

Clear**Revise**TM

AQA GCSE

Food Preparation and Nutrition 8585

Illustrated revision and practice

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PREFACE

Absolute clarity! That's the aim.

This is everything you need to ace the examined component in this course and beam with pride. Each topic is laid out in a beautifully illustrated format that is clear, approachable and as concise and simple as possible.

Each section of the specification is clearly indicated to help you cross-reference your revision. The checklist on the contents pages will help you keep track of what you have already worked through and what's left before the big day.

We have included worked exam-style questions with answers for almost every topic. This helps you understand where marks are coming from and to see the theory at work for yourself in an exam situation. There is also a set of exam-style questions at the end of each section for you to practise writing answers for. You can check your answers against those given at the end of the book.

LEVELS OF LEARNING

Based on the degree to which you are able to truly understand a new topic, we recommend that you work in stages. Start by reading a short explanation of something, then try and recall what you've just read. This has limited effect if you stop there but it aids the next stage. Question everything. Write down your own summary and then complete and mark a related exam-style question. Cover up the answers if necessary but learn from them once you've seen them. Lastly, teach someone else. Explain the topic in a way that they can understand. Have a go at the different practice questions – they offer an insight into how and where marks are awarded.

ACKNOWLEDGEMENTS

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THE SCIENCE OF REVISION

Illustrations and words

Research has shown that revising with words and pictures doubles the quality of responses by students.¹ This is known as ‘dual-coding’ because it provides two ways of fetching the information from our brain. The improvement in responses is particularly apparent in students when asked to apply their knowledge to different problems. Recall, application and judgement are all specifically and carefully assessed in public examination questions.

Retrieval of information

Retrieval practice encourages students to come up with answers to questions.² The closer the question is to one you might see in a real examination, the better. Also, the closer the environment in which a student revises is to the ‘examination environment’, the better. Students who had a test 2–7 days away did 30% better using retrieval practice than students who simply read, or repeatedly reread material. Students who were expected to teach the content to someone else after their revision period did better still.³ What was found to be most interesting in other studies is that students using retrieval methods and testing for revision were also more resilient to the introduction of stress.⁴

Ebbinghaus’ forgetting curve and spaced learning

Ebbinghaus’ 140-year-old study examined the rate in which we forget things over time. The findings still hold power. However, the act of forgetting things and relearning them is what cements things into the brain.⁵ Spacing out revision is more effective than cramming – we know that, but students should also know that the space between revisiting material should vary depending on how far away the examination is. A cyclical approach is required. An examination 12 months away necessitates revisiting covered material about once a month. A test in 30 days should have topics revisited every 3 days – intervals of roughly a tenth of the time available.⁶

Summary

Students: the more tests and past questions you do, in an environment as close to examination conditions as possible, the better you are likely to perform on the day. If you prefer to listen to music while you revise, tunes without lyrics will be far less detrimental to your memory and retention. Silence is most effective.⁵ If you choose to study with friends, choose carefully – effort is contagious.⁷

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CONTENTS

Section 1 Food preparation skills

3.1	Food preparation and skills.....	3	<input type="checkbox"/>	<input checked="" type="checkbox"/>
-----	----------------------------------	---	--------------------------	-------------------------------------

Section 2 Food, nutrition and health

3.2.1.1	Protein.....	4	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.2.1.2	Fats.....	6	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.2.1.3	Carbohydrates.....	8	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.2.1.3	Dietary fibre and excess carbohydrate.....	10	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.2.2.1	Fat soluble vitamins.....	11	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.2.2.1	Water soluble vitamins.....	12	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.2.2.1	Antioxidant functions of vitamins.....	13	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.2.2.2	Minerals.....	14	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.2.2.3	Water.....	16	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.2.3.1	Making informed choices for a varied and balanced diet.....	17	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.2.3.1	Portion size and meal planning.....	18	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.2.3.1	Planning balanced meals for specific dietary groups.....	20	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.2.3.2	Energy needs.....	22	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.2.3.3	Nutritional analysis.....	24	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.2.3.4	Diet, nutrition and health.....	26	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Examination practice.....	28	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Section 3 Food science

3.3.1.1	Cooking and heat transfer.....	30	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.3.1.2	Selecting appropriate cooking methods.....	32	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.3.1.2	Dry methods of cooking.....	34	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.3.1.2	Fat based cooking methods.....	36	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.3.2.1	Protein denaturation and coagulation.....	37	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.3.2.1	Gluten and foam formation.....	38	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.3.2.2	Carbohydrates.....	39	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.3.2.3	Fat and oils.....	40	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.3.2.4	Fruit and vegetables.....	42	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.3.2.5	Chemical and mechanical raising agents.....	43	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.3.2.5	Biological raising agents.....	44	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3.3.2.5	Steam.....	44	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Examination practice.....	45	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Section 4 Food safety

			<input checked="" type="checkbox"/>
3.4.1.1	Growth conditions for microorganisms and enzymes.....	47	<input type="checkbox"/>
3.4.1.1	Temperature, time, pH and moisture.....	48	<input type="checkbox"/>
3.4.1.1	High-risk foods.....	49	<input type="checkbox"/>
3.4.1.1	Biological catalysts.....	50	<input type="checkbox"/>
3.4.1.2	The signs of food spoilage.....	51	<input type="checkbox"/>
3.4.1.3	Microorganisms in food production.....	52	<input type="checkbox"/>
3.4.1.4	Food poisoning.....	53	<input type="checkbox"/>
3.4.1.4	Bacterial contamination.....	54	<input type="checkbox"/>
3.4.2.1	Buying and storing food.....	56	<input type="checkbox"/>
3.4.2.1	Storing food in fridges and freezers.....	57	<input type="checkbox"/>
3.4.2.2	Preparing, cooking and serving food.....	58	<input type="checkbox"/>
3.4.2.2	Defrosting and reheating food.....	60	<input type="checkbox"/>
	Examination practice.....	61	<input type="checkbox"/>

Section 5 Food choice

			<input checked="" type="checkbox"/>
3.5.1.1	Menu planning and costing.....	63	<input type="checkbox"/>
3.5.1.1	Factors influencing food choice.....	64	<input type="checkbox"/>
3.5.1.2	Food choices.....	66	<input type="checkbox"/>
3.5.1.2	Moral and ethical beliefs.....	67	<input type="checkbox"/>
3.5.1.2	Food choice with an intolerance or allergy.....	68	<input type="checkbox"/>
3.5.1.3	Food labelling.....	69	<input type="checkbox"/>
3.5.1.3	Marketing influences.....	70	<input type="checkbox"/>
3.5.2	British cuisine.....	71	<input type="checkbox"/>
3.5.2	International cuisine.....	72	<input type="checkbox"/>
3.5.3	Sensory evaluation.....	73	<input type="checkbox"/>
3.5.3	Sensory testing methods.....	74	<input type="checkbox"/>
3.5.3	Profiling.....	75	<input type="checkbox"/>
3.5.3	Taste panels.....	76	<input type="checkbox"/>
	Examination practice.....	77	<input type="checkbox"/>

Section 6 Food provenance

			<input checked="" type="checkbox"/>
3.6.1.1	Food sources.....	79	<input type="checkbox"/>
3.6.1.1–2	Intensive and organic farming.....	80	<input type="checkbox"/>
3.6.1.1	Free range production.....	81	<input type="checkbox"/>
3.6.1.1	Genetically modified food (GM).....	82	<input type="checkbox"/>
3.6.1.1–2	Locally produced and seasonal food.....	83	<input type="checkbox"/>
3.6.1.1–2	Sustainable food.....	84	<input type="checkbox"/>

3.6.1.2	Packaging and transportation.....	85	□
3.6.1.2	Food and the environment.....	86	□
3.6.1.3	Climate change and global warming.....	88	□
3.6.1.3	Availability of food.....	90	□
3.6.1.3	Sustainability of food.....	91	□
3.6.2.1	Primary food processing.....	92	□
3.6.2.1	Secondary food processing.....	94	□
3.6.2.1	Heat treatment of milk.....	96	□
3.6.2.1	Yoghurt and cheese production.....	97	□
3.6.2.1	Making jam.....	98	□
3.6.2.1	Nutrient loss through heating.....	98	□
3.6.2.1	The effect of drying foods.....	99	□
3.6.2.2	Technological developments associated with better health and food production.....	100	□
3.6.2.2	Food additives.....	102	□
3.6.2.2	Preservatives.....	104	□
3.6.2.2	Advances with genetically modified food.....	105	□
	Examination practice.....	106	□
	Examination practice answers.....	108	
	Levels based mark schemes for extended response questions.....	113	
	Index.....	114	
	Examination tips.....	121	

MARK ALLOCATIONS

Green mark allocations^[1] on answers to in-text questions throughout this guide help to indicate where marks are gained within the answers. A bracketed '1' e.g.^[1] = one valid point worthy of a mark. In longer answer questions, a mark is given based on the whole response. In these answers, a tick mark^[✓] indicates that a valid point has been made. There are often many more points to make than there are marks available so you have more opportunity to max out your answers than you may think.

TOPICS FOR THE EXAM

Food Preparation and nutrition

Information about the exam paper

Written exam: 1 hour 45 minutes

100 marks

50% of qualification grade

Specification coverage

Theoretical knowledge of food preparation and nutrition Sections 1–5:

Food nutrition and health

Food science

Food safety

Food choice

Food provenance

Assessment overview

20 multiple-choice questions followed by five further questions involving closed short answer and open response questions assessing knowledge, understanding and skills.

FOOD NUTRITION AND HEALTH

Diet and food are topics that are continually discussed in the media. Magazines, television programmes, websites and social media devote pages and hours discussing new food trends and what they'd like the consumer to buy; all loaded with suggestions of what is good for us. Poor diet and nutrition are known to contribute to many health issues and understanding the building blocks of nutrition is crucial to making the right choices about the food.

Nutrition means having a healthy, balanced diet for growth, metabolism, and repair.

Eating a well-balanced range of foods with the appropriate nutrients and calories is fundamental to good health. So, understanding the connections between our food, the nutrients they provide and how this influences our health can have far reaching consequences.

More than half of the population of the UK is overweight or obese. High body mass is one of the main risk factors for chronic illness, which puts a huge financial strain on the National Health Service (NHS). The cost of treating health problems brought on by obesity, as well as the specialist surgery and equipment required to deal with it, cost the NHS billions each year. At the other end of the scale, it is estimated that approximately three million people in the UK have poor diets and are malnourished, detrimentally affecting their ability to work and their wellbeing, and has significant health implications.

According to the United Nations, around the world, 690 million people go to bed hungry.

Programs are being developed to empower people to be better educated about diet, nutrition and to ensure children are given food to help them grow up healthy and strong.

Our food choices also have a considerable effect on the environment, so even small changes in our shopping and eating habits can be beneficial to our planet.

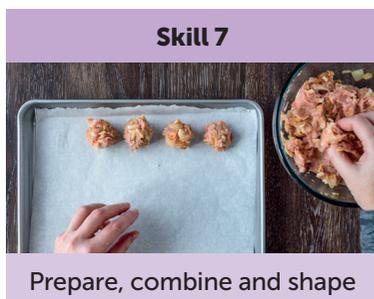
By having the skills to choose the right foods, be adept at budgeting and meal planning, produce a nutritional meal and understand the impacts of unnecessary waste, you can set the foundation for a healthier lifestyle.



FOOD PREPARATION SKILLS

This course integrates 12 groups of practical skills through the practical elements of the course. You should be familiar with each of these skills and know how and when they can be applied and combined in various tasks.

For full details of the skills, refer to the specification.



ENERGY NEEDS

The body needs energy for every function from breathing, keeping warm, movement and growing. **Energy** is provided by the food and drink we consume. Where food is labelled, the amounts of energy will be listed.

Energy is measured in **kilocalories** (kcal) or kilojoules (kJ). One kilocalorie equals 4.18 kilojoules.

Physical Activity Level (PAL)

To help calculate the total daily kilocalories a person needs, PAL identifies how many additional kilocalories are needed to meet the demands of their lifestyle. The additional kilocalories are identified as a percentage. Daily energy in kcal is equal to $BMR \times PAL$.

This is added to their BMR which gives an indication of the total kilocalories required every day. Lifestyles are categorised as: 1) Sedentary or light activity 2) Active/moderately active lifestyle 3) Vigorously active lifestyle.

Being physically active each day contributes to good health, by reducing the risk of heart disease and obesity. Exercise is important for maintaining bone strength and for strengthening muscles which protect and support the joints.

Modern lifestyles mean we can spend too much time sitting down for work, watching television or using computers. An inactive lifestyle can lead to poor health and weight gain.

Basal Metabolic Rate (BMR)

The BMR is the number of kilocalories required to keep the body functioning whilst at rest. This is also known as metabolism. This varies depending on age, gender, physical activity level and body mass. BMR can only be measured under laboratory conditions.

Energy balance

Energy in is what we eat and drink. **Energy out** is energy used through physical activity. If we take more energy in than we use, the body will start to gain weight. If we take in less energy than we use the body will start to lose weight.

1. Explain the factors that affect an adult's energy requirements throughout their life. [6]

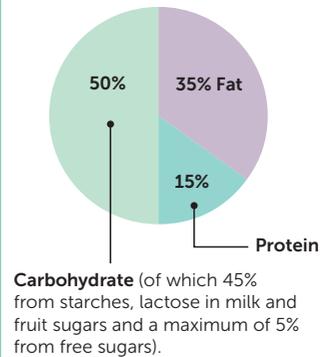
1. For someone who is extremely active such as a competitive athlete or sportsperson^[1], their PAL will be higher.^[1] They need to balance their energy intake to provide enough energy and maintain a healthy weight.^[1] As we get older our BMR decreases^[1], and the energy intake should reduce too.^[1] Gender also affects BMR as women usually have a lower rate than men.^[1]



Recommended energy intake

NHS guidance provides a daily reference intake for adults. On average adults should consume 2,000 per day kilocalories made up of:

Protein 50g	Carbohydrate at least 260g
Total fat less than 70g	Saturates less than 20g
Total sugars 90g	Salt less than 6g



Sources of energy

Our energy is sourced from the foods we eat. Foods described as **energy dense** contain a high proportion of carbohydrate (in particular sugar) and fat. Highly processed foods such as sausages, pizza, cakes, biscuits, and pastries are all energy dense foods.

Carbohydrate – sugars and starch	1g of pure carbohydrate	3.75 kcal of energy
Fat – invisible/visible fats and oils	1g of pure fat	9 kcal of energy
Protein	1g of pure protein	4 kcal of energy

2. Maren is 25 years old, works from home and sits at a desk all day. She has biscuits with her morning coffee. She has a chicken mayonnaise sandwich for lunch with a bag of salted crisps. After work she likes to play computer games and watch television, so she has ready prepared meals such as beef curry or lasagne for speed and convenience. She likes fizzy orange drinks and cookies in the evening.
- (a) Describe the energy sources she achieves from her daily diet. [8]
- (b) Consider what the long-term effect of her diet may have on her health. [4]
- (c) Explain what changes you would make to her daily diet. [6]
2. (a) Maren's diet is energy dense.^[1] Her snacks are high in sugar or salt.^[1] The ready meals will contain a higher level of saturated fat, salt and sugar.^[1] Her diet is low in dietary fibre.^[1] She is not having her five a day^[1] as there are no fresh fruit or vegetables in her daily diet.^[1] She is having enough protein but exceeding her daily energy requirements^[1], and not having a balanced energy mix.^[1]
- (b) Maren's diet does not provide a balance of vitamins and nutrients needed for optimum health.^[1] Her energy-dense diet^[1], combined with a lack of exercise will lead to weight gain.^[1] Excess weight with a high salt / fat diet can contribute to CHD^[1] or type 2 diabetes.^[1] Her digestive function will be affected and may lead to constipation.^[1]
- (c) She should have breakfast to provide energy and aid concentration.^[1] Her diet should contain plenty of fresh food^[1], oily fish for Omega-3, seeds and iron rich foods.^[1] She needs to increase intake of all vitamins and minerals, and calcium with fruit for her desk snacks^[1], vegetables with her meals.^[1] Maren should build regular exercise into her day to strengthen her skeleton, oxygenate the body^[1] and maintain her energy balance.^[1] She must reduce the amount of energy dense foods.^[1] Fizzy drinks should be replaced by water to reduce the sugar intake.^[1]

PROTEIN DENATURATION AND COAGULATION

Functional and chemical properties of food

Food or ingredients contain properties which perform different functions during preparation and cooking. Understanding these properties, helps determine the final taste, look and texture of a finished dish. **Proteins** have several functional properties including swelling, gelling, and foaming.

Protein denaturation

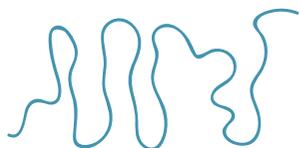
Protein structure is a sequence of amino acid chain molecules that chemical bonds hold together. When the bonds in the molecule break, the protein molecule unfolds and changes shape. To denature means to change by chemical or physical means, breaking the chemical bond.

Protein can be denatured by the action of heat, with agitation or by using an acid in marinating.

Complex folded structure of protein



Long strand of amino acids



Heat and acid change the structure of protein permanently.

Give **one** example of how agitation of a protein can be reversed. [1]

When an egg white is whisked it turns to a foam, however if the foam is left to stand it can return to a liquid state.^[1]

Protein coagulation

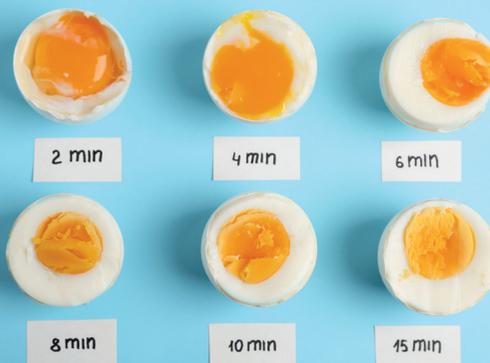
Coagulation is a change in the structure of protein. The denatured protein molecules join and change the texture and appearance of the protein food.

Acids

Using an acidic marinade denatures protein and help to tenderise meat. By immersing food in citrus juice, vinegar, wine or beer, yoghurt with other seasonings also adds flavour and keeps it moist. Protein coagulation is the basis of turning milk into cheese. Casein is the protein in milk that denatures by coagulation, creating curds (solids) and whey (liquids).

The effect of heat on protein

- Eggs – when an egg is heated the white (albumen) changes colour and becomes solid.
- Meat – as meat is heated, the meat changes colour and the fibres lose water and shrink. If it is cooked for too long, meat becomes chewy.



GLUTEN AND FOAM FORMATION

Wheat, barley and rye contain a mix of two proteins **gliadin** and **glutenin**. When flour from these grains is mixed with water, the proteins combine to form a structure called **gluten**.

Gluten

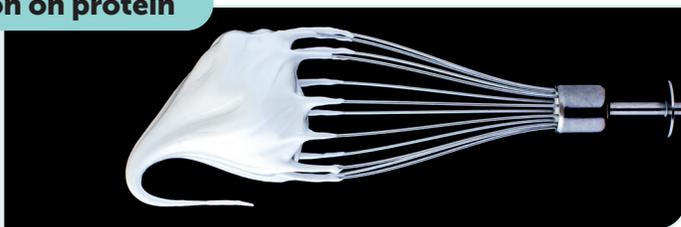
Gluten is then developed by kneading, which strengthens and lengthens the gluten strands. The dough becomes stretchy and elastic, meaning it can change shape.

Farmers categorise the wheat they grow as hard wheat or soft wheat. Hard wheat has a high protein content and good quality gluten, which makes a strong flour. Soft wheat has a lower gluten content and is used to produce plain and self-raising flour.



Agitation or mechanical action on protein

Whisking egg denatures protein. The protein stretches as the molecules unfold and form a mesh to trap bubbles of air. With continued whisking this eventually forms a foam.



Foam formation

Foams are formed when gases (mainly air) are trapped inside a liquid, such as whisking egg white. The more it's whisked the stiffer it gets and will eventually stand in soft peaks. Fat will affect the formation of foam, so care should be taken not to let any egg yolk get into the egg white.

If egg white is cooked it **coagulates** or sets firm such as in a soufflé.

Aquafaba is the cooking liquid from chickpeas and some beans. It naturally contains protein and can be whipped like an egg white, making it a suitable egg alternative for vegan meringues.

- You have been asked to bake a Victoria Sponge cake and a loaf of bread.
 - Name the type of flour you will select for each recipe. [2]
 - Justify your choices. [4]
- Describe the effect on milk when acid is added to it. [2]
- Give **one** use of curdled milk. [1]
 - (a) Self-raising flour^[1] or plain flour with a raising agent^[1] for the sponge cake. Strong bread flour for the loaf of bread.^[1]
 - (b) Sponge: Self raising flour has a low gluten and protein content.^[1] It is a soft flour, making it suitable for a crumbly texture.^[1] Strong bread flour has a higher gluten content^[1] to develop a strong and elastic dough.^[1]
- The milk protein will denature^[1] and curdle.^[1]
- Curdled milk is used to make cheese, ricotta, paneer.^[1]

CARBOHYDRATES

Gelatinisation

Gelatinisation enables starch to become digestible such as in potatoes, rice, pearl barley, pasta and when making sauces. Cornflour and arrowroot are rich in starch and used to thicken sauces, puddings and custards.

Gelatinisation is a chemical reaction where starch thickens in the presence of moisture and heat. It occurs when making sauces or custards. Starch is densely packed with two types of molecules, **amylose** and **amylopectin**. When heat is applied at around 60°C, the starch molecules start to break open and swell, absorbing liquid. This increases the viscosity of a sauce and as the temperature increases, the sauce thickens. The starch granules burst at 80°C and that no further gelatinisation occurs above boiling point, 100°C.

You have been asked to make a roux. The thickness of a sauce can be varied depending on its use. Describe how you would increase the viscosity of the sauce. [2]

*Any two points from:
By increasing the ratio of starch to liquid.^[1] The starch gelatinises when it is heated^[1] which will make the sauce will thicken.^[1]*

Caramelisation

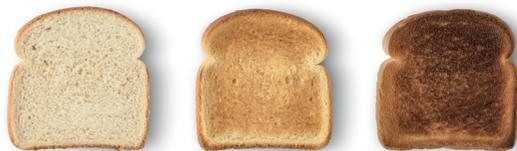
Caramelisation occurs when carbohydrates such as sugar are heated. At high temperatures the water evaporates and sugar begins to break down and brown. Different sugars begin to caramelize at different temperatures. When sucrose is heated, it melts down into glucose and fructose and begins to caramelize at 160°C. As the temperature increases the sugar darkens, giving a butterscotch, nutty flavour.

When frying vegetables such as onions, the onion changes from white to golden brown as the natural sugars are caramelised.



Dextrinisation

This is a structural modification of starch that usually occurs in the presences of dry heat. When heated, starches break down into sugars called **dextrin**. Dextrin is brown which results in food turning golden brown when baked. Dextrinisation also changes the taste and smell of food. A typical example of this is toast. If the food is overcooked the starch turns to carbon and the food will look black and burnt.



FAT AND OILS

Fats and oils are made up of **triglyceride** molecules. These are composed of three fatty acids and one unit of glycerol.

Some fatty acids remain solid longer than others, as triglycerides have different melting points. Manufactured fats can have their fatty acids arranged which enables products to spread straight from the fridge meaning they have good **plasticity**.

Plasticity

Fat can be spread and shaped, but the plasticity depends on the melting point. Generally, fats that contain a higher amount of saturated fatty acids, have a higher melting point.

Plasticity is relevant to the different function fats are used for, such as creaming, spreading and shortening.



Shortening

Fats that are solid at room temperature are most suitable for the rubbing-in method which give food a crumbly or crisp texture. Fats are rubbed into flour to make short crust pastry, crumble toppings, scones and some biscuits/cookies, so should have good plasticity.

Fat coats the particles of flour creating a barrier and limiting the gluten molecules from developing. When water is added to bind the mixture, such as in pastry, the gluten strands can only form short lengths and therefore produce the desired texture (hence the term **shortening**). Without a layer of fat, the dough would develop elasticity.

1. Describe how temperature can affect plasticity. [2]

A hard fat such as butter has little plasticity when taken cold from the fridge,^[1] but at room temperature can be soft and spreadable.^[1]



Aeration

This is the process of trapping tiny pockets of air into a mixture giving a well risen and light texture to baked goods such as cakes and puddings. When fat and sugar are beaten together this is known as creaming. Due to its plasticity, the butter or baking spreads trap bubbles of air. The mixture will increase in volume and soften.



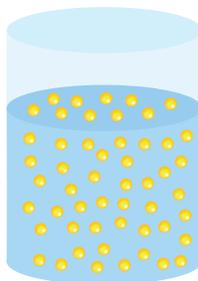
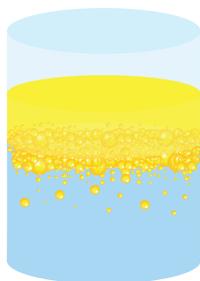
Emulsification

An immiscible liquid cannot be mixed with another liquid without separating. For instance, water and oil don't mix. To emulsify is to force two immiscible liquids to combine in a suspension, with the help of an emulsifier. An emulsion happens when small droplets of one solution are dispersed throughout another. Emulsifiers have properties that are attracted to both water and oil.

- The part that is attracted to water is known as **hydrophilic**.
- The part that isn't attracted to water is **hydrophobic**.

Emulsifiers are also used as anti-caking agents and to control crystallisation. **Lecithin** is a natural emulsifier found in egg yolks. Mustard, soy and guar gum are other natural emulsifiers.

Oil in water



Two liquids such as oil and vinegar in a vinaigrette will separate when left to stand. This is an unstable emulsion.

Mayonnaise or hollandaise sauce are examples of a stable emulsion as the egg yolk acts as an emulsifier.

2. (a) Name **two** food products that use emulsification as part of their manufacture. [2]

(b) Describe why emulsifiers are used. [3]

(a) Food products such as mayonnaise^[1], sauces^[1] and spreads.^[1]

(b) To prevent the ingredients from separating^[1] and to improve the appearance^[1] and consistency.^[1]



EXAMINATION PRACTICE

1. Which gas is released when yeast is activated in bread making? [1]
 - A. Carbon dioxide
 - B. Methane
 - C. Nitrogen
 - D. Oxygen

2. Which type of heat transfer occurs when cooking with a grill? [1]
 - A. Conduction
 - B. Convection
 - C. Microwave
 - D. Radiation

3. Which of the following are methods of moist cooking? [1]
 - A. Braising, baking, stewing
 - B. Blanching, braising, poaching
 - C. Roasting, grilling, steaming
 - D. Steaming, stewing, roasting

4. Which of the following is an example of a foam? [1]
 - A. Custard
 - B. Mayonnaise
 - C. Salad dressing
 - D. Whipped cream

5. Denaturation creates a change in the structure of: [1]
 - A. Carbohydrate
 - B. Fat
 - C. Protein
 - D. Starch

6. Which of the following is a true statement? [1]
 - A. Yeast produces carbon dioxide by fermentation
 - B. Yeast produces oxygen by fermentation
 - C. Yeast requires high temperatures to begin fermentation
 - D. Yeast requires salt to activate

7. Give **two** reasons why food is cooked. [2]

8. Describe **one** effect that cooking has on the nutritional value of food. [2]

9. Explain why stir frying can be a healthier form of cooking. [3]

BACTERIAL CONTAMINATION

Food can be contaminated with bacteria from a variety of sources and is a common cause of food poisoning.

The different sources of bacterial contamination

Raw food



Raw meat, poultry, shellfish, untreated milk, eggs may carry pathogenic bacteria.

People



During transport, manufacture, preparation and service, bacteria can pass from the handler to the food due to poor personal hygiene and careless handling.

Soil



Soil in unwashed vegetables, fruit, and rice can contain bacteria.

Utensils



Utensils, equipment, food contact surfaces that have not been properly cleaned can harbour bacteria that can be passed onto the food.

Pests / pets



Food pests, cockroaches, flies, rodents, can spread bacteria. Spread from pets to people.

Waste



Food waste must be properly contained and regularly disposed of to avoid misuse and attracting pests and rodents.

Campylobacter

Campylobacter is the most common cause of food poisoning in the UK. It is a food borne bacteria and lives in the gut of many farm animals. Other foods can be contaminated through contact with animal or human faeces. Campylobacter is spread by cross contamination, for example storing raw and cooked foods together.



Escherichia (E. coli)

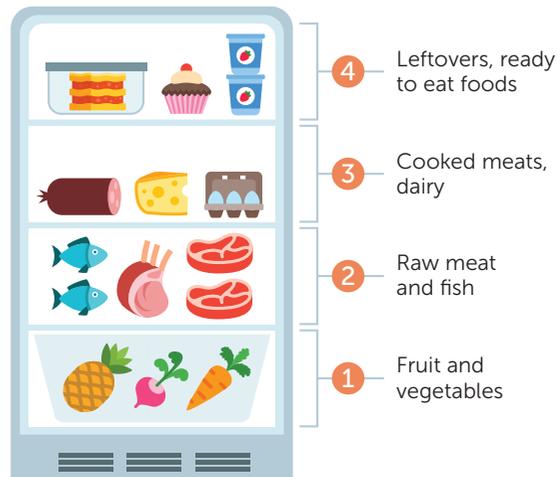
Escherichia or **E. coli** can be found in human or animal intestines, raw meat and sewage. The strain E. coli O157 can cause serious foodborne illness. It can contaminate foods such as salad leaves, vegetables, raw and under cooked meats, and water. The bacteria are usually spread through faecal matter reaching the mouth.

- Thorough cooking of food will destroy E. coli, particularly in burgers and mince.
- Good personal hygiene before and after preparing food, going to the toilet or handling animals.
- Safe sources of drinking water and water should be used for washing food.

STORING FOOD IN FRIDGES AND FREEZERS

Storage of foods in a fridge

1. Fridges should maintain a temperature between 0°C and 5°C.
2. High risk foods should be stored in a fridge.
3. Food should be wrapped or in containers to prevent cross contamination. It also protects foods from tainting or picking up smell of other foods.
4. Raw meat, poultry and fish should be stored on the bottom shelf, wrapped or in a container.
5. Avoid over-crowding fridge shelves so the cool air can circulate and maintain the correct temperature.
6. Ensure door seals are working properly.



Food should be cooled ready to put into the fridge. If a quantity of hot food is placed in the fridge it can raise the temperature inside, potentially creating ideal temperatures for bacteria to multiply. Stews and casseroles can be cooled more rapidly by placing them in a large shallow container.

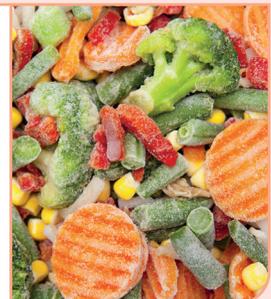
Explain why raw meat and fish should always be kept on the bottom shelf.

[2]

This prevents contamination with other types of food in the fridge or dripping blood or juice^[1] onto other foods which could cause food poisoning.^[1]

Storing food in a freezer

- Freezers should be kept at a temperature between -18°C and -24°C.
- Food should be wrapped and clearly labelled stating the date and contents.
- Poor wrapping can cause dehydration and freezer burn.
- If stored for too long, food begins to lose its flavour and texture.
- Freezing doesn't kill bacteria but makes it dormant.
- Defrosted food should not be re-frozen.



7. Name the bacteria commonly found on human skin that is a cause of food poisoning. [1]
8. State what is meant by the term ambient temperature. [1]
9. Name **three** microorganisms that cause food spoilage. [3]
10. Explain why defrosted food should not be refrozen. [4]
11. Describe the steps of good kitchen hygiene before and after preparing food. [3]
12. Suggest **two** ways of storing dry goods such as oats to prevent spoilage. [2]
13. Explain the purpose of a use by date on a packet of sausages. [2]
14. A temperature probe is used to check that food is safe to eat.
 - (a) Explain how to use a probe correctly to check the temperature of a piece of meat. [2]
 - (b) State the minimum core temperature food should reach. [1]
 - (c) Describe the steps used in checking that your probe is accurate. [3]
15. Give **three** examples of how cross contamination can occur. [3]
16. It is the summertime and Kyle has been shopping in his lunch hour. He has bought a fresh chicken, a packet of sausages, a packet of ham and some bread rolls for a BBQ he plans to have at the weekend.
 - (a) Explain what safety methods he should adopt when buying his food and why they are important. [4]
 - (b) Describe how he should store the food when he gets home. [2]
17. E-coli 0147 is commonly associated with undercooked beef used in beef burgers. Discuss how you would minimise the risk of infection. [6]

FOOD CHOICES

Our **cultural influences** lead to different choices in food and methods of preparation. **Customs** and **religions** also guide what foods are eaten or restricted.

Buddhism

Buddhists 'refrain from taking life', so many are vegan or vegetarian and avoid alcohol. Celebration with traditional dishes takes place at holidays such as Vesak.

Christianity

No dietary restrictions. Some may choose to limit certain foods during Lent. Christians uphold many food traditions at religious celebrations such as Easter and Christmas.

Hinduism

Hindus do not eat beef as the cow is sacred. Many are vegetarian and avoid alcohol. Celebrate with traditional dishes at Diwali and Holi. Those following a Ayurvedic diet choose not to eat onions and garlic.



Islam

Food must be Halal, and meat must be slaughtered according to permitted methods. Muslims do not eat pork and avoid alcohol. Ramadan (fast of fast-breaking) is a time for celebration.

Judaism

Jewish communities have strict food guidelines particularly with meat and dairy, and these two should not be prepared together. Food prepared in an acceptable way is Kosher. Jews do not eat pork or shellfish. They celebrate many festivals including Yom Kippur, Hanukkah and Passover.

Sikhism

The view of Sikhism is that eating meat or not, is the individual's choice. However, meat should be Jhatka, meaning the animal has been slaughtered quickly, without suffering or ritual. Baisakhi is just one of the holidays celebrated with a wealth of dishes using a variety of vegetables and infused with flavours.

Rastafarianism

The diet aims to be natural with lots of fruits and vegetables and avoids processed foods and additives/chemicals. The diet is primarily vegan, although some eat small fish. Their cooking is known as ital. Shellfish and pork are forbidden. Ethiopian Christmas (January) and New Year (September) are times for celebration.

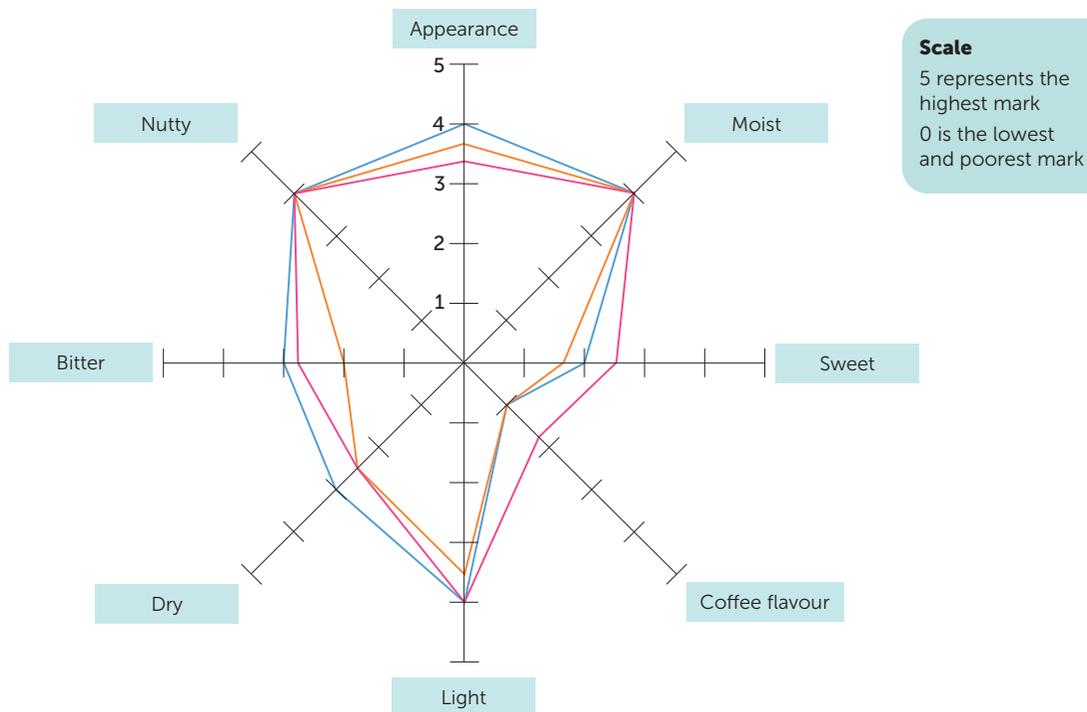
PROFILING

A **sensory profiling test** gives a more detailed evaluation of the food being tested and by comparing several factors at once, a profile will take shape. These tests provide useful information for the food industry when developing a new product.

Sensory profiling chart

The results are charted to provide a comparison, and to look for patterns or issues.

A manufacturer is testing their new coffee and walnut cake to add to their range of high-quality cakes. The results from three testers are shown in the star diagram.



You will have carried out a sensory evaluation and recorded the results as part of your practical work.

Look at the taste tester results in the star diagram above. Explain the findings in the star chart above. [6]

The results were consistent and show that all the testers arrived at similar results^[1], which provides clear, accurate test information to the manufacturer.^[1] All the testers suggest that the 'coffee flavour' was poor^[1], so the levels of coffee should be increased to improve the taste.^[1] The remaining results are good, but not high^[1], so it indicates an overall^[1] improvement in production is needed if the cake is aimed for their high-quality range.^[1]

FOOD SOURCES

Food provenance describes how food is **grown, reared** and **caught** and where it comes from. Understanding methods of food production enables consumers to make informed food choices.

Conventional and organic farming

Plants that are cultivated and grown on a large scale are referred to as crops. Farmers in the UK grow a range of cereals, fruit and vegetables. Produce that isn't grown in the UK due to the climate is imported.

Methods of farming have different consequences on the environment. **Conventional farming** relies on synthetic inputs such as fertilisers, pesticides and herbicides to reduce pests, weeds and provide chemical nutrition. This causes an increase in greenhouse emissions, soil erosion and water pollution.

Organic production relies on natural cycles, processes and biodiversity to work with the local conditions. Organic farmers use age old techniques such as green manures, crop rotation and composted animal manures to maintain biological diversity and replenish soil fertility naturally. Organic farming has a lower carbon footprint and helps keep a natural ecosystem without toxic residues polluting the air and water ways.

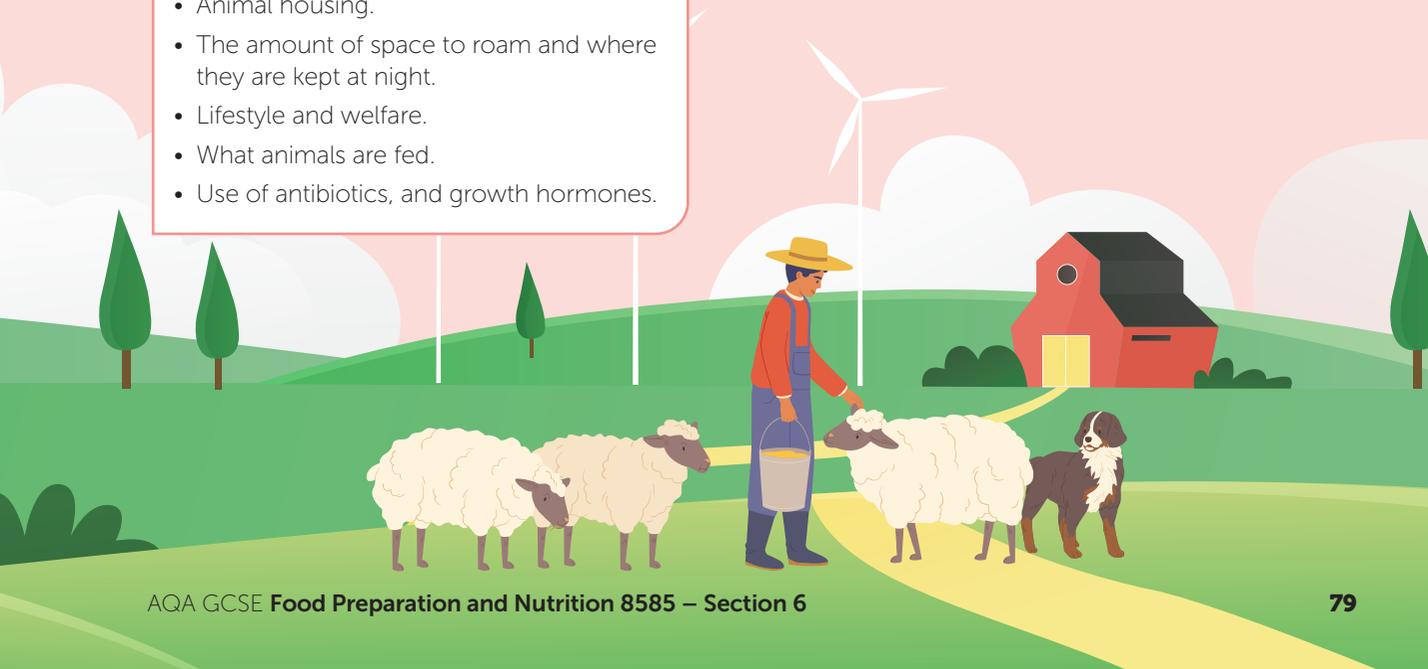
Meat and poultry farming

Different farming techniques are used for reared ingredients such as meat and poultry. Conditions for animals vary depending on the way they are reared, such as **intensive** farming, **free range** or **organic** production. Each method has an impact on:

- Animal housing.
- The amount of space to roam and where they are kept at night.
- Lifestyle and welfare.
- What animals are fed.
- Use of antibiotics, and growth hormones.

Catching

Humans have hunted for food or foraged wild plant foods for thousands of years. We still hunt wild game such as deer, rabbits, grouse and pheasants. Fish are caught in seas and rivers such as salmon, brown trout and shellfish.



SUSTAINABLE FOOD

If farming meets its level of production and society's need for food, whilst maintaining and improving the environment, it can be described as **sustainable**.

Sustainable fishing

When oceans and inland fisheries are overfished, too many fish are caught and at a speed that the species cannot naturally replenish. Some commercial fishermen catch huge quantities of fish or other marine animals that are either too small or not wanted so they are just thrown away. Industrial scale fishing also has an impact on independent fishermen, who provide an economy to small fishing port communities.

Stocks of fish can be protected by:

- Limiting the amounts of fish that can be caught (Government fishing quotas).
- Protecting areas of the sea from fishing to enable stock to replenish and thrive.
- Changing methods some species are caught, for instance line caught tuna.

Consider why regulating the size of holes in fishing nets can help conserve fish stocks. [3]

By ensuring that the hole is of a certain size, it means that small or underdeveloped fish are not caught.^[1] These fish can grow to a mature size^[1] and have time to breed to produce more fish.^[1]

Fish farming

Fish farming or **aquaculture** has increased around the world to meet the rising demand for fish. Fish are grown in open water pens, situated at inshore marine environments, until they reach the right size to be sold for supermarkets and restaurants. Farms are required to follow defined standards of safety and care with the feed and treatments they use on the fish in order to increase sustainability.



Sustainable farming

There is a concern that sustainable farming uses more land but gives a lower yield. It is hoped that by using a range of improved farming techniques such as managing water carefully, maintaining healthy soil and minimising pollution, that sustainably farmed land can be as productive as an intensively farmed one.



PACKAGING AND TRANSPORTATION

Much of the food we buy comes in packaging, which provides a safe, reliable and clean way to store food. However, most of the packaging is single use and made from a variety of synthetic materials.

Paper and cardboard may have a plastic coating or lining and include labels with printers' inks. If these are thrown away, rather than recycled, they contaminate the land, waterways and wildlife.

Carbon footprint

A **carbon footprint** is the total amount of greenhouse gas emissions generated by our actions, from production to consumption. We can help to minimise our individual footprint by:

- Minimising food waste, and correctly disposing or composting waste.
- Reducing the amounts of pre-packaged foods and preparing meals from fresh ingredients.
- Shopping locally and seasonally to reduce food miles.
- Think seasonally – growing food out of season means vast greenhouses are heated day and night to artificially create warm growing conditions.
- Reusing bags, buying loose produce, using refillable containers where available.
- Growing your own produce.
- Reducing consumption of meat and meat-based products.

1. Describe **six** methods that improved packing can help reduce food and packaging waste. [6]
2. Suggest **four** ways that individual consumers can help reduce their transportation emissions when food shopping. [4]
 1. *Increased use of recyclable packaging and clear recycling symbols.^[1] Clear and prominent storage advice, use by or best before dates and guidance on freezing.^[1] Packets that can reseal.^[1] A variety of packet sizes to suit individual needs.^[1] Option to use reusable bags when buying fresh fruit and vegetables.^[1] Independent stores offer refillable containers for dry foods and cleaning products.^[1]*
 2. *Shopping locally or walking/cycling to shops.^[1] Minimising the number of journeys by making a weekly shop.^[1] Using a delivery service that has fuel efficient vehicles or offers a green delivery slot.^[1] Buying seasonally has a huge impact on reducing long distance food miles.^[1]*

Transportation

Food miles measure how far food has travelled before it reaches the consumer. Food is moved around the world by air, sea, rail and road which all contribute to emissions.



THE EFFECT OF DRYING FOODS

Drying foods is an ancient method of preservation. It reduces the moisture content to a level which inhibits microorganisms and increases the shelf life of food. It also changes the texture.

Sun drying and dehydration

Sun drying is the traditional method, but electric dehydrators, which circulate air, dry foods under controlled conditions.

Fruits that are dried such as grapes, figs, plums provide a concentrated source of micronutrients vitamin A and E and are a good source of fibre. However, they lose vitamin C in the drying process. Dried apricots are particularly rich in antioxidants and a good source of vitamin A.



The effect of heating and drying on the sensory characteristics of milk

Milk powder can be used for convenience, or where people don't have access to fresh milk or refrigeration. It is also used in the manufacture of baby formula and infant milk as it is rich in calcium.

When milk is heated it affects the taste, smell and colour. The longer and hotter the milk is heated for, the more the taste changes. Lactose or milk sugar begins to caramelise which makes the milk taste sweeter. Pasteurising is a very rapid process, so the taste of milk is not affected.

Dried and evaporated milks are heated to a high temperature, causing caramelisation of the lactose and creating a sweet taste. Condensed milk has had around 60% of the water removed to produce a thick milk, which often has sugar added to it to help preserve it, making it taste very sweet.



Explain why dried milk powder is fortified with vitamins A and D. [2]

When fat is removed in the drying process, fat soluble vitamins are also lost^[1], therefore they must be replaced during processing^[1].



EXAMINATION PRACTICE ANSWERS

Section 2

1. (A) Fat. [1]
2. (A) Fatty acids and glycerol. [1]
3. (C) Broccoli. [1]
4. (A) Calcium. [1]
5. (A) Anaemia. [1]
6. (C) Meat, fish, eggs, soya beans. [1]
7. Aids digestion, regulates body temperature, flushes waste. [3]
8. (a) The body is unable to digest lactose [1], a type of sugar mainly found in milk and dairy products [1]. [2]
(b) The milk and the yoghurt [1] can be replaced with a soya or nut-based milk that doesn't contain lactose [1].
A coconut milk yoghurt [1] could add any additional flavour and natural sweetness [1]. [4]
9. (a) People choose to become vegetarian if they have concerns about animal welfare, health reasons to reduce the amount of meat they consume, environmental reasons.
(b) In having a plant-based diet, protein that would come from meat needs to be replaced with dairy products, eggs, grains, pulses, meat alternatives, nuts and seeds. By having a daily intake of at least five portions of fruit and vegetables the recommended fibre intake is met.
10. Reduce the sugar intake by replacing sugary drinks with water, swapping sweetened yoghurts for plain, reduce the number of smoothies and fruit juice, replace sugary snacks such as biscuits with fresh fruit and vegetable sticks. [3]
11. Obesity indicates a someone is overweight with a large amount of body fat. Obesity is a growing problem as many people are eating too much low nutrient, high calorie food. Combine this with a lack of exercise and long periods sitting down at a desk, in the car or on the sofa means that the high energy intake is not being burnt off with exercise. Obesity leads to a physical change which can make movement uncomfortable and lead to life threatening conditions such as type 2 diabetes, coronary heart disease, stroke and some cancers. It can affect a person's quality of life and lead to low self-esteem.
12. Energy: The beef lasagne meal exceeds daily energy requirements by nearly 50%. Given that this only meal, their energy intake could double with the inclusion of breakfast and an evening meal. Although his parents are still active, they don't need to consume an excess of energy as their natural metabolism will have slowed. The vegetarian option would be a better choice meeting nearly a third of their daily needs, it is rich in nutrients and vitamins and overall provides the healthier choice.
Protein: The vegetable lasagne meal is quite low in protein at 14%. They may have a more protein rich meal in the evening. The beef lasagne provides a higher proportion at just over 20g. Protein is needed help maintain and repair the body.
Carbohydrate: Meal A is high in carbohydrate, with the inclusion of pasta, bread and potatoes. Although this provides good starchy carbohydrate, one or two of these should be replaced with green leafy vegetables, which will also reduce the fat content. The starchy carbohydrates provide a lot of energy, more than they need, so this type of meal could lead to obesity and other health issues.
Fat: Meal A at 41% of the RI, is much higher than Meal B. The saturated fat level at over 12g is more than half of the RI. This is due to the butter in the garlic bread and oil for cooking the potatoes. Meal B is lower in saturated fat and a healthier choice at 11%.
Vitamins and nutrients provided by the broccoli, carrots and peas to accompany Meal B, provide a more balanced meal. The higher levels of vitamin A and C in Meal B provide antioxidants which can help reduce the risk of heart disease.
The sugar levels in the meals are both low, but both meals are high in salt and exceed the daily RI. Excess salt contributes to high blood pressure and the beef lasagne contains 7.44g exceeding the RI which is no more than 6g per day.
Iron is important in the diet to help prevent anaemia and help absorb vitamin C. Meal A contains more iron due to the beef in the meal. An iron rich vegetable such as spinach could be added to both meals to increase the intake.

LEVELS BASED MARK SCHEME FOR EXTENDED RESPONSE QUESTIONS

Questions that require extended writing use mark bands. The whole answer will be marked together to determine which mark band it fits into and which mark should be awarded within the mark band.

Mark Band 3	
High Level 8–10 marks	<ul style="list-style-type: none"> The meaning of technical terms in the question has been understood
Mark Band 2	
Mid Level 3–5 marks	<ul style="list-style-type: none"> The meaning of technical terms in the question has been understood The response shows an understanding of Food and Nutrition concepts Arguments and points are developed in the response, but sometimes useful examples or related knowledge to the context have not been included Some structure has been given to the response with at least one line of reasoning Sound knowledge has been effectively shown
Mark Band 1	
Low Level 1–2 marks	<ul style="list-style-type: none"> The answer shows that technical terms used in the question have not been understood Key Food and Nutrition concepts have not been understood and have not been related to the context of the question The answer is only loosely related to the question and some inaccuracies are present Gaps are shown in Food and Nutrition knowledge The answer only considers a narrow viewpoint or one angle The answer is unstructured Examples used are mostly irrelevant to the question or have no evidence to support them
0 marks	<ul style="list-style-type: none"> No answer has been given or the answer given is not worth any marks.

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