

Digestion Knowledge Organiser

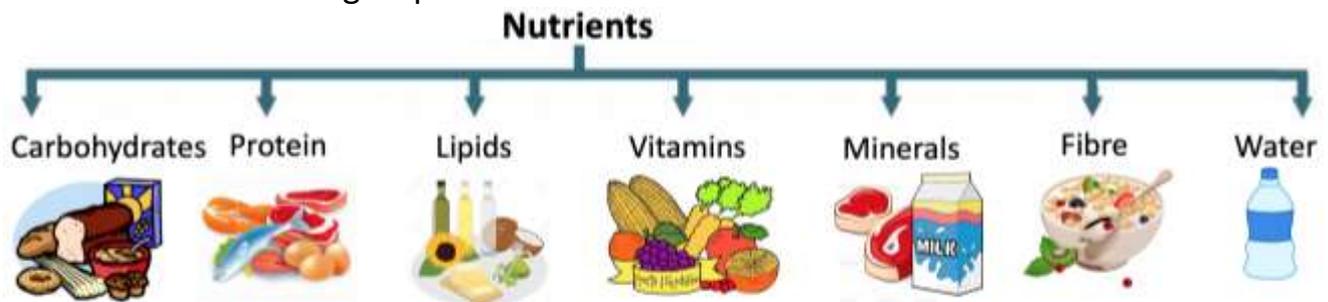
Topic Overview

Key concept 1: A balanced diet depends on eating appropriate amounts of different types of food.

- Food contains useful substances called **nutrients**.
- A balanced diet helps to keep us healthy by providing us with the *correct amount of each* nutrient group.
- **Food tests** can be used to show which nutrients food contain:

Nutrient	Starch	Sugar	Protein	Fat
Reagent	Iodine	Benedict's	Biuret test	Ethanol + water
Positive result	Blue-black	Brick red	Lilac	Cloudy white

- There are 7 nutrient groups in total:

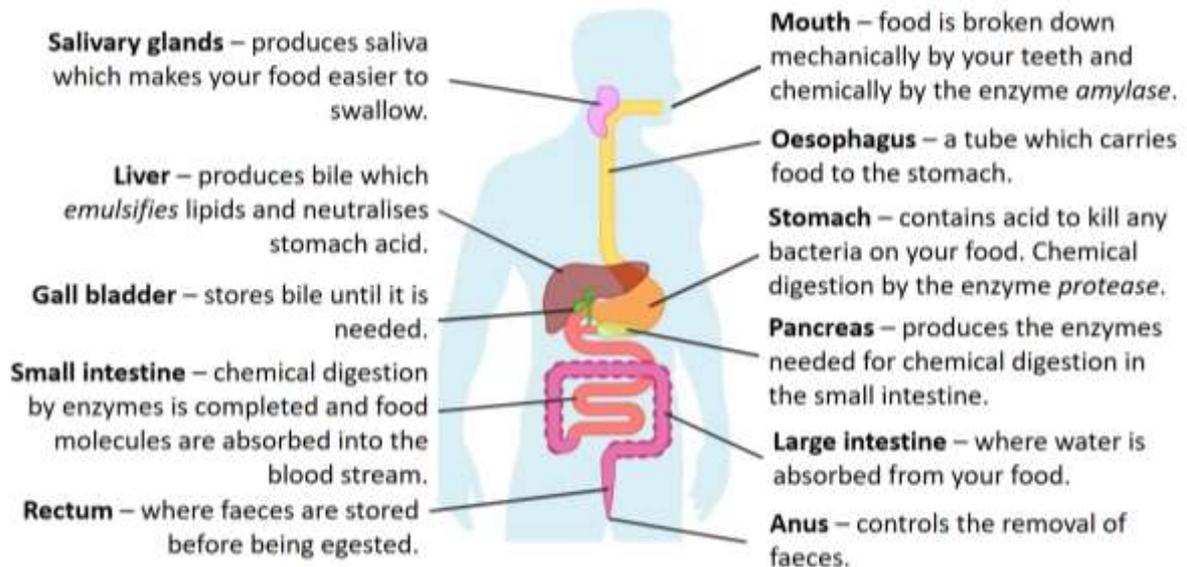


1. **Carbohydrates** (starches and sugars) such as cereal, bread, rice, pasta and potatoes are our main source of energy because the glucose they contain is used in respiration.
2. **Proteins** are needed to make new cells when we are growing or repairing our body. Proteins are found in foods such as fish, meat, beans, nuts and eggs.
3. **Lipids** are fats (e.g. butter) and oils (e.g. olive oil). Our bodies uses lipids to store energy, protect our organs and insulate us.
4. **Vitamins** are needed in small amounts to keep our bodies healthy. The best sources of vitamins are fruit and vegetables. People who do not eat enough vitamins, can develop **deficiency diseases** e.g. rickets or scurvy.
5. **Minerals:**
 - **Calcium** is needed for strong bones and teeth. It is found in milk and cheese.
 - **Iron** is needed to make red blood cells. It is found in red meat like beef.
6. **Fibre**, found in fruit, vegetables and wholegrain cereals, helps move food through our digestive system (a process called peristalsis) – this prevents us from becoming constipated.
7. **Water** is essential for life and is found in a wide range of food and drink. It used for transporting substances around our body.
 - Active people need more energy and so would need to eat more carbohydrates.
 - Pregnant women need more protein as they must also provide protein for the growing fetus.
 - Women who are menstruating need more iron as they lose blood each month.
 - Children need more calcium as their bones are still growing.

- People who eat too food and do not exercise enough can become **obese**.
- People who eat too many unhealthy fats (called saturated fats), found in foods like cakes and crisps, can develop **heart disease**.

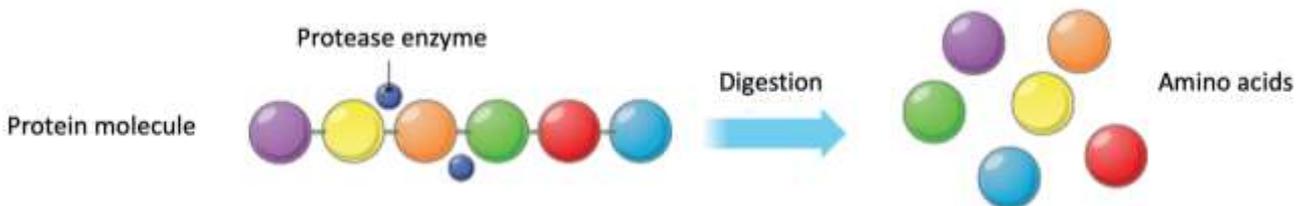
Key Concept 2: Organs of the digestive system are adapted to break large food molecules into small ones which can travel in the blood to cells and are used for life processes.

- The digestive system breaks down large molecules of insoluble food into smaller molecules which can be absorbed into the blood.
- The diagram below shows the digestive system:



What happens in the small intestine?

- We cannot absorb complex carbohydrates, proteins or lipids. Even after chewing, the molecules are still too big to pass through the lining of the small intestine.
- **Enzymes** are needed to break these foods down even further. They act like chemical scissors, snipping long chains of food into individual molecules, for example,
 - **Proteins** are broken down into amino acids by protease enzymes:



- **Starch** is broken down into glucose by amylase.
- **Lipids** are first *emulsified* into small droplets by **bile** and then broken down into fatty acids and glycerol by lipase.
- In the **small intestine**, the individual molecules are absorbed into our **blood stream** and transported to the cells in our body. The small intestine is covered in special finger-like projections called **villi** which provide a huge surface area for absorption.
- Enzymes work best in certain conditions:
 - Most enzymes work best at in **neutral** conditions (pH 7). However, the protease in your stomach (pepsin) works best in a strong acid.
 - All work fastest at **37°C** as it is our body temperature. If the enzyme is heated above this temperature, it will not work anymore – we say it has been **denatured**.

Digestion Key Fact Test 1-10

KC	No	Questions	Answers	<input checked="" type="checkbox"/>
KC1	1	If Benedict's solution turns brick-red, what must the food contain?	Sugar	
	2	If iodine turns blue-black, what must the food contain?	Starch	
	3	Name foods which are a good source of carbohydrate.	Potatoes, bread, rice and pasta	
	4	Name foods which are a good source of protein.	Meat, fish, eggs, pulses and nuts	
	5	Name foods which are a good source of lipids (fats).	Butter, margarine and oil	
	6	Which nutrient is needed to give us energy?	Carbohydrates	
	7	Which nutrient is needed for growth and repair?	Protein	
	8	Which nutrient stores energy, protects our organs and insulates us?	Lipids (fats)	
	9	Which nutrient helps food move through the digestive system?	Fibre	
	10	Which mineral is needed to make red blood cells?	Iron	

Digestion Key Fact Test 11-20

KC	No	Questions	Answers	<input checked="" type="checkbox"/>
KC1	11	Which mineral is needed for strong bones and teeth?	Calcium	
	12	Which organ can be harmed by eating too many unhealthy fats?	Heart	
KC2	13	What is the name given to the breaking down of food?	Digestion	
	14	Why do we need to digest our food?	So the nutrients are small enough to be absorbed	
	15	Where is food broken down mechanically?	The mouth	
	16	Why does the stomach contain acid?	To kill bacteria	
	17	In which part of the digestive system is digestion completed and the nutrients absorbed?	The small intestine	
	18	What do we call the 'chemical scissors' that break foods down into small molecules?	Enzymes	
	19	Which substance emulsifies (breaks down) fat into small droplets?	Bile	
	20	What temperature do enzymes work best at?	37°C (body temperature)	