

Science

Social Sciences

Home Learning Pack

Year 10

- ✓ GCSE Computer Science
- ✓ GCSE Sociology
- ✓ GCSE Business
- ✓ Creative iMedia

Place the following structures in order from smallest to largest:

cell

organ

nucleus

tissue

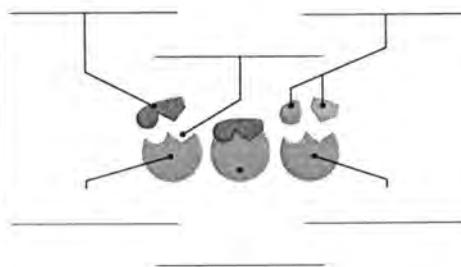
organism

1. _____
2. _____
3. _____
4. _____
5. _____



The _____ is the part of the body where food is absorbed into the bloodstream.

The diagram below shows the lock and key model of enzyme function. Label the diagram using the following words: enzyme, active site, substrate, products, enzyme-substrate complex.



Define what an enzyme is.

Enzymes are described as being specific to a substrate. What does this mean? Use the diagram to help your explanation.



Bile is made in the liver and stored in the gall bladder.

Bile neutralises s _____ a _____ to lower the pH so protease enzymes can work.

It also e _____ fats to give them a larger s _____ a _____ for lipase to work on. This speeds up d _____.

Describe how to carry out the test for reducing sugars. Keywords: Benedict's, heat, colour change, blue, red.

1. _____
2. _____
3. _____
4. _____

What is the function of phloem tissue?

The xylem tissue is composed of hollow tubes strengthened by lignin. What is the function of xylem tissue?

Describe how a root hair cell is adapted for the efficient uptake of water and mineral ions.



Where, in the plant, is meristem tissue located?

Transpiration is:
(Tick the correct box.)

The movement of water molecules from a high water concentration to a lower water concentration across a partially permeable membrane. ☐

The evaporation and diffusion of water from the leaves of a plant. ☐

The movement of glucose molecules around the plant. ☐

Name three factors that affect the rate of transpiration.

- _____
- _____
- _____
- _____

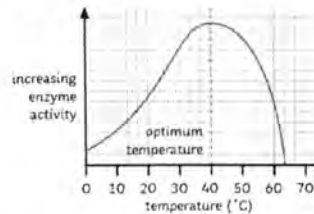
Describe how to test for starch.

1. _____
2. _____
3. _____

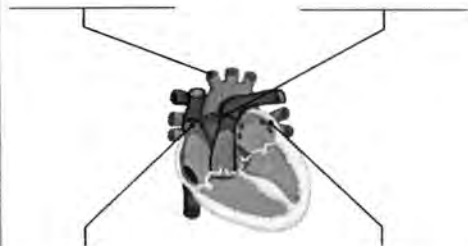
Describe how to test for protein.

1. _____
2. _____
3. _____

Use the graph below to describe how temperature affects enzyme function. Keywords: optimum, rate of activity, temperature, increase, decrease 50 °C



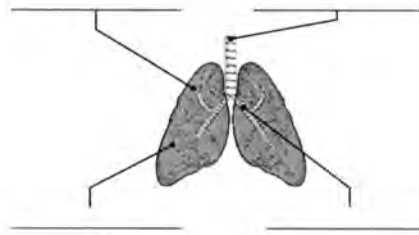
Label the following blood vessels on the diagram of the heart:
aorta, vena cava, pulmonary artery, pulmonary vein.



The artery carries blood a _____ from the heart. It has thick layers of m _____ for strength and elastic f _____. The walls are thick with a small l _____.

Why does the left ventricle have a thicker, more muscular wall than the right ventricle?

Label the following parts on the diagram below:
trachea, bronchus, bronchiole, alveolus.



In coronary heart disease, layers of fatty material builds up inside the coronary arteries. Explain how this can lead to a heart attack. Keywords: fatty material, oxygen, heart attack, arteries.

What are statins? Choose the correct answer.

They reduce the amount of LDL. ☐

They reduce the amount of HDL. ☐

They increase the amount of LDL. ☐

Stents can be used to treat coronary heart disease. Give one advantage and one disadvantage of using stents.

advantage: _____

disadvantage: _____

How can the valves in the heart become damaged?

What happens when the valves become leaky?

What can they be replaced by?

What could be the problems?

A problem with heart transplants is rejection of the donor heart. What is meant by rejection in terms of a heart transplant?

Describe two ways that the lungs are adapted for gaseous exchange.

Match up the four components of the blood and their functions

red blood cells	help to clot the blood
white blood cells	transport oxygen
platelets	defend against pathogens
plasma	liquid part of blood

Explain how an infection from a microorganism could lead to the development of other, non-communicable diseases.

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

Biology 2: Organisation

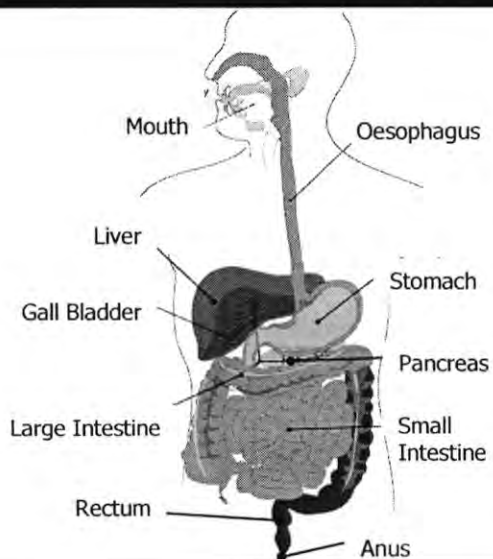
Section 1: Organisation

1 Tissue	A group of cells with a similar structure and function e.g. muscle tissue
2 Organ	A group of tissues performing a specific function e.g. heart, leaf
3 Organ System	A group of organs that perform a specific function e.g. digestive system.

Section 2: Human Digestive System

4 Order of movement of food through the digestive system:

Mouth	Many
Oesophagus	Ordinary
Stomach	Students
Small intestine	Struggle
Large intestine	Learning and
Rectum	Remembering
Anus	Answers



Section 3: Enzymes Key Terms

5 Enzyme	A biological catalyst that can speed up the rate of reaction without being used itself. Made of a large protein molecule .
6 Substrate	The chemical that fits into the active site of an enzyme.
7 Lock and Key Model	Only one type of substrate can fit into the active site of an enzyme, like a key fits into a lock.
8 Denatured	When the active site of an enzyme changes shape and the substrate can no longer fit in . Can be caused by pH or temperature .

Section 4: Testing for Biological Molecules

Molecule	Chemical Test	Positive Result
9 Starch	Add orange/brown iodine solution .	Colour turns to blue/black .
10 Sugar	Add blue Benedict's solution . Place in a boiling water bath for 5 minutes .	Colour turns green/ yellow/ orange/ brick red .
11 Protein	Add blue Biuret solution .	Colour turns to lilac/ purple .
12 Lipid	Add ethanol and decant into water .	Cloudy white emulsion .

Section 5a: Human Digestive Enzymes

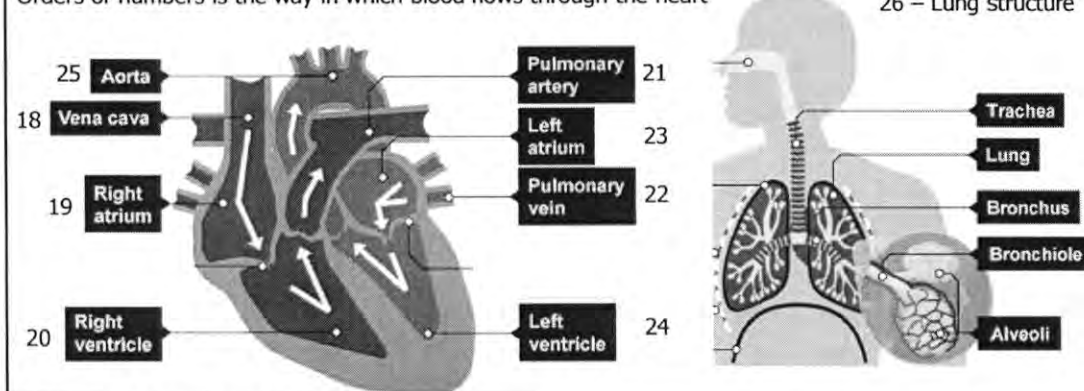
Enzyme	Function	Sites of production	Sites of action
13 Amylase	Breaks starch into sugars .	Salivary glands Pancreas Small intestine	Mouth Small intestine
14 Protease	Breaks proteins into amino acids .	Stomach Pancreas Small intestine	Stomach Small intestine
15 Lipase	Breaks lipids (fats) into fatty acids and glycerol .	Pancreas Small intestine	Small intestine

Section 5b: Other Chemicals

16 Hydrochloric Acid	Acid with pH of 2 produced by the stomach. Unravels proteins .
17 Bile	Emulsifies fats (turns them into droplets to give a greater surface area). It is alkaline so neutralises acid from the stomach . Produced in liver, stored in gall bladder and is released into the small intestine .

Section 6: Heart and Lungs

Orders of numbers is the way in which blood flows through the heart



Section 6a: Structures in the Heart

27 Pacemaker	Group of cells in the right atrium that controls resting heart rate .
28 Right ventricle	Pumps deoxygenated blood to the lungs for gas exchange .
29 Left ventricle	Pumps oxygenated blood to the body . Thick, muscular wall .
30 Valve	Stops blood flowing the wrong way / leaking.

Section 6b: Structures in the Lungs

31 Alveoli	Small sacs where gas exchange occurs. Surrounded by capillaries . Oxygen moves from the alveoli into the capillaries , carbon dioxide moves from the capillaries into the alveoli
32 Trachea and Bronchi	Tubes through which gases move. Lined with cartilage so they don't collapse.

Biology 2: Organisation

Section 7: Heart Disease

33 Coronary Heart Disease Build up of **fatty material in coronary arteries**. Can lead to a **blood clot** and a **heart attack**.

Treatment	What it is	Advantage	Disadvantage
34 Stent	Wire mesh that opens up a blocked artery .	Keeps artery open. Low-risk surgery.	Fatty material can rebuild.
35 Statin	Drug that reduces cholesterol .	Reduces fat being deposited in arteries.	Side effects e.g. liver damage.
36 Heart transplant	Replacement heart from a donor.	Long-term.	Major surgery. Could be rejected.
37 Artificial heart	Man-made heart used while waiting for a transplant .	Not rejected. Keeps patient alive.	Short life-time. Battery has to be transported. Limited activity.
38 Mechanical heart valve	Mechanical replacement of faulty heart valve.	Can last a life-time.	Can damage red blood cells.
39 Biological heart valve	Biological replacement of faulty heart valve.	Don't damage red blood cells.	Valve hardens and may need replacing.

Section 8: Blood Vessels



	40 Artery	41 Vein	42 Capillary
Purpose	Takes blood away from the heart .	Takes blood back to the heart .	Exchange of substances between blood and cells.
Adaptations	Thick wall to withstand high pressure	Thin wall. Valves to prevent backflow of blood.	Wall is one cell thick to allow quick diffusion of substances.

Section 9: Components of the Blood

43 Plasma	Liquid part of the blood. Transports blood cells as well as carbon dioxide, proteins, glucose, hormones and urea .
44 Red Blood Cells	Carries oxygen . Packed with haemoglobin , a protein that binds to oxygen. No nucleus to create extra space for haemoglobin. Biconcave shape to give a large surface area .
45 White Blood Cells	Destroy pathogens . Some can produce antibodies .
46 Platelets	Cell fragments that help to clot wounds .

Section 10a: Movement within Plants

47 Transpiration	The loss of water vapour from the leaves by evaporation from cells and then out through the stomata .
48 Transpiration Stream	The movement of water from the roots , up the stem to the leaves .
49 Translocation	The movement of dissolved sugars around the plant.

Section 10b: Factors Affecting Transpiration

50 Temperature	Increasing temperature increases the transpiration rate as water evaporates quickly.
51 Humidity	Increasing humidity decreases the rate of transpiration as water evaporates slowly.
52 Wind speed	Increasing wind speed increases the transpiration rate as water evaporates quickly.
53 Light	Increasing light increases the rate of transpiration as stomata open .

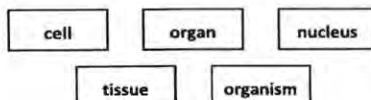
Section 11: Cell Adaptations for Movement Within Plants

54 Root hair cell Extension gives a large surface area to absorb water and minerals .	55 Xylem Vessels are strengthened by lignin to withstand pressure . Cell walls are waterproof .	56 Phloem End of cells contain pores to allow dissolved sugars to move between cells.	57 Guard Cells and Stoma Guard cells can open the stoma to allow gas exchange or close to prevent water loss .

Section 12: Leaf Structure and Plant Tissues

58 Epidermis	Cover the surfaces of the leaf; lets light penetrate .
59 Xylem	Carries water and minerals from the roots around the plant.
60 Phloem	Carries dissolved sugars made through photosynthesis around the plant.
61 Palisade mesophyll	Where most photosynthesis takes place. Cells contain many chloroplasts . Absorbs light .
62 Spongy mesophyll	Some photosynthesis . Has air spaces for diffusion of CO ₂ and O ₂ .
63 Guard cells	Cells that open and close stomata .
64 Stoma	Opening that allows CO₂ and O₂ to diffuse in and out of the leaf.

Place the following structures in order from smallest to largest:



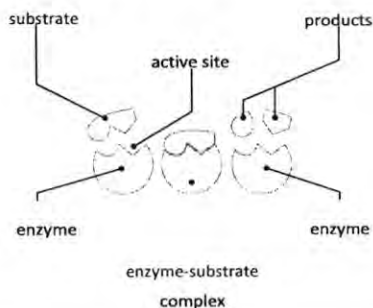
1. nucleus
2. cell
3. tissue
4. organ
5. organism



The small intestine is the part of the body where food is absorbed into the bloodstream.

The diagram below shows the lock and key model of enzyme function. Label the diagram using the following words:

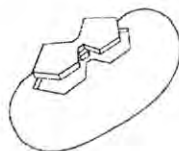
enzyme, active site, substrate, products, enzyme-substrate complex.



Define what an enzyme is.

A biological catalyst.

Enzymes are described as being specific to a substrate. What does this mean? Use the diagram to help your explanation.



The active site of the enzyme has a unique shape. Only a substrate with a complementary shape can fit and bind to form an enzyme-substrate complex.

Bile is made in the liver and stored in the gall bladder.

Bile neutralises stomach acid to lower the pH so protease enzymes can work.

It also emulsifies fats to give them a larger surface area for lipase to work on. This speeds up digestion.

Describe how to carry out the test for reducing sugars.

Keywords: Benedict's, heat, colour change, blue, red.

1. Place the test sample into a test tube (about 2ml).
2. Add an equal amount of Benedict's reagent.
3. Heat in a water bath for 5 minutes.
4. The colour will change from blue to either green/yellow/red, depending on the amount of reducing sugar present.

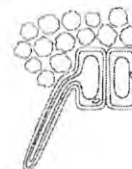
What is the function of phloem tissue?

To transport food substances (dissolved sugars) around the plant. This process is called translocation.

The xylem tissue is composed of hollow tubes strengthened by lignin. What is the function of xylem tissue?

To transport water and dissolved minerals from the roots to the stem and the leaves. This is called the transpiration stream.

Describe how a root hair cell is adapted for the efficient uptake of water and mineral ions.



They have a large surface area for the rapid absorption of water and mineral ions from the soil.

Where, in the plant, is meristem tissue located?

Growing tips of roots and shoots.

Transpiration is:

(Tick the correct box.)

The movement of water molecules from a high water concentration to a lower water concentration across a partially permeable membrane.

☐

The evaporation and diffusion of water from the leaves of a plant.

☒

The movement of glucose molecules around the plant.

☐

Name three factors that affect the rate of transpiration.

Any three from the following:

- temperature;
- light intensity;
- air flow;
- humidity.

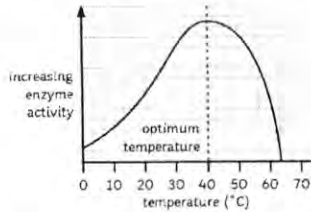
Describe how to test for starch.

1. Place the test sample into a test tube.
2. Add a few drops of iodine solution and mix.
3. The colour will change from orange to blue/black if starch is present.

Describe how to test for protein.

1. Place the test sample into a test tube (about 2ml).
2. Add an equal amount of Biuret reagent and mix.
3. The colour will change from blue to purple if protein is present.

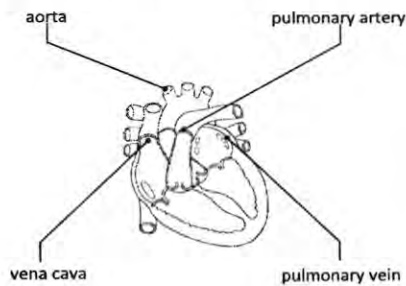
Use the graph below to describe how temperature affects enzyme function. Keywords: optimum, rate of activity, temperature, increase, decrease 50 °C



Initially, as temperature increases, the rate of enzyme activity also increases up to 40°C. This is the optimum temperature. After 40°C, as the temperature increases, the rate of enzyme activity decreases.

Label the following blood vessels on the diagram of the heart:

aorta, vena cava, pulmonary artery, pulmonary vein.

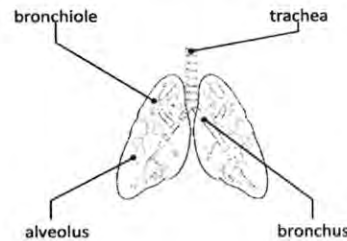


The artery carries blood away from the heart. It has thick layers of muscle for strength and elastic fibres. The walls are thick with a small lumen.

Why does the left ventricle have a thicker, more muscular wall than the right ventricle?

The left ventricle has to pump blood at high pressure so that it can reach all body cells. Whereas the right ventricle only has to pump blood to the lungs.

Label the following parts on the diagram below: trachea, bronchus, bronchiole, alveolus.



In coronary heart disease, layers of fatty material build up inside the coronary arteries. Explain how this can lead to a heart attack. Keywords: fatty material, oxygen, heart attack, arteries.

The layers of fatty material block the coronary arteries and restrict blood flow to heart muscle cells. This results in a lack of oxygen and the heart muscle cells stop respiring. This can lead to a heart attack.

What are statins? Choose the correct answer.

They reduce the amount of LDL.



They reduce the amount of HDL.



They increase the amount of LDL.



Stents can be used to treat coronary heart disease. Give one advantage and one disadvantage of using stents.

advantage: Patients recover quickly and they are effective for a long time.

disadvantage: There is a risk of the patient developing a blood clot near the stent, which can lead to a heart attack.

How can the valves in the heart become damaged?

Heart attack, infection, old age.

What happens when the valves become leaky?

Blood flows in two directions.

What can they be replaced by?

Biological or mechanical valves.

What could be the problems?

A blood clot.

A problem with heart transplants is rejection of the donor heart. What is meant by rejection in terms of a heart transplant?

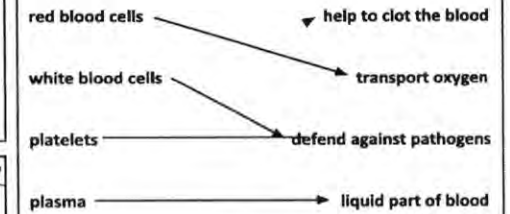
When the body's immune system (white blood cells) attacks and destroys the donor heart muscle cells.

Describe two ways that the lungs are adapted for gaseous exchange.

Any three from the following:

- large surface area;
- moist lining;
- thin walls;
- good blood supply.

Match up the four components of the blood and their functions



Explain how an infection from a microorganism could lead to the development of other, non-communicable diseases.

Infection from some viruses can lead to the development of cancer (e.g. HPV infection and cervical cancer). Also, infection with pathogens can sometimes trigger allergic reactions and worsen asthma, for example.

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

A benign tumour remains in one place and doesn't invade other tissues in the body – not usually dangerous.

A malignant tumour spreads to other parts of the body when cells break off and travel in the bloodstream to form secondary tumours.