



PiXL KnowIT!

GCSE Biology

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AQA Topic – Organisation

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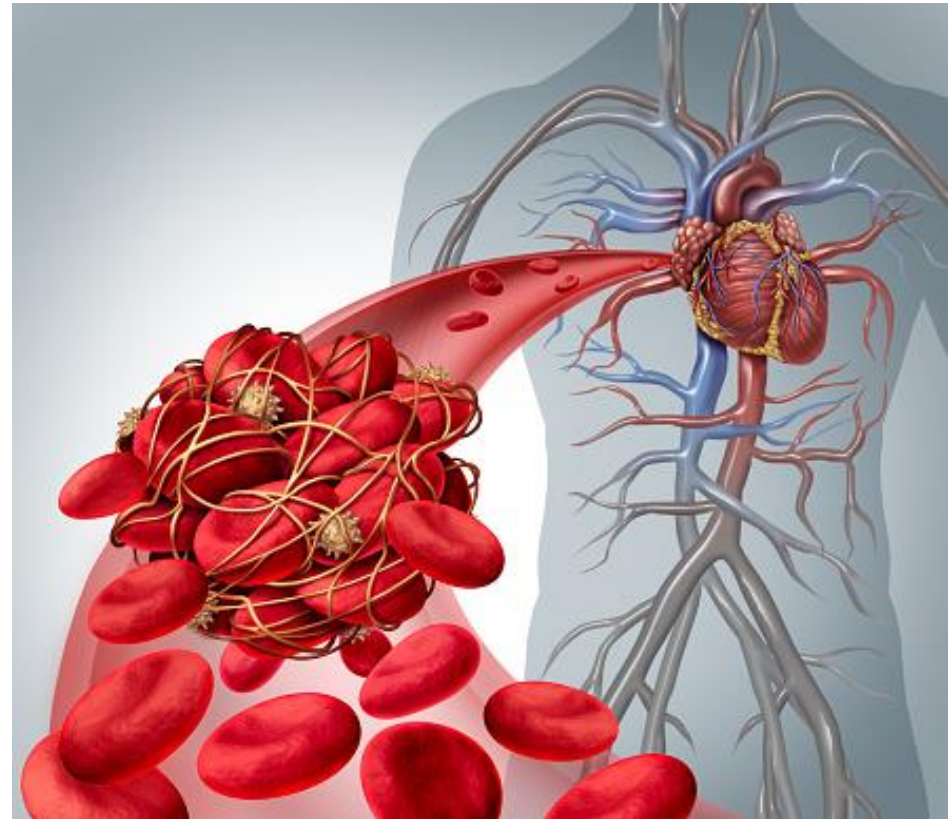
Principles of organisation

Animal tissues, organs and organ systems

- The human digestive system
- Enzymes
- The heart and blood vessels
- Blood
- Coronary heart disease: a non-communicable disease
- Health issues
- The effect of lifestyle on some non-communicable diseases
- Cancer

Plant tissues, organs and systems

- Plant tissues
- Plant organ system



largest

organism

A group of organ systems working together.

e.g. human, frog, oak tree, orchid



organ system

A group of organs working together to perform a specific function.

e.g. digestive system, respiratory system, root system, shoot system



organ

A group of tissues working together to perform a specific function.

e.g. heart, stomach, leaf, flower



tissue

A group of similar cells with a similar structure and function.

e.g. muscle tissue, blood, xylem, phloem



cell

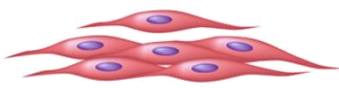
The smallest structural and functional unit of an organism.

e.g. nerve, epithelial, palisade, root hair

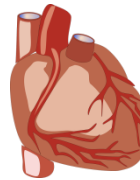


smallest

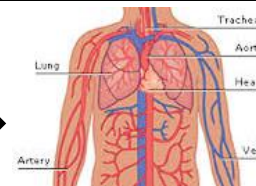
muscle cell



muscle tissue



heart



circulatory system



human

[Video - Organisation in Plants](#)

QuestionIT!

Principles of
organisation



1. Put the following in order of size from the smallest to the largest:

organ organism cell tissue organ system

2. Define each of the words in the box.

AnswerIT!

Principles of
organisation



1. Put the following in order of size from the smallest to the largest:

organ organism cell tissue organ system

cell → tissue → organ → organ system → organism

2. Define each of the words in the box.

Organism - A group of organ systems working together.

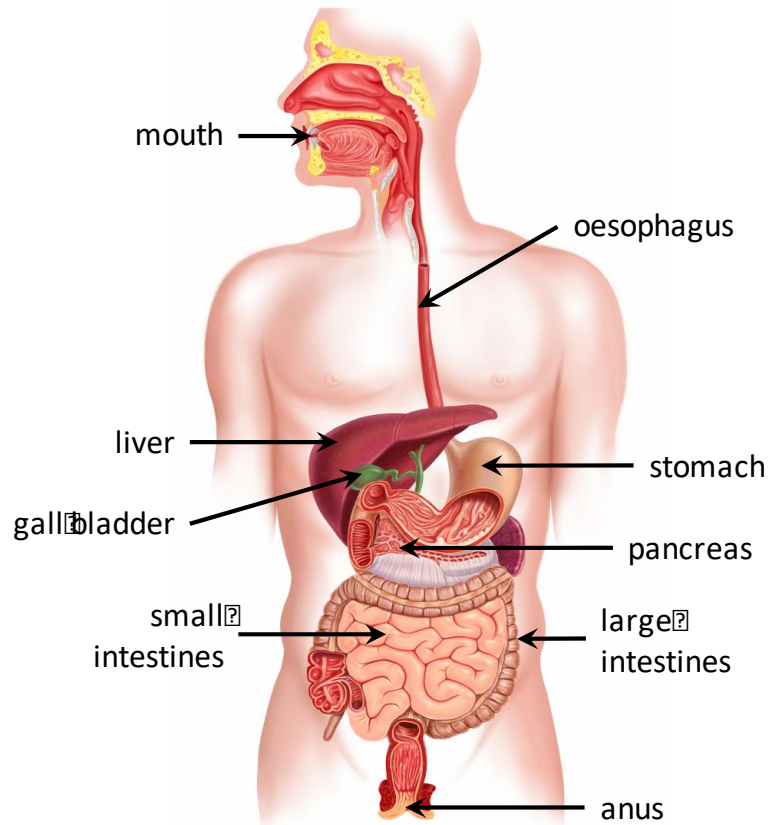
Organ system - A group of organs working together to perform a specific function.

Organ - A group of tissues working together to perform a specific function.

Tissue - A group of similar cells with a similar structure and function.

Cell - The smallest structural and functional unit of an organism.

The **digestive system** is an example of an **organ system** where **different** organs **work together** to digest and absorb food.



Digestion is where **large insoluble molecules** are **broken down** into **smaller soluble ones that can be absorbed into the bloodstream**. Digestion occurs in the **GUT** (tube from the mouth to the anus) and it relies on **ENZYMES** (biological catalysts).

[Activity - Digestive Enzymes](#)

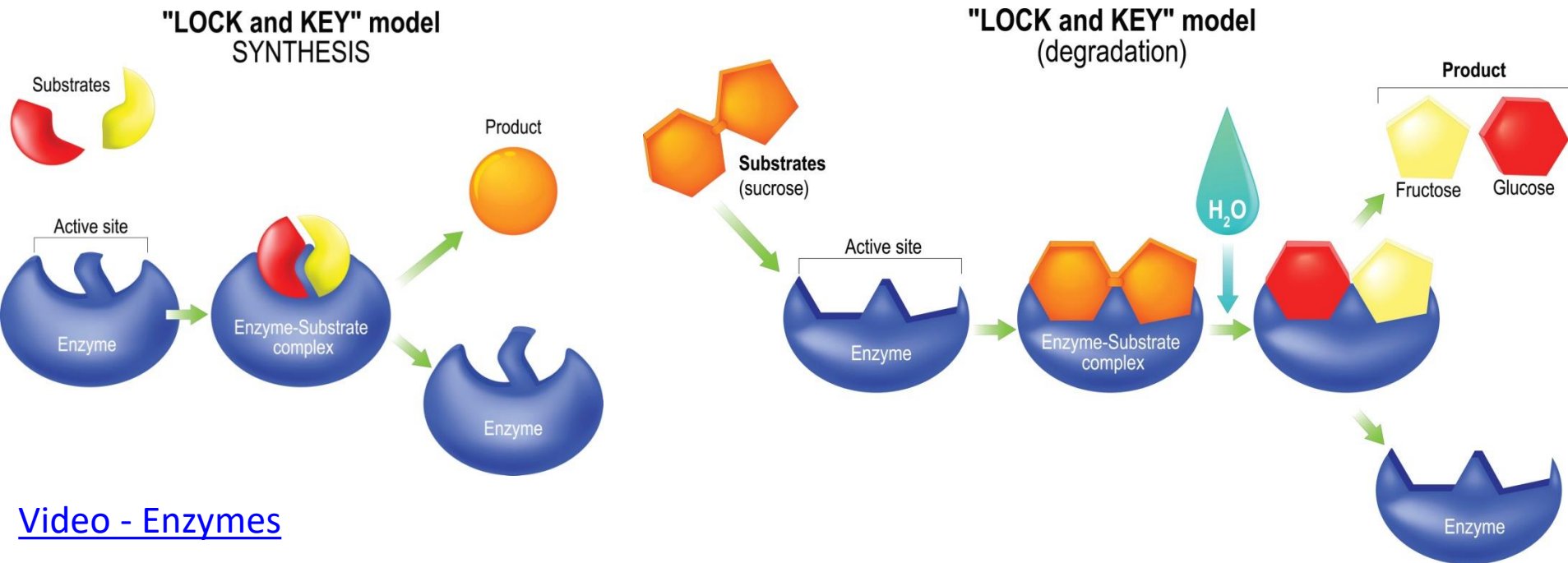
Digestive Enzyme	Where released?	Breakdown what?
Amylase	Salivary glands and pancreas	Carbohydrates into simple sugars
Protease	Stomach and pancreas	Proteins into amino acids
Lipase	Pancreas	Fats and oils (lipids) into fatty acids and glycerol

[Video - Digestion and Enzymes](#)

[PiXL - Required Practical Guide Food Tests](#)

'Lock and Key theory' – is a **model** to explain **enzyme action**

Enzymes are made of **proteins** and are **biological catalysts** - substances that **increase** the rate of **chemical reactions** without being **used up**. The shape of the **active site** of the enzyme is specific for each substrate (substance the enzyme acts on).



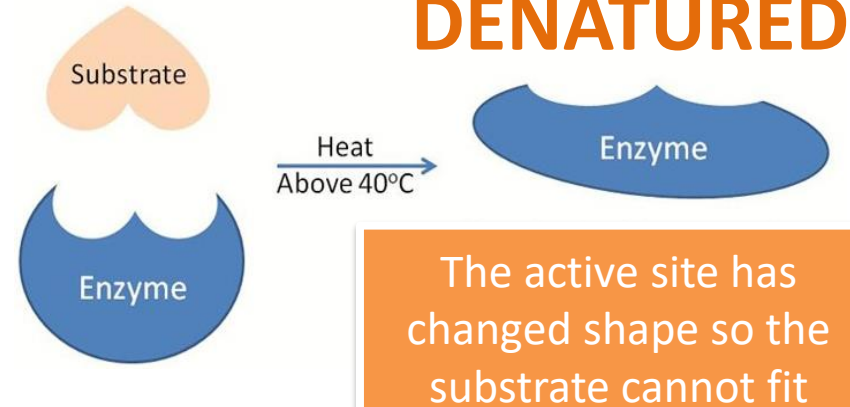
[Video - Enzymes](#)

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

[PiXL - Required Practical Guides - Enzymes](#)

Enzyme activity is affected by **temperature** and by **pH**. Specific conditions are needed to keep enzymes working at their best. **OPTIMUM CONDITIONS!** Enzymes **control** the chemical reactions in the body this is known as **metabolism**.

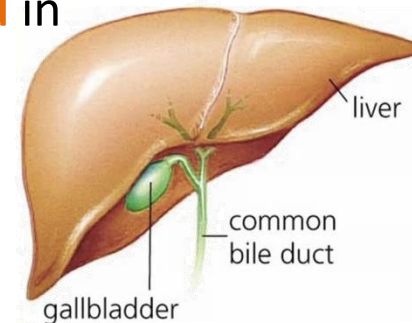
In enzyme reactions, **increasing the temperature** will initially increase the **rate of reaction** due to increased **collisions** between the enzyme and substrates. **BUT** if the **temperature** is **too high** the **enzyme** will **denature** (NB: denature NOT die/killed)



Digestion and pH. The **stomach** releases acid. The enzymes made in the **stomach** work best in **acidic** conditions. The **enzymes** made in the **pancreas** and small **intestine** work best in **alkaline** conditions.

Bile is **made** in the **liver** and **stored** in the **gall bladder**. It is alkaline to **neutralise** hydrochloric **acid** from the **stomach**. It also **emulsifies fat** to form small droplets which **increases** the **surface area**.

The alkaline conditions and large surface area **increase the rate of fat breakdown** by lipase.



QuestionIT!

Animal tissues, organs and organ systems

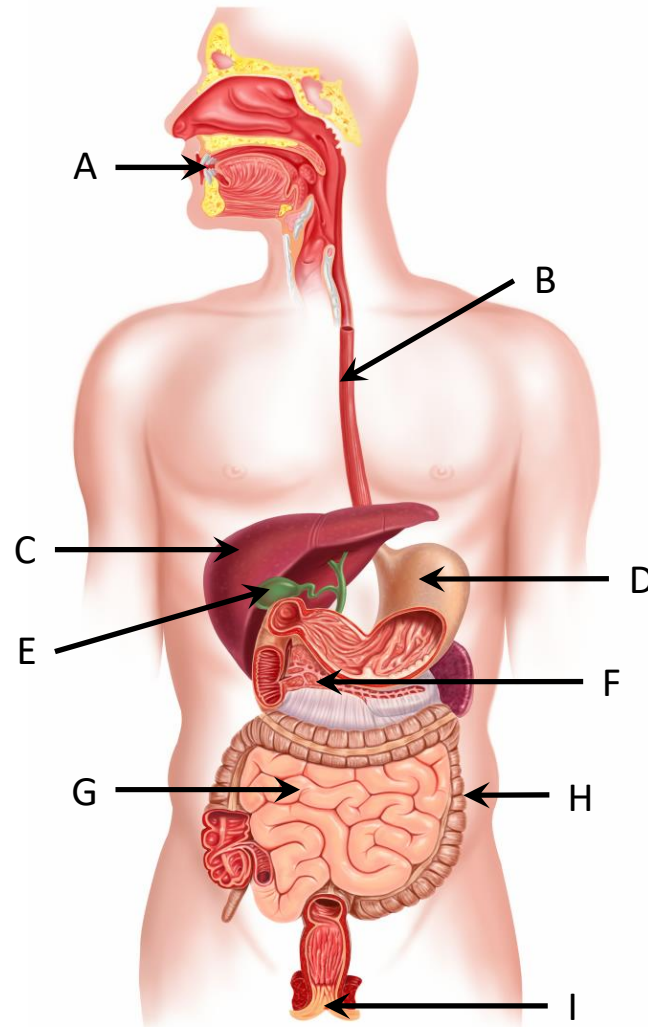
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Part 1

- The human digestive system
- Enzymes



1. Name parts A - I of the digestive system from the diagram below:



2. What is digestion?
3. What is an enzyme?
4. Complete the table below:

Digestive Enzyme	Where released?	Breakdown what?
Amylase		
Protease		
Lipase		

5. What biological molecule are enzymes made of?
6. What is the active site of an enzyme?
7. What is a substrate?

8. What are the products of digestion used for in the body?
9. What does denatured mean?
10. How does increasing the temperature affect enzyme activity?
11. How does pH affect enzyme activity?
12. What is the role of bile in digestion?
13. Where in the body is bile made?

AnswerIT!

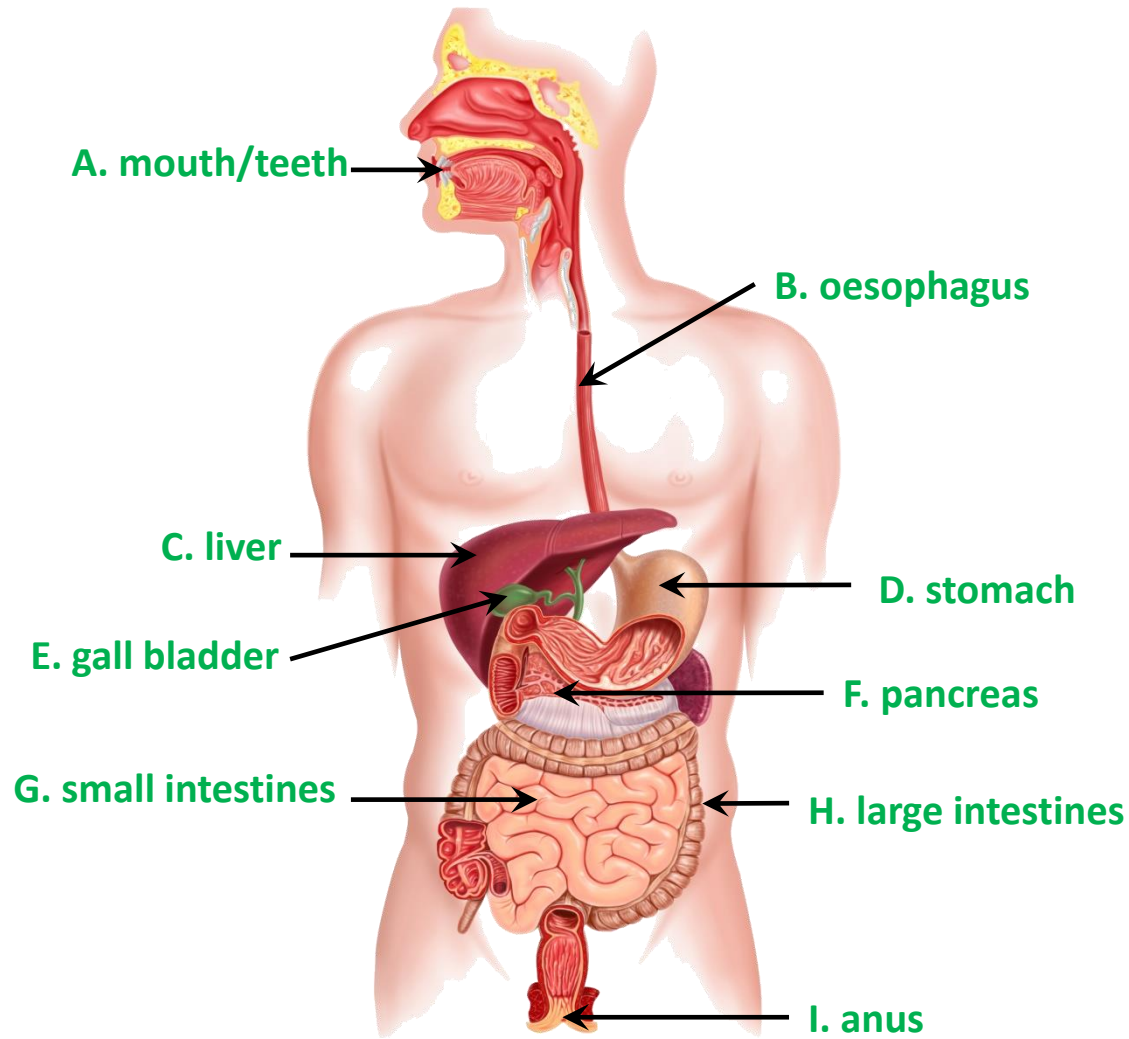
Animal tissues, organs
and organ systems

Part 1

- The human digestive system
- Enzymes



1. Name parts A - I of the digestive system from the diagram below:



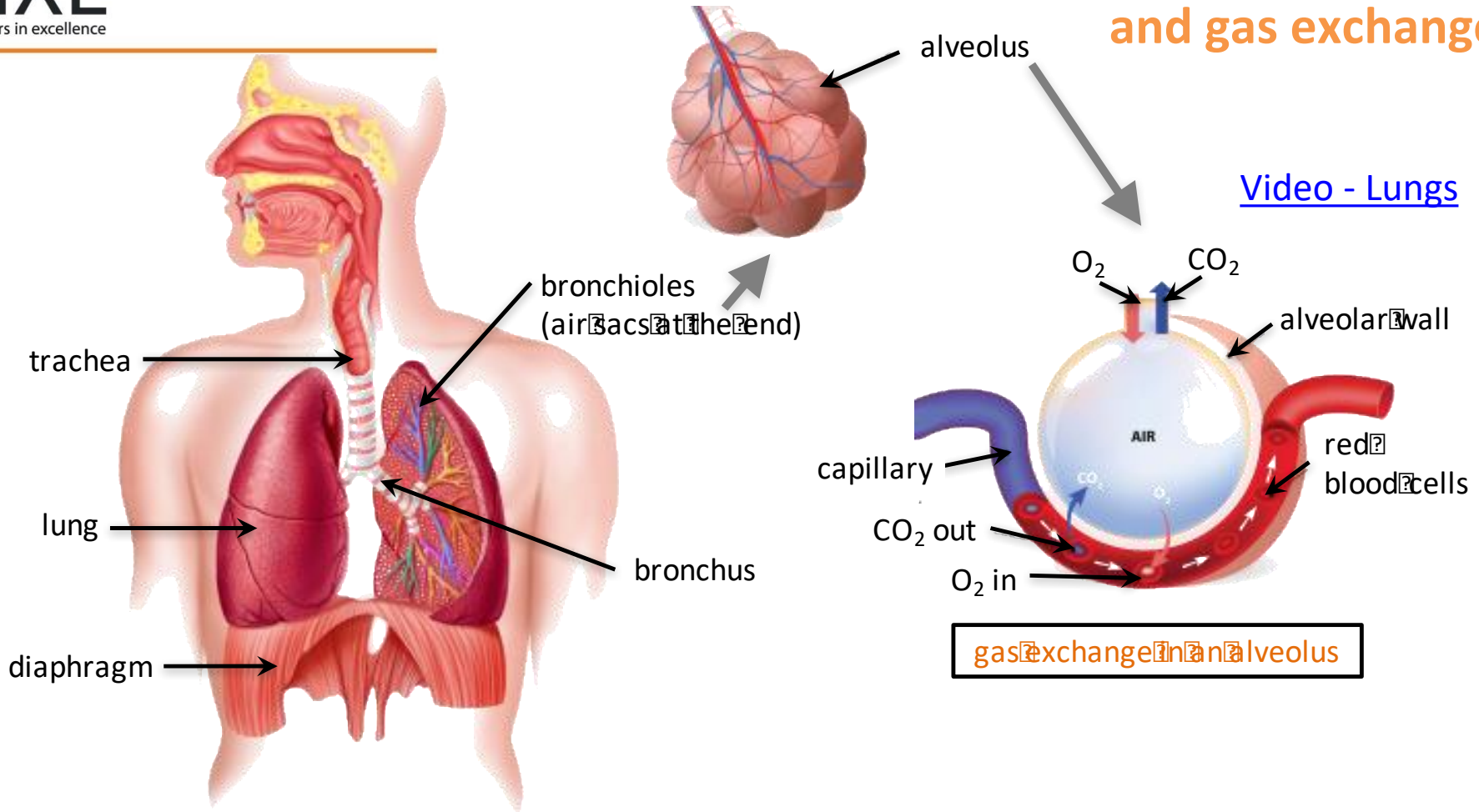
2. What is digestion? **Large insoluble molecules are broken down into smaller soluble ones.**
3. What is an enzyme? **A biological catalyst – they speed up the rate of reaction without being used up.**
4. Complete the table below:

Digestive Enzyme	Where released?	Breakdown what?
Amylase	Salivary glands and pancreas	Carbohydrates into simple sugars
Protease	Stomach and pancreas	Proteins into amino acids
Lipase	Pancreas	Fats and oils (lipids) into fatty acids and glycerol

5. What biological molecule are enzymes made of? **Proteins.**
6. What is the active site of an enzyme? **It is where the substrate binds.**
7. What is a substrate? **Substance (chemical) that the enzyme acts on.**

8. What are the products of digestion used for in the body? **They are used to build new carbohydrates, lipids and proteins in the body. Glucose is used in respiration.**
9. What does denatured mean? **That the active site of the enzyme has changed shape so the substrate cannot fit.**
10. How does increasing the temperature affect enzyme activity? **Initially it increases the rate of reaction due to increased collisions between the enzyme and substrates, if the temperature is too high the enzyme will denature.**
11. How does pH affect enzyme activity? **Enzymes have optimum pH conditions, if these are too alkaline or acidic the enzyme denatures**
12. What is the role of bile in digestion? **It neutralises stomach. (hydrochloric) acid and emulsifies fats.**
13. Where in the body is bile made? **Bile is made in the liver and stored in the gall bladder.**

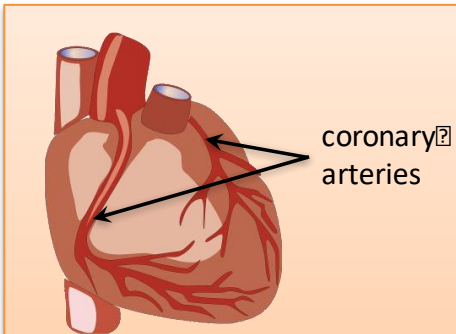
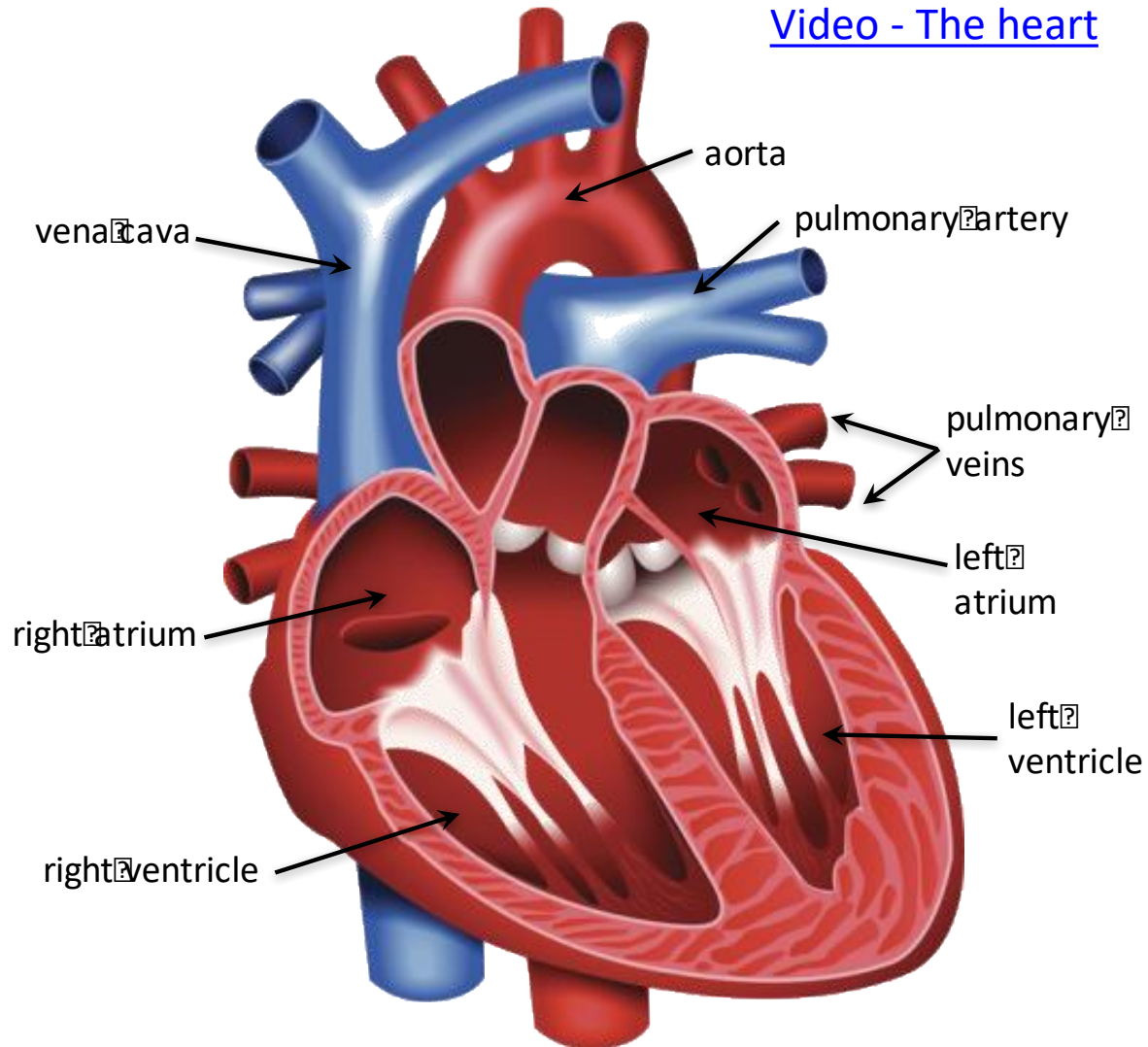
Animal tissues, organs and organ systems Part 2 - The lungs and gas exchange



The **heart** pumps **low oxygen/high carbon dioxide** containing **blood** to the lungs. In the **lungs**, oxygen and carbon dioxide are **exchanged** in the tiny **air sacs (alveoli)** at the end of the **bronchial tubes**. The **alveoli** are surrounded by **capillaries**.

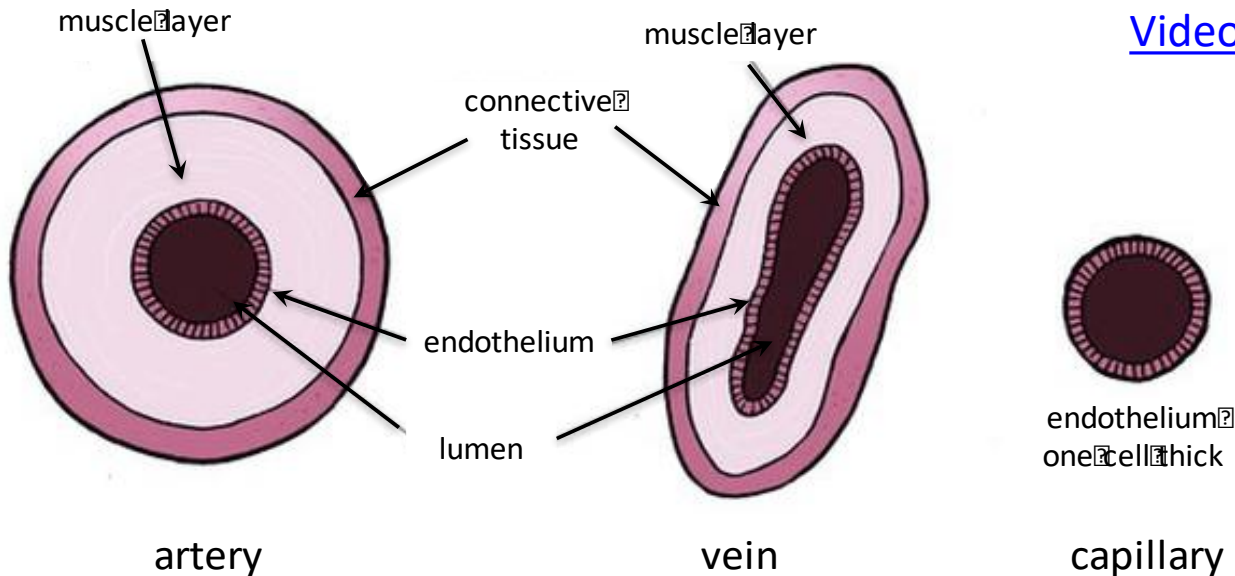
The **heart** is an **organ** that **pumps blood** around the body in a **double circulatory system**

1. The **right ventricle** pumps blood to the lungs where gas exchange takes place
2. The **left ventricle** pumps blood around the rest of the body.



Coronary arteries supply **oxygen** rich blood to the heart **muscle**.

The **natural resting heart rate** is **controlled** by a group of cells in the **right atrium (pacemaker)**. Artificial **electrical** pacemakers are used to **correct irregularities** in the heart rate.



[Video - Blood Vessels](#)

artery

vein

capillary

Arteries

- Carry blood away from the heart
- Thick muscular walls
- Small lumen (internal hole)
- Carry blood under high pressure

Veins

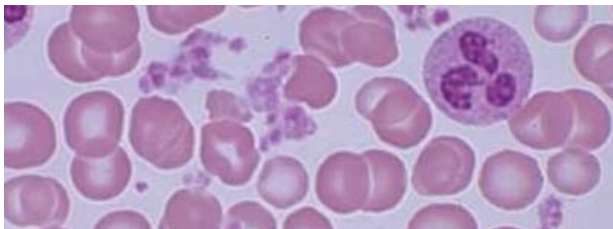
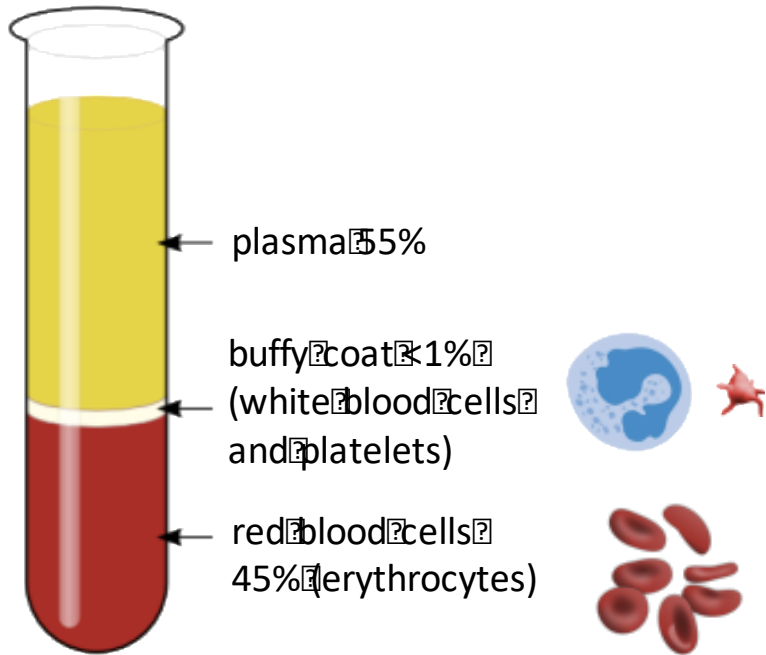
- Carry blood to the heart
- Thin walls
- Large lumen (internal hole)
- Carry blood under low pressure
- Have valves

Capillaries

- Connect arteries and veins
- One cell thick
- Carry blood under very low pressure

All arteries **carry** oxygenated blood **except for the** pulmonary artery.
All veins **carry** deoxygenated blood **except for the** pulmonary vein.

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



Plasma – Pale yellow fluid part of blood, transports cells, CO₂, hormones and waste.

Red blood cells (erythrocytes)

- have no nucleus (more room to carry O₂)
- contain the red pigment **haemoglobin** which carries O₂

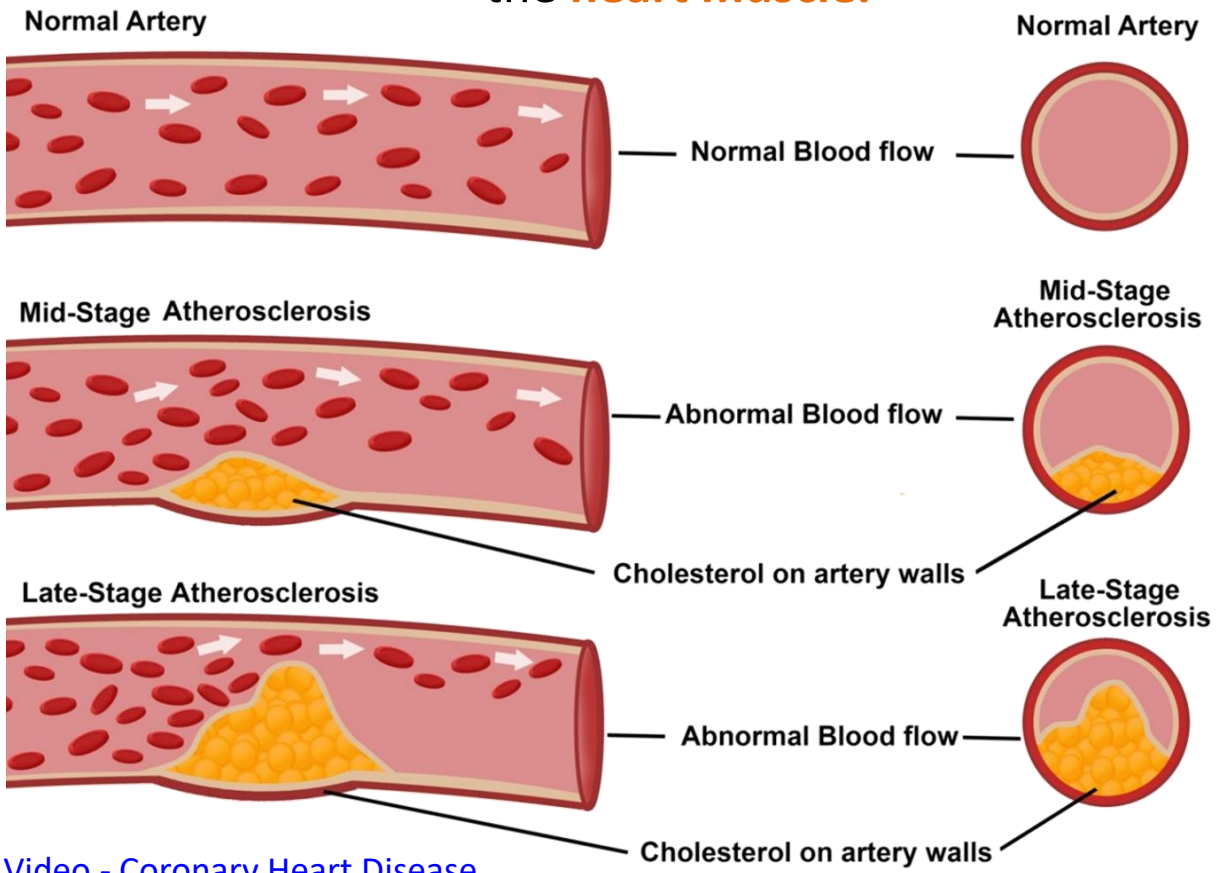
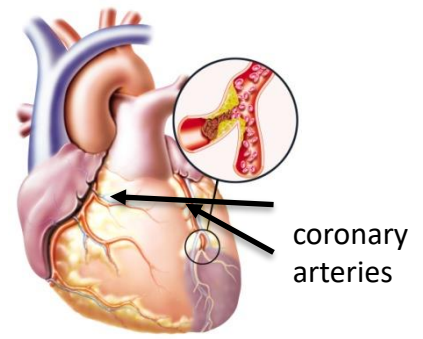
oxygen + haemoglobin → oxyhaemoglobin

- they have a **large surface area to volume ratio** for faster diffusion of oxygen

White blood cells - An important part of the **immune** system, some produce **antibodies** (proteins that bind to microbes and destroy them) and others surround and **engulf** foreign cells, all have a nucleus.

Platelets - Tiny fragments of cells (no nuclei), clump together to help form clots, protect the body by stopping/reducing bleeding.

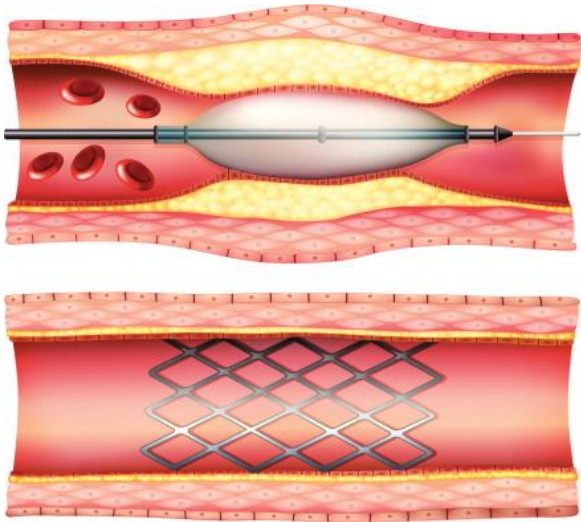
Atherosclerosis is a cause of **coronary heart disease (CHD)** where **layers of fatty material** build up inside the coronary arteries, **narrowing** them. This **reduces** the flow of blood through the coronary arteries, resulting in a **lack of oxygen** for the **heart muscle**.



- Risk factors for CHD:
- **Smoking and High Blood pressure:** damages the lining of the artery, leading to a build up of fatty deposits.
 - **High cholesterol:** Cholesterol is a fatty substance that is carried in your blood by proteins.
 - **Not enough exercise:** Increases blood pressure and cholesterol in the blood.

[Video - Coronary Heart Disease](#)

Atherosclerosis (coronary heart disease) can be **treated** in two main ways by placing a **stent** in the coronary artery and/or using drugs called **statins**.



Stents are metal cylinder grids which can be **inserted** into an artery to maintain blood flow by **keeping the artery open** so that the heart continues to receive **enough oxygen** to function effectively.

[Video - Stent Insertion Animation](#)

Statins are drugs that lower harmful **cholesterol** in the blood and stop the **liver** producing too much cholesterol and reduce the rate at which it is deposited. Patients should also have a healthy diet. This **reduces** the risk of heart disease.

Heart valves prevent the blood in the heart from **flowing** in the **wrong direction**. In some people heart valves may become **faulty**, preventing the valve from **opening fully** or the heart valve might develop a **leak** because it does not **close fully**.

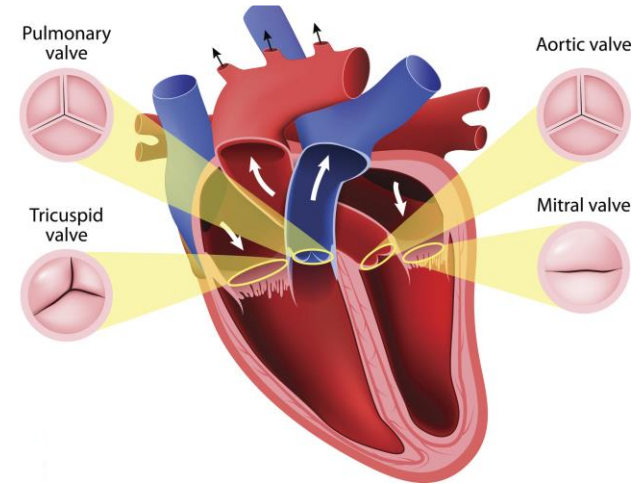
Symptoms can include:

- Being short of breath
- Swelling in the ankles and feet
- Feeling unusually tired

Causes:

- Being born with it (congenital heart disease)
- Having had rheumatic fever
- Cardiomyopathy - a disease of the heart muscle
- Damage to the heart muscle from a heart attack
- Getting older
- Endocarditis a bacterial infection in the heart

Valves in the Heart



Faulty heart valves can be replaced by biological or mechanical valves.



biological



mechanical

[Video - Heart valve Replacement Animation](#)



Heart disease can lead to **heart failure**. Patients with heart failure can be given **heart** or **heart and lung transplants**. Donor hearts come from a **person who has died**. These only have a **few hours** to get to the person needing the heart. Often hearts and lungs are transplanted together. In this country you have to give **consent** for your organs to be donated.

[Video - Heart Transplant \(graphic\)](#)

Conditions that may require a heart transplant include:

- **Atherosclerosis** (coronary heart disease) – a build-up of fatty substances in the arteries supplying the heart
- **Cardiomyopathy** – where the walls of the heart have become stretched, thickened or stiff
- **Congenital heart disease** – birth defects that affect the normal workings of the heart



Artificial hearts are occasionally used to keep patients alive whilst waiting for a heart transplant, or to allow the heart to rest as an aid to recovery. Artificial hearts can only be used as a short term measure.

QuestionIT!

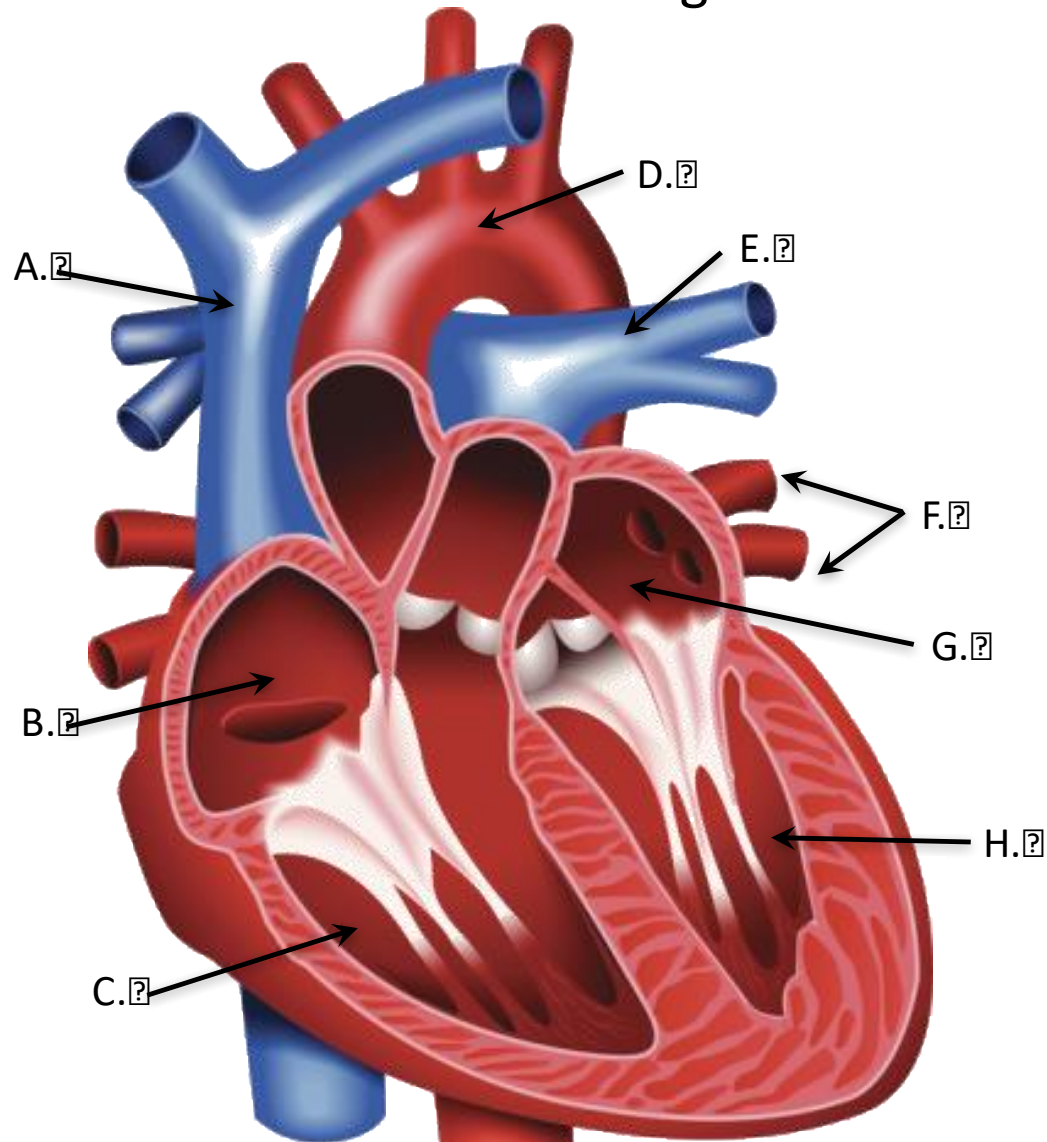
Animal tissues, organs and organ systems

Part 2

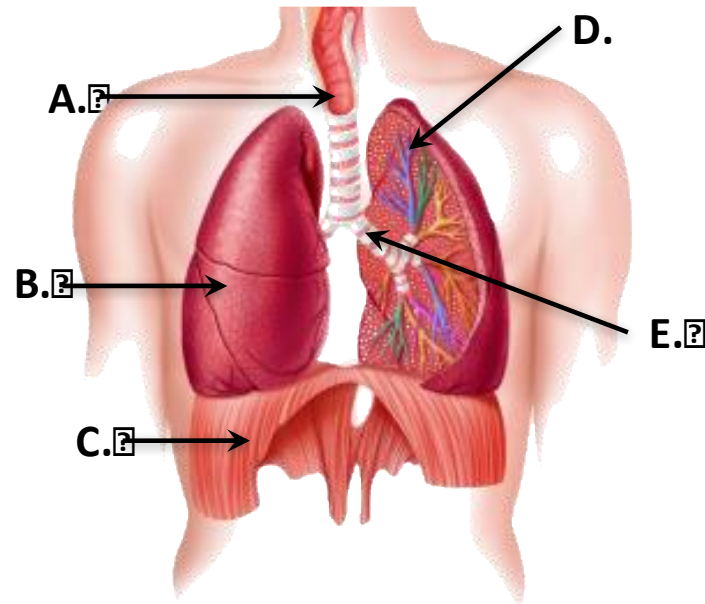
- The heart and blood vessels
- Blood
- Coronary heart disease:
a non-communicable disease



1. Name parts A - H of the heart from the diagram below:



2. What is a double circulatory system?
3. What is a pacemaker?
4. What is the role of the coronary arteries?
5. Where does the left atrium pump blood to?
6. Name parts A - E of the lung from the diagram:



7. Where does gas exchange take place in the lungs?
8. Name the gas that moves from the blood into the lungs.
9. Name the blood vessels that carry blood away from the heart.
10. Which blood vessels are only one cell thick?
11. Which blood vessels have thick muscular walls?
12. Which blood vessels have valves?
13. What is plasma?
14. What is the role of a red blood cell?
15. In what two ways can white blood cells fight infection?
16. What is the role of platelets?

17. What is coronary heart disease?
18. What are the risk factors for coronary heart disease?
19. What is a stent?
20. What are statins?
21. What is the role of heart valves?
22. Give two faults that can occur with heart valves.
23. What treatment can be given to a person with faulty heart valves?
24. Name three conditions that can lead to heart failure.

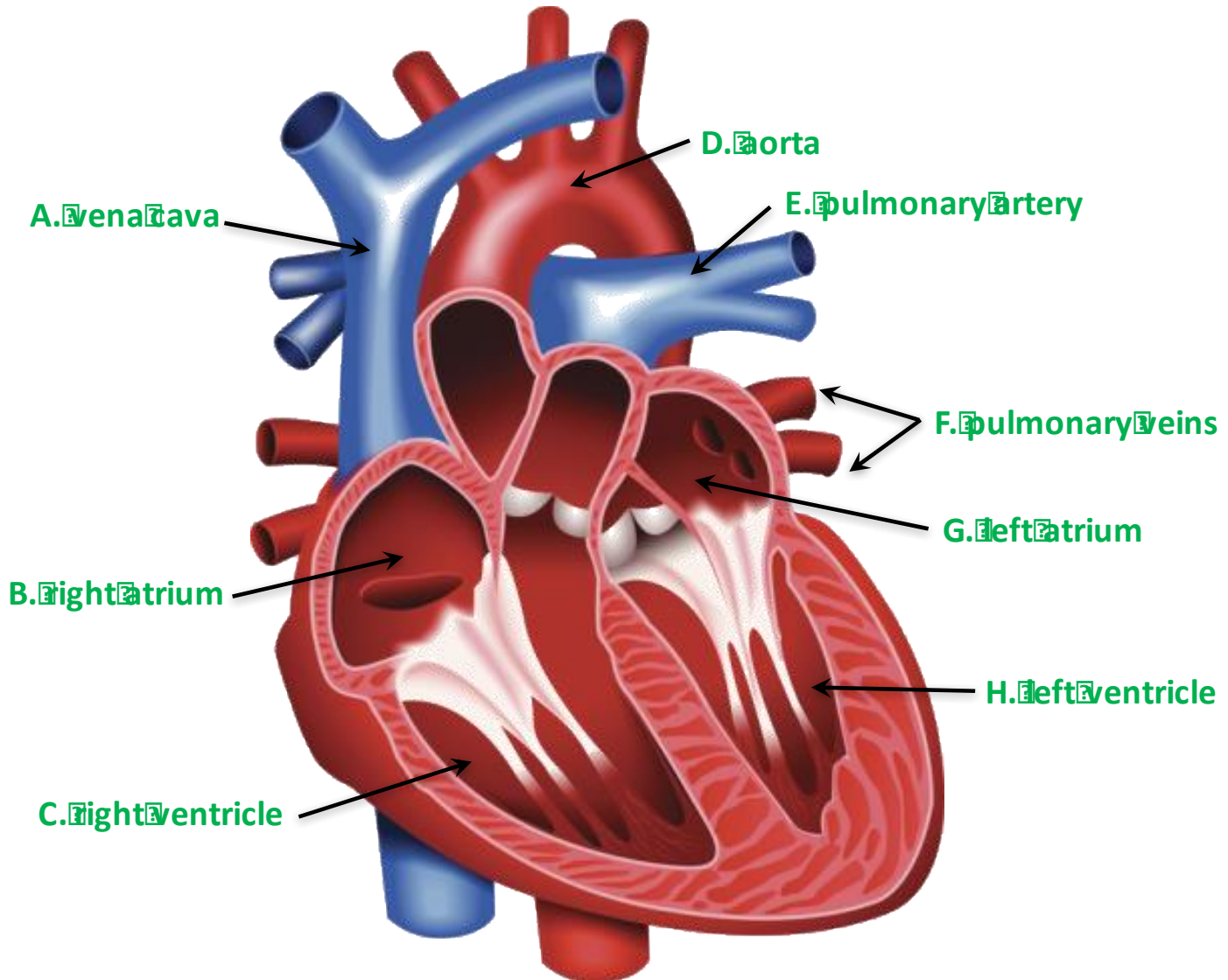
AnswerIT!

Animal tissues, organs and organ systems Part 2

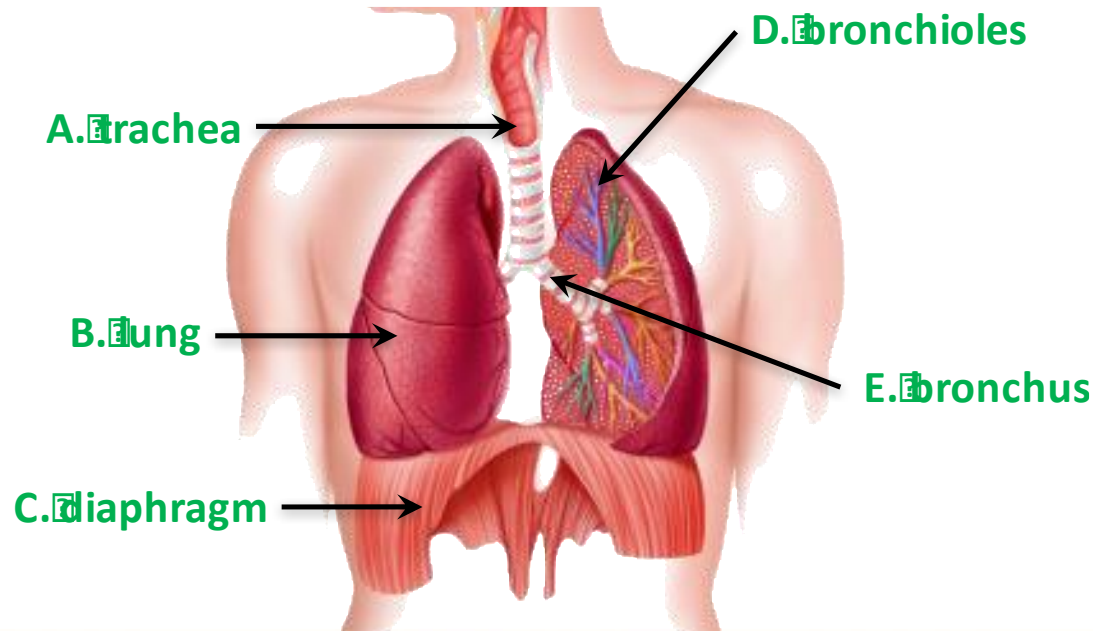
- The heart and blood vessels
- Blood
- Coronary heart disease:
a non-communicable disease



1. Name parts A - H of the heart from the diagram below:



2. What is a double circulatory system? **Where blood from the heart is pumped to the lungs and the body at the same time.**
3. What is a pacemaker? **A group of cells in the right atrium that controls the heart rate.**
4. What is the role of the coronary arteries? **To supply oxygenated blood to the heart muscle.**
5. Where does the left atrium pump blood to? **To the left ventricle.**
6. Name parts A - E of the lung from the diagram:



7. Where does gas exchange take place in the lungs? **In the alveoli.**
8. Name the gas that moves from the blood into the lungs **Carbon dioxide.**
9. Name the blood vessels that carry blood away from the heart **Arteries.**
10. Which blood vessels are only one cell thick? **Capillaries.**
11. Which blood vessels have thick muscular walls? **Arteries.**
12. Which blood vessels have valves? **Veins.**
13. What is plasma? **The pale yellow fluid part of blood, it transports cells, CO₂, hormones and waste.**
14. What is the role of a red blood cell? **To carry oxygen around the body.**
15. In what two ways can white blood cells fight infection? **They can produce antibodies that destroy microbes or they can engulf microbes.**
16. What is the role of platelets? **They form clots to reduce bleeding.**

17. What is coronary heart disease? **Where layers of fatty material build up inside the coronary arteries narrowing them.**
18. What are the risk factors for coronary heart disease? **Smoking, high blood pressure, high cholesterol and not enough exercise.**
19. What is a stent? **A metal cylinder grid that is inserted into an artery to keep the artery open.**
20. What are statins? **Drugs that reduce the harmful cholesterol in the blood .**
21. What is the role of heart valves? **To stop the blood in the heart from flowing in the wrong direction.**
22. Give two faults that can occur with heart valves. **They may not open fully or develop a leak.**
23. What treatment can be given to a person with faulty heart valves? **They can have their heart valves replaced (biological or mechanical).**
24. Name three conditions that can lead to heart failure. **Atherosclerosis (CHD), cardiomyopathy, congenital heart disease (born with it).**

The World Health Organisation definition:

Health is a state of complete **physical, mental** and **social well-being** and not merely the absence of disease or infirmity.



Disease can be:

- **Communicable** – these are **infectious** diseases caused by viruses, bacteria, protists and fungi and are **spread** in animals (and plants) e.g. malaria, measles, athlete's foot
- **Non-communicable** – these diseases are not caused by **infection** and cannot be **spread** e.g. heart disease, diabetes, Alzheimer's, asthma

Different **types of disease** may **interact** (work together) to make a person ill.

- **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 to form
- **Immune reactions** initially caused by a pathogen can trigger allergies such as skin rashes and asthma
- **Severe physical ill health** can lead to depression and other mental illness

Non-communicable diseases (NCDs) can have a significant **human** and **financial** cost for individuals, local communities, nationally and globally. [Video - NCDs](#)

WHO Factsheet data [link](#)

- Non-communicable diseases (NCDs) kill **40 million** people each year, equivalent to **70% of all deaths globally**
- Each year, **15 million** people die from a NCD between the ages of 30 and 69 years; over **80%** of these "premature" deaths occur in low- and middle-income countries
- **Cardiovascular diseases** account for **most** NCD deaths, or **17.7 million people** annually, followed by **cancers** (8.8 million), **respiratory diseases** (3.9million), and diabetes (1.6 million)

Human cost: lower quality of life, shorter lifespan and the families of the sufferer are also affected due to caring responsibilities, parental/partner death etc.

Financial cost: cost of health care, research into diseases, awareness campaigns. Reduced income due to inability to work, personal care costs, adaptations to the home and buying specialist equipment e.g. wheelchairs, mobility scooters etc.
Also if many people are unable to work due to NCDs the economy can be affected.

There are **other factors** that can also affect health and increase the risk of getting a disease, these can be:

- **aspects of a persons lifestyle**
 - e.g. lack of exercise, stress levels, exposure to too much sunlight, exposure to ionising radiation (e.g. X-rays, gamma rays)
- **substances (chemicals) taken into:**
 - **a persons body** – e.g. high fat/sugar diet, cigarette smoke, alcohol
 - **in their environment** - e.g. air/water pollution, asbestos, ionising radiation

These are called **RISK FACTORS**

HAZARD

RISK FACTOR

HARM

The potential source of harm e.g. smoking, lack of exercise

The combination of the chances of the hazard causing harm and the severity of that harm

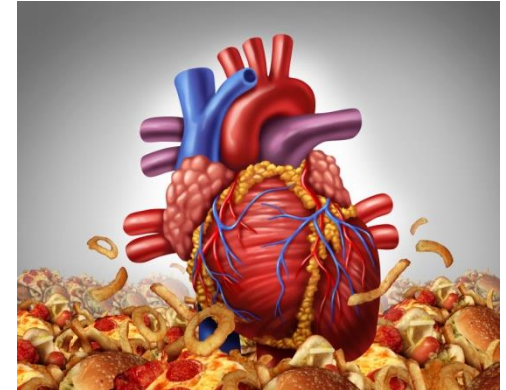
The damage to health or a disease that can occur

MANY DISEASES ARE CAUSED BY THE INTERACTION OF A NUMBER OF RISK FACTORS

Some **RISK FACTORS** have been found to directly **cause disease**.

CARDIOVASCULAR disease:

- **Diet** – a diet high in saturated fats can increase the levels of LDL (low density lipoproteins – cholesterol plus a protein that can cause atherosclerosis)
- **Smoking** – tobacco smoke **damages** the lining of the arteries leading to atherosclerosis, **carbon monoxide** in tobacco smoke reduces the amount of oxygen in the blood so the heart has to pump harder, the **nicotine** in tobacco smoke causes the heart to beat faster and raises blood pressure
- **Lack of exercise** – exercising regularly lowers blood pressure and stress



Some **RISK FACTORS** have been found to directly **cause disease**.

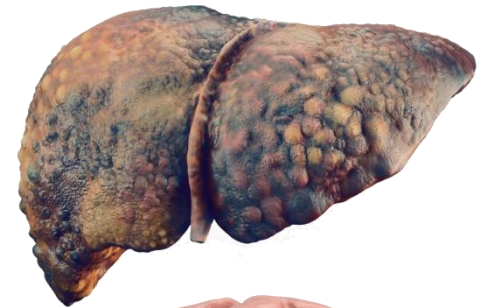
OBESITY is a risk factor for Type 2 diabetes:

- **Type 2 diabetes** – is where the cells in the body are less sensitive or resistant to insulin so the body cannot control the concentration of glucose in the blood correctly [Video - Type 2 Diabetes](#)
- **Obesity** increases the risk of developing type 2 diabetes, the more fat you have around your abdomen (tummy)



Alcohol is a risk factor for Liver disease and Brain damage:

- **Liver disease** – the liver breaks down toxins in alcohol, if you have too much alcohol the first stage of liver disease is when the liver becomes fatty and eventually **cirrhosis** of the liver develops if you continue to drink too much alcohol
- **Brain function damage** – alcohol affects the way the nerve cells in the brain work and the cells then become damaged. The brain mass may also shrink [Video - Alcohol and the Body](#)



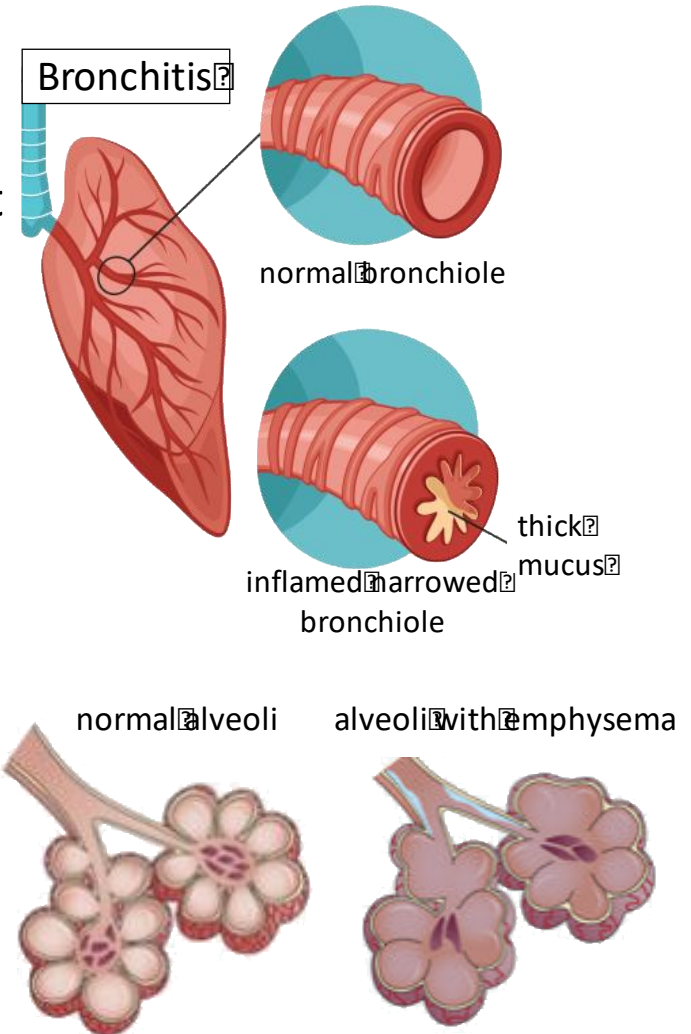
Some **RISK FACTORS** have been found to directly **cause disease**.

SMOKING is a risk factor for Lung disease:

- **COPD** – describes a group of lung diseases that make it difficult for people to move air in and out of the lungs

Two examples of these are:

- **Bronchitis** – the bronchi and bronchioles are **inflamed** (swollen) and excess **mucus** is produced
- **Emphysema** – this affects the **alveoli**, the walls are **broken down** and they then trap excess air



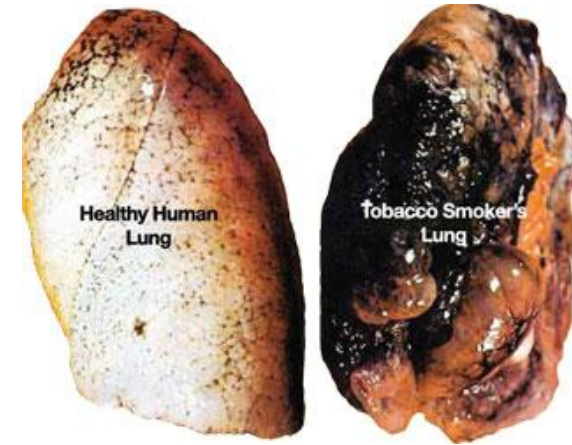
COPD **narrows** the airways and makes it difficult to get rid of CO_2 and get in the O_2 needed for respiration. **Smoking** is the main cause of COPD and is responsible for 9 out of 10 cases. [Video - COPD](#)

Some **RISK FACTORS** have been found to directly **cause disease**.

SMOKING is a risk factor for **Lung cancer**:

- **Lung cancer** - is one of the **most common** and serious types of cancer. Around 44,500 people are diagnosed with the condition every year in the UK (NHS)
- **Symptoms include**:
 - a persistent cough
 - frequent chest infections
 - coughing up blood
 - breathlessness
- **Causes: most** cases of lung cancer are linked to **smoking 85%** (NHS), tobacco smoke contains over **60 toxic chemicals** and some of these substances are known to be **carcinogenic** (cancer causing)

If you smoke more than **25 cigarettes a day**, you are **25 times** more likely to get lung cancer than a non-smoker. Some people who have never smoked can get lung cancer too.



All cigarettes must now by law be sold in plain packaging and with graphic images and health warnings.

Some **RISK FACTORS** have been found to directly **cause disease**.

Risks of **SMOKING** and **ALCOHOL** on unborn babies:

Smoking:

Tobacco smoke contains over **4000 chemicals** one of these is **carbon monoxide**, it is a toxic gas that **reduces** the amount of **oxygen** available to the unborn baby.

- **Smoking** while **pregnant** increases the **risk** of: miscarriage, premature births, sudden infant death syndrome (SIDS)

Alcohol:

Medical experts are still **unsure** how much alcohol is safe to drink while pregnant and advise pregnant woman not to drink any alcohol.

- **First 3 months** of pregnancy: – can increase the risk of miscarriage and premature birth
- **Heavy drinking** during pregnancy can lead to **foetal alcohol syndrome** (FAS) children with FAS have:
 - poor growth
 - facial abnormalities
 - learning difficulties



Some **RISK FACTORS** have been found to directly **cause disease**.

CARCINOGENS as a risk for cancer:

- **Carcinogen** - a **substance** or form of **radiation** that can **cause cancer**. Some carcinogens cause cancer by damaging the DNA directly, others can speed up cell division making mutations more likely
- **Tobacco** - smoke can cause cancers in the lungs, oesophagus, larynx (voice box), mouth, throat, kidney, bladder, pancreas, stomach and cervix
- **Alcohol** - is a risk factor in the following cancers - mouth, larynx, oesophagus, liver and breast
- **Occupational carcinogens** – there are over 40 known carcinogens in the work environment and these need to be carefully controlled so that workers don't get too exposed to them e.g. asbestos causes lung cancer
- **Ionising radiation** – this type of radiation can knock electrons off the atoms in DNA causing changes that can lead to cancer e.g. UV, X-rays, radon gas, radiation in medical treatments [Video - UV Radiation](#)



Uncontrolled cell division and **growth** results in the formation of a **tumour** (mass of cells), these can be **BENIGN** or **MALIGNANT**, **not all** tumours are cancerous.

- **Benign tumours:**

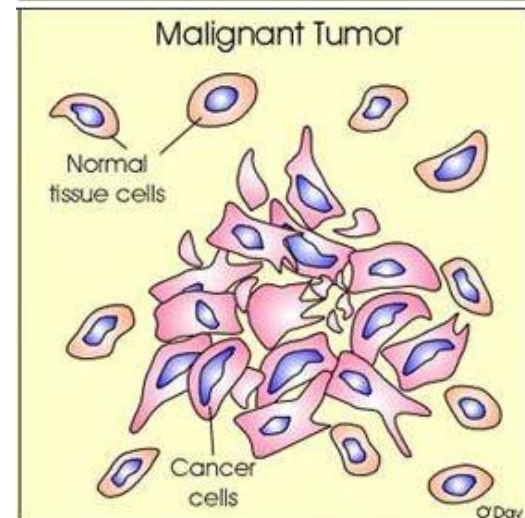
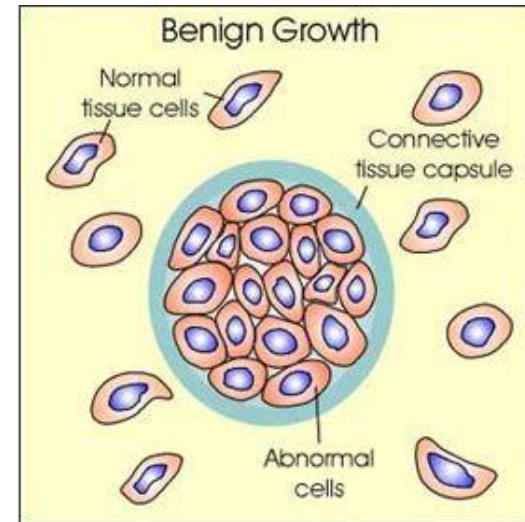
- Growths of abnormal cells
- Contained in one area
- Usually within a membrane surrounding the cells
- They do not invade other parts of the body

[Video - Benign Brain Tumour](#)

- **Malignant tumour (CANCER):**

- Growths of abnormal cells
- These are **cancerous**
- Invade neighbouring tissues and spread to different parts of the body in the blood where they form secondary tumours
- Can be caused by lifestyle or genes

[Video - What is Cancer?](#)



QuestionIT!

Animal tissues, organs and organ systems Part 3

- Health issues
- The effect of lifestyle on some non-communicable diseases
- Cancer



1. Define the word health.
2. What are communicable diseases?
3. What are non-communicable diseases?
4. Name 4 ways that different types of disease can interact to make a person ill.
5. List some human costs of non-communicable diseases.
6. List some financial costs of non-communicable diseases.
7. Name two other risk factors that affect health.
8. What are the risk factors for cardio vascular disease?
9. What is a risk factor for Type 2 diabetes?

10. How does alcohol cause liver disease?
11. What does alcohol damage in the brain?
12. What is COPD?
13. Give two examples of COPD.
14. What is the main cause of COPD?
15. What is the biggest risk factor for lung cancer?
16. What are the symptoms of lung cancer?
17. What are the risks of smoking while pregnant?
18. What is the risk of heavy drinking throughout pregnancy?
19. What is a carcinogen?

20. How can carcinogens cause cancer?
21. Name four types of carcinogens?
22. What is a tumour?
23. What are benign tumours?
24. What are malignant tumours?
25. Which type of tumour is cancerous?

AnswerIT!

Animal tissues, organs
and organ systems

Part 3

- Health issues
- The effect of lifestyle on some non-communicable diseases
- Cancer

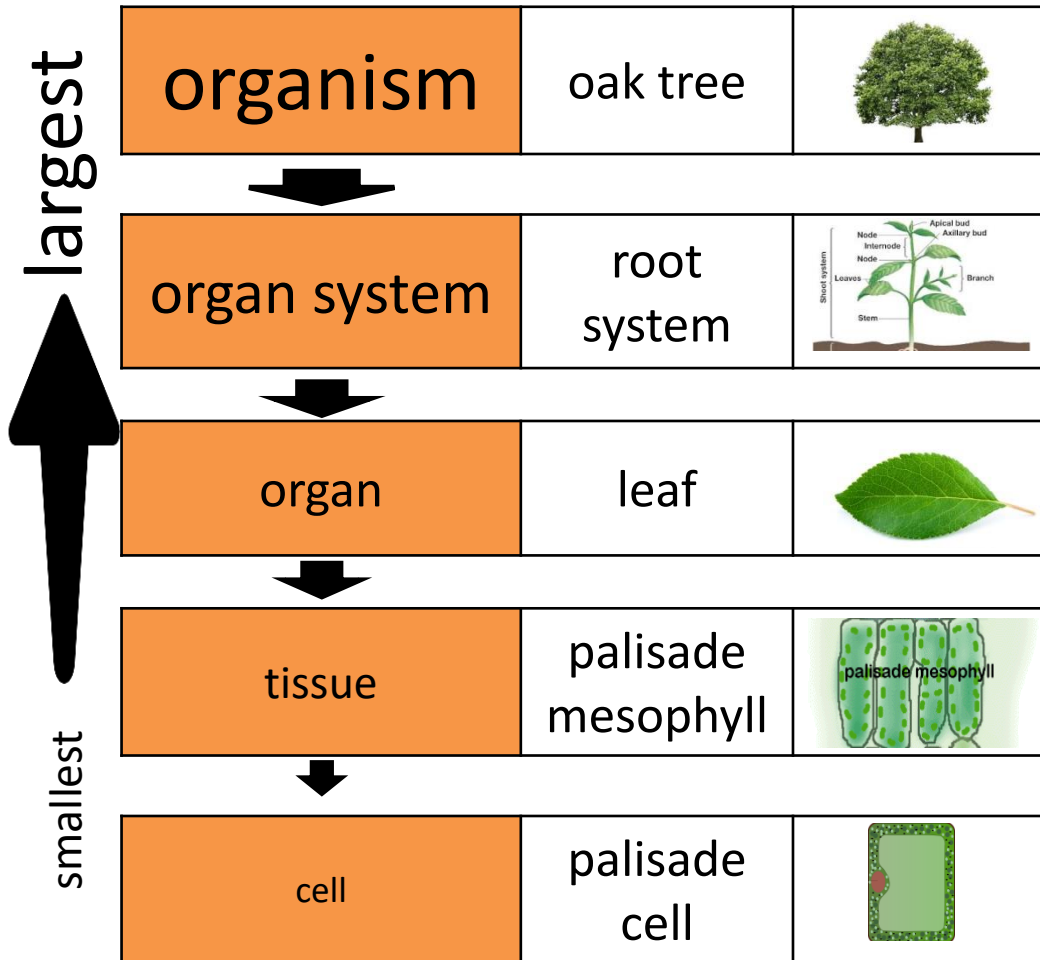


1. Define the word health. **A state of complete physical and mental well-being and not merely the absence of disease or infirmity.**
2. What are communicable diseases? **Infectious diseases caused by microbes that can be spread.**
3. What are non-communicable diseases? **Diseases not caused by infections and cannot be spread.**
4. Name 4 ways that different types of disease can interact to make a person ill. **Defects in the immune system, viruses that can trigger cancer, immune reactions caused by pathogens, physical ill health.**
5. List some human costs of non-communicable diseases **Lower quality of life, shorter life span.**
6. List some financial costs of non-communicable diseases **Healthcare costs, reduced income, buying of specialist equipment.**
7. Name two other risk factors that affect health **Lifestyle and substances taken into the body or in the environment.**
8. What are the risk factors for cardio vascular disease? **Diet, smoking, lack of exercise.**
9. What is a risk factor for Type 2 diabetes? **Obesity.**

10. How does alcohol cause liver disease? **It causes the liver to become fatty and this can lead to cirrhosis.**
11. What does alcohol damage in the brain? **It damages the nerve cells and the brain mass may shrink.**
12. What is COPD? **A group of lung diseases that narrow airways making it difficult for people to move air in and out of the lungs.**
13. Give two examples of COPD. **Bronchitis and emphysema.**
14. What is the main cause of COPD? **Smoking.**
15. What is the biggest risk factor for lung cancer? **Smoking.**
16. What are the symptoms of lung cancer? **Persistent cough, frequent chest infections, coughing up blood, breathlessness.**
17. What are the risks of smoking while pregnant? **Miscarriage, premature births, sudden infant death syndrome (SIDS).**
18. What is the risk of heavy drinking throughout pregnancy? **It can lead to foetal alcohol syndrome.**
19. What is a carcinogen? **A substance that can cause cancer.**

20. How can carcinogens cause cancer? **They damage DNA or speed up cell division and increase the chance of a mutation occurring.**
21. Name four types of carcinogens? **Tobacco, alcohol, occupational carcinogens, ionising radiation.**
22. What is a tumour? **A mass of cells caused by uncontrolled cell growth.**
23. What are benign tumours? **An abnormal growth of cell in a membrane contained in one area.**
24. What are malignant tumours? **An abnormal growth of cells that invade other tissues and can spread in the body.**
25. Which type of tumour is cancerous? **Malignant.**

Like animals, **plants** are organised into **tissues** made of **similar cells** that carry out a particular function.



Epidermal

- Covers the surfaces of the plant

Palisade mesophyll

- The cells are packed with chloroplasts it is the site of most of the photosynthesis

Spongy mesophyll

- Photosynthesis also occurs in the cells here
- Large air spaces for gas exchange

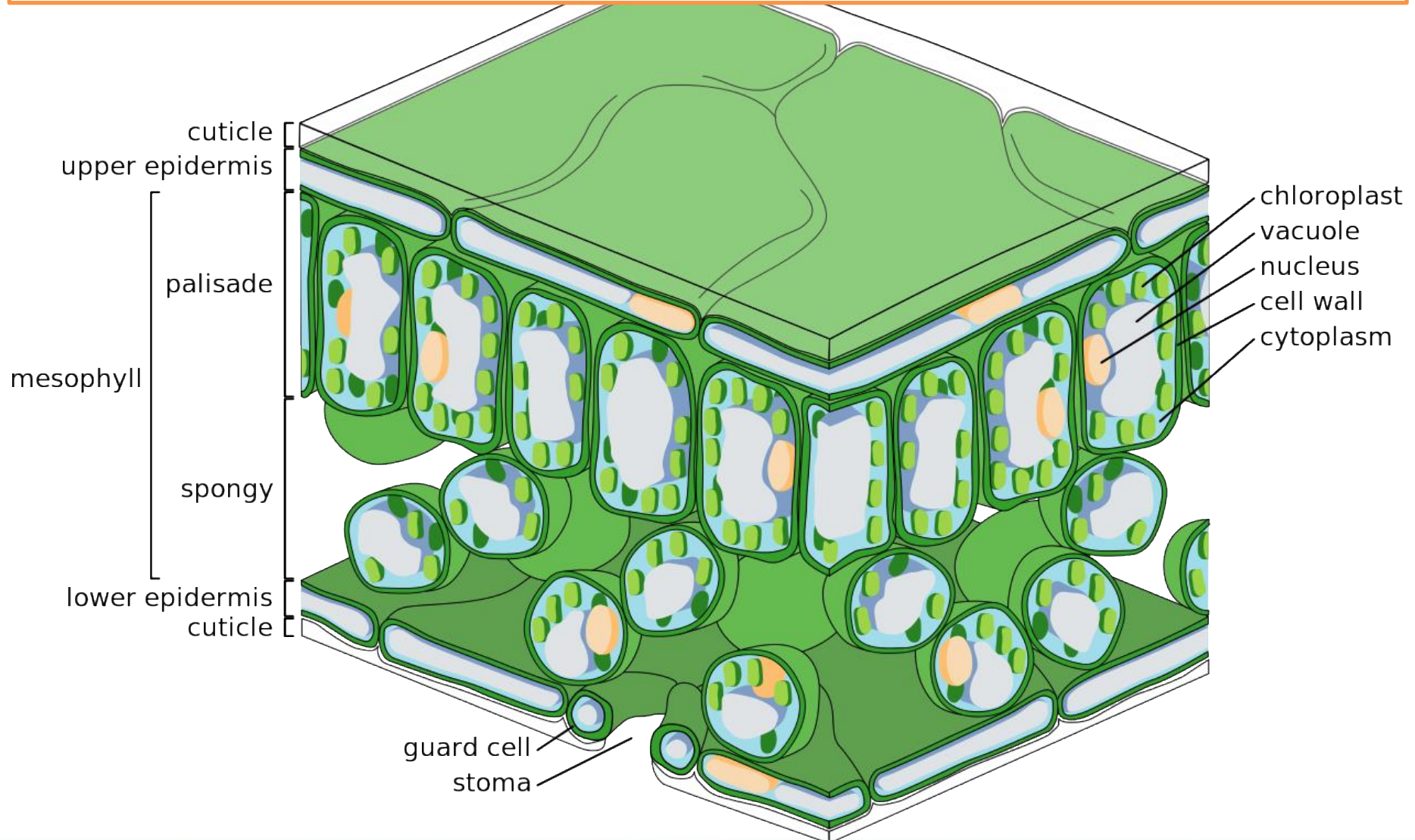
Xylem and phloem

- Form vascular bundles and transport water and glucose around the plant

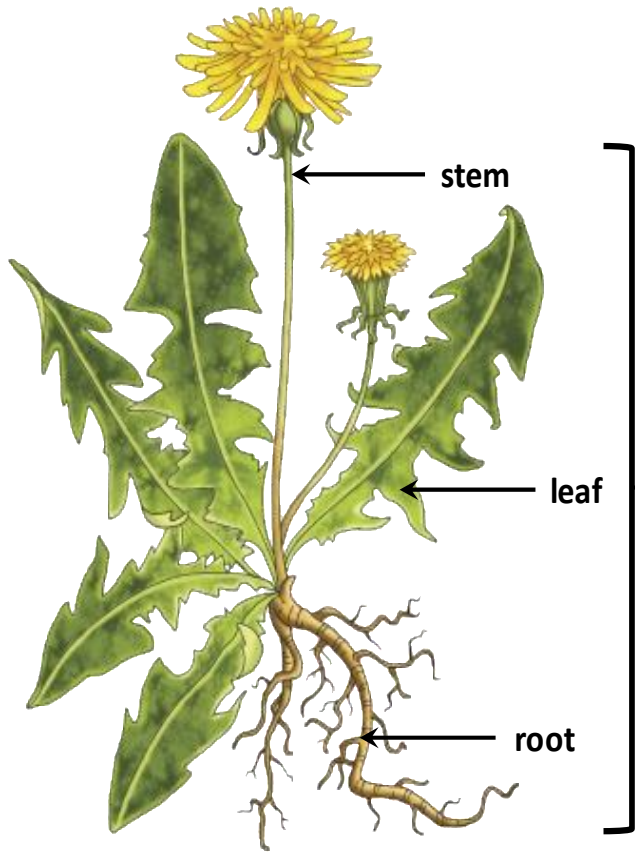
Meristem

- Found at the tips of roots and shoots
- Where cell differentiation occurs

The leaf is a **plant organ**, it is the site of **photosynthesis** and **respiration** in plants.

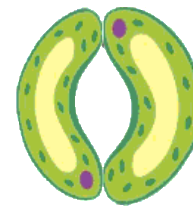


The **roots, stem** and **leaves** form a **plant organ system** for transport of substances around the plant.

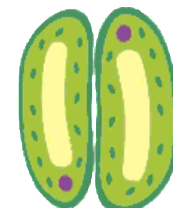


Most leaves (except for those on aquatic plants) have **guard cells** on their lower epidermis. These cells open and close depending on the **water content** of the cells.

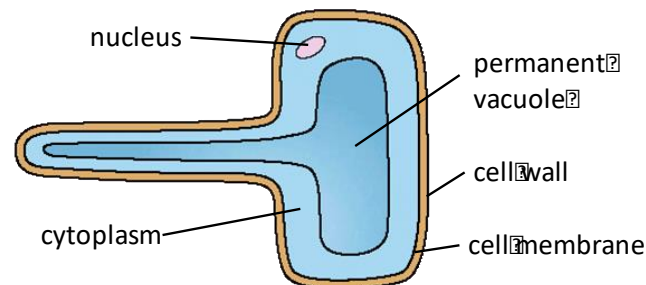
The **stoma** (stomata) open and close to let gases diffuse in and out and **control water** loss. If there is a lack of water in the guard cells they go '**flacid**' and **close**, this prevents water vapour from leaving through the **stomata**



stomata open



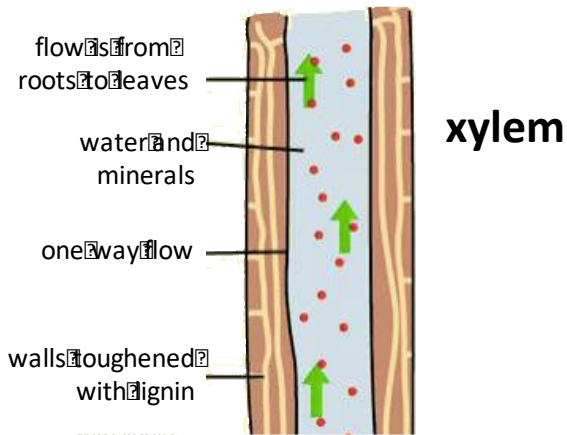
stomata closed



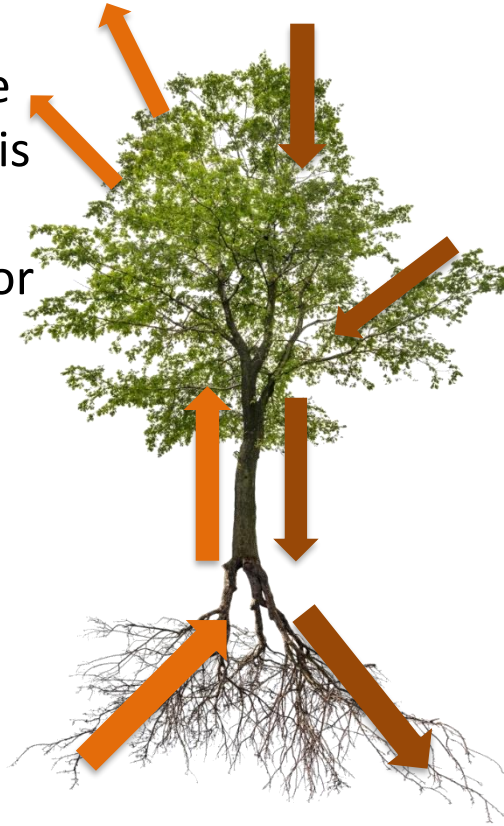
Root hair cell - Hair like projections to increase the **surface area** for uptake of water and mineral ions.

TRANSPIRATION

Xylem tissue transports **water** and **mineral** ions from the **roots** to the **stems** and **leaves**. It is composed of **hollow tubes** strengthened by **lignin** adapted for the transport of water in the **transpiration stream**.

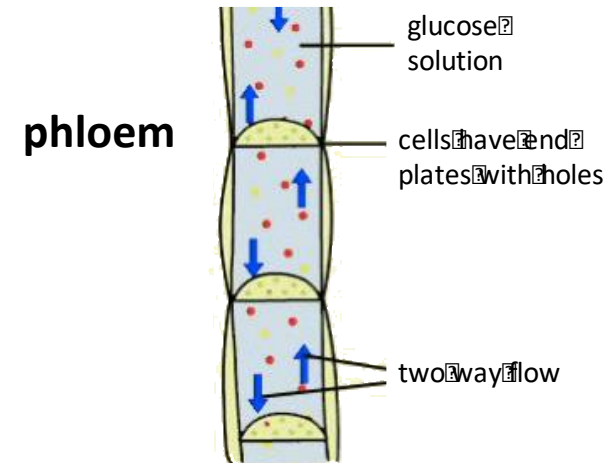


The rate of transpiration is increased as the temperature, humidity, air movement and light intensity increase



TRANSLOCATION

Phloem tissue transports dissolved **sugars** from the **leaves** to the **rest of the plant** for immediate **use** or **storage**. Phloem is composed of tubes of **elongated cells** with pores in the end walls.



Cell sap can move from one phloem cell to the next through pores in the end walls.

QuestionIT!

Plant tissues, organs and systems

- Plant tissues
- Plant organ system



1. What is a plant tissue?
2. Complete the table for the five types of plant tissue:

Plant tissue	Description and function
Epidermal	
Palisade mesophyll	
Spongy mesophyll	
Xylem and phloem	
Meristem	

3. What is the role of the leaf organ?
4. What is the role of the guard cells?

5. What is a plant organ?
6. Name the organs in the plant organ system that transports substances around the plant.
7. What is the role of the root hair cell?
8. What is transpiration?
9. What is translocation?
10. What factors increase the rate of transpiration?

AnswerIT!

Plant tissues, organs and systems

- Plant tissues
- Plant organ system



1. What is a plant tissue? **A group of similar plant cells working together to carry out a particular function.**

2. Complete the table for the five types of plant tissue:

Plant tissue	Description and function
Epidermal	Covers the surfaces of the plant for protection
Palisade mesophyll	The cells are packed with chloroplasts it is the site of most of the photosynthesis
Spongy mesophyll	Photosynthesis also occurs in the cells here. Large air spaces for gas exchange
Xylem and phloem	Form vascular bundles and transport water, mineral ions and glucose around the plant
Meristem	Found at the tips of roots and shoots. Where cell differentiation occurs

3. What is the role of the leaf organ? **Photosynthesis and respiration.**

4. What is the role of the guard cells? **To open and close to let gases diffuse in and out through the stoma.**

5. What is a plant organ? **A group of plant tissues working together to carry out a particular function.**
6. Name the organs in the plant organ system that transports substances around the plant. **Stem, leaf and root.**
7. What is the role of the root hair cell? **To take in water and mineral ions from the soil.**
8. What is transpiration? **The movement of water and mineral ions from the roots to the stems and leaves.**
9. What is translocation? **The movement of dissolved sugars from the leaves to the rest of the plant for immediate use or storage.**
10. What factors increase the rate of transpiration? **Increased temperature, humidity, air movement and light intensity.**