


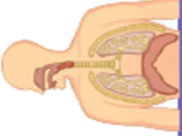



AQA GCSE Biology (Combined Science) Unit 2: Organisation

Principles of Organisation

				
cell	tissue	organ	organ system	organism
Cells are the basic building blocks of all living things.	A group of cells with a similar structure and function is called a tissue.	An organ is a combination of tissues carrying out a specific function.	Organs work together within an organ system.	Organ systems work together to form whole living organisms.

Food Tests (Required Practical)


What are you testing for?	Which indicator do you use?	What does a positive result look like?
sugar	Benedict's reagent	Once heated, the solution will change from blue-green to yellow-red.
starch	iodine	Blue-black colour indicates starch is present.
protein	biuret	The solution will change from blue to pink-purple.
lipid	sudan III	The lipids will separate and the top layer will turn bright red.

Effect of pH on the Rate of Reaction of Amylase (Required Practical)

Iodine is used to test for the presence of starch. If starch is present, the colour will change to blue-black.

The independent variable in the investigation is the pH of the buffer solution.

The dependent variable in the investigation is the time taken for the reaction to complete (how long it takes for all the starch to be digested by the amylase).



Method:

- Use the marker pen to label a test tube with the first value of pH buffer solution (pH 4) and stand it in the test tube rack.
- Into each well of the spotting tiles, place a drop of iodine.
- Using a measuring cylinder, measure 2cm³ of amylase and pour into the test tube.
- Using a syringe, measure 1cm³ of the buffer solution and pour into the test tube.
- Leave this to stand for five minutes and then use the thermometer to measure the temperature. Make a note of the temperature.

Organisation

Describe levels of organisation within an organism

Digestive system

Identify functions of the digestive system

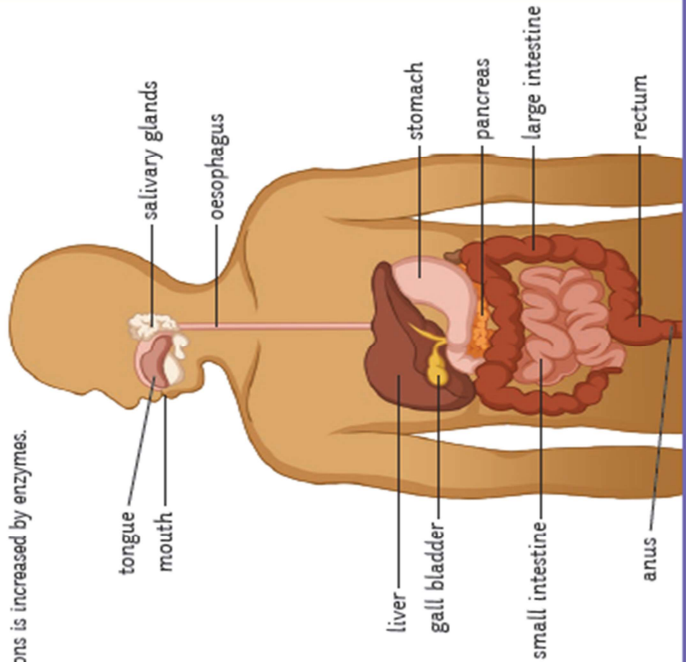
Enzymes

Identify digestive enzymes and their actions

- Add 2cm³ of starch solution into the test tube, using a different measuring cylinder to measure, and begin a timer (leave the timer to run continuously).
- After 10 seconds, use a pipette to extract some of the amylase/starch solution, and place one drop into the first well of the spotting tile. Squeeze the remaining solution back into the test tube.
- Continue to place one drop into the next well of the spotting tile, every 10 seconds, until the iodine remains orange.
- Record the time taken for the starch to be completely digested by the amylase by counting the wells that were tested positive for starch (indicated by the blue/black colour change of the iodine). Each well represents 10 seconds of time.
- Repeat steps 1 to 8 for pH values 7 and 10.

The Digestive System

The purpose of the digestive system is to break down large molecules into smaller, soluble molecules, which are then absorbed into the bloodstream. The rate of these reactions is increased by enzymes.



Organisation

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Identify functions of the digestive system

Enzymes

Identify digestive enzymes and their actions

An enzyme is a biological catalyst; enzymes speed up chemical reactions without being changed or used up.



This happens because the enzyme lowers the activation energy required for the reaction to occur. Enzymes are made up of chains of amino acids folded into a globular shape.

Enzymes have an active site which the substrate (reactants) fits into. Enzymes are very specific and will only catalyse one specific reaction. If the reactants are not the complementary shape, the enzyme will not work for that reaction.

Enzymes also work optimally at specific conditions of pH and temperature. In extremes of pH or temperature, the enzyme will denature. This means that the bonds holding together the 3D shape of the active site will break and the active shape will deform. The substrate will not be able to fit into the active site anymore and the enzyme cannot function.

Enzyme	Reactant	Product
amylase	starch	sugars (glucose)
protease	protein	amino acids
lipase	lipid	glycerol and fatty acids

The products of digestion are used to build new carbohydrates and proteins and some of the glucose is used for respiration.

Bile is produced in the liver and stored in the gall bladder. It is an alkaline substance which neutralises the hydrochloric acid in the stomach. It also works to emulsify fats into small droplets. The fat droplets have a higher surface area and so the rate of their digestion by lipase is increased.