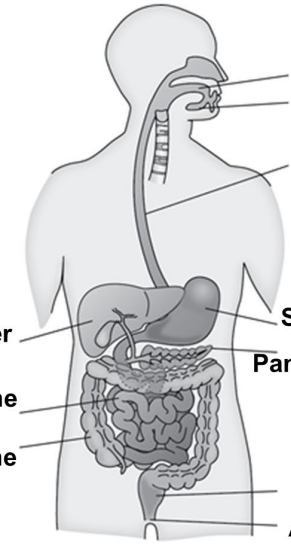
AQA B2a Organisation: The human digestive system TRIPLE BIOLOGY

Key word	Definition	Example
cells	The basic building blocks of all living organisms.	muscle cell
tissues	A group of cells with a similar structure and function.	muscle tissue
organs	Multiple tissues working together to perform a specific function.	heart
organ systems	Multiple organs working together to perform a specific function	circulatory system
organism	A living thing	human

Digestive organs

The digestive system is an organ system where multiple organs work together to digest and absorb food.



Mouth

Salivary glands

Oesophagus – muscular tube that carries food down to the stomach

Stomach – contracts to churn up food

Pancreas – makes and releases enzymes

Makes bile – **Liver**

Breaks down and absorbs small, soluble food molecules – **Small intestine**

Absorbs water from undigested food - **Large intestine**

Rectum

Anus

Enzymes

Enzymes are proteins that catalyse (speed up) chemical reactions in the body. 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.

Enzymes control the rate of metabolism (all the chemical reactions that occur in the body).

Digestive enzymes convert insoluble food molecules into small, soluble molecules that can be absorbed into the blood stream. These soluble products of digestion are then used to build new proteins, lipids and carbohydrates. Some glucose is used in respiration.

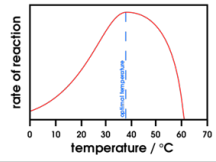
Chemistry of food

Enzyme	Food it breaks down	Product of digestion	Where it's made
carbohydrase	Carbohydrates	Simple sugars	Salivary glands, pancreas, small intestine
amylase (a type of carbohydrase)	Starch	Glucose	Salivary glands, pancreas, small intestine
protease	Protein	Amino acids	Stomach, pancreas, small intestine
lipase	Lipids	Glycerol and fatty acids	Pancreas, small intestine

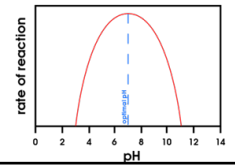
Factors affecting enzyme activity (required practical 5)

The activity of an enzyme can be altered by temperature and pH

If the temperature is too high, then the enzyme denatures.



If the pH is too high or low, then the enzyme denatures.



When an enzyme denatures its active site changes shape. This means it can no long bind to the substrate and cannot catalyse the reaction.

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
carbohydrate	Benedict's solution	Blue → brick red
protein	Biuret reagent	Blue → purple
lipid	Ethanol and water (emulsion test)	Clear → cloudy white

Making digestion efficient

	Where is it made?	What does it do?
bile	Made in the liver and stored in the gall bladder	Is alkaline liquid that neutralises stomach acid. This provides enzymes in the small intestine with their optimum pH.
		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.