Your notes

KS3 Science: revision notes

B2.4 Nutrition

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A balanced diet

- **Carbohydrates** (starch and sugars) give energy. **Lipids** (fats and oils) store energy and insulate the body. **Proteins** are needed for growth and repair.
- **Vitamins** and **minerals** keep us healthy: **vitamin** C prevents scurvy, vitamin D and calcium keep bones and teeth strong, and iron is needed for red blood cells (a lack causes anaemia).
- **Fibre** keeps food moving through the gut and prevents constipation. Water is needed for all the body's reactions.
- Eating too much can lead to obesity; not enough can lead to starvation. Both are malnutrition.

Food tests

- Starch: add iodine solution. Orange-brown turns blue-black.
- Sugar (glucose): add Benedict's solution and heat in a water bath. Blue turns green, yellow, orange or brick-red.
- **Protein**: add biuret solution. Blue turns purple.
- Fats and oils: shake with ethanol, then add water: a cloudy white layer forms. (Or rub on paper: a translucent spot.)

The digestive system

- Mouth (teeth chew food; saliva contains **amylase**) → oesophagus → stomach (hydrochloric acid kills bacteria; **protease** starts digesting **protein**) → small intestine (enzymes finish digestion, and nutrients are absorbed into the blood) → large intestine (water is absorbed) → rectum → anus.
- The liver makes **bile**, which is stored in the gall bladder and breaks fats into small droplets. The pancreas makes **enzymes**.

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- The small intestine is long and lined with **villi**: tiny finger-like folds that give a huge surface area. They have thin walls and a good blood supply for absorption.

Enzymes and plant nutrition

- **Enzymes** are biological catalysts: they speed up reactions without being used up. Digestive **enzymes** break large, insoluble molecules into small, soluble ones that can be absorbed.
- **Amylase** (a carbohydrase) breaks down starch into sugars. **Protease** breaks down **proteins** into amino acids. Lipase breaks down fats into fatty acids and glycerol.
- **Enzymes** work best at an optimum temperature (about 37 °C in the body) and pH. High temperatures denature them, so they stop working.
- To investigate **amylase**, mix it with starch and test a drop with iodine every 30 seconds; when the iodine stays orange-brown, the starch has gone.
- Plants make their own food by photosynthesis, but they need **mineral** ions from the soil: nitrates for **proteins**, phosphates for roots, potassium for flowers and fruit, and magnesium for chlorophyll.

Key terms

Balanced diet	Eating the right amounts of all the nutrients, fibre and water.
Carbohydrate	A nutrient that gives energy, such as starch or sugar.
Lipid	A fat or oil, used to store energy and insulate the body.
Protein	A nutrient needed for growth and repair.
Vitamin	A nutrient needed in small amounts to stay healthy, such as vitamin C.
Mineral	A nutrient such as calcium or iron, needed in small amounts.
Fibre	Keeps food moving through the gut.
Deficiency disease	An illness caused by a lack of a nutrient, such as scurvy.
Enzyme	A biological catalyst that speeds up reactions.
Amylase	An enzyme that breaks down starch into sugars.
Protease	An enzyme that breaks down proteins into amino acids.
Lipase	An enzyme that breaks down fats into fatty acids and glycerol.
Villi	Tiny folds in the small intestine that increase the surface area.
Bile	Made by the liver; breaks fats into small droplets.

Your notes

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. What is protein needed for?
2. What is fibre needed for?
3. Which mineral is needed for healthy bones and teeth?
4. Which solution is used to test for starch?
5. What colour does biuret solution turn if protein is present?
6. Which food test needs heating in a water bath?
7. What does amylase break down?
8. What are enzymes?

Answers

1. Growth and repair
2. Keeping food moving through the gut
3. Calcium
4. Iodine solution
5. Purple
6. Benedict's test for sugar
7. Starch into sugars
8. Biological catalysts that speed up reactions

What to do next

Practise 15 questions on this topic

Try 4 exam questions, with mark schemes

Read the lesson, one step at a time

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