

## Biology 2: Organisation

Section 1: Organisation	
1 Tissue	A <b>group of cells</b> with a <b>similar structure and function</b> e.g. muscle tissue
2 Organ	A <b>group of tissues</b> performing a specific <b>function</b> e.g. heart, leaf
3 Organ System	A <b>group of organs</b> that perform a specific <b>function</b> 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

The diagram illustrates the human digestive system. It shows the mouth at the top, leading to the oesophagus. The stomach is located below the oesophagus. The liver and gall bladder are situated to the left of the stomach. The pancreas is located below the stomach. The small intestine is a long, coiled tube that follows the stomach. The large intestine is a shorter, wider tube that follows the small intestine. The rectum is the final part of the large intestine, leading to the anus.

## Section 3: Enzymes Key Terms

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

## Section 4: Testing for Biological Molecules

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

## Section 5a: Human Digestive Enzymes

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

## Section 5b: Other Chemicals

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

## Section 6: Heart and Lungs

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

The diagram shows the heart and lungs. The heart is a four-chambered organ with four main blood vessels: the Aorta (25), Vena cava (18), Right atrium (19), and Right ventricle (20) on the left side; and the Pulmonary artery (21), Left atrium (23), Pulmonary vein (22), and Left ventricle (24) on the right side. Arrows indicate the direction of blood flow. The lungs are shown to the right, with the Trachea (26), Lung, Bronchus, Bronchiole, and Alveoli labeled.

## Section 6a: Structures in the Heart

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

## Section 6b: Structures in the Lungs

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

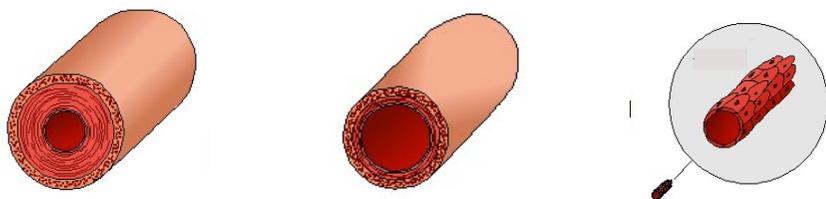
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### Section 7: Heart Disease

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	<b>Wire mesh that opens up a blocked artery.</b>	Keeps artery open. Low-risk surgery.	Fatty material can rebuild.
35 Statin	Drug that <b>reduces cholesterol</b> .	Reduces fat being deposited in arteries.	Side effects e.g. liver damage.
36 Heart transplant	<b>Replacement heart</b> from a donor.	Long-term.	Major surgery. Could be rejected.
37 Artificial heart	<b>Man-made heart</b> used while <b>waiting for a transplant</b> .	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 <b>away from the heart</b> .	Takes <b>blood back to the heart</b> .	<b>Exchange of substances between blood and cells.</b>
Adaptations	<b>Thick wall to withstand high pressure</b>	Thin wall. <b>Valves to prevent backflow of blood.</b>	Wall is <b>one cell thick</b> to allow <b>quick diffusion</b> of substances.

### Section 9: Components of the Blood

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

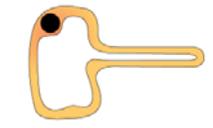
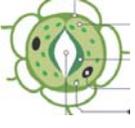
### Section 10a: Movement within Plants

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

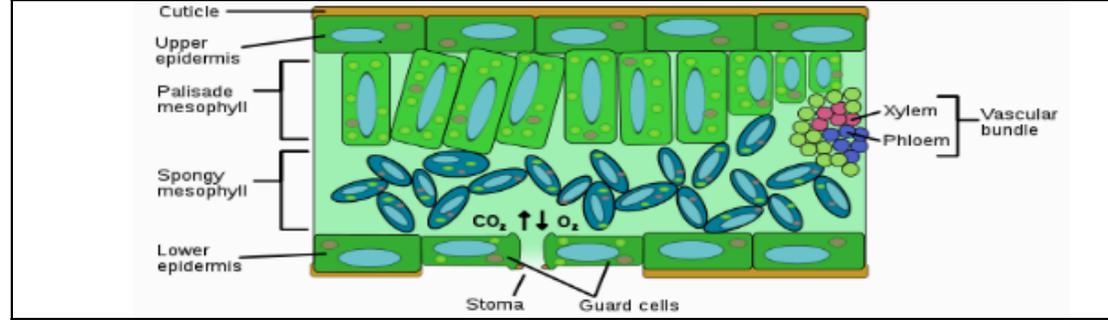
### Section 10b: Factors Affecting Transpiration

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

### Section 11: Cell Adaptations for Movement Within Plants

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

### Section 12: Leaf Structure and Plant Tissues



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