

AQA GCSE

FOOD PREPARATION AND NUTRITION



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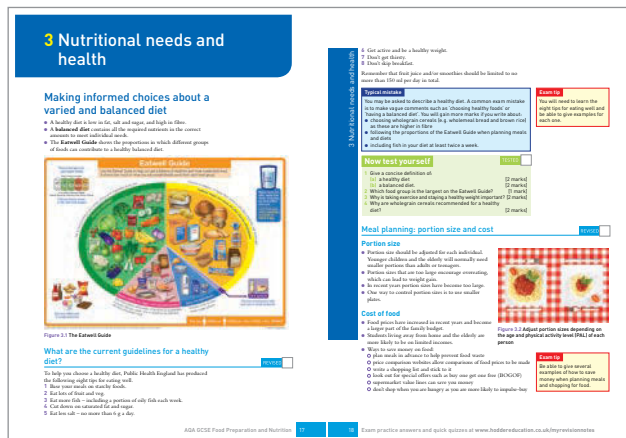
Everyone has to decide their own revision strategy, but it is essential to review your work, learn key facts and test your understanding. These Revision Notes will help you to do that in a planned way, topic by topic. You can check your progress by ticking off each section as you revise.

Tick to track your progress

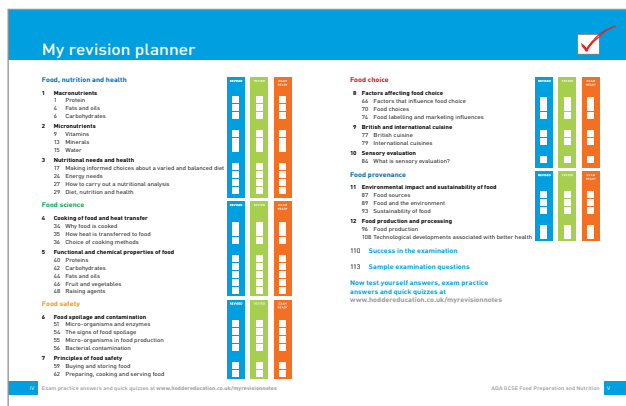


Use the revision planner on pages iv and v to plan your revision, topic by topic. Tick each box when you have:

- revised and understood a topic
- tested yourself
- practised exam questions and gone online to check your answers and complete the quick quizzes.



You can also keep track of your revision by ticking off each topic heading in the book. You may find it helpful to add your own notes as you work through each topic.



Features to help you succeed

Exam tips

Expert tips are given throughout the book to help you polish your exam technique in order to maximise your chances in the exam.

Typical mistakes

The authors identify the typical mistakes candidates make and explain how you can avoid them.

Now test yourself

These short, knowledge-based questions provide the first step in testing your learning. Answers are at the back of the book.

Key words

Key words from the specification are highlighted in bold throughout the book.

Revision activities

These activities will help you to understand each topic in an interactive way.

Exam practice

Practice exam questions are provided for each topic. Use them to consolidate your revision and practise your exam skills.

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AQA GCSE Food Preparation and Nutrition

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1 Macronutrients

Macronutrients are needed by the body in large amounts. Protein, fat and carbohydrates are macronutrients.

Protein

- Protein is present throughout the human body.
- Protein is a **secondary energy source**.
- One gram of protein provides **4 kcals of energy**.

Functions, sources, deficiency and excess

REVISED

Table 1.1 Functions and sources of protein

Functions in the body	Growth Repair Maintain tissue A secondary source of energy	
Sources of protein	High biological value (HBV) sources Meat Fish Eggs Milk Cheese Soya beans Quinoa Mycoprotein (Quorn)	Low biological value (LBV) sources Cereals (e.g. rice, oats) Wheat Peas, beans and lentils Nuts and seeds
What happens if we don't get enough protein?	Children Poor growth Thinning hair or hair loss Catch infections (e.g. colds) easily Fluid under their skin (oedema)	Adults Poor growth Fluid under the skin (oedema) Thinning hair or hair loss Catch infections (e.g. colds) easily
What happens if we get too much protein?	Puts strain on kidneys and liver Increased weight, as extra protein is converted into fat	

Exam tip

There are four functions of protein:

Growth, **E**nergy, **R**epair and **M**aintain = GERM

Note that 'energy' is second in this list. This is because protein is a secondary source of energy; most energy comes from fats and carbohydrates.

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AQA GCSE Food Preparation and Nutrition

The biological value of protein

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- Proteins are made up of building blocks called **amino acids**.
- The body can make amino acids but some can only be obtained from food – these are called **essential amino acids**. There are eight essential amino acids needed by adults and children, and at least two more needed just by children because they are growing.
- Foods that contain all the essential amino acids are described as **high biological value (HBV)**. These include soya beans and soya products, and quinoa.
- Foods that lack one or more of the essential amino acids are described as **low biological value (LBV)**.

Protein complementation

REVISED

- Combining LBV protein foods to form an HBV protein meal is known as **protein complementation**.
- Protein complementation is needed to make sure that vegetarians get all the essential amino acids.
- The essential amino acids lacking in one of the LBV foods will be provided by the other LBV food.
- An example of this is beans on toast. Beans and toast separately are both LBV foods, but together they become HBV protein as, when combined, all of the essential amino acids are present.
- Protein complementation can save money because LBV foods tend to be cheaper than HBV foods.

Revision activity

Match up the pairs below to give some typical examples of protein complementation.

Lentil dhal	Rice
Peas	Chapattis
Baked beans	Pitta bread
Hummus (chickpeas)	Toast

Exam tip

Try to learn **one example** of protein complementation. In 'explain' or 'describe' questions, examples will be credited.

Protein alternatives

REVISED

- Protein alternatives provide protein from plant or vegetable sources.
- They are important for people who don't eat meat or animal products.
- There are three main protein alternatives: **soya** (e.g. textured vegetable protein (TVP) and tofu); **mycoprotein** (Quorn); and **quinoa** (a bead-shaped seed). All of these are high biological value.

Soya

- Fresh soya beans are known as edamame beans and are eaten in salads.
- Dried soya beans can be made into TVP, tofu, soya milk, tempeh and miso.



Figure 1.1 Soya beans are an important high biological value protein

Mycoprotein

- Quorn is made from mycoprotein, a type of fungus grown under special conditions.
- It can be made into different shapes (e.g. sausages, burgers) and minced.

Quinoa

- Quinoa are tiny, bead-shaped seeds that can be used in a wide range of dishes (e.g. curries, soups, salads).
- Quinoa is an HBV protein.

Typical mistake

Not all protein alternatives are suitable for vegetarians. Some Quorn products are made with egg white so cannot be eaten by vegans, although a Quorn vegan range has recently been launched.

Dietary reference value for protein

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- Boys aged 11–14 years require **42.1 g** of protein each day.
- Girls aged 11–14 years require **41.2 g** of protein each day.
- Men require more protein than women due to the fact they are usually bigger.
- Babies and children require a lot of protein because they are growing.
- Teenagers need more protein to support their rapid growth spurt.

Deficiency and excess of protein

REVISED

- Protein deficiency is very rare in the developed world.
- **Kwashiorkor** is a deficiency of protein and energy. Children suffering from kwashiorkor have poor growth rates and persistent infections.

Now test yourself

TESTED

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|--|-----------|
| 1 List three functions of protein in the diet. | [3 marks] |
| 2 Explain the difference between high biological value protein and low biological value protein. | [2 marks] |
| 3 Name three sources of plant protein. | [3 marks] |
| 4 Describe two products that are made from soya beans. | [4 marks] |
| 5 Explain the term protein complementation. | [2 marks] |

Fats and oils

- All fats provide us with energy; 1 g of fat provides 9 kcals of energy.
- Fat intake should not be more than 35 per cent of total energy intake.
- Excess fat is stored as body fat.

Fats and oils have an important role in improving the flavour, texture and smell of food. They make food crispy, crumbly and moist.

Functions, sources, deficiency and excess

REVISED

Table 1.2 Functions and sources of fats

Functions in the body	Provide energy Keep the body warm, as adipose tissue under the skin Form part of every body cell Protect organs (e.g. kidneys) Provide the fat-soluble vitamins A, D, E and K Provide the essential fatty acids Make you feel full for longer because fats slow down the rate at which the stomach empties	
Sources of fat	Animal sources Butter, ghee Lard, goose fat, suet, dripping Meat and meat products Oily fish Full-fat Greek yoghurt Hard cheese Cream Eggs Chocolate, pastries, biscuits, cakes	Vegetable sources Vegetable and plant oils Avocados and olives Nuts and nut products Seeds Fat spreads
What happens if we don't get enough fat?	Weight loss Lack of essential fatty acids Lack of vitamins A, D, E and K	
What happens if we get too much fat?	Weight gain Obesity Raises 'bad cholesterol' levels in the body Risk of type 2 diabetes, high blood pressure and heart disease	

Types of fats and oils

REVISED

- The chemical name for a fat is a **triglyceride**.
- A triglyceride molecule is made of three fatty acid parts attached to one glycerol part.
- The fatty acids can either be:
 - **saturated** (full up) with hydrogen atoms
 - **unsaturated** (not full up) with hydrogen atoms.

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Saturated fats

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- Saturated fats are mainly **animal foods** (e.g. red meat, butter, ghee, cream, hard cheese, eggs).
- Too much saturated fat in the diet has been linked to high blood cholesterol, which causes an increased risk of **heart disease, type 2 diabetes** and **obesity**.
- Only 11 per cent of our energy intake should come from saturated fat.

Unsaturated fats

REVISED

- Unsaturated fats are found in animal and plant foods (e.g. oily fish, nuts and seeds).
- Unsaturated fats are healthier than saturated fats. They may lower blood cholesterol levels and reduce the risk of heart disease.
- Monounsaturated fatty acids have **one double bond** (e.g. avocados, cashews and peanuts).
- Polyunsaturated fatty acids have **two or more double bonds** (e.g. sunflower oil).

Typical mistake

Only low-fat spread is low in fat. Butter, margarine and vegetable oils all contain at least 80 per cent fat.

Essential fatty acids

- Omega 3 and omega 6 are **essential fatty acids** and must be eaten in the diet as the body cannot make them. They are vital for the proper functioning of the brain and nervous system.
- **Omega 3** is found in oily fish, seeds and green leafy vegetables.
- **Omega 6** is found in vegetables, grains, seeds and chicken.



Figure 1.2 Fat spread

Cholesterol

- Cholesterol is a fatty substance that is needed by the body to make cell membranes and help with the digestion of fats.
- Eating foods that are high in saturated fat will raise cholesterol levels in the blood.
- Cholesterol is carried around the body by proteins called **lipoproteins**.
- There are two types of lipoprotein:
 - **low-density lipoprotein (LDL)**, called 'bad cholesterol'
 - **high-density lipoprotein (HDL)**, called 'good cholesterol'.
- Too much bad cholesterol and saturated fat in the body can build up in arteries and cause heart disease.
- Good cholesterol may actually help to protect against heart disease.

Now test yourself

TESTED

- | | |
|---|-----------|
| 1 List three functions of fat in the diet. | [3 marks] |
| 2 Explain the difference between visible and invisible fat. | [2 marks] |
| 3 Name three sources of vegetable fat. | [3 marks] |
| 4 Explain the link between heart disease and fat. | [4 marks] |
| 5 Describe the role of cholesterol in the diet. | [4 marks] |

Exam tip

Accurate spelling of the technical terms cholesterol, hydrogenation, diabetes and saturated fats is important.

Carbohydrates

- Carbohydrates give the body energy.
- Carbohydrates can be divided into two groups: **sugars** and **starches**.
- Sugars are the simplest form of carbohydrates.
- There are two types of sugar: **monosaccharides** and **disaccharides**.
- Starches are more **complex carbohydrates**.
- Complex carbohydrates provide **dietary fibre**, which helps digestion.
- Sugars are absorbed quickly into the body, providing an instant burst of energy.

Functions, sources, deficiency and excess

REVISED

Table 1.3 Functions and sources of carbohydrate

Functions in the body	Energy for movement, growth, chemical reactions and processes	
Sources of carbohydrate	Sugar sources	Starch sources
	All types of sugar Treacle and golden syrup Honey, jam and marmalades	Root vegetables (e.g. potatoes, carrots) Cereals and cereal products (e.g. bread, pasta, rice, beans, breakfast cereals)
What happens if we don't get enough carbohydrate?	Lose fat and weight Poor growth in children	
What happens if we get too much carbohydrate?	Increase in body fat and weight, leading to obesity Too much sugar will cause tooth decay	

Types of carbohydrate

REVISED

- Carbohydrates can be divided into **simple sugars** and **complex carbohydrates**.
- The simple sugars are **monosaccharides** and **disaccharides**.
- The **complex carbohydrates** are the **polysaccharides**.

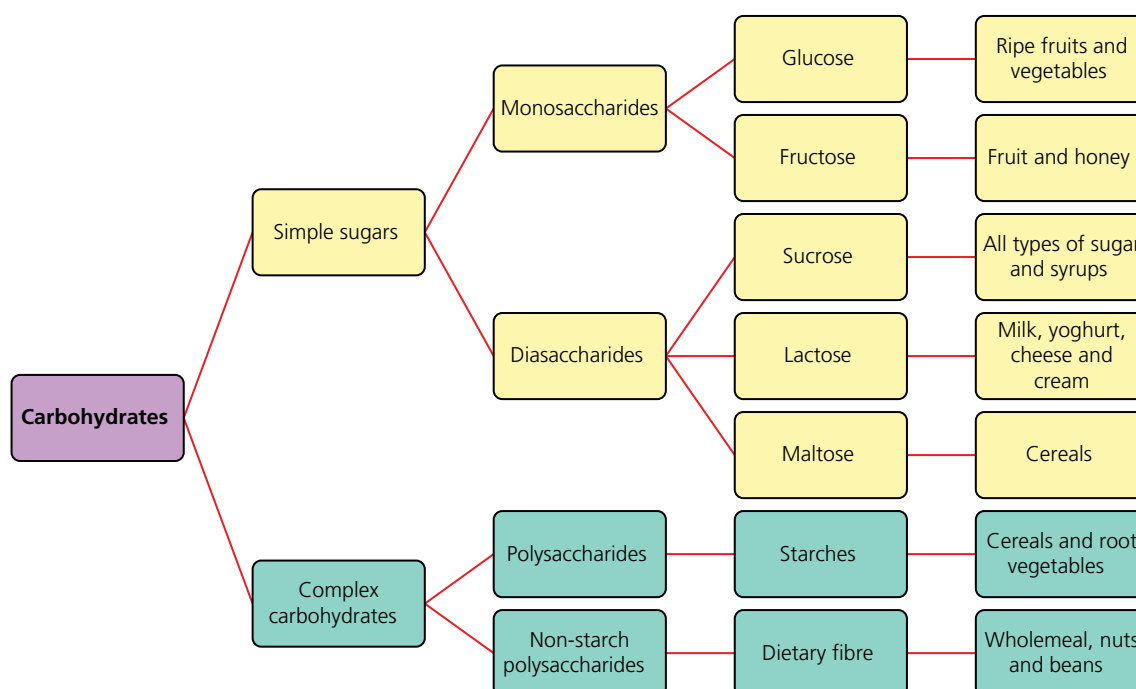


Figure 1.3 Types of carbohydrate

Types of sugar

REVISED

- Sugar can be described as a **free sugar** or **fruit sugar**.
- **Fruit sugars** are found naturally inside fruit and vegetable cells (e.g. sugar in fresh fruit).
- **Free sugars** are added to food or found outside the cell structure (e.g. granulated sugar, icing sugar, treacle, syrup and honey).
- A diet high in free sugars can lead to tooth decay and obesity.
- Sugar provides energy but contains no other nutrients.
- Many processed foods contain **hidden sugar**.
- Hidden sugars are found in savoury foods like salad dressings, bread, sauces and soups.
- The names of hidden sugars can be found on food labels. They are **corn sugar**, **dextrose**, **fructose** and **glucose**.

Complex carbohydrates

REVISED

- Complex carbohydrates, or **polysaccharides**, are made up of many simple sugars (glucose) joined together.
- **Starch**, **pectin** and **glycogen** are complex carbohydrates.
- **Starch** is found in cereals and root vegetables.
- **Pectin** is found naturally in some fruits and helps jams to set.
- **Glycogen** is made from glucose by humans; it is stored in the liver and muscles as an energy reserve.
- **Dietary fibre** is a complex carbohydrate.



Figure 1.4 Bran flakes are a good source of dietary fibre

Dietary reference values for sugars and starches

REVISED

- 50 per cent of total food energy should be from carbohydrates.
- 45 per cent should be from starchy carbohydrate, milk sugar and fruit sugar.
- Free sugars should be restricted to providing 5 per cent of daily energy (calorie) requirements.
- Teenagers consume 50 per cent more sugar on average than is currently recommended.

Dietary fibre

REVISED

- **Dietary fibre** is a polysaccharide found in the cell walls of vegetables, fruits, pulses and cereal grains.
- Dietary fibre cannot be broken down by the digestive system so passes through the intestine **undigested**.
- Dietary fibre helps the digestive system to work properly.
- There are two types of dietary fibre: **soluble fibre** and **insoluble fibre**.
 - **Insoluble fibre** passes through the body mostly unchanged as it is undigested.
 - **Soluble fibre** slows down the digestion and absorption of carbohydrates, so it helps to control blood sugar levels.

Exam tip

You may be asked to state the sources of dietary fibre. Always be specific and avoid generalisations (e.g. 'vegetables' is vague; instead try 'vegetables eaten with their skins').

Functions, sources, deficiency and excess

REVISED

Table 1.4 Dietary fibre

Functions in the body	Allowing the digestive system to function properly Helping weight control as high-fibre foods release energy slowly and leave us feeling fuller for longer Preventing some bowel diseases, e.g. diverticular disease Providing soluble fibre, which can help to reduce cholesterol levels	
Sources of dietary fibre	Insoluble fibre Wholegrain foods (e.g. wholegrain bread, breakfast cereals and pasta) Brown rice Wheat bran Fruit and vegetable peel and skins Nuts and seeds	Soluble fibre Oats Nuts Legumes (e.g. dried peas, beans and lentils) Fruits (e.g. prunes, bananas, apples, pears, plums) Vegetables (e.g. potatoes, sweet potatoes, broccoli, carrots)
What happens if we don't get enough dietary fibre?	Constipation Increased risk of bowel cancer	
What happens if we get too much dietary fibre?	Too much fibre can reduce the body's ability to absorb iron and calcium	

Dietary reference values for dietary fibre

- The dietary reference value (DRV) for dietary fibre is 30 g for adults.
- Children should eat less because of their small body size.
- Very young children should avoid too many fibre-rich foods as being full up with fibre can make it difficult for them to meet their other nutritional needs.

Typical mistake

Some students assume that everyone should eat more dietary fibre. Remember that very young children should avoid too many fibre-rich foods because they can slow down the absorption of some nutrients.

Now test yourself

TESTED

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|---|-----------|
| 1 Name three processes that require energy in the body. | [3 marks] |
| 2 Explain the difference between a free sugar and a fruit sugar. | [2 marks] |
| 3 Explain the difference between soluble and insoluble dietary fibre. | [2 marks] |
| 4 Name two complex carbohydrates. | [2 marks] |