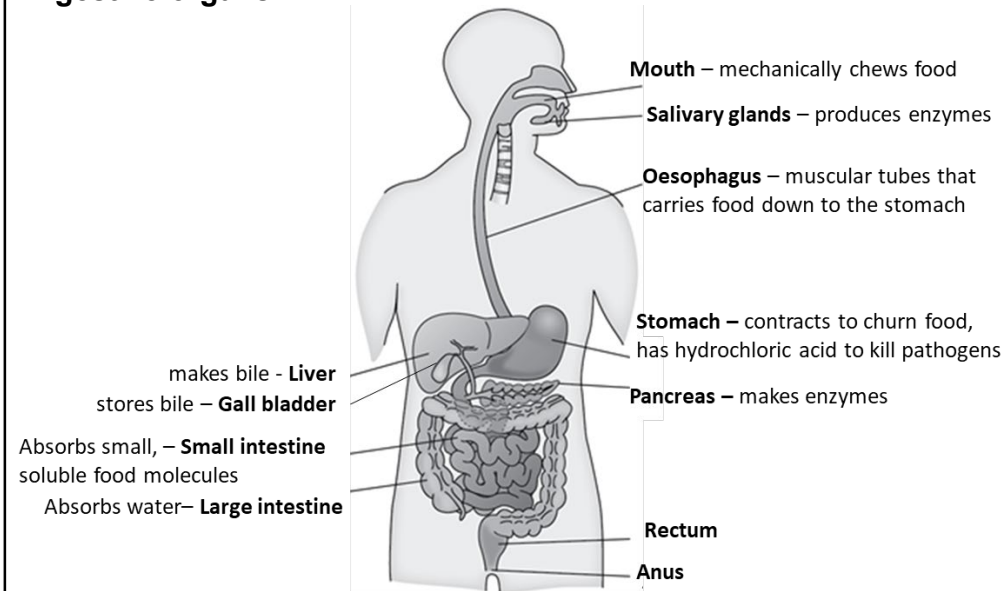


AQA B2a Organisation: The human digestive system COMBINED FOUNDATION

	Key word	Definition	Example
smallest ↓ biggest	cell	The basic building blocks of all living organisms.	Muscle cell
	tissue	A group of cells with a similar structure and function.	Muscle tissue – contracts to cause movement Epithelial tissue – covers organs and the outside of the body Glandular tissue – produces enzymes and hormones
	organ	Multiple tissues working together to perform a specific function.	Heart
	organ system	Multiple organs working together to perform a specific function	Digestive system
	organism	A living thing	Human, plant, bacteria

Digestive organs



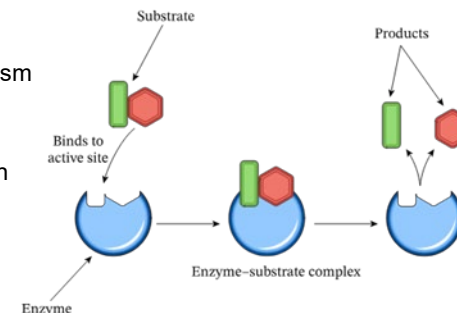
Key word	Definition
Digestion	Digestion is breaking down large, insoluble food molecules into small, soluble ones that can be absorbed into the bloodstream.
Enzyme	Protein that speeds up reactions
Rate of reaction	How fast a reaction is
Denature	When the active site of an enzyme changes shape and is no longer complementary to a substrate.

Enzymes

Enzymes are proteins that catalyse (speed up) chemical reactions in the body. They make our metabolism (chemical reactions) fast enough for us to survive.

Enzymes are described using the 'lock and key theory'. They have a very specific shaped active site (lock) which is only complementary to one substrate (key).

The enzyme and substrate bind together and products are formed. The enzyme isn't changed so it can be used again.



Food tests (required practical 4)

Food	What chemical would you use to test for it?	What colour change would you see?
starch	Iodine	Brown/orange → blue/black
Sugar	Benedict's solution + HEAT	Blue → brick red
protein	Biuret reagent	Blue → purple
Lipid (fat)	Ethanol and water	Clear → cloudy white

Chemistry of food

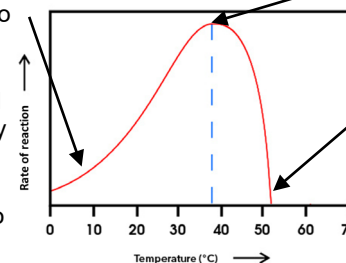
Food is broken down into small molecules, than can then be used to build new proteins, lipids, carbohydrates. Some glucose is used in respiration

Food	Role	Enzyme that digests it	Where the enzyme is made	What the food is made out of
Carbohydrates	Energy source	carbohydrase	Salivary glands, pancreas, small intestine	Simple sugars
Starch	Energy source	amylase	Salivary glands, pancreas, small intestine	Glucose
Protein	Growth and repair	protease	Stomach, pancreas, small intestine	Amino acids
Lipids	Store of energy and insulation	lipase	Pancreas, small intestine	Glycerol and fatty acids

Factors that affect enzymes (can speed them up or slow them down) (Required practical 5)

1. Temperature

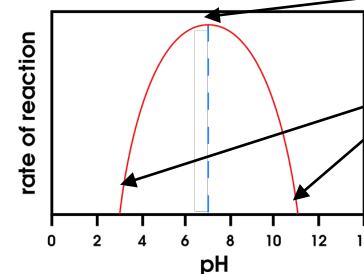
If the temperature is too low, then the enzyme and substrate don't have much energy and move very slowly. They are unlikely to collide and form an enzyme substrate complex – so the rate of reaction is very slow.



The enzymes optimum temperature. This is when the enzyme works as quickly as possible

If the temperature is too high, the enzyme denatures and the rate of reaction slows down

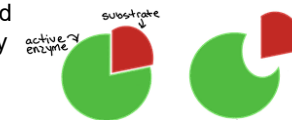
2. pH



The enzymes optimum pH. This is when the enzyme works as quickly as possible

If the pH is too high or too low, the enzyme denatures and the rate of reaction slows down

An enzyme **denatures** when the active site of an enzyme changes shape and is no longer complementary to a substrate.



3. Bile

Bile is an alkaline liquid that is made by the liver and stored in the gall bladder. It helps to speed up the digestion of lipids in two ways:

- It is an alkali so it neutralised acid from the stomach. This provides enzymes in the small intestine with their optimum pH.
- It emulsifies (breaks down) lipids into small droplets to increase the surface area. This allows the enzyme lipase to break down the lipids at a quicker rate.

