vessels.

Blood Vessel	Function	Structure
Vein		



- CS/F
- CS/H
- SS/F
- SS/H

# 2.2.1 Heart and Blood Vessels

Function and adaptations of different blood vessels.

Blood Vessel	Function	Structure
Capillary		

Capillary



5 - 10 micron ( $\mu\text{m}$ ) diameter



## Exam Practice

L3

(c) The diagram below shows part of the lungs.

There are many alveoli in the lungs.

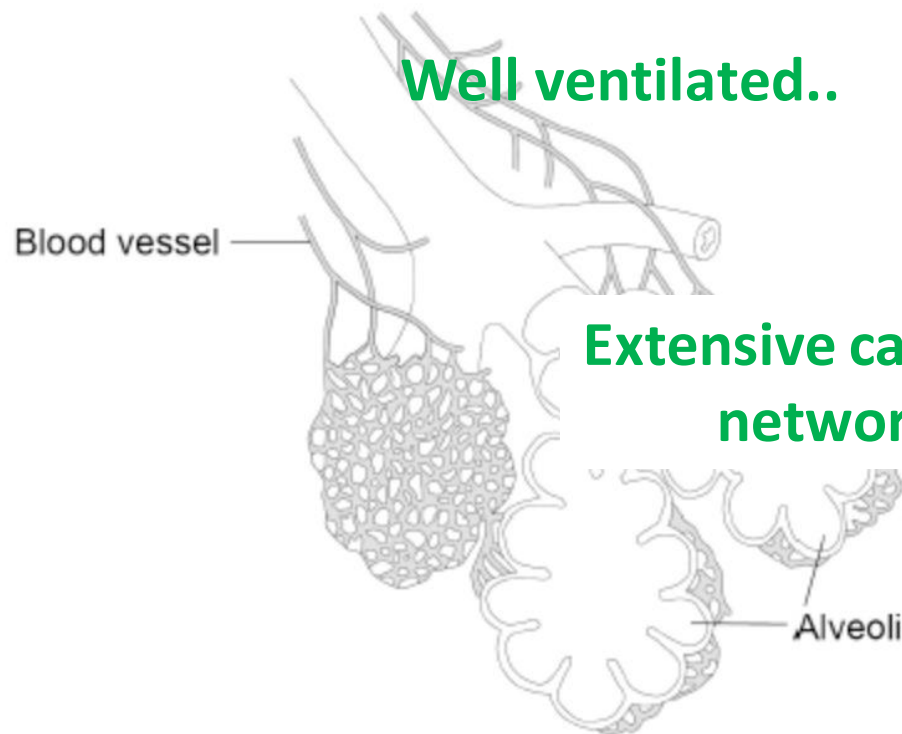
Alveoli provide a large surface area for gas exchange.

Thin wall..

..short diffusion pathway

Well ventilated..

..maintain steep concentration gradient



Explain how **two** other adaptations of the alveoli allow efficient gas exchange.

Do **not** refer to surface area in your answer.

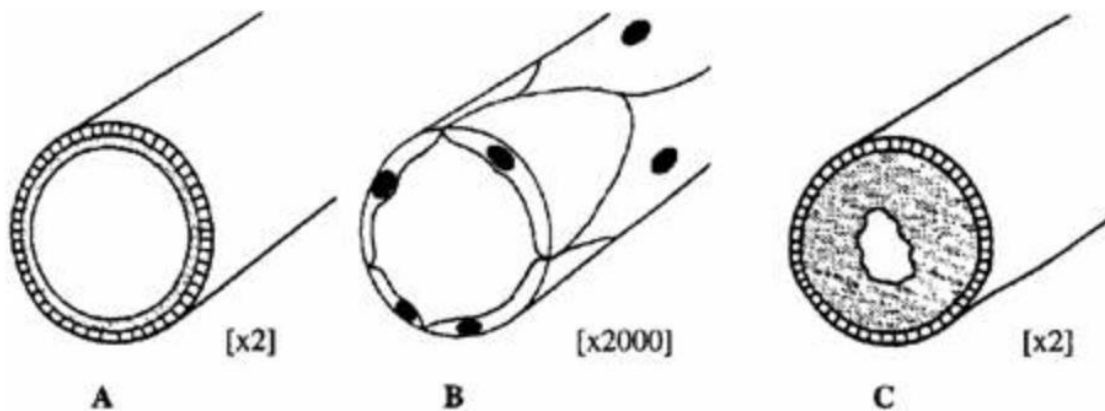




# Exam Practice

L2

The drawings show the structure of three types of blood vessel, **A**, **B** and **C**. They are drawn to the scales indicated.



Describe the job of blood vessel **B**.

**Named substance diffuses (e.g. oxygen, carbon dioxide, glucose)**

**Between blood and tissue**



# Exam Practice

L2

Arteries and veins have different structures and different functions.

Explain how the different structure of arteries and veins relates to their different functions.

_____	<b>Level 3:</b> Relevant points (differences / functions) are identified, given in detail and linked logically to form a clear account.	5-6
_____	<b>Level 2:</b> Relevant points (differences / functions) are identified and there are attempts at logical linking. The resulting account is not fully clear.	3-4
_____	<b>Level 1:</b> Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.	1-2

- Artery transports blood away from the heart.
- Thicker wall..to withstand higher pressure
- Thicker elastic tissue..to stretch..and to return to original shape
- Vein transports blood towards the heart.
- Has valves..to prevent backflow



# Exam Practice

L3

Describe how the structure of an artery is different from the structure of a vein.

**Artery doesn't have valves**

---

**Artery has thicker walls/smaller lumen**

---

---

---

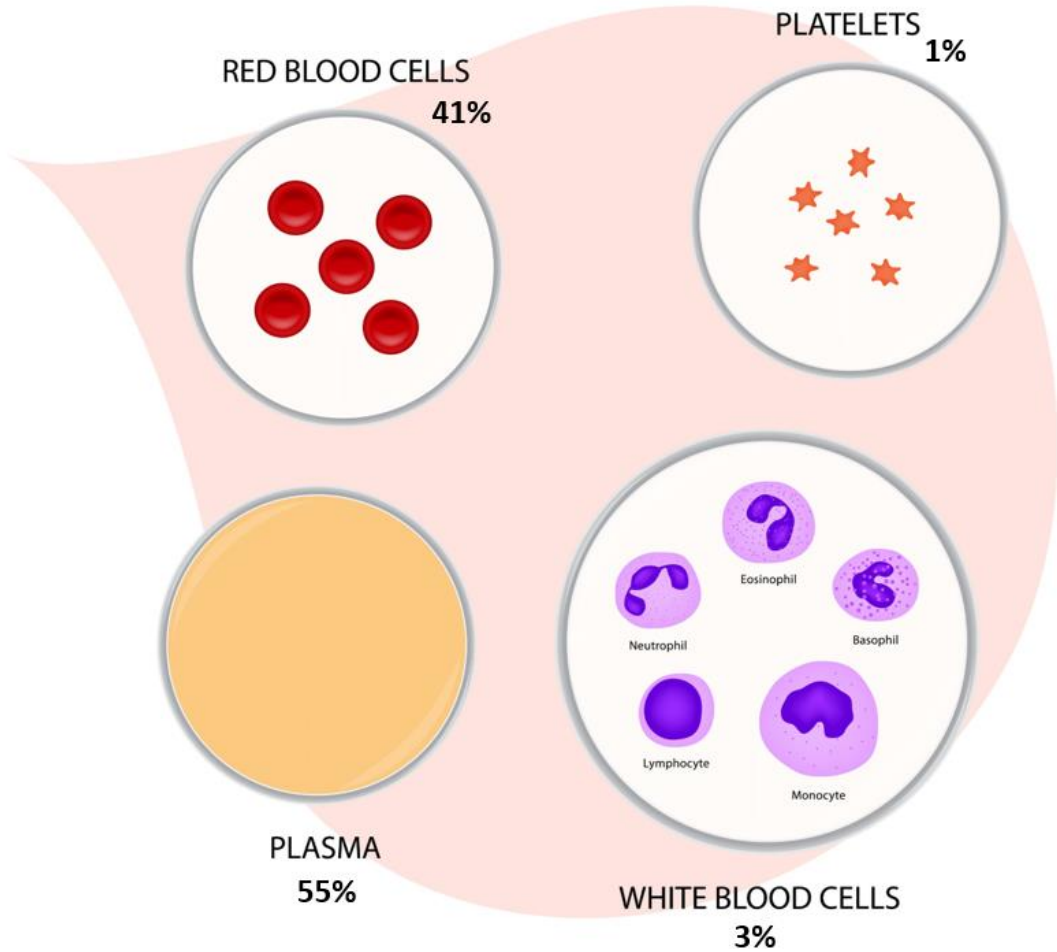
---

(2)

# 2.2.3 Blood

Blood is  
white blood cells,

<b>Blood</b>
Red
White
Plasma
Fibrinogen



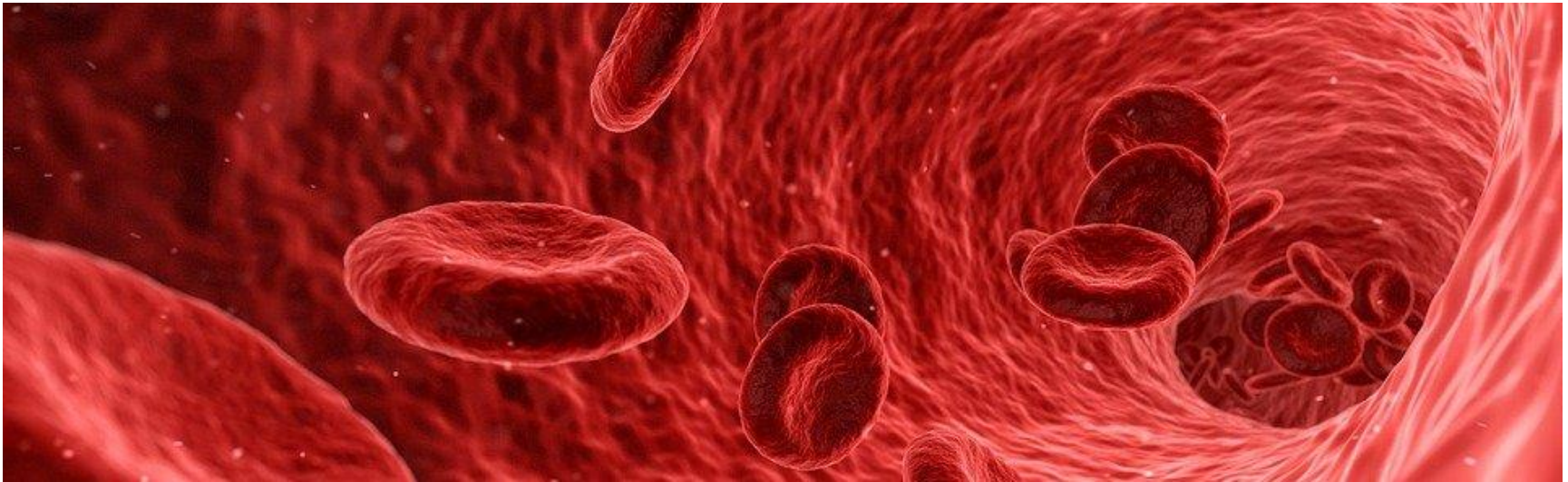
cells,


CS/F CS/H SS/F SS/H

## 2.2.3 Blood

Red blood cells have several adaptations for the transport of oxygen:

- Contain haemoglobin which combines with oxygen.
- Have no nucleus to contain more haemoglobin
- Biconcave shape to maximise their surface area
- Thin red blood cells with thin cell membranes for quicker diffusion of gases.



CS/F

CS/H

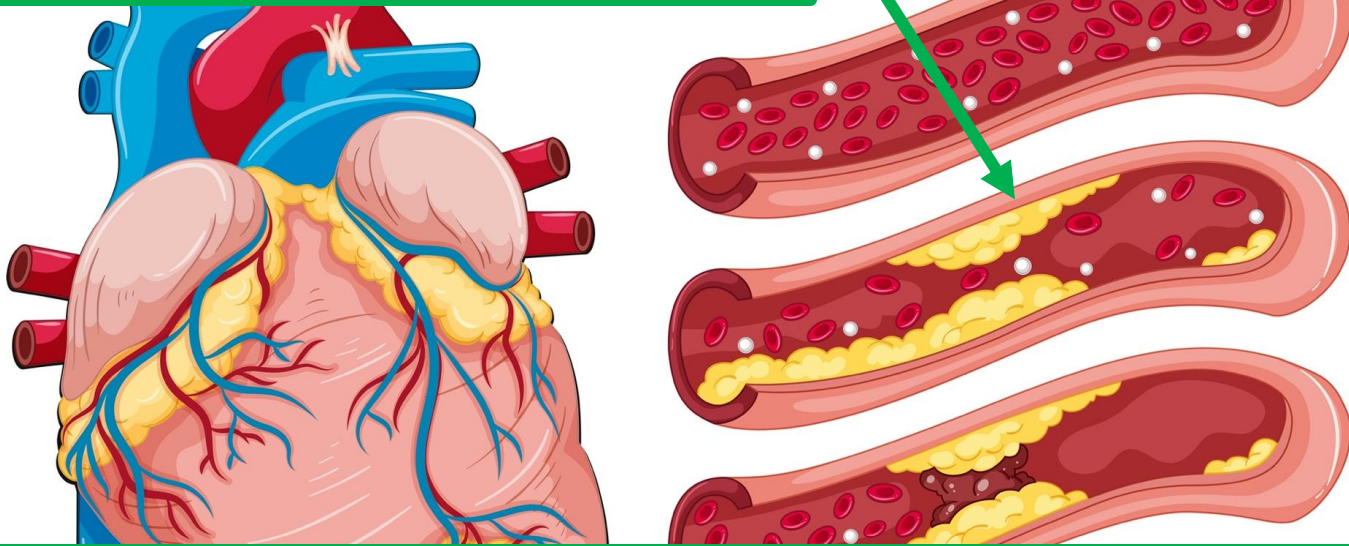
SS/F

SS/H



## 2.2.4 Coronary Heart Disease

In coronary heart disease layers of fatty material build up inside the coronary arteries, narrowing them.



This reduces the flow of blood through the coronary arteries, resulting in a lack of oxygen for the heart muscle.

CS/F

CS/H

SS/F

SS/H



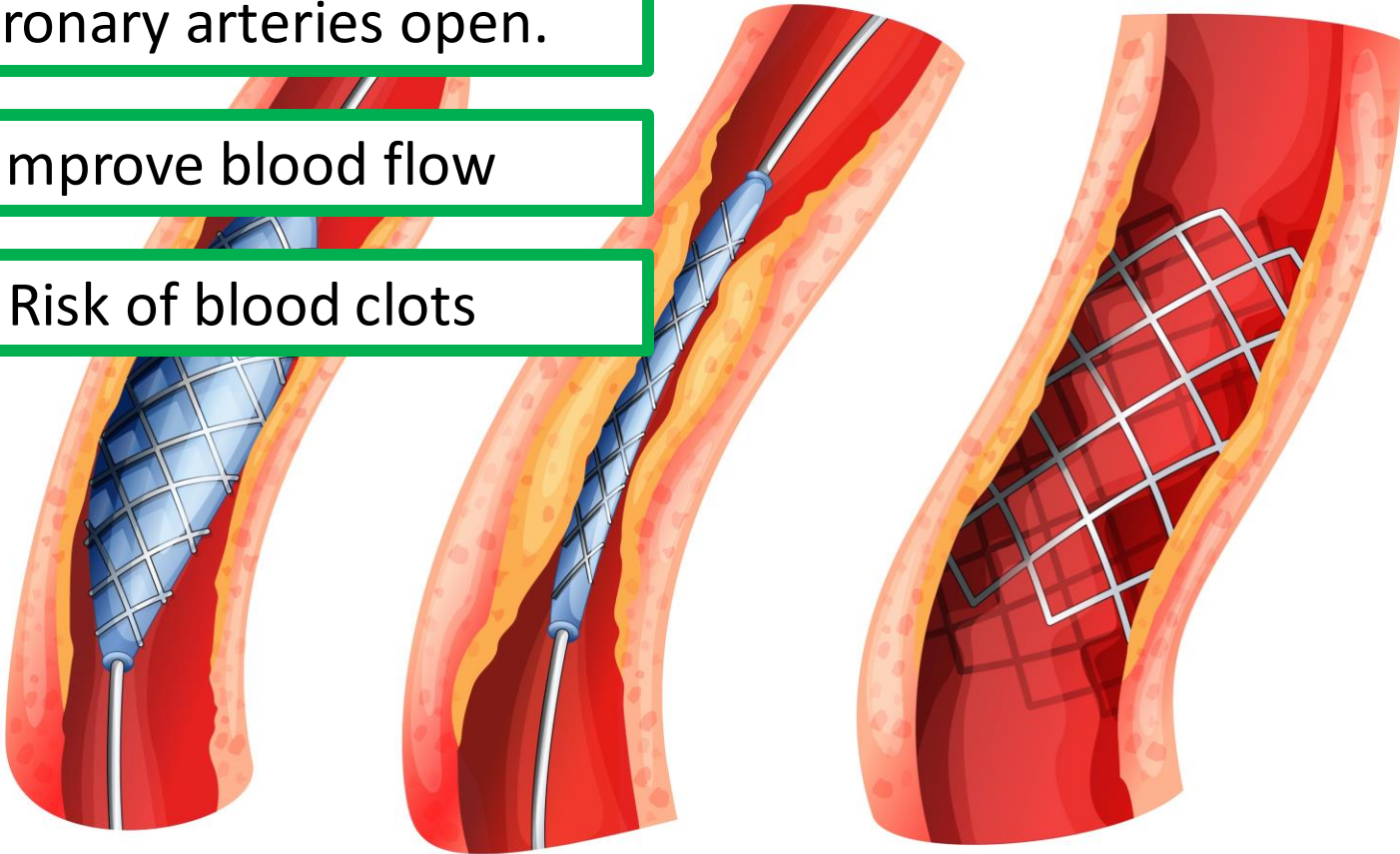


## 2.2.4 Coronary Heart Disease

Stents are used to keep the coronary arteries open.

Improve blood flow

Risk of blood clots



CS/F

CS/H

SS/F

SS/H



## 2.2.4 Coronary Heart Disease

Treatment	Description	Advantages	Disadvantages
Statins			
Artificial Hearts			
Heart Transplant			
Mechanical Valve			

## 2.2.5 Health Issues

Key Term	Definition
Health	
Pathogen	
Cancer	
Non-Communicable Disease	
Communicable Disease	



## 2.2.5 Health Issues

Diseases are major causes of ill health.

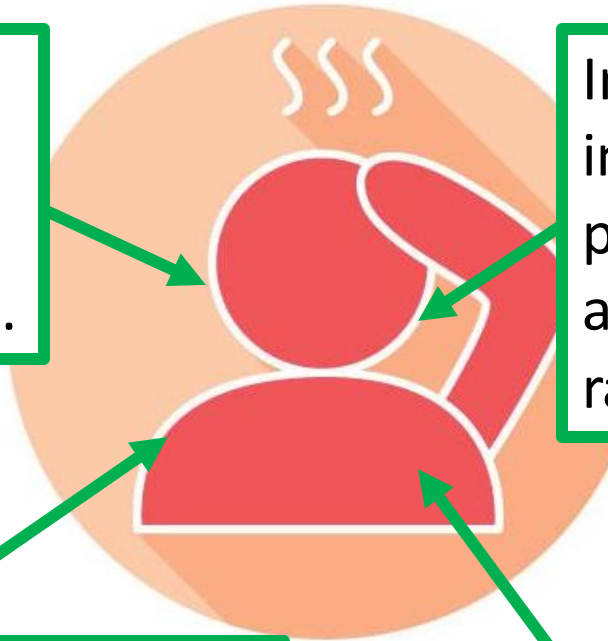
Diet, stress and life situations all affect health

Severe physical ill health can lead to depression and other mental illness.

Immune reactions initially caused by a pathogen can trigger allergies such as skin rashes and asthma.

Defects in the immune system mean that an individual is more likely to suffer from infectious diseases.

Viruses living in cells can be the trigger for cancers.



## 2.2.6 Lifestyle

Lifestyle Factor	The Effect It Has on Health
Diet	
Alcohol	
Smoking	

## 2.2.6 Lifestyle

Non-Communicable Disease	Risk Factors
Cardiovascular System	
Type 2 Diabetes	
Cancer	



## 2.2.6 Lifestyle

Think  
Pair  
Share

How does smoking affect pregnancy?

Affects development

Increased risk of cot death.

Increased risk of respiratory illnesses such as bronchitis and pneumonia

Increase risk of miscarriage

Low birth weight

## 2.2.6 Lifestyle

Think  
Pair  
Share

How does alcohol effect conception and pregnancy?

Increased risk of ovulation problems.

Facial proble

The alcohol diffuses into the baby's bloodstream through the **placenta** and damages the developing organs and nervous system.

Alcohol reduces fertility and makes conception less likely

Increase risk of age

ie risk of birth

Reduces the amount of sperm a male produces.

1 weight

CS/F

CS/H

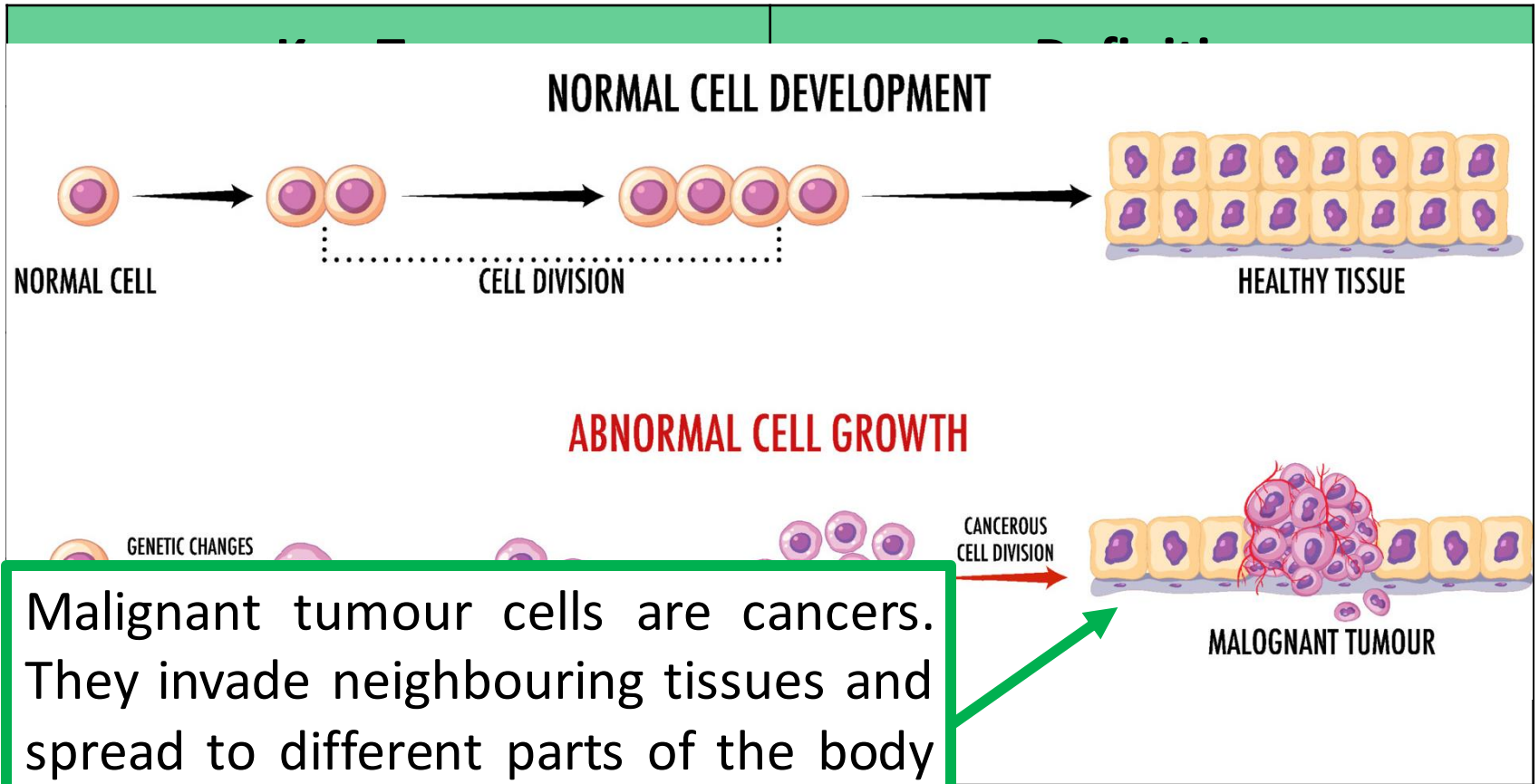
SS/F

SS/H



# 2.2.7 Cancer

Benign tumours do not spread to other parts of the body.



Malignant tumour cells are cancers. They invade neighbouring tissues and spread to different parts of the body in the blood where they form secondary tumours.

- CS/F
- CS/H
- SS/F
- SS/H

# Exam Practice

L2

The number of people in the UK with tumours is increasing.

- (a) (i) Describe how tumours form.

- **Abnormal division of cells** \_\_\_\_\_

\_\_\_\_\_

(1)

- (ii) Tumours can be malignant or benign.

What is the difference between a malignant tumour and a benign tumour?

- **Benign tumours do not spread** \_\_\_\_\_

\_\_\_\_\_

(1)

- (b) Describe how some tumours may spread to other parts of the body.

— \_\_\_\_\_

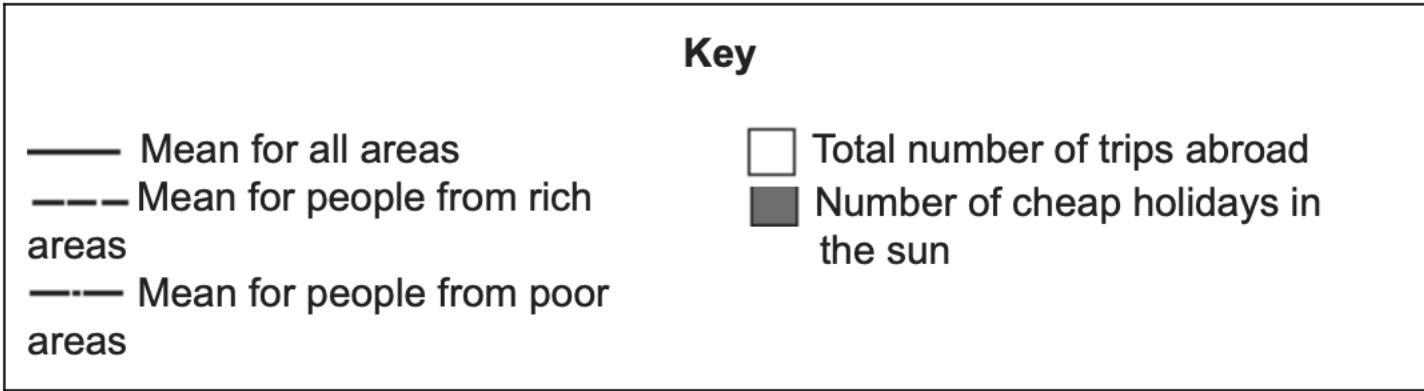
**Blood** \_\_\_\_\_

— \_\_\_\_\_

(1)

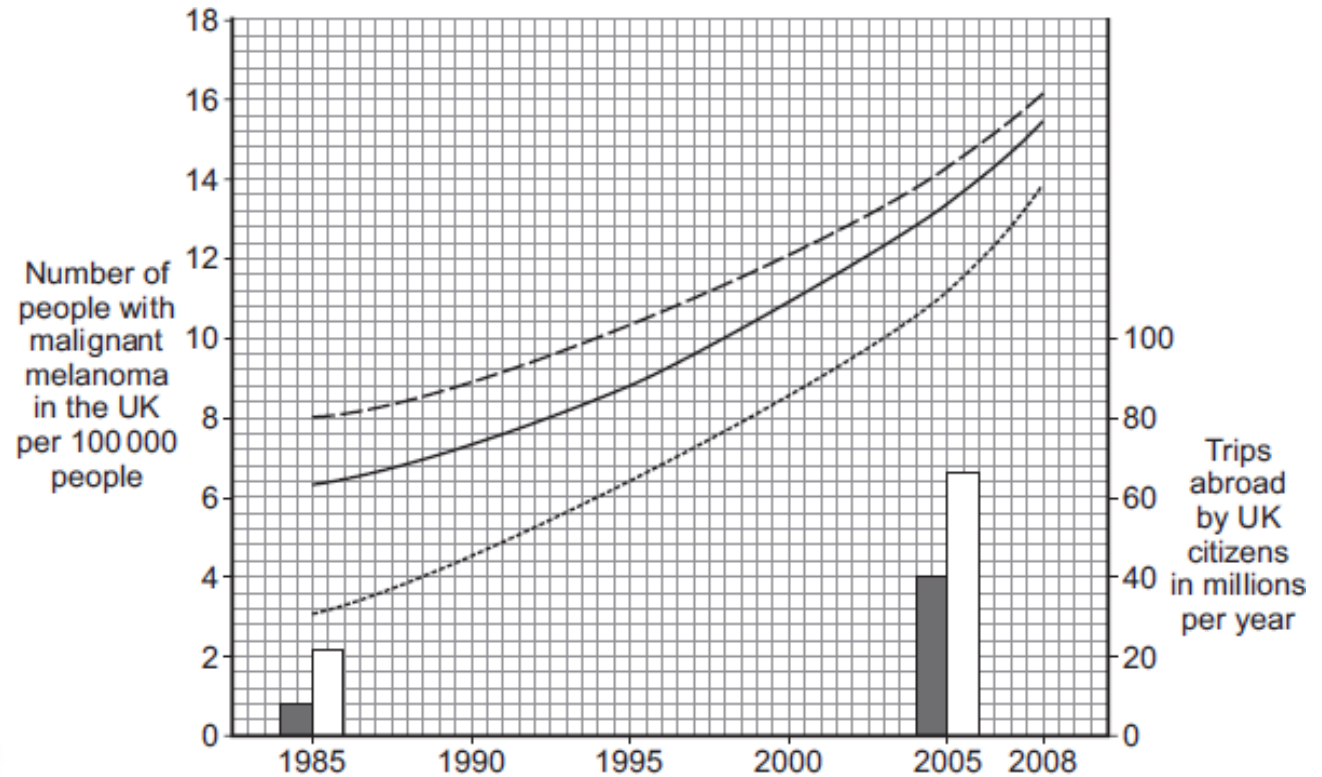


# Exam Practice



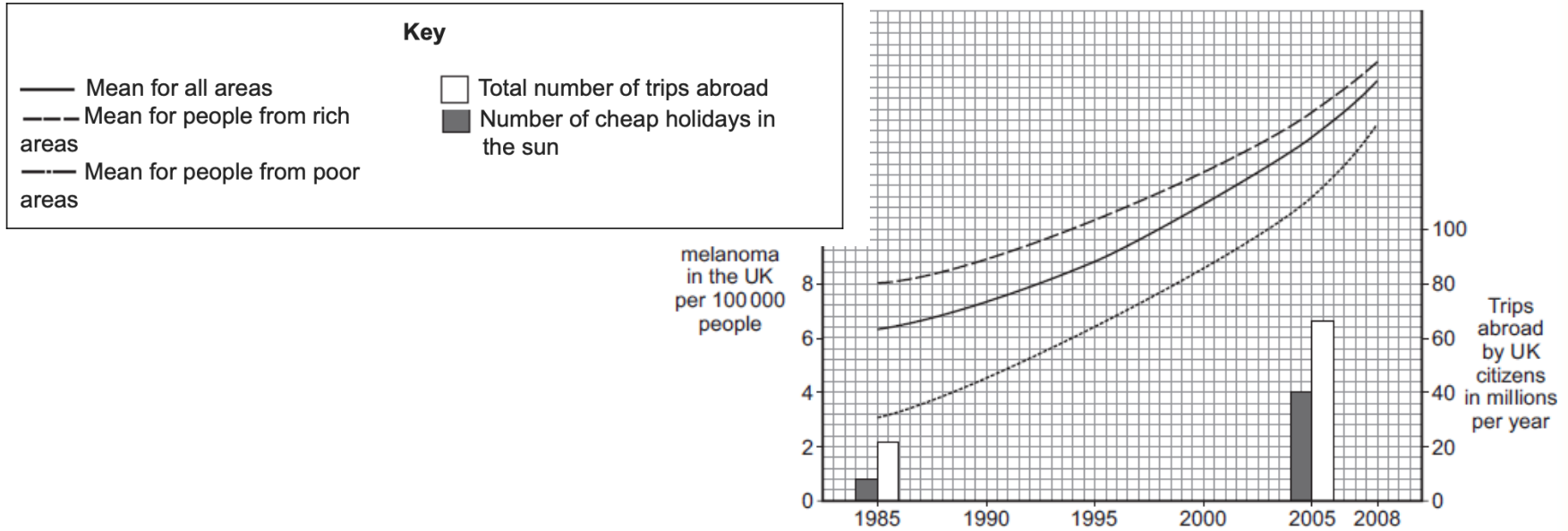
10ma

nd





# Exam Practice



Describe the trends in the number of people with malignant melanoma skin cancer between 1985 and 2008.

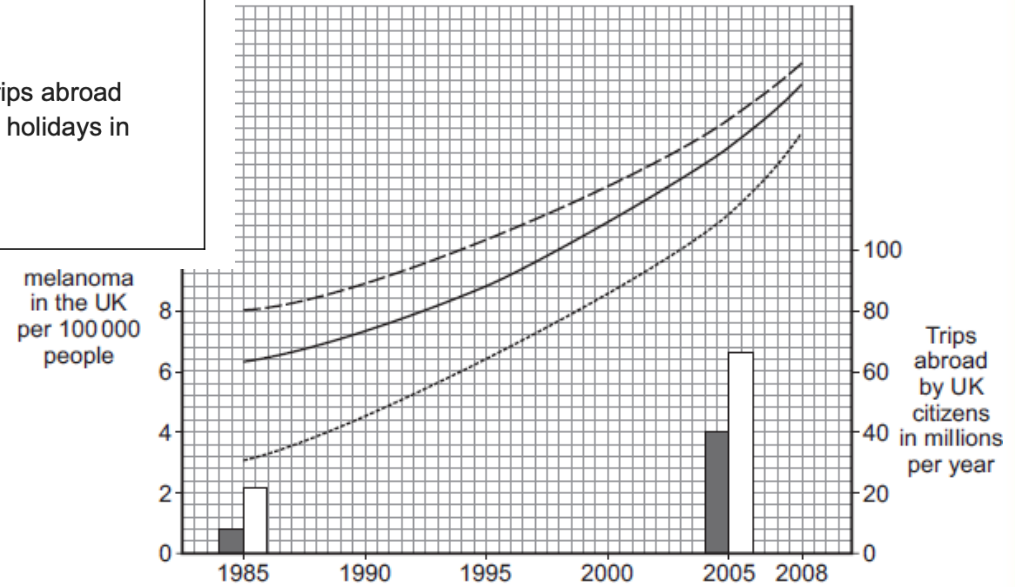
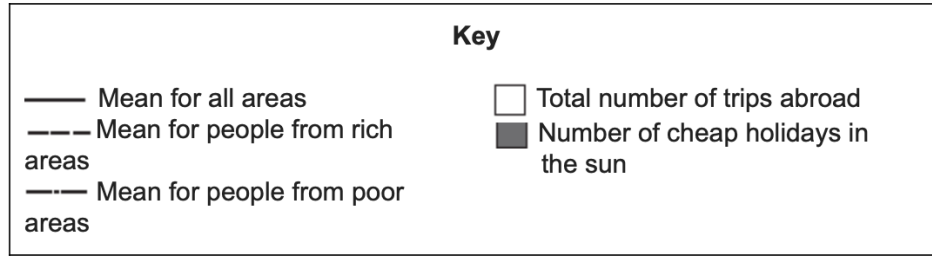
**Incidence is increasing..** \_\_\_\_\_

**..more rapidly in more recent years** —

**Difference between rich and poor is getting less**

# Exam Practice

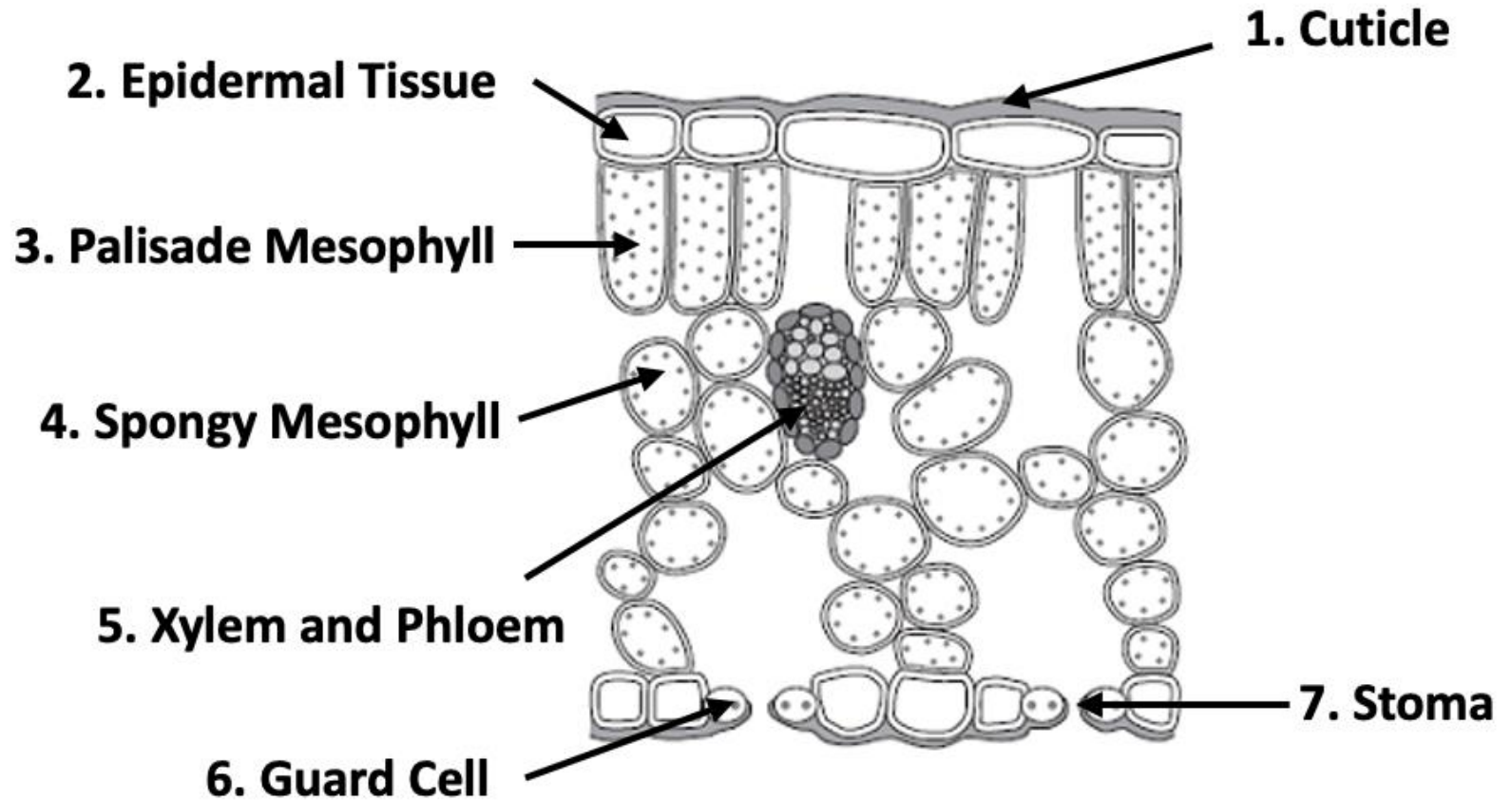
L2



Use the data about the number of trips abroad to suggest an explanation for the trends you have described in part (c)(i).

- **UV is a risk factor** \_\_\_\_\_
- **More people are having sunny holidays** \_\_\_\_\_
- \_\_\_\_\_

# 2.3.1 Plant Tissues



## 2.3.1 Plant Tissues

Plant Tissue	Function
Epidermal	
Palisade Mesophyll	
Spongy Mesophyll	
Xylem	
Phloem	
Meristem Tissue	



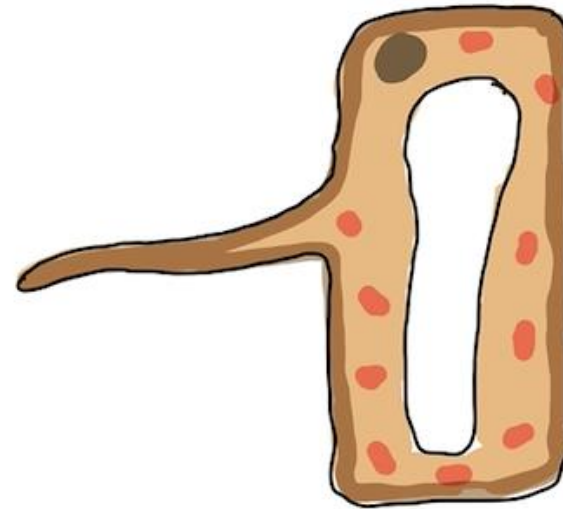
## 2.3.2 Plant Organ Systems

Cells may be specialised to carry out a particular function:

### Root Hair Cell

Large surface area for increased absorption.

Lots of mitochondria to provide energy for active transport



**Function** Absorb water and dissolved mineral ions.

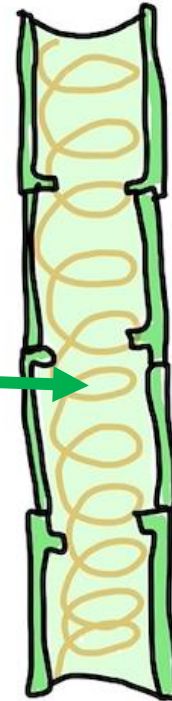
## 2.3.2 Plant Organ Systems

Cells may be specialised to carry out a particular function:

### Xylem

Hollow tube to allow more water to travel through.

Spirals of lignin to make it strong to withstand the pressure of water moving through.



**Function** Transports water.

CS/F

CS/H

SS/F

SS/H



## 2.3.2 Plant Organ Systems

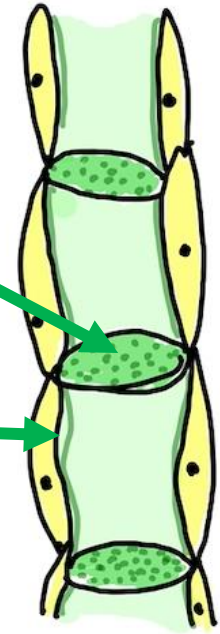
Cells may be specialised to carry out a particular function:

### Phloem

Lose internal structure for more space.

Have sieve plates to allow water carrying dissolved sugars to move freely.

Have companion cells to help keep them alive.



**Function** Transports sugars.

CS/F

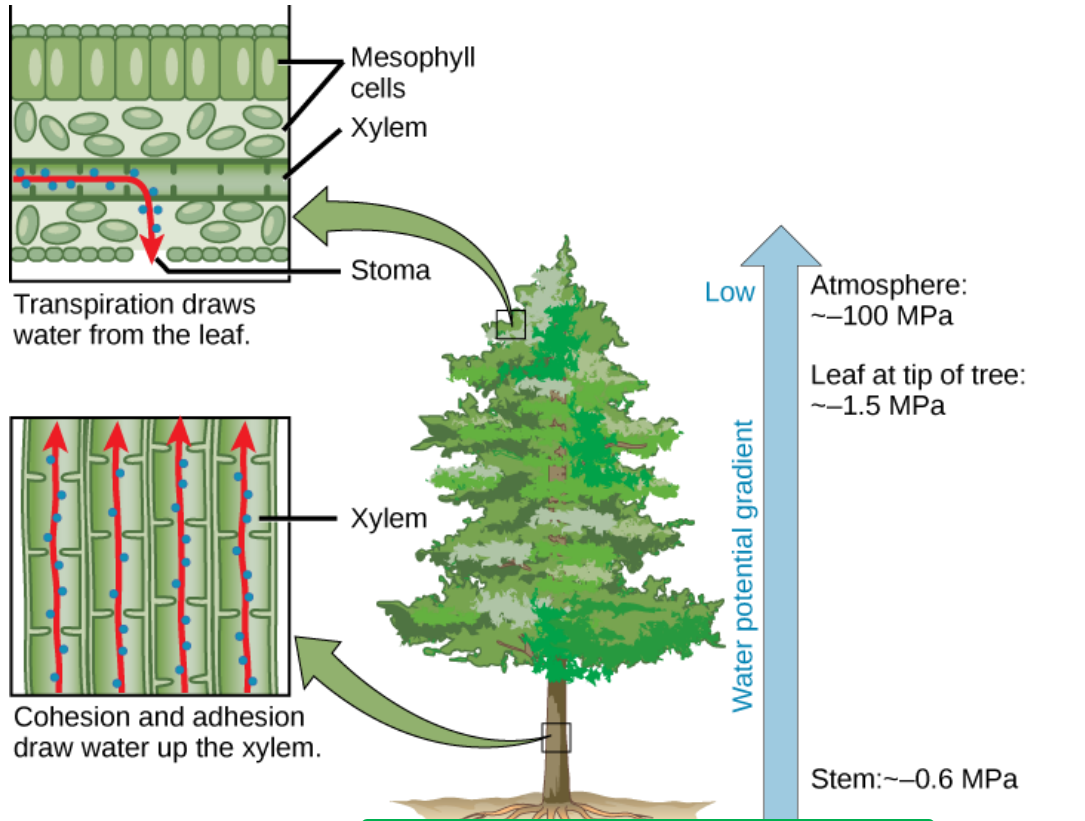
CS/H

SS/F

SS/H



# 2.3.2 Plant Organ Systems



The hotter it is, the faster the rate of transpiration as evaporation occurs faster.

The greater the wind intensity the faster the rate of transpirations as evaporation occurs faster.

When humidity is higher the rate of transpiration is slower.

When light intensity is higher the rate of transpiration is faster. This is because light causes the stomata to open.

CS/F

CS/H

SS/F

SS/H