science

biology

Y8 B4 – Digestion

1) Balanced Diet

A balanced diet is one that contains the correct amounts of all the nutrients needed for healthy growth and activity.

Nutrient	What is it used for	Food it is found in
Carbohydrate	Provides energy	Pasta, rice, potatoes
Protein	Growth and repair	Meat, pulses, eggs
Fat	Store of energy and insulation	Butter, oils, nuts
Vitamins	Maintains health	Fruit, veg, dairy
Minerals	Maintains health	Milk (for calcium), liver (for iron)
Fibre	Keeps food moving through gut	Vegetables, bran cereals
Water	Used in all cells and body fluids	Water, fruit juice, milk

2) Food Testing

- **Iodine** solution tests for the presence of **starch**
  - Present: orange → black
  - Not present: stays orange
- **Biuret** solution tests for the presence of **protein**
  - Present: blue → lilac
  - Not present: stays blue
- **Ethanol** tests for the presence of **fats**
  - Present: colourless → cloudy white
  - Not present: stays colourless

3) Energy from Food

Individuals need different amounts of energy depending on:

- gender (male or female)
- age
- amount of daily activity

Foods energy content is usually measured in **kilojoules, kJ**.

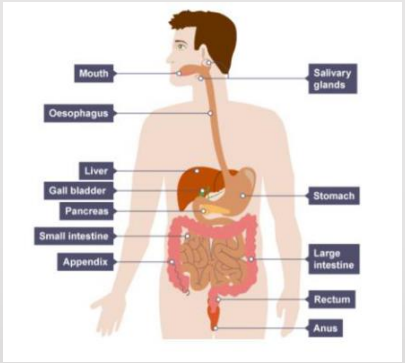
The energy content of food can be found by burning the food and calculating the temperature change of the water you heat.

4) Malnourishment - when people do not eat the right amounts of **nutrients**

- Too little food, or a lack of particular nutrients can cause **deficiency diseases** e.g. lack of vitamin C causes **scurvy**, lack of iron causes **anemia** and lack of vitamin D causes **rickets**.
- Too much food results in **obesity**. This may cause **heart disease** or **type-2 diabetes**.

5) The Digestive System

An organ system that breaks food down into small molecules that can then be absorbed into the blood.

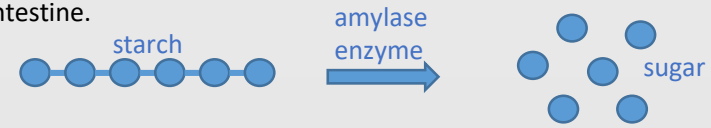


Organs in the digestive system:

- **Oesophagus:** Connects the mouth to the stomach. Food is pushed down using the contraction of muscles.
- **Stomach:** Churns the food. Hydrochloric acid kills harmful bacteria and enzymes break down proteins.
- **Small intestine:** Enzymes break down food and the products are absorbed into the bloodstream.
- **Large intestine:** Absorbs excess water.
- **Rectum:** Storage of faeces (digested material) before excretion.
- **Anus:** Where faeces are excreted (removed from the body).
- **Liver:** Produces bile to help break down fats.
- **Pancreas:** Produces and releases enzymes into the small intestine which speed up the break down of food.

6) Enzymes

Enzymes are special proteins that help break large food molecules into smaller molecules so they can be absorbed into the blood. They are found in the mouth, stomach and small intestine.

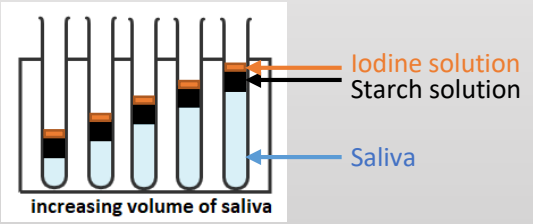


Different enzymes are needed to break down different foods.

- **Proteases:** break down protein into amino acids.
- **Lipases:** break down fats into glycerol and fatty acids.
- **Carbohydrases e.g. amylase:** break down starch into sugar.

7) Investigating Effects of Saliva on Starch

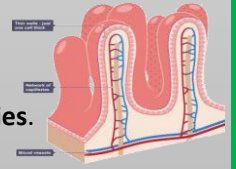
- **Independent variable** – what you change e.g. volume of saliva
- **Dependent variable** – what you measure e.g. time taken for the starch to break down into sugar
- **Control variables** – what you keep the same e.g. volume of starch solution, concentration of starch solution, volume of iodine solution, temperature, concentration of saliva used



- **Anomaly** – a result that does not fit the pattern

8) The Small Intestine

The small intestine is lined with **villi** that are adapted for efficient absorption of digested food into the blood stream by:



- Having a very **large surface area**.
- Being surrounded by **lots of blood capillaries**.
- Having **thin walls** (1 cell thick) for faster absorption.

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