

AQA GCSE Food Preparation and Nutrition Revision Guide

Answers to Stretch and Challenge questions

NOTE: This section suggests and outlines the topics to include in the answer to each question to achieve a good mark if you gave them, with details, reasons and examples, in an exam. They are designed to help guide and instruct you, but they should not be considered to be the only answers you could give.

- ↳ Chapter 1 Nutrients
- ↳ Chapter 2 Nutritional needs and health
- ↳ Chapter 3 Cooking of food and heat transfer
- ↳ Chapter 4 Functional and chemical properties of food
- ↳ Chapter 5 Food spoilage and contamination
- ↳ Chapter 6: Principles of food safety
- ↳ Chapter 7: Factors affecting food choice
- ↳ Chapter 8: British and international cuisines
- ↳ Chapter 9: Sensory evaluation
- ↳ Chapter 10: Environmental impact and sustainability
- ↳ Chapter 11: Processing and production

Followed by answers to Activities

Chapter 1 Nutrients

1. In the UK, Public Health England have recommended that the price of high-sugar products, such as soft drinks, should be increased by adding a sugar tax to them.

(Ref: Public Health England, October 2015: *Sugar Reduction – The evidence for action* www.gov.uk/government/uploads/system/uploads/attachment_data/file/470179/Sugar_reduction_The_evidence_for_action.pdf)

Analyse why this recommendation has been made, and explain what it is hoped will be achieved by the introduction of the sugar tax.

(8 marks)

Include information on:

- The role of sugars in the body (brief)
- The types of sugars present in foods naturally or added during food processing, including different types of free sugars
- Which food products are classified as high sugar, e.g. soft drinks, sweets, chocolates, ice cream, biscuits, etc.
- Health problems associated with regular and high intakes of these products: tooth decay, weight gain/obesity, type 2 diabetes
- Sugar tax aims to reduce consumption in all target groups, especially children, and therefore contribute to a reduction in diet related diseases

2. In major sporting competitions such as the Olympic Games and World Athletics Championships, dietitians and nutritionists are involved to ensure that team members follow a dietary programme suited to their particular needs during training and events.

- a) Analyse and explain the nutritional needs of track athletes who run in events such as the 100m and 200m sprint, hurdles, 4 × 100m relay, and 5,000 and 10,000 metres races.

(5 marks)

Include information on:

- Physical activity level and energy needs
- How the body receives energy from food and how it stores it
- Importance of glycogen stores in the muscles and liver
- What happens to their performance if athletes do not have enough (or use up) glycogen stores

- b) Plan a two-course lunch for a track athlete and evaluate how it would help them to maintain their fitness.

(4 marks)

Include information on:

- Energy from carbohydrates to build up glycogen stores
- Protein to maintain muscles
- Vitamin A – to maintain mucous membranes and help to resist infection/antioxidant
- Vitamins B1, 2, 3 for energy release
- Vitamin C to absorb iron which is needed for energy release/antioxidant
- Vitamin D to absorb calcium to strengthen skeleton
- Vitamin E – antioxidant
- Calcium – skeletal strength
- Iron – energy release
- Iodine – to maintain health of thyroid gland and metabolic rate

- c) Explain why hydration is particularly important for these athletes.

(3 marks)

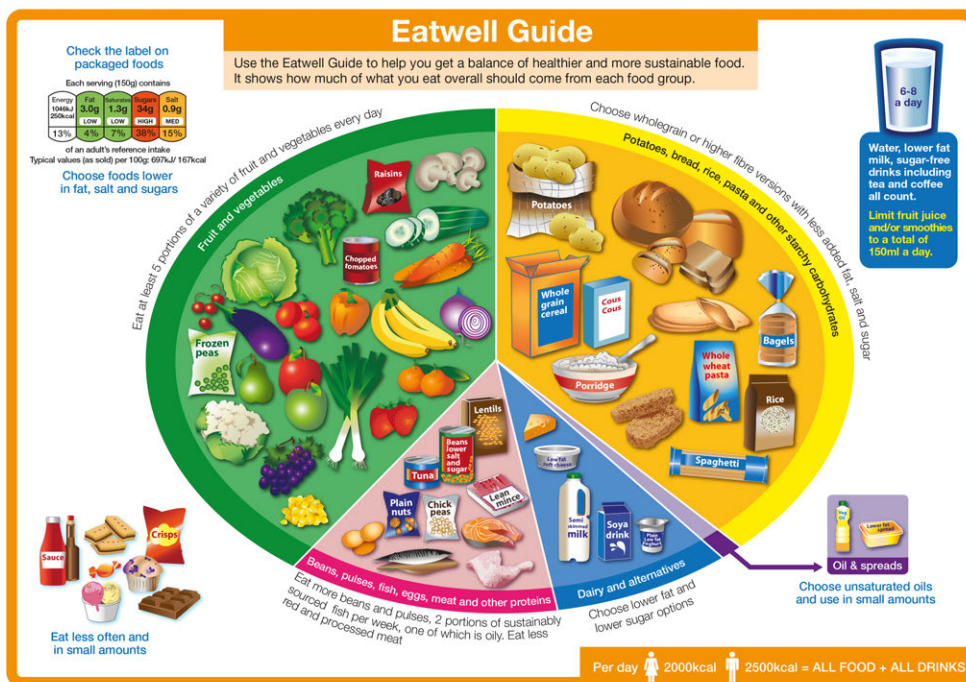
Include information on:

- Why water is needed by the body
- Importance of water for athletes to control body temperature/get rid of waste products/maintain the correct concentration of minerals in the blood

3. Analyse and explain the reasons for the following practices in food preparation and cooking, giving examples in your answers:
- a) Choosing and buying vegetables and fruits that are as fresh as possible and not damaged or bruised. (2 marks)
- Fresh vegetables and fruits have the highest quantities of nutrients/the best flavour and texture
 - If damaged or bruised they can be spoiled by contamination by micro-organisms and the action of enzymes, which can damage the nutrients they contain
- b) Peeling, chopping, grating and slicing vegetables and fruits as close as possible to the time that they are cooked or served. (2 marks)
- Vegetables and fruits contain water soluble vitamins B and C
 - These vitamins can be lost through reacting with oxygen in the air when they are cut/peeled/grated, etc.
 - If prepared close to the cooking time, the amounts of vitamins lost through oxidation is greatly reduced
- c) Boiling green vegetables in the minimum amount of water for the minimum amount of time. (2 marks)
- Water soluble vitamins B and C will dissolve in water
 - If a lot of water is used, more vitamins will be lost
 - If cooked for a long time the heat will damage the vitamins so they are no longer any use to the body
 - Reducing the amount of water used and the cooking time will greatly reduce the losses of these vitamins
- d) Steaming green vegetables instead of boiling them. (2 marks)
- There is less loss of water soluble vitamins if steaming is the cooking method because they cannot dissolve so readily as in water; there is also less damage to their colour, texture and flavour

Chapter 2 Nutritional needs and health

The Eatwell Guide gives advice to people about how to choose a healthy, balanced diet.



1. Explain in detail, the reasons for the following pieces of advice given on the Eatwell Guide:

a) Starchy foods: Choose wholegrain or higher fibre versions with less added fat, salt and sugar.

(4 marks)

- Starchy foods are a main source of energy, e.g. bread, pasta, potatoes, rice, cereals, etc.
- Whole grain/higher fibre versions take longer to be digested in the body so the release of energy from them is slower than in processed starchy foods such as white flour/bread/pasta/rice
- The fibre is important to help prevent constipation/colon cancer
- Lower fat and sugar version will be less energy dense
- Lower salt versions will help prevent high blood pressure and heart disease

b) Oils and spreads: Choose unsaturated oils and use in small amounts.

(4 marks)

- Unsaturated oils are better for health – saturated fats can increase blood cholesterol levels
- High blood cholesterol levels can lead to blocked coronary arteries in heart muscle and heart attacks
- Oils and spreads are energy dense
- Excess intake of oils and spreads can lead to weight gain and obesity if all the energy they contain is not used by the body

c) Eat more beans and pulses, two portions of sustainably sourced fish per week, one of which is oily. Eat less red and processed meats.

(4 marks)

- Beans and pulses are an important source of LBV protein/fibre/are also low in fat
- Fish of any kind are a good source of HBV protein
- Oily fish are a good source of fat soluble vitamins A, D, and essential fatty acids
- Choosing sustainable fish conserves fish stocks of endangered species as they are able to breed and increase their numbers
- High consumption of red and processed meats has been linked to increased risk of developing cancers in the digestive system/colon/bowel

2. In the UK, the number of people changing from a meat eating to a vegetarian diet has grown over the past few years.
- a) Analyse the reasons why more people are choosing to eat a vegetarian diet, giving details and examples in your answer. (5 marks)
- Include information on:
- Health benefits of eating more plant foods – lower fat content/lower energy value/more vitamins and minerals/more fibre
 - High consumption of red and processed meats has been linked to increased risk of developing cancers in the digestive system/colon/bowel
 - People have concerns about animal welfare/environmental sustainability of meat production
 - Sustainability issues with producing meat, poultry and dairy foods – higher carbon footprint/land needed/animal feed needs to be grown/high production of greenhouse gases
 - Religious dietary laws that encourage vegetarianism
- b) Explain the similarities and differences between a lacto-ovo vegetarian diet and a vegan diet. (3 marks)
- Lacto-ovo – will eat milk and dairy products and eggs
 - Will not eat meat/poultry/fish or any product where the animal has had to be killed
 - Vegan – will not eat or use animal products of any kind
3. The number of people who develop osteoporosis is rising each year in the UK.
- a) Explain what osteoporosis is and why it develops. (4 marks)
- During the normal natural ageing process after age 30–35 years, minerals start to leave the skeleton and are not replaced through the diet
 - If the skeleton reached peak bone mass (when the skeleton contains its maximum amount of minerals) before age 30 years it will be stronger and less likely that osteoporosis will develop
 - If the bones develop osteoporosis they will have lost a lot of minerals and will be very fragile, painful and likely to easily break
 - People with severe osteoporosis lose some height and develop a curved spine as the weakened vertebrae (back bones) change shape
- b) Explain why it is important that young people know about osteoporosis and what they can do to help prevent themselves from developing it when they are older. (4 marks)
- Bones become stronger as they mineralise throughout childhood
 - During teenage years a lot of minerals are laid down in the skeleton
 - Young people need to know the importance of:
 - ~ Having enough calcium and vitamin D in their diet
 - ~ Taking regular physical exercise (jumping/running/walking) which stimulates the bones to take up minerals
 - ~ Limiting the consumption of fizzy drinks which may affect how many minerals are taken up by the bones

Chapter 3 Cooking of food and heat transfer

1. Explain, giving detailed reasons:

a) Which method of cooking you would use to cook a piece of meat which includes lots of muscle (is a tougher cut of meat). (2 marks)

- Long, slow, moist methods, e.g. stewing, braising, simmering

b) How the beef would become tender. (4 marks)

- Meat muscle is formed into bundles of muscle fibres surrounded by lots of connective tissue
- This makes the meat tough
- Connective tissue contains the protein collagen which converts to gelatine in the presence of moisture
- This causes the muscle fibres to be released and tenderises the meat

2. Using your knowledge of cooking methods and heat transfer, explain in detail, the reasons for the following instructions:

a) Pieces of meat and poultry that are to be grilled should be no thicker than 3.5cm. (2 marks)

- Heat transfer by radiation
- Radiation heats the surface it comes in contact with
- If too thick, heat cannot get through to the centre to cook the meat/poultry thoroughly
- This may be a food safety risk

b) Boil raw kidney beans for at least 15 minutes. (2 marks)

- Raw kidney beans contain a natural toxin (poison)
- Boiling will destroy the toxin
- If not boiled for long enough the remaining toxin may cause illness

c) Coat raw fish or chicken in flour, egg and breadcrumbs or batter before deep frying. (2 marks)

- These ingredients are used to protect the protein in the fish or chicken from being over cooked in the heat of the oil
- Flour goes on first – makes beaten egg stick to the food
- Egg protein coagulates in the heat of the oil and seals the food to protect it
- Breadcrumbs add texture and become crispy when fried

3. Explain in detail, the effects on the sensory properties and nutritional value of the following foods by the three different cooking methods shown for each:

a) Broccoli – cooked by steaming, stir frying and microwaving. (6 marks)

Broccoli	Sensory properties	Nutritional value
Steaming	<ul style="list-style-type: none">• Green colour will be retained• Flavour will be unaffected• Texture will be just tender	<ul style="list-style-type: none">• Vitamin C – only minimal losses because broccoli will not be cooked in water
Stir frying	<ul style="list-style-type: none">• Green colour will be retained• Flavour may not develop fully in the short cooking time• Texture may remain very crisp, especially if pieces of broccoli are too big to cook in the short time available	<ul style="list-style-type: none">• Vitamin C – only minimal losses as it is cooked for a very short time
Microwaving	<ul style="list-style-type: none">• Green colour will be retained• Flavour will be unaffected if cooked until just tender• Texture may become too wet and soft if overcooked	<ul style="list-style-type: none">• Vitamin C – only minimal losses because broccoli will not be cooked in water

b) Potatoes – cooked by boiling, baking and roasting.

(6 marks)

Potatoes	Sensory properties	Nutritional value
Boiling	<ul style="list-style-type: none"> Starch will gelatinise and texture will soften If overcooked, potatoes may become watery and break up 	<ul style="list-style-type: none"> Vitamin C – significant losses because of the high temperature and length of time involved in boiling the potatoes
Baking	<ul style="list-style-type: none"> Starch will gelatinise and texture will soften inside the potato The skin will become crisp and develop quite a strong flavour 	<ul style="list-style-type: none"> Vitamin C – significant losses because of the high oven temperature and length of time involved in baking the potatoes
Roasting	<ul style="list-style-type: none"> Starch will gelatinise and texture will soften inside the potato Oil will be absorbed and the outside of the peeled potatoes will become crisp and develop quite a strong flavour A golden brown colour will develop on the outside of the potatoes as some of the starch dextrinises 	<ul style="list-style-type: none"> Vitamin C – significant losses because of the high oven temperature and length of time involved in baking the potatoes Energy density will increase due to the absorption of the oil used for roasting

c) White fish – cooked by shallow frying, baking and poaching.

(6 marks)

White fish	Sensory properties	Nutritional value
Shallow frying	<ul style="list-style-type: none"> Protein will coagulate and fish will form flakes and remain moist If coated in egg and breadcrumbs or batter, the protein will be protected and the fish will stay moist inside with a crisp outer coating 	<ul style="list-style-type: none"> If overcooked, the protein will coagulate too much and the texture will dry out and become less digestible B vitamins will be damaged by heat
Baking	<ul style="list-style-type: none"> Protein will coagulate and fish will form flakes and remain moist if it is wrapped in foil or cooked in a covered dish 	<ul style="list-style-type: none"> If overcooked/not covered, the dry heat of the oven will cause the protein to coagulate too much and the texture will dry out and become less digestible B vitamins will be damaged by heat
Poaching	<ul style="list-style-type: none"> Protein will coagulate and the water will help to keep it moist It will toughen if overcooked 	<ul style="list-style-type: none"> If overcooked, the protein will become less digestible B vitamins will be damaged by heat and some will dissolve in the water

Chapter 4 Functional and chemical properties of food

1. Using your knowledge of the functional and chemical properties of foods, explain what are the possible causes of each of the following:
 - a) You have made some baked egg custards in the oven, but when you serve them their texture is watery and tough. (2 marks)
 - Oven temperature too high so protein has denatured and coagulated too quickly
 - The coagulated protein molecules have tightened up with the high heat and squeezed out the water they were holding, which gives a holey texture and watery appearance
 - The texture is tough and less digestible because the protein is overcooked
 - b) You have made some bread and it has a very dense texture and has not risen very much. (3 marks)
 - Flour with too little gluten may have been used
 - Yeast may be old and inactive so has not fermented the starch in the flour to produce CO₂ gas to raise the dough
 - Yeast may have been too cold so could not produce enough CO₂ gas
 - Water may have been too hot and has killed the yeast
 - Too little water was added so the dough was not stretchy enough to rise
 - Oven temperature may have been too cool so the gases have not expanded enough to raise the dough
 - c) You have made a béchamel sauce to go with some pasta, but the sauce is lumpy. (2 marks)
 - The sauce has not been stirred enough when heating, so the starch granules have settled to the base of the pan
 - As the starch granules have begun to absorb water and swell with the increasing heat, they have joined together and formed lumps
2. Explain, with details and examples, the reasons for the following instructions in these recipes:
 - a) Yorkshire puddings: Pre-heat the oven until it is very hot (gas 7/220°C). (2 marks)
 - These are made of batter, which contains milk, egg and plain flour
 - They rise due to the water in the milk and egg turning to steam in the very hot oven and then set as the egg protein and gluten in the flour coagulates
 - The oven needs to be hot enough in order to turn the water quickly into steam to start the rising process
 - b) Swiss roll: Sieve the flour twice and fold it very carefully into the egg and sugar mixture, using a metal spoon. (2 marks)
 - Swiss rolls are made using the whisking method where air is trapped by whisking the eggs and sugar to form a foam and makes the mixture rise in the oven
 - Sieving flour traps air between the flour particles so doing it twice traps additional air
 - Folding the flour carefully into the mixture with a metal spoon prevents the trapped air from being lost, which would happen if it was beaten with a wooden spoon
 - c) Shortcrust pastry: Rub the fat into the flour with the fingertips, until the mixture looks like breadcrumbs. (2 marks)
 - The fingertips are cool so the fat will not easily melt
 - When the fat is rubbed in it coats the flour particles with a waterproof layer
 - When water is added, the gluten molecules remain short in the pastry dough
 - Rubbing it in until it look like breadcrumbs means that the flour particles have been evenly coated with fat
 - d) Crème caramel: Boil the sugar in the pan until a golden brown colour. Remove from the heat straightaway and pour into the ramekin dishes. Do not leave the pan on the heat. (2 marks)
 - Boiling the sugar causes it to caramelise as sucrose molecules are changed by the heat
 - It must be poured into the ramekin dishes straightaway before it sets as it cools
 - If left on the heat, the sugar will burn as water evaporates – what is left is black carbon

3. Explain, giving details and examples, the reason(s) for the following: (3 marks)
- a) Properly made mayonnaise does not separate into oil and water. (3 marks)
- Oil and water do not mix together – they separate
 - Egg yolk is added to the mixture
 - Egg yolk contains lecithin – an emulsifier, in which one end of the lecithin molecule is attracted to the oil and the other end is attracted to water
 - When the emulsifier molecules arrange themselves in this way, the oil and water cannot separate
- b) Scones made with bicarbonate of soda as the only raising agent taste soapy. (3 marks)
- Bicarbonate of soda is added to scone mixture to produce CO₂ gas in the oven and make the scones rise
 - Bicarbonate of soda is an alkali
 - If used on its own, it will produce CO₂ gas so the scones will rise in the oven but the chemical reaction will leave behind washing soda, which gives the scones a soapy taste
 - To prevent this, an acid is added (cream of tartar) which neutralises the alkali and prevents the soapy taste
- c) Ganache, made with chocolate melted into warmed cream, can be used to pipe decorations on cakes and desserts if it is cooled to the right temperature. (3 marks)
- Once the chocolate has melted and is well mixed into the cream, the mixture is left to cool
 - As it cools down the chocolate begins to become solid, but the cream prevents it from becoming as solid as it was before
 - The ganache can be used to pipe decorations once it has set enough, because the fat in the chocolate has plasticity. This means it can be shaped and spread with light pressure
 - Plasticity occurs because the fat contains triglycerides that have different melting temperatures, which makes the ganache the right texture to be able to be piped and spread with a knife
4. Explain the functional and chemical properties of the following ingredients in the recipes shown:
- a) Flour in bread making. (3 marks)
- Wheat flour contains two proteins – glutenin and gliadin
 - When water is added to the flour, these two proteins combine to form gluten
 - Strong plain flour has more gluten than ordinary plain flour
 - Gluten gives the dough plasticity – it can be stretched and shaped during kneading
 - Gluten makes the dough elastic so that it can stretch when the gas bubbles in it expand during rising and baking
 - Starch in the flour creates a network which sets with the gluten during baking to form the soft texture inside the bread
 - Starch turns to dextrin with the dry heat of the oven to give it a golden crust
- b) Eggs in a whisked sponge mixture. (e.g. Swiss roll) (3 marks)
- Eggs contain protein in the yolk and white
 - When whisked with sugar, the egg proteins stretch and trap lots of air bubbles as a foam is created
 - After flour is added and the mixture is placed in the oven, the trapped air bubbles expand in the heat and the mixture rises
 - The mixture sets as the proteins in the egg and the gluten in the flour denature and coagulate to form a light, spongy texture
- c) Water and eggs in choux pastry. (3 marks)
- The water is heated with the fat and is absorbed by the starch granules in the flour when it is added

- The eggs add more moisture to the mixture
- When baked in a hot oven, the water that is added and the water in the eggs quickly turns to steam and causes the mixture to rise
- The water evaporates
- The protein in the eggs denatures and coagulates in the heat and helps the mixture to set along with the gluten in the flour

d) Flour in a béchamel sauce.

(3 marks)

- Flour contains starch in the form of granules
- When in a cold liquid, the starch granules sink to the bottom of the pan
- When the liquid is heated and stirred, the starch granules do not stay at the bottom of the pan
- At 60°C the starch granules start to absorb some of the water in the liquid and begin to swell up and become larger – this makes the sauce start to thicken
- At 80°C the starch granules are very swollen and start to burst and release starch into the liquid
- This starch forms a 3D network that traps water molecules and stops them moving around so much
- At 100°C the sauce completely thickens
- The whole process is called gelatinisation

Chapter 5 Food spoilage and contamination

1. In the UK, businesses such as restaurants and factories that produce food have to be regularly inspected by Environmental Health Officers to make sure that they are following the rules of the Food Safety Act.

Evaluate why it is important that each of the following checks are made by Environmental Health Officers during one of these inspections. Give examples in your answers.

- a) Refrigerator and freezer temperatures. (3 marks)

- Low temperatures in a refrigerator that is working properly (0°C to below 5°C) slow down the growth and multiplication of micro-organisms so that they do not become a food poisoning risk in high-risk foods such as meat, poultry, fish, cream and milk, for the short while they are stored in the refrigerator
- In a freezer, low temperatures (–18°C to –24°C) make the micro-organisms dormant (alive but inactive) until they are thawed
- The inspection should make sure that these temperatures are correct so that the food remains safe from the growth and multiplication of microbes whilst they are stored
- The temperatures can be affected by:
 - ~ The refrigerator or freezer not being defrosted regularly so it does not work efficiently
 - ~ A faulty door seal that lets warm air in
 - ~ Siting the refrigerator or freezer too close to hot areas of the kitchen, e.g. the cooker
 - ~ A faulty thermostat

So the inspection will need to check all of these

- b) How food is stored in refrigerators and food cupboards. (3 marks)

- Food should be stored correctly to prevent:
 - ~ The growth and multiplication of microbes
 - ~ Infestation of food by pests such as flies, mice and birds
 - ~ New food stocks being used before older ones are finished
- In refrigerators:
 - ~ The air needs to circulate freely inside to maintain a cold temperature and cool all the food down – if it is too tightly packed, this will not happen
 - ~ Raw foods such as meat, poultry and fish should be stored in covered containers to prevent them dripping onto other foods and causing cross-contamination of microbes
 - ~ Strong-smelling foods, e.g. cheese, should be well wrapped to prevent other foods, e.g. eggs from being tainted by the smell
 - ~ Food with soil on them, e.g. vegetables, should be washed and not allowed to touch other foods
 - ~ Raw and cooked foods should be kept separate to avoid cross-contamination
- In food cupboards:
 - ~ Dry foods, e.g. flour, rice, should be well wrapped and stored in air tight containers to prevent them from picking up moisture in the air and to prevent pests, e.g. flies, from contaminating them
 - ~ All foods should be used in rotation – oldest stocks used first to prevent foods from going out of date and being wasted
 - ~ Food cupboards should be well ventilated to prevent build-up of moisture and growth of moulds
 - ~ Foods should not be stored on the floor to prevent contamination by pests, e.g. insects

- c) How food is handled by the staff during preparation. (3 marks)

- Food can be contaminated by food handlers by:
 - ~ Unwashed hands, e.g. after using toilet, after handling raw meat/poultry
 - ~ Bacteria from nose, mouth, throat
 - ~ Dirty clothing/loose hair
 - ~ Wearing nail varnish/false nails
 - ~ Licking fingers then handling food

- ~ Wearing jewellery
- ~ Preparing raw and cooked foods together
- ~ Not washing equipment properly
- ~ Using the same equipment and not washing hands in between

d) The disposal of waste and rubbish. (3 marks)

- Waste and rubbish will be contaminated with micro-organisms – these will multiply in a warm kitchen
- Waste and rubbish needs to be disposed of regularly throughout the preparation time
- If allowed to come in contact with food being prepared, waste and rubbish will cross-contaminate it
- Waste and rubbish will attract pests, e.g. flies, which will cross-contaminate food being prepared nearby

e) The cleanliness of the kitchen, food store rooms, equipment and the staff toilet and hand washing facilities. (3 marks)

- Micro-organisms will live and multiply in areas/surfaces/equipment, etc., that are not clean
- Cross-contamination of microbes to food is more likely to happen if facilities, etc., are dirty, especially from the hands of food handlers
- Good standards of cleanliness will help prevent infestation by pests, e.g. flies, mice, ants
- Staff toilet and hand washing facilities should be regularly cleaned and have soap, hot water and equipment for hand drying so that staff can maintain high standards of hygiene when handling food

2. Giving details and examples, explain why the following are important in preventing food spoilage and food poisoning:

a) Wearing clean, protective clothing when preparing food. (3 marks)

- Bacteria from outside of the kitchen will be found in the clothing of food handlers
- Clean, protective clothing prevents cross-contamination of bacteria from clothing onto the food being prepared
- Protective clothing also includes hats to prevent hairs falling into food and scarves to absorb sweat from the skin from contaminating the food when working in a hot kitchen
- Wearing disposable plastic gloves when handling high risk foods, e.g. raw meat and fish, will help prevent cross-contamination

b) Separating raw foods from cooked foods in a refrigerator. (3 marks)

- Raw high risk foods such as meat, fish, eggs and poultry contain a lot of pathogenic bacteria, which are not destroyed until the foods are cooked
- Raw foods should be kept separate from cooked foods because they can easily contaminate them, e.g. if they are able to drip on them or touch them – they should each be stored in sealed containers and stored on different shelves in the refrigerator
- If they contaminate cooked foods, the bacteria will be able to multiply slowly in the refrigerator and could be present in high enough numbers to cause food poisoning

c) Regularly washing your hands when preparing and cooking food. (3 marks)

- The hands can easily pick up bacteria from lots of different places
- Moist hands are likely to have many more bacteria on them than dry hands
- Hands should be washed regularly to remove as many bacteria as possible so that they are not passed on to other foods
- Hands should be washed after handling raw foods, e.g. meat, fish, poultry, eggs, vegetables with soil on them, because these foods will have the greatest number of pathogenic bacteria
- Hands should be washed after using the toilet and returning to the kitchen as many bacteria are found in sewage and on door handles, etc., which may be touched

d) Using different coloured chopping boards and different knives for different foods. (3 marks)

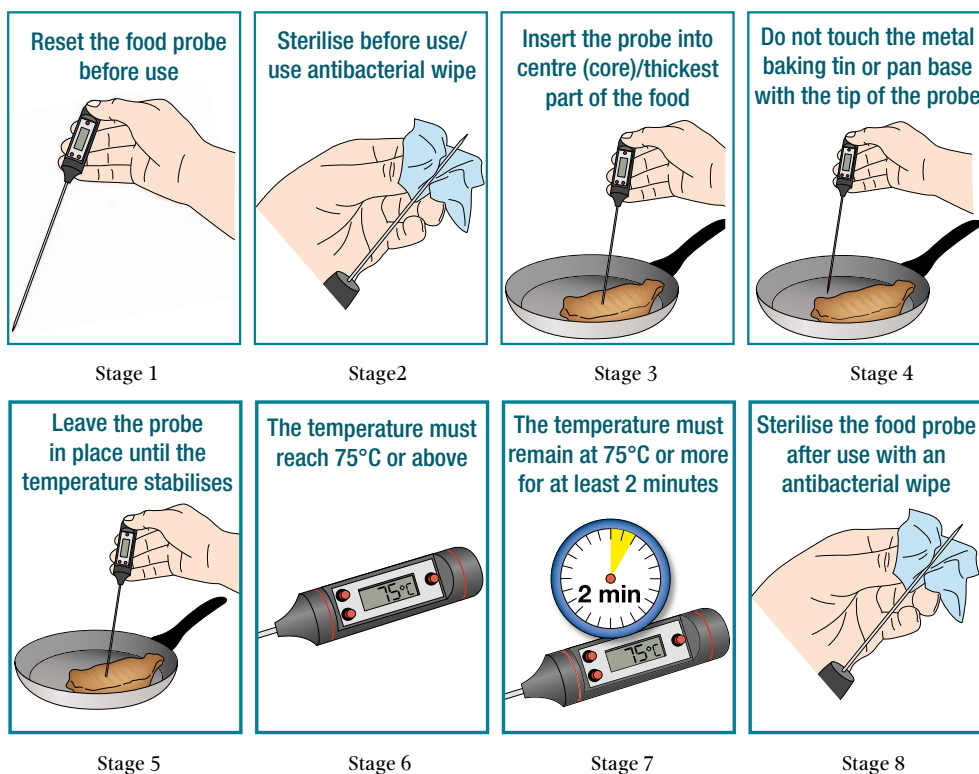
- In restaurants, different coloured chopping boards and knives are used to prepare different foods separately
- The colours that are normally used are:
 - ~ Red = raw meat and poultry
 - ~ Yellow = cooked meat, poultry and fish
 - ~ Blue = raw fish
 - ~ Green = fruit and green/salad vegetables
 - ~ Brown = root vegetables
 - ~ White = bakery and dairy foods
- This avoids the chance of bacteria being cross-contaminated from one type of food to another

e) Using a food probe when cooking meat or poultry. (3 marks)

- For food safety, the core temperature of cooked meats or poultry should be 75°C for 2 minutes
- Food probes are accurate digital thermometers that measure the internal core temperature of the meat
- If the temperature is lower than this, there is a chance that pathogenic bacteria will be able to survive the cooking process and grow and multiply in the centre of the meat

3. Here are the stage-by-stage instructions for using a food probe when cooking.

Analyse and evaluate why each stage is important from a food safety point of view, giving examples in your answer. (2 marks for each stage)



Stage 1 – reset to 0°C to ensure an accurate reading

Check that the probe is working properly by testing the probe in ice (0°C) and boiling water (100°C)

Stage 2 – sterilise with antibacterial wipe to ensure that there are no bacteria on the probe before it is pushed into the food – to avoid cross-contamination

Stage 3 – the probe should be put into the thickest part of the food to make sure that it is cooked to the right temperature and is safe to eat

Stage 4 – If the probe touches the pan, it will register a higher temperature because the metal is hot and will not give an accurate reading for the centre of the food

Stage 5 – Leaving the probe until the temperature stabilises will give an accurate reading

Stage 6 – 75°C or above is recommended to ensure that pathogenic bacteria have been destroyed by the heat

Stage 7 – If the temperature stays at 75°C or above for 2 minutes, it shows that the core temperature of the food is safe

Stage 8 – Sterilise the probe afterwards to ensure that any bacteria from the food are removed so that they do not contaminate the next food that the probe is used in

Chapter 6 Principles of food safety

1. Explain, giving detailed reasons for your answers, why food safety laws require food businesses to do the following:
 - a) Send their staff for regular training about food hygiene. (4 marks)
 - To make sure staff understand:
 - ~ How food poisoning occurs
 - ~ How food should be stored, prepared and cooked to keep it safe
 - ~ What their responsibilities are to keep food safe to eat
 - ~ What the law says about food safety and why they must follow the rules
 - b) Keep rubbish bins outside and well away from a food preparation kitchen. (4 marks)
 - Waste and rubbish will be contaminated with micro-organisms – these will multiply in a warm kitchen
 - If allowed to come in contact with food being prepared, waste and rubbish will cross-contaminate it
 - Waste and rubbish will attract pests, e.g. flies, which will cross-contaminate food being prepared nearby
 - It must be kept well away from food preparation areas to avoid cross-contamination
 - c) Make regular checks on how well their refrigerators and freezers are working. (4 marks)
 - The internal temperature of a refrigerator should be 0°C to below 5°C to keep food safe
 - The internal temperature of a freezer should be –18°C to –24°C to keep food safe
 - Checking can be done by keeping a thermometer inside the refrigerator or freezer
 - If not working at the right temperatures, bacteria may multiply very slowly and cause a food poisoning risk
 - The temperature may rise and cause a food safety risk if:
 - ~ The door seals do not work properly and allow heat in
 - ~ The inside is overcrowded and the food cannot cool down properly
 - ~ The thermostats are not working properly
 - ~ They are too near a source of heat, e.g. a cooker
2. Giving details and examples, explain why the following are important in food storage:
 - a) Food labels clearly show the shelf-life of foods. (4 marks)
 - Shelf life means how long a food is safe and palatable to eat
 - Use-by dates show the date by which high risk foods, e.g. meat, poultry, cream, fish, should be used in order to be safe
 - Best-before dates show the date by which foods such as biscuits, canned foods, breakfast cereals are at their best for flavour, texture and freshness, after which they may not be so palatable to eat
 - Showing the shelf life of foods helps consumers to avoid the risk of food poisoning and wasting food
 - b) Cupboards for the storage of dried foods are well ventilated and pest-proof. (4 marks)
 - Dried foods will pick up moisture and become damp – this may allow moulds to grow
 - Well-ventilated cupboards allow air through and prevent cupboards from becoming damp, which helps prevent mould growth and food wastage
 - Cupboards need to be pest proof because pests such as ants, mice, rats and cockroaches will eat dried foods and contaminate them with urine and faeces
 - Flies will lay eggs in dried foods, which hatch out into maggots that eat the foods and contaminate them

c) Freezer and refrigerator thermometers are used. (4 marks)

- The internal temperature of a refrigerator should be 0°C to below 5°C to keep food safe by preventing micro-organisms from growing and multiplying rapidly
- The internal temperature of a freezer should be –18°C to –24°C to keep food safe by making micro-organisms dormant (alive but inactive)
- Checking these temperatures can be done by keeping a thermometer inside the refrigerator or freezer
- Thermometers will indicate if the freezer or refrigerator is working correctly or if a fault has occurred
- Some freezers and refrigerators have an inbuilt alarm which will alert the consumer if the temperature is wrong

3. Explain, giving detailed reasons for your answers, the food safety points you should consider for fresh red meat, e.g. beef or lamb when:

a) Buying it. (3 marks)

Make sure it :

- Has a good colour (red), this shows it is fresh and has not started to break down.
- Is moist but not slimy (if slimy it means that bacteria are starting to break down the protein)
- Has a fresh smell (if not, it means bacteria are breaking down the protein)

b) Storing it. (3 marks)

Meat is a high risk food, so:

- Store it in a refrigerator at 0°C to below 5°C to prevent micro-organisms from growing and multiplying rapidly in the meat; or:
- Store it in a freezer at –18°C to –24°C to ensure that micro-organisms remain dormant (alive but inactive)
- Do not allow fresh meat to drip onto other foods to avoid cross-contamination

c) Preparing it. (3 marks)

- Use a red chopping board to prepare raw meat to avoid cross-contamination
- Wash hands before and after handling raw meat to prevent cross-contamination
- Keep raw meat separate from cooked foods to avoid cross-contamination

d) Cooking it. (3 marks)

- Meat should be cooked to at least 75°C to destroy pathogenic bacteria
- Use a food probe to check the core temperature of roasted, grilled and fried meat to ensure it has reached at least 75°C for 2 minutes
- Left-over meat should only be cooked once to at least 75°C to ensure that any bacteria it contains are destroyed

e) Serving it. (3 marks)

- If not served straightaway, cooked meat should be kept hot at a minimum of 63°C to prevent the growth of bacteria
- Cooked meat should be served with clean utensils – not those that were used to prepare raw meat, to avoid cross-contamination
- Left-over cooked meat should be cooled within 1½ hours and stored in the refrigerator in order to prevent the growth and multiplication of bacteria

Chapter 7 Factors affecting food choice

1. There are several factors that influence what people choose to eat.

For each of the examples below, choose three factors and explain, giving reasons, how these would influence what each person would choose to eat:

a) A middle-aged man who has high blood pressure. (3 marks)

- How much saturated fat the food contains – too much saturated fat has been linked to the development of heart disease which is more likely if someone already has high blood pressure
- How much salt food contains – high salt intakes change the volume and consistency of blood which raises blood pressure because the heart has to work harder to pump it round the body
- How energy dense food is – eating a lot of energy dense foods (e.g. those containing fats and sugars) and lack of physical activity are likely to weight gain and obesity, which is likely to increase blood pressure

b) A young man who follows a vegan diet and works for a charity that supports farmers in developing countries. (3 marks)

- The ingredients a food contains – vegans do not eat any animal products at all, so food labels will help him to choose his food
- Eating a variety of plant foods – this is important in order to ensure that he eats a variety of nutrients to meet all his needs
- The provenance of the food – because of his job, he may prefer to buy Fairtrade products, because the Fairtrade foundation supports farmers and farm workers in developing countries to make sure they receive a fair price for their food products

c) A busy young woman who likes to eat well, but has little time to cook her own meals. (3 marks)

- The ingredients a food contains – she may need to buy ready-made meals or parts of meals, e.g. sauces/salads, so food labels will give her nutrition information and other details about what the food contains
- How the food is produced – she may prefer to buy foods produced organically/locally/free range
- How the food is prepared and cooked, e.g. she may eat out regularly or buy take away food to save time and may choose to avoid places to eat where a lot of the food is deep fried

2. Food labels are used for the majority of the foods that we buy.

a) Give two reasons why food labels are used. (2 marks)

- To give consumers a range of information about food products to inform them about what they are choosing to buy
- To comply with the law about the information that consumers must be given about the food they buy
- To attract consumers to buy particular food products by using colours, phrases, words and slogans on the labels

b) Give five pieces of information that have to be on a food label by law and explain how each helps the consumer to choose their food. (10 marks)

- The name and description of the food product – *To inform people exactly what the product is*
- Ingredients list (in descending order by quantity in the food) – *To check quality (e.g. % of meat in product) and for any ingredients they may not choose to eat*
- Net quantity (weight or volume) of the food (i.e. the amount of food you actually have to eat) – *To check for value for money and for the quantity that may be required for a recipe*
- Name and address of food manufacturer, distributor or retailer – *To be able to contact them about the food product for any reason*

- The place of origin of the food – *the consumer may not want to purchase food from certain countries for various reasons, e.g. political situation, how food is grown/reared*
- How to store, prepare and cook the product (food safety) – *To prevent the chance of food poisoning happening through incorrect handling of the food*
- The shelf-life (use-by and best before dates) – *To ensure consumer knows when food is safe to eat*
- Allergy warnings, e.g. contains milk/gluten/nuts – *To inform consumer and avoid allergic reactions*
- Information about additives put into the food – *To inform consumer and avoid possible health problems*
- Nutritional information: Per 100g/100ml and serving quantity of the food product: *All of these will give the consumer information about how consumption of the food will influence their health*
- Energy value (kJ or kcal)
- Protein (g)
- Total fat (g)
- Saturated fat (g)
- Total carbohydrate (g)
- Sugars (g)
- Salt (g)

3. Food products are marketed to consumers to encourage them to buy them.

- a) List three ways in which a supermarket may market food products to its customers. (3 marks)
- Price deals and special offers, e.g. buy one get one free; special buy, etc.
 - Loyalty cards – to target particular foods to consumers based on their buying habits
 - Linking a product to a celebrity or famous brand
 - Ethical marketing, e.g. Fairtrade, low food miles, recyclable packaging, organic production
 - Healthy eating, e.g. special diets, fortified foods, foods with reduced salt or sugar
 - Time saving – convenience and ease of preparation
 - Selling misshapen vegetables and fruits
- b) List three ways in which a food manufacturer may market a new food product to consumers. (3 marks)
- TV advertisements
 - Internet and mobile phone advertisements and apps
 - Social media advertisements
 - Free samples
 - Promotional leaflets
 - Product placements in popular TV shows
 - Magazines and newspapers
 - Advertisement hoardings (large posters or digital screens in the street)

Chapter 8 British and international cuisines

1. The cuisines of many countries have been influenced by people from other countries coming to live there and bringing their traditional foods and eating habits with them.

Giving details and examples, explain how and why the UK has been influenced by the cuisines of other countries in the last few decades. (12 marks)

Include information on:

- Immigration of people from different countries/ethnic groups around the world who have brought their food cultures with them
- The multi-cultural nature of many cities and towns in the UK where different food cultures and cuisines are integrated as people mix and become friends/work colleagues/related by marriage, etc.
- Availability in many shops of foods and ingredients from different cultures
- Availability of places to eat specialising in cuisines from different food cultures – restaurants, cafes, street food
- Availability of ready meals from different cuisines and food cultures
- TV cookery programmes showing food preparation and recipes from different cuisines and food cultures
- Recipe and text books about different cuisines
- TV documentaries about food in different cultures
- People travelling to other countries and eating local cuisines which they enjoy and then want to eat at home when they return to the UK
- The health benefits of certain food cultures, e.g. Mediterranean food

2. Research has shown that the Mediterranean cuisine is considered to be very healthy.

- a) Describe what types of ingredients and meals are eaten in Mediterranean cuisine, including the preparation and cooking methods that are used. (5 marks)

Foods eaten in a Mediterranean diet:

- Plenty of fresh fruits and vegetables – particularly dark green leafy vegetables, e.g. spinach, kale, green cabbage, broccoli, and tomatoes, aubergines, cauliflower, butternut squash – eaten mostly fresh in salads or lightly cooked by, e.g., steaming
- Nuts, e.g. almonds, pecans, pistachios, walnuts and seeds, e.g. sesame, chia, sunflower, pumpkin, linseeds – eaten fresh or lightly toasted in a dry heated pan or added to salads
- Olive oil – preferably unprocessed, cold pressed extra virgin olive oil
- Legumes (peas, beans and lentils), e.g. chick peas, cannelloni beans, kidney beans – cooked and used in a variety of dishes including salads, soups and stews
- Fresh herbs and spices, e.g. basil, rosemary, oregano, parsley, sage, thyme, coriander
- Whole grain cereals, e.g. rice, wheat, rye, barley, oats – used in breads, pasta, salads
- A small amount of fresh pasta and bread
- Fresh fish and seafood – often pan fried, grilled or baked in the oven
- A small amount of poultry (roasted/pan fried/grilled), eggs, cheese, dairy products
- A small amount of lean red meat – only once or twice a week – often pan fried or made into meat sauces, e.g. Bolognese sauce
- Plenty of water to drink

- b) Using your knowledge of nutrition, explain why the Mediterranean diet is so good for health. (5 marks)

The Mediterranean food culture and diet originate in countries such as southern Italy, Spain, Greece, and Turkey. Research has shown that the Mediterranean diet has a number of health benefits, including:

- It helps reduce the risk of developing high blood pressure/type 2 diabetes/high blood cholesterol levels/heart disease
- There is less chance of people putting on weight because of the high intake of low energy dense foods such as fruits and vegetables

- It contains plenty of antioxidants (vitamins A, C and E) from fruits, vegetables, oily fish, seeds and nuts, which can lower the risk of developing certain cancers
- Olive oil contains plenty of monounsaturated fatty acids which may reduce the risk of developing coronary heart disease
- It is low in sugar and highly processed foods, which can help reduce the risk of developing tooth decay and obesity
- Nuts, seeds and oily fish such as sardines and anchovies contain healthy fats which benefit the health of the heart and the development of the brain

Chapter 9 Sensory evaluation

1. Using your knowledge of the functional and chemical properties of foods and different cooking methods, explain in detail, how the sensory qualities of foods can be preserved, improved or spoiled when preparing and cooking the following foods:

a) Green vegetables, e.g. broccoli, Brussels sprouts, green cabbage. (4 marks)

- All are green vegetables, which when raw are fairly hard and crisp
- They should be steamed or boiled for a few minutes in a little water until they are just tender
- Steaming or boiling will soften the cellulose they contain and develop their natural flavours
- Cooking for a only few minutes will also preserve their bright green colour
- Overcooking will make their texture very soft, watery and slimy and the bright green colour will gradually change to olive green and then green/brown
- Overcooking will spoil the flavour as the heat will cause chemical changes in the vegetables

b) Meat. (4 marks)

- Meat contains protein in muscle fibres, which are bound together in bundles by connective tissue, which also contains a protein called collagen
- When meat is cooked, the proteins denature and coagulate
- Meat that comes from hard-working areas of an animal, e.g. the leg or neck, will have a lot of connective tissue and large muscle fibres and is likely to be tough
- Tough cuts of meat can be tenderised by using moist cooking methods, e.g. stewing and braising, which cooks the meat slowly for a long time. This causes the collagen in the connective tissue to convert to gelatine so the muscle fibres are released, which makes the meat tender
- Cuts of meat that come from parts of the animal that do the least work, e.g. the fillet, are tender and can be cooked more quickly by methods such as roasting, shallow pan frying and grilling – this will develop flavour as the meat will shrink slightly as the protein coagulates and extractives in the muscle fibres will be squeezed out and come to the surface, where they will add flavour
- If meat is overcooked, the coagulated proteins will tighten up and squeeze out any moisture they are holding, which will make the meat dry, hard and less easy to digest
- As meat is cooked, it develops a different colour, e.g. red meat turns brown due to chemical changes
- Meat also contains fat and when it is cooked, the fat melts and adds flavour and moistness to the cooked meat
- Grilling or frying meat on too high a temperature may make the fat become smoky and burn, which may spoil the flavour and appearance of the cooked meat

c) White rice. (4 marks)

- White rice has been through a process of polishing, where the outer layers of the grain have been removed, leaving the inner white grain (endosperm)
- The endosperm contains a lot of starch in the form of granules
- When the rice is cooked in a liquid, at 60°C the starch granules it contains start to absorb some of the water in the liquid and begin to swell up and become larger – this makes the rice grains start to swell and soften
- At 80°C the starch granules are very swollen and start to burst and release starch into the liquid – they start to gelatinise
- At 100°C the process of gelatinisation is completed and within a few minutes, all of the rice grains will have softened as the starch right in the centre of each has gelatinised – the rice grains should still be separate and not stuck together (unless sticky rice has been used, in which case, they are expected to stick together)
- If ordinary (not sticky) rice is overcooked, more and more starch will be released into the surrounding liquid and the rice grains will start to stick together and form solid lumps
- Steaming rice, rather than boiling it, can help to avoid this

2. Using your knowledge of the chemical properties of foods and different food storage methods, explain in detail, how the following foods should be stored in order to preserve their sensory qualities:
- a) Savoury crackers and crispbreads. (4 marks)
- Due to the way they have been cooked, which means they are very dry and have an open texture, absorption of moisture would make them soften and lose their crispness
 - Store in a cool, dry, well ventilated cupboard to avoid a build-up of moisture from steam in the kitchen
 - Store them wrapped tightly in foil or plastic and keep in an airtight container to avoid being exposed to any moisture in the air
 - Use by the best-before date, after which the crackers and crispbreads will start to lose their flavour and texture
- b) Salad vegetables, e.g. lettuce, cucumber, peppers. (4 marks)
- Store in the salad crisper drawer of a refrigerator where the humidity (moisture) is more suited to these foods so that they do not dry out and become limp and soft
 - Avoid contact with the back of the refrigerator as they may become too cold and start to freeze
 - If frozen, they will become mushy and watery once defrosted because the ice crystals that formed in them whilst frozen will break down their cell structure and allow the liquid inside them to escape.
 - Use within a couple of days as they will naturally start to break down due to the enzymes they contain and will lose texture, flavour and colour
- c) Eggs. (4 marks)
- Store in a refrigerator to prevent the growth and multiplication of bacteria which would break down the protein and make them unfit to eat
 - Store away from strong smelling foods as they have porous shells which will absorb odours and make them tainted
 - Do not allow the eggs to freeze at the back of the refrigerator as the texture of the raw egg will be affected – it will go rather like glue
 - Use the eggs by the use-by date; as they get older, they absorb water through the pores in the shell and become watery in texture
3. A local farm shop is developing a new ice cream to be launched in winter. The chefs will be carrying out some sensory testing on the new flavour, which is cinnamon and cranberry. Explain, giving reasons:
- a) Which sensory test they will use. (1 mark)
- They will use a Grading test such as a Rating test, where tasters will be asked to taste the ice cream and rate it for a particular characteristic, e.g. taste, texture, aroma; or sensory descriptor, e.g. fruitiness, spiciness; or how much they like it on a 5-point scale, e.g. 1 the least and 5 the most
- b) Eight sensory descriptors that could be included on a tasting chart for the new ice cream. (8 marks)
- Smoothness
 - Sweetness
 - Fruitiness
 - Sharpness
 - Creaminess
 - Sourness
 - Spiciness
 - Tanginess
- c) How the sensory analysis test will be carried out. (5 marks)
- Tasters will be asked to taste samples of the ice cream and fill out a chart with their ratings
 - The samples will vary, e.g. different amounts of sugar/cinnamon/cranberry
 - The tasters will give their own opinions – they will not confer with anyone else

- The tasters will need to drink some water between each sample so that they clear their taste buds in order not to be confused between the different samples
- The results of the test will be collated to find out which sample was the most popular

d) The controlled conditions which will be required to ensure fair testing. (5 marks)

In order to give accurate and fair results that are not influenced by anyone or anything else, the following conditions should be provided:

- Test should be held away from food preparation area, to prevent distraction from cooking smells and noises
- There should be enough tasters, e.g. 10 to give realistic results
- Clear instructions should be given to the tasters
- The samples of ice cream should be coded randomly with numbers or letters to ensure a fair test (a 'blind' test)
- Tasters should work on their own away from other people, so they are not distracted and give their own opinion
- Small samples should be given so the tasters do not get over full
- The samples should all be at the same temperature/texture so that the flavours are not affected
- The samples should be served in the same plain coloured dishes to each taster so that their senses are not affected by distracting patterns or multiple colours
- The test should be held in hygienic conditions to avoid contamination by micro-organisms

Chapter 10 Environmental impact and sustainability

1. a) Explain what the term 'food miles' means. (1 mark)
 - The distance travelled by foods and ingredients before they reach the consumer
 - b) Give two reasons why food miles have increased in recent times. (2 marks)
 - Increasing amount of foods being imported from countries all over the world throughout the year
 - Transport of foods from distribution centres by road to supermarkets throughout the country
 - Delivery of foods to consumers from orders placed with supermarkets and online delivery companies
 - Consumers driving to supermarkets and other places to buy foods
 - c) Give two ways in which food miles have an impact on the environment. (2 marks)
 - The use of non-renewable fossil fuels for transporting foods by road, sea, rail and air
 - The emission of greenhouse gases caused by pollution from the transport of food by road, sea and air
 - d) Suggest one way in which food miles can be reduced. (1 mark)
 - Buying foods that have been grown locally
 - Eating foods in season rather than importing them out of season from other countries
-
2. Research has shown that in the UK, approximately 20% of the food that consumers buy for their families is thrown away and that most of this wasted food is good enough to eat.
 - a) List four reasons why so much food is wasted. (4 marks)
 - Providing too large portions of food
 - Buying more food than is needed and not using it all
 - Not knowing how to make use of left-over foods for family meals
 - Not understanding how to store food properly so that it remains fresh and safe to eat for longer
 - b) Explain why wasted food has a bad effect on the environment. (1 mark)
 - A lot of it goes to landfill sites where it rots and gives off greenhouse gases, e.g. methane, which affect global warming and climate change
 - c) How can supermarkets reduce the amount of food waste? (4 marks)
 - Selling fruits and vegetables that are not all the same size, shape and appearance and encouraging consumers to buy them
 - Giving away excess foods to charities for homeless people or those on low incomes
 - Ensuring that they do not order too much food which is unlikely to be all sold
 - Encouraging consumers to store foods correctly and giving them advice for using up left over foods with, e.g. recipe ideas
 - By reviewing portion and pack sizes of different foods to try to provide suitable sizes for single people as well as families
-
3. In order for there to be food security, food production and consumption need to be sustainable.
 - a) Explain what sustainable food production means. (5 marks)

It means that food production should:

 - Enable farmers in every country to earn enough so they can live well and continue to produce food
 - Protect plant and animal diversity by producing different varieties and species
 - Protect the welfare of farmed and wild species of animals and plants
 - Avoid damaging or wasting natural resources, i.e. land, water and the ecology of the sea and countryside

- Avoid contributing to climate change by reducing or preventing the emission of greenhouse gases
 - Reduce food waste and food packaging
 - Give social benefits to people – safe, healthy, good quality food, education, employment
- b) Explain, giving reasons, why the practice of throwing away misshapen and different sized vegetables and fruits because they do not meet the strict standards set by supermarkets, is unsustainable. (4 marks)
- Producing vegetables and fruits uses a lot of resources: land, water, fertiliser, pesticides, time, labour, non-renewable energy (fuel for machinery)
 - By throwing away misshapen and odd sized crops all the resources that went into growing them are wasted
 - If the wasted crops are put into landfill they produce greenhouse gases as they rot, which contributes towards climate change
 - Wasting crops in this way does not give any social benefits to people – the crops could be eaten if the farmer was allowed to sell them to the supermarkets
 - Wasting crops in this way gives the wrong message to people about the value of food
 - If enough crops are thrown away for this reason, it could put a farmer out of business
- c) Suggest three ways in which consumers could be encouraged to buy and use misshapen and different sized vegetables and fruits. (3 marks)
- Reducing the price of them
 - Promotional recipe leaflets
 - Promotional tasting of products made with them
 - Celebrity chef endorsement
 - Educational information about the natural variations that occur when crops are grown

Chapter 11 Processing and production

1. Most foods are processed before we eat them.
 - a) Give four reasons why foods are processed. (4 marks)

Foods are processed to make them:

 - Safe, appetising and palatable to eat
 - Ready to be transported and ready for sale
 - Convenient and easy to buy, store and use
 - Appealing and attractive to consumers
 - Ready for consumers to prepare, cook and eat
 - b) Explain what primary processing is and give an example to illustrate your answer. (2 marks)
 - Processing foods straight after harvest or slaughter to prepare them for eating or to be used in other food products, e.g. wheat milled into flour
 - c) Explain what secondary processing is and give an example to illustrate your answer. (2 marks)
 - When primary processed foods are used on their own or mixed with other foods or turned into other food products, e.g. flour turned into bread or pasta
2. Cow's milk is consumed in large amounts every day in the UK.
 - a) Explain in detail how milk is processed to ensure that it is safe to drink. (8 marks)
 - Milk is a high risk food because it provides ideal conditions for the growth of bacteria
 - To make it safe, it is heat treated to destroy pathogenic bacteria that could cause food poisoning
 - There are various ways to heat treat milk:
 - ~ Pasteurisation: milk heated quickly in heat exchanger to 72°C for 15 seconds, then rapidly cooled to 4°C. Must be kept in refrigerator and used within a few days
 - ~ Ultra heat Treatment (UHT or Long Life milk): milk heated quickly in heat exchanger to 132°C for 1 second, then rapidly cooled and packed into a special multi-layered storage pack, which is sealed. Can be kept unopened at room (ambient) temperature for several months. Once opened, it becomes high-risk and must be refrigerated and used within a few days.
 - ~ Sterilisation: milk is put into a special sealed bottle (usually glass) and heated to 110°C for 30 minutes. Can be kept unopened at room (ambient) temperature for several months. Once opened, it becomes high-risk and must be refrigerated and used within a few days.
 - Milk can also be micro-filtered to remove virtually all bacteria before being pasteurised. This increases its shelf life as long as it is refrigerated at 0°C to below 5°C
 - b) Explain how milk is processed to give it a consistent texture (same throughout). (3 marks)
 - Milk is homogenised
 - This means it is forced under pressure through thousands of tiny holes which break up the fat in the milk and prevent it from separating out
 - This means it is the same colour, texture and flavour throughout
 - c) Explain why a lot of milk is skimmed and what happens during skimming. (4 marks)
 - Skimming is the process of removing some of the fat (cream) from milk to reduce its fat content and energy density, and also to produce cream, e.g. single, whipping and double cream
 - When whole cow's milk (containing approximately 3.9% fat) is left to cool and stand in a large tank, the fat naturally rises to the surface
 - The fat is removed by skimming to produce:
 - ~ Skimmed cow's milk with almost no fat (approx. 0.5–0.9%)
 - ~ Semi-skimmed cow's milk with 1.5–2% fat
 - ~ 1% cow's milk

3. There are many food products available that have been nutritionally modified.

Explain, giving examples, what nutritional modification is, why it is done and who might benefit from it.

(12 marks)

Include information on:

- Nutritional modification means changing the nutritional profile of a food product so that it meets current dietary guidelines or helps promote a health benefit
- Foods can be fortified with nutrients to add extra nutrients already present in a food, e.g. B vitamins to breakfast cereals or add nutrients that are not usually found in the food, e.g. vitamins A and D in vegetable fat spread
- Some foods are fortified by law, e.g. vitamins A and D in vegetable fat spread; calcium added to wheat flour (not wholemeal or self-raising); iron, vitamins B1 and B3 added to wheat flour (not wholemeal)
- Natural plant substances called sterols and stanols are added to some vegetable fat spreads, yogurt drinks and yogurts to help lower blood cholesterol levels – these are aimed at people with a high blood cholesterol level to help them reduce it and therefore lower their risk of developing heart disease
- Some soya products, e.g. fat spreads, milks, drinks and yogurts, have calcium and vitamin B12 added. These are targeted at vegetarians and vegans and people who do not eat dairy foods because of allergies. Plant foods contain virtually no vitamin B12
- Some foods are modified by, e.g. adding extra dietary fibre (e.g. sliced bread); reducing the sugar content (e.g. fruit yogurts) or reducing the salt content (e.g. canned fish or vegetables) to meet dietary guidelines

Please note that in some copies of the Revision Guide, Question 3 in Chapter 10 was incorrectly duplicated in Chapter 11 as Question 4.

AQA GCSE Food Preparation and Nutrition Revision Guide

Answers to Activities

- ↳ Chapter 1 Nutrients
- ↳ Chapter 2 Nutritional needs and health
- ↳ Chapter 3 Cooking of food and heat transfer
- ↳ Chapter 4 Functional and chemical properties of food
- ↳ Chapter 5 Food spoilage and contamination
- ↳ Chapter 6: Principles of food safety
- ↳ Chapter 7: Factors affecting food choice
- ↳ Chapter 8: British and international cuisines
- ↳ Chapter 9: Sensory evaluation
- ↳ Chapter 10: Environmental impact and sustainability
- ↳ Chapter 11: Processing and production
- ↳ Chapter 12: Getting ready for the written examination

Activity 1.1










Solve the puzzle below by filling in the missing letters. The clues are in the questions:

- Pulses** is the group name for peas, beans and lentils, which are good sources of LBV protein
- Repair** of the body is one of the functions of protein
- Oats** and seeds are two LBV protein foods that are ingredients in muesli
- Tofu** is one of three alternative protein foods beginning with a 'T' – (what are the other two?)
Tempeh and TVP (Texture Vegetable Protein)
- Energy** protein is only used for this if the body doesn't have enough from carbohydrate or fat
- Infections** these will happen a lot if the body does not have enough protein
- Nuts** these are good sources of LBV protein

Activity 1.2

Look at the pictures in the chart below and identify which of the foods contain visible and/or invisible fat.

For each one you identify, explain why the fat it contains is visible and/or invisible:

Food	Visible fat? Invisible fat? ... or both?	Explain why you have given this answer
	Invisible	Fat is part of the cake mixture and has been absorbed by the starch in the flour Fat in the chocolate and cream is not visible in the ganache
	Beef burger – invisible Fries – invisible Mayonnaise – invisible	Beef burger – when cooked the fat has melted Fries – the fat is absorbed by the potato starch during frying Mayonnaise – oil is emulsified in the mixture
	Fish – invisible Chips – invisible	Fish – oil is absorbed by the starch in the batter during frying Chips – the fat is absorbed by the potato starch during frying
	Visible	Fat is found under the skin in animals
	Invisible	Oil is absorbed by the starch in crisps and similar fried snacks during frying
	Pork sausages – visible before cooking invisible when cooked Potato – invisible	Sausages – fat is found under the skin and in between muscles in animals Potato – butter added to mashed potato is absorbed into the mash
	Visible	Fat is added to salami for flavour and texture
	Visible	Sardines have oily flesh Oil is added to give flavour and texture
	Scones – invisible Clotted cream – visible	Scones – fat melts during baking and is absorbed by the starch in flour Clotted cream – has very high fat content
	Visible	Some oil from the peanuts is visible because they have been processed

Activity 1.3

Solve the puzzle below by filling in the missing letters. The clues are in the questions:

Complex	carbohydrates include starch, pectin and dietary fibre
Arrowroot	is a white starchy powder that is used to thicken liquids
Root	vegetables are a good source of starch
Barley	is a cereal that is used to make maltose
Obesity	is a health condition that may develop if a person eats too much carbohydrate
HFCS	is the abbreviation for a substance that is used to sweeten many soft drinks and foods
Yams	are root vegetables that contain a lot of starch
Dextrin	is formed when starchy foods are heated in an oven or under a grill
Running	as a sport needs a lot of glycogen to be stored in the leg muscles
Athletes	need to load their body with carbohydrates before an event
Thiamine	is the name of a vitamin which helps to release energy from carbohydrates
Energy	carbohydrates supply the body with most of this
Sugars	are the group of carbohydrates which includes galactose, fructose and sucrose

Activity 1.4

Look at the chart below and work out which carbohydrate each set of pictures is about. Explain how you worked out the answers from the picture clues:

Picture clues

Which carbohydrate is it?

Explain how you worked it out

	<p>Pectin</p>	<p>Jars of jam – jam is set by pectin Plums and citrus fruits contain a lot of pectin</p>
	<p>Starch</p>	<p>All the foods shown have a high starch content</p>
	<p>Sucrose</p>	<p>All the foods shown contain high amounts of free sugars – mainly sucrose</p>
	<p>Dietary fibre</p>	<p>Wholegrain cereal products and fruit and vegetables contain large amounts of dietary fibre</p>
	<p>Glycogen</p>	<p>Humans make glycogen from carbohydrate foods and store it in their liver and muscles which is used for instant energy. Athletes need to eat plenty of carbohydrate foods before they take part in an event.</p>

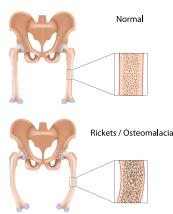






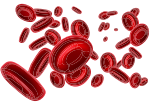



Activity 1.5

Look at the chart below and work out which vitamin each set of pictures is about. Explain how you worked out the answers from the picture clues:

Picture clues	Which vitamin is it?	Explain how you worked it out
	D	<p>Most Vitamin D is made by the action of sunlight on the skin</p> <p>Deficiency of vitamin D causes rickets – bones bend because they are weak</p> <p>The foods shown supply vitamin D</p>
	C	<p>Vitamin C is found in citrus fruits</p> <p>Vitamin C is needed to absorb iron</p>
	B1	<p>Vitamin B is needed to release energy from carbohydrate</p> <p>Foods shown are good sources of vitamin B1</p>
	B9	<p>Vitamin B9 is found in the foods shown</p> <p>It is needed for the production of red blood cells</p> <p>If a pregnant woman is deficient in vitamin B9 there is a risk that her baby will be born with spina bifida</p>
	A	<p>Vitamin A (retinol) is needed to see in dim light</p> <p>Carrots contain beta carotene which is converted into retinol in the body</p> <p>Vitamin A in excess amounts is toxic (poisonous) to unborn babies</p> <p>Vitamin A is needed to keep the mucous membranes in the lungs, bronchial tubes and digestive system moist and healthy</p>

Activity 1.6

Look at the chart below and work out which mineral each set of pictures is about. Explain how you worked out the answers from the picture clues:

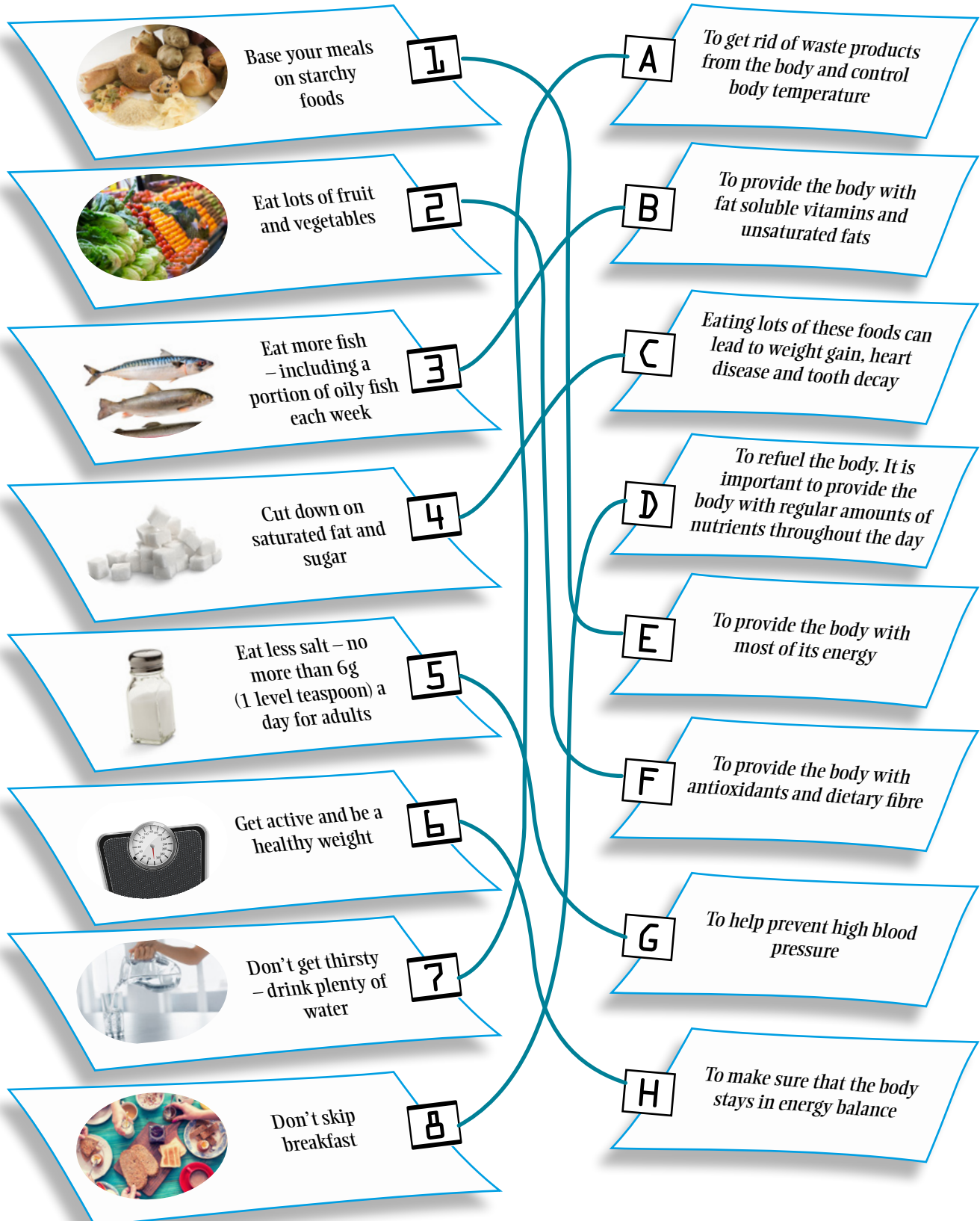
Picture clues	Which mineral is it?	Explain how you worked it out
 	Calcium	<p>The foods shown contain calcium</p> <p>In the bones with osteoporosis, osteomalacia and rickets, calcium has been lost and the bones are very weak and fragile</p>
   	Sodium (salt)	<p>Lack of sodium (salt) leads to muscle cramps</p> <p>Excess sodium (salt) can lead to high blood pressure</p> <p>The foods shown contain high amounts of sodium (salt)</p>
 	Iodine	<p>A lack of iodine leads to a swelling in the neck called a goitre, caused by the thyroid gland swelling</p> <p>The foods shown contain iodine</p>
   	Iron	<p>The citrus fruits contain vitamin C, which is needed to absorb iron</p> <p>Iron is needed to make haemoglobin in red blood cells</p> <p>The foods shown contain good levels of iron</p> <p>A symptom of lack of iron (anemia) is tiredness</p>
 	Fluoride	<p>Fluoride is needed to make enamel stronger and help prevent tooth decay</p> <p>Fish contains fluoride</p>
   	Phosphorus	<p>The foods shown contain phosphorus</p> <p>Phosphorus mineralises the bones and teeth to make them strong</p> <p>It makes up phospholipids (special fat molecules) found in cell membranes, especially in the brain and nervous system</p>

Activity 2.1

Using your knowledge of the nutrients in foods, match up the dietary guidelines with the correct reason why each is recommended:

Dietary guideline

Why it is recommended



Activity 2.2

Look at the pictures in the chart below and identify which of the foods are energy dense.
For each one you identify, explain why the ingredients it contains make it energy dense.
For each one you do not identify, explain why it is not energy dense.

Food	Energy dense? or Not energy dense?	Explain why you have given this answer
cucumber and lettuce 	Not energy dense	These foods have a high water content.
jam doughnut 	Energy dense	These foods contain a lot of sugar and fat as the doughnut is fried, coated in sugar and contains jam.
chocolate chip cookie 	Energy dense	Contains sugar and fat in the recipe. Chocolate chips also contain fat and sugar.
low fat strawberry yogurt 	Usually not energy dense	Skimmed milk has most of the fat removed. May have sugar added.
pork pie 	Energy dense	Pork contains fat. Pastry contains fat.
lentil and vegetable soup 	Not energy dense	Contains high water content. Lentils are low in fat.
chips, cheese and mayonnaise 	Energy dense	Chips are fried in oil. Cheese has a high fat content. Mayonnaise has high fat content.
kebab and fries 	Energy dense	Kebab has high fat content because of fat in meat. Chips fried in oil.
sausage roll made with puff pastry 	Energy dense	Sausages often have high fat content. Puff pastry has a high fat content.
fresh fruit salad 	Not energy dense	Fruit contains a lot of water and natural sugars.

Activity 2.3

Compare, contrast and analyse the two nutrient profiles shown for milk and fizzy lemonade.

Comment on:

1. The differences and similarities between the two drinks
2. Explain, with reasons, why you think one is more suitable for children to drink than the other.

Nutrient profile: milk

MACRONUTRIENTS	
Protein	
Carbohydrate – sugar (lactose)	
Fat	
VITAMINS	
Vitamin A – Retinol	Vitamin B7
Vitamin A – Carotene	Vitamin B9
Vitamin B1	Vitamin B12
Vitamin B2	Vitamin C
Vitamin B3	Vitamin D
Vitamin B5	Vitamin E
MINERALS	
Calcium	Manganese
Chloride	Phosphorus
Copper	Potassium
Iodine	Selenium
Iron	Sodium
Magnesium	Zinc
Water	



Nutrient profile: fizzy lemonade





MACRONUTRIENTS	
Carbohydrate (sugar: high fructose corn syrup)	
VITAMINS	
none	
MINERALS	
Calcium – small amount	
Sodium – small amount	
Water	



	Milk	Fizzy lemonade
1. The differences and similarities between the two drinks		
Differences	<ul style="list-style-type: none"> • 27 nutrients listed • Contains protein and fat • Carbohydrate – natural lactose • Wide range of vitamins • Wide range of minerals 	<ul style="list-style-type: none"> • 3 nutrients listed • No protein or fat • Carbohydrate – man-made sweetener added • No vitamins • Only small amounts of calcium and sodium
Similarities	<ul style="list-style-type: none"> • Liquid • Contains water 	<ul style="list-style-type: none"> • Liquid • Contains water
2. Suitability for children	<ul style="list-style-type: none"> • Contains a wide range of nutrients that children need • Not very sweet to taste • Better for the health of the teeth • No additives 	<ul style="list-style-type: none"> • Contains very few nutrients therefore not very useful for children's needs • Very sweet to taste – may lead to sugar addiction • More likely to cause tooth decay • Likely to contain additives such as colours, preservatives and artificial flavourings which may affect children's health

Activity 2.4

Suggest some ways in which you could reduce the energy density of the following food items/recipes by changing some of the ingredients and/or the method of cooking, to help someone who is trying to lose weight:

Name of recipe	Energy-dense ingredients	Change to ingredient or method of cooking
Quiche flan 	Shortcrust pastry	Use filo pastry base – much lower fat content Bake just the filling in an ovenproof dish without a pastry base – when cooled, cut into slices and serve with salad
	Cheddar cheese and cream in filling	Use low fat cheddar cheese Use skimmed milk instead of cream Use half fat cream instead of double cream
	Fried bacon in filling	Use lean bacon and dry fry in a pan or grill to remove the fat
Cowboy pie (fried onions and baked beans on base then sausages then mashed potato with cheese on top) 	Base layer: fried onion with baked beans in tomato sauce	Use only 1 tbsp oil to sauté the onions – if pan becomes dry, add a small amount of water (2–3 tbsps) to prevent onion from sticking Use low sugar baked beans
	Middle layer: fried sausages	Bake or grill sausages to allow fat to melt and run away from the sausages
	Topping: mashed potato with butter and grated cheese	Do not put butter into mashed potato – mash with low fat milk Use low fat cheese
Trifle 	Base layer: sponge cake made with flour, eggs, sugar and butter	Make a whisked sponge instead which has no added fat
	Custard: made with sugar and whole milk (full fat)	Use semi-skimmed or 1% fat milk Reduce sugar content by at least half
	Topping: whipped double cream, grated chocolate and chopped nuts	Use low fat crème fraiche or natural yogurt instead of cream Decorate with fresh fruit instead of chocolate or nuts
Tortilla wrap 	Filling: Fried chicken	Bake chicken in oven instead of frying Remove skin from chicken
	Filling: Mayonnaise and avocado	Mix cooked chicken with low fat natural yogurt or crème fraiche plus low fat salad vegetables, e.g. lettuce, spinach leaves, cucumber, tomatoes, peppers instead of avocado

Activity 2.5

Solve the puzzle below by filling in the missing letters. The clues are in the questions:

High blood pressure is a **risk factor** for heart disease

Exercise is important for preventing heart disease

Antioxidants (vitamins A, C and E) can help prevent heart disease

Reducing stress levels can lower the risk of developing heart disease

Too much salt raises blood pressure

Dietary guidelines should be followed to help prevent heart disease

Inactive people who sit about a lot are at risk of developing heart disease

Smoking is a risk factor for heart disease

Exercise helps to strengthen the heart

Arteries in the heart muscle can become blocked with fatty deposits

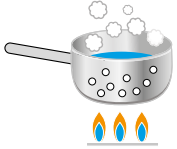
Saturated fats can raise blood cholesterol levels and cause blockages in the arteries

Excess body weight puts a big strain on the heart

Activity 3.1

Look at the different cooking methods below and explain which heat transfer method is used to cook the food.

conduction
convection



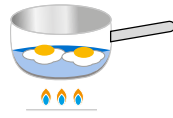
Boiling

conduction
convection



Braising

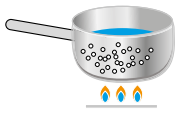
conduction
convection



Poaching

Moist cooking methods

Simmering



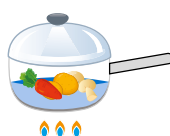
conduction
convection

Steaming



conduction
convection

Stewing



conduction
convection

conduction



Sautéing

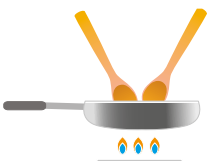
conduction



Shallow frying

Methods using oil

Stir frying



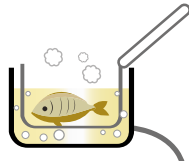
conduction

Roasting



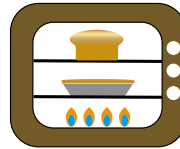
convection
conduction

Deep fat frying



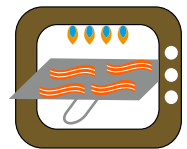
conduction
convection

convection
conduction



Baking

radiation



Grilling

Methods using dry heat

Toasting



radiation

Dry frying



conduction

Microwaving



radiation

Activity 3.2

Look at the method below which is for a vegetable and pasta medley recipe (book-link: pages 40 – 41).

Identify and list the **cooking methods** and methods of **heat transfer** that are used in this recipe. Explain how each method will affect the **sensory qualities** and **palatability** of the ingredients used:

Explain your understanding of the **functional** and **chemical properties** of the different stages/cooking of the ingredients.

Method	Cooking method used and method of heat transfer involved	Effects on the sensory qualities of the ingredients
1. Heat the oven: <ul style="list-style-type: none"> Gas 6/200°C (190°C if you are using a fan oven). 2. Vegetables: <ul style="list-style-type: none"> Spread the vegetables on a metal tray and drizzle the oil over them. Add the seasoning and place the vegetables in the oven for 25–30 minutes, turning them occasionally until browned and tender. 	Roasting Convection conduction	Vegetables will shrink in size – water evaporates Starch will gelatinise – vegetables will become tender Vegetables will go golden brown colour – natural sugars will caramelise
3. Pasta: <ul style="list-style-type: none"> Place the pasta in a large pan of boiling water and cook until it is tender. Drain it using a sieve or colander. 	Boiling Conduction convection	Pasta will swell and soften Starch granules in pasta will absorb water from 60°C and start to swell and at 80°C some starch granules will burst and at 100°C the starch will be fully gelatinised
4. Cheese sauce: <ul style="list-style-type: none"> Grate the cheese onto a plate. <i>All-in-one method:</i> <ul style="list-style-type: none"> Put the flour and the mustard powder in a mixing bowl. Gradually add the milk, mixing it to make it smooth with a wooden spoon or balloon whisk. Add the butter. Place the bowl into the microwave and set the timer to 1 minute. When it stops, stir the sauce thoroughly and microwave again for 1 minute – stir the sauce again. Repeat this 4–5 times until the sauce has thickened and is smooth and glossy. Take it out of the microwave and add $\frac{3}{4}$ of the grated cheese. Stir until the cheese has melted. In a small saucepan, melt the butter on the hob – do not let it burn. Add the flour and mustard and continue heating it, stirring it all the time with a wooden spoon, for 1 minute (roux). Remove the pan from the heat. Gradually add the milk to the roux, stirring well each time to avoid any lumps forming, until all the milk has been added. Put the pan back on the heat and, stirring all the time, heat the sauce until it boils and thickens – the sauce should coat the back of the wooden spoon and be smooth and glossy in appearance. Remove the pan from the heat and add $\frac{3}{4}$ of the grated cheese. Stir until the cheese has melted. 	Microwaving Radiation	Sauce will thicken and become smooth and glossy in appearance Starch granules in the flour will absorb water from the milk at 60°C and start to swell. At 80°C some starch granules will burst and at 100°C the starch will be fully gelatinised and the sauce thickened
5. Assemble the dish <ul style="list-style-type: none"> Put the vegetables and the cooked pasta into the dish, then pour the sauce over. Topping Sprinkle the rest of the cheese on top. Place the dish under a hot grill and heat until golden brown on top. 	Grilling Radiation	Cheese will become set and golden brown Fat melts, protein denatures and coagulates.

Activity 3.2 continued

Béchamel (roux) method:

- In a small saucepan, melt the butter on the hob – do not let it burn.
- Add the flour and mustard and continue heating it, stirring it all the time with a wooden spoon, for 1 minute (roux).
- Remove the pan from the heat.
- Gradually add the milk to the roux, stirring well each time to avoid any lumps forming, until all the milk has been added.
- Put the pan back on the heat and, stirring all the time, heat the sauce until it boils and thickens – the sauce should coat the back of the wooden spoon and be smooth and glossy in appearance.
- Remove the pan from the heat and add $\frac{3}{4}$ of the grated cheese. Stir until the cheese has melted.

5. Assemble the dish

- Put the vegetables and the cooked pasta into the dish, then pour the sauce over.
- Topping
- Sprinkle the rest of the cheese on top.
- Place the dish under a hot grill and heat until golden brown on top.

**Grilling
Radiation**


Cheese will become set and golden brown

Fat melts, protein denatures and coagulates.

Activity 3.3

Look at the mind map below, which shows how potatoes can be prepared in lots of different ways to give people a variety of foods in their diet.

In each of the blank spaces, write down the name of the cooking method that you think has been used to cook the potatoes. Some of them may have more than one cooking method:

 <p>Cooked potatoes</p>	1 boiling	 <p>Chips</p>
	deep fat frying	
 <p>Potato cakes</p>	3 shallow frying	 <p>Mashed potato</p>
	boiling	
 <p>Potatoes for a Sunday roast</p>	5 roasting	 <p>Potato salad</p>
	boiling	
 <p>Potato crisps</p>	7 deep fat frying	 <p>Jacket potato</p>
	baking	
 <p>Potato wedges</p>	9 roasting	 <p>Potato dauphinoise</p>
	baking	
 <p>Potato croquettes</p>	11 shallow frying or deep fat frying	 <p>Potato rosti</p>
	shallow frying	

Answer the questions below:

1. Explain what happens to the sensory qualities of potatoes when they are cooked by different methods.

Boiling: Starch granules in the potatoes swell as they absorb water from the potato and the cooking water. They gradually gelatinise and the potato texture softens.

Baking/roasting: Starch granules in the potatoes swell as they absorb water from the potato. They gradually gelatinise and the potato texture softens.

The outside of roasted and fried potatoes becomes crisp.

2. Explain why some of the potatoes in the pictures have a golden brown colour on the outside.

When fried or roasted the intense heat causes the carbohydrate (starch) in the potatoes to produce a golden brown colour (dextrinisation).

Activity 4.1

Explain (using the correct food science terms) what is happening to the egg in the pictures below:



- Egg white is a transparent liquid and yolk is liquid
- As egg is heated the egg white protein starts to denature and coagulate – egg white starts to go opaque
- As coagulation continues, egg white becomes solid and egg yolk protein starts to denature and coagulate
- In the last picture, the egg white and egg yolk are both solid as the protein has all coagulated

Activity 4.2

Now have a go at completing the table for the method for making All-in-one chocolate and orange cake on page 128–129 in student book:



Stage in the method for making the recipe	What the ingredients do in the recipe (their functional properties)	The food science involved (their chemical properties)	Key food science terms involved
1. Basic cake mix – place all the ingredients for the basic cake mix (self-raising flour, cocoa powder, baking powder, butter or vegetable fat spread, caster sugar, eggs, milk, orange zest) into a mixing bowl and whisk at medium speed with an electric whisk, or beat well with a wooden spoon until well mixed and light in texture and colour.	<p>self-raising flour: makes cake rise in oven</p> <p>cocoa powder: flavours mixture</p> <p>baking powder: helps mixture rise</p> <p>butter or vegetable fat spread: traps air; adds moisture</p> <p>caster sugar: traps air with the fat; adds flavour; softens the gluten</p> <p>eggs: help mixture rise; add moisture</p> <p>milk: adds moisture</p> <p>orange zest: adds flavour</p>	<p>self-raising flour: gluten and starch give texture to unbaked mixture</p> <p>butter and sugar together trap air</p> <p>eggs: trap air to help mixture rise</p>	<p>Raising agent Gluten Starch</p> <p>Raising agent</p> <p>Denaturation and coagulation</p>
3. Spread the mixture out evenly using a palette knife or the back of a spoon.		The plasticity of the fat enables the mixture to be spread	Plasticity
4. Bake at 190°C, (180°C for fan ovens)/gas 4, for 20–25 minutes until the cakes are well risen and spongy to the touch.	As in 1 above	<p>self-raising flour: gives off CO₂ gas to raise the mixture and gluten sets during baking to give the cake texture</p> <p>baking powder: gives off CO₂ gas to raise the mixture</p> <p>butter and sugar: trapped air expands on heating and raises the mixture</p> <p>sugar: caramelises in the heat of the oven</p> <p>eggs: protein denatures and coagulates in oven to set mixture</p>	<p>Raising agent Gluten Starch Denaturation and coagulation Raising agent Expansion</p> <p>Caramelisation</p> <p>Denaturation and coagulation</p>
6. Frosting: Whisk or beat together the sieved icing sugar, cocoa and softened butter or vegetable fat spread until well mixed – it may be a bit dry at this stage, but that is quite normal. Add the orange juice, a teaspoonful at a time, until the mixture is smooth, creamy and easy to spread.	Butter or vegetable fat spread give texture to frosting	The plasticity of the fat enables the mixture to be spread	Plasticity
8. Spread more frosting on the top of the cake and if you have enough left, you can then pipe it onto the top of the cake with a star nozzle and piping bag to decorate.	Butter or vegetable fat spread give texture to frosting	The plasticity of the fat enables the mixture to be spread to be spread and shaped by piping	Plasticity

Activity 4.3

To help you to think of examples, make a list of recipes you have made that include these functional and chemical properties of ingredients.

Recipes you have made that include these functional and chemical properties

Proteins

Protein denaturation	E.g.: quiche flan; cakes; fish cakes; scotch eggs; meat and poultry dishes, chilled lemon flan
Protein coagulation	E.g.: quiche flan; cakes; fish cakes; scotch eggs; meat and poultry dishes, chilled lemon flan
Gluten formation	E.g.: bread, shortcrust pastry, biscuits, cakes, buns, puff pastry, choux pastry, scones
Foam formation	E.g.: meringue, lemon meringue pie, chocolate mousse, whisked sponges, e.g. Swiss roll

Carbohydrates

Gelatinisation	E.g.: béchamel sauce; custard; pasta and rice dishes; roasted vegetables; potato recipes
Dextrinisation	E.g.: baked items such as bread, cakes and biscuits, scones
Caramelisation	E.g.: cake and biscuit mixtures, crème caramel

Fats

Plasticity	E.g.: cake mixtures; chocolate decorations; cake frostings, bread and bun doughs, shortcrust pastry, shortbread
Emulsification	E.g. Hollandaise sauce; mayonnaise
Aeration	E.g.: cake mixtures, mousses, meringue, whisked sponges e.g. Swiss roll, puff pastry
Shortening	E.g.: shortcrust pastry, shortbread, rubbed in cake mixtures, crumbles, scones, sweet and savoury biscuits

Raising agents

Air	E.g.: cake and biscuit mixtures; whisked sponges, e.g. Swiss roll, puff pastry, choux pastry
Carbon dioxide	E.g. scone mixtures; cakes and biscuits using self-raising flour; gingerbread; bread, buns
Steam	E.g. choux pastry, puff pastry, batters, e.g. Yorkshire puddings

ACTIVITY 5.1



1



2



3

Look at these foods:

1. Describe what you can see in each of the three pictures above. (3 marks)

- 1 – yeast growth on the skin of the oranges
- 2 – maggots (from flies) have infested the meat
- 3 – mould growth on bread,

2. What might happen to a person if they ate these foods? (2 marks)

They may be ill with food poisoning if they ate the bread or the meat. The orange may not make them ill but would be very unpleasant to eat.

3. Why do the foods look like this? Evaluate and explain what has happened to them. (3 marks)

- 1. The oranges have had yeast cells land on them and they yeast has grown and multiplied. The yeast will eat the natural sugars in the oranges and ferment them.
- 2. Flies have landed on the meat because it was not stored properly. They have laid eggs and these have hatched into larvae (maggots) which are now eating and contaminating the meat.
- 3. The bread has been stored in the right conditions for mould growth: food, warmth and moisture. Mould spores have landed on the bread and have grown into mould plants.

ACTIVITY 5.2



A



B



C

Look at these foods:

1. Describe what you can see in each of the three pictures above. (3 marks)

A. The apple has been cut and the cut surface has gone brown.

B. The banana skins have turned brown and spotty.

C. The avocado pear has been cut in half and the cut surfaces have gone brown and they have started to develop some mould growth.

2. Why do the foods look like this?

Evaluate and explain what has happened to them. (3 marks)

A. Enzymes in the cells of the apple have reacted with oxygen from the air (oxidation) and mixed with substances in the cells, and have then turned brown in colour.

B. Enzymes in the bananas have ripened them so they have changed from green to brown in colour as the starch they contain has been gradually turned into sugars. The bananas have become softer in texture as well.

C. Enzymes in the cells of the avocados have reacted with oxygen from the air (oxidation) and mixed with substances in the cells, and have then turned brown in colour.

3. Will it be safe to eat them? Give reasons for your answer. (2 marks)

A. Yes – the brown substances are safe to eat.

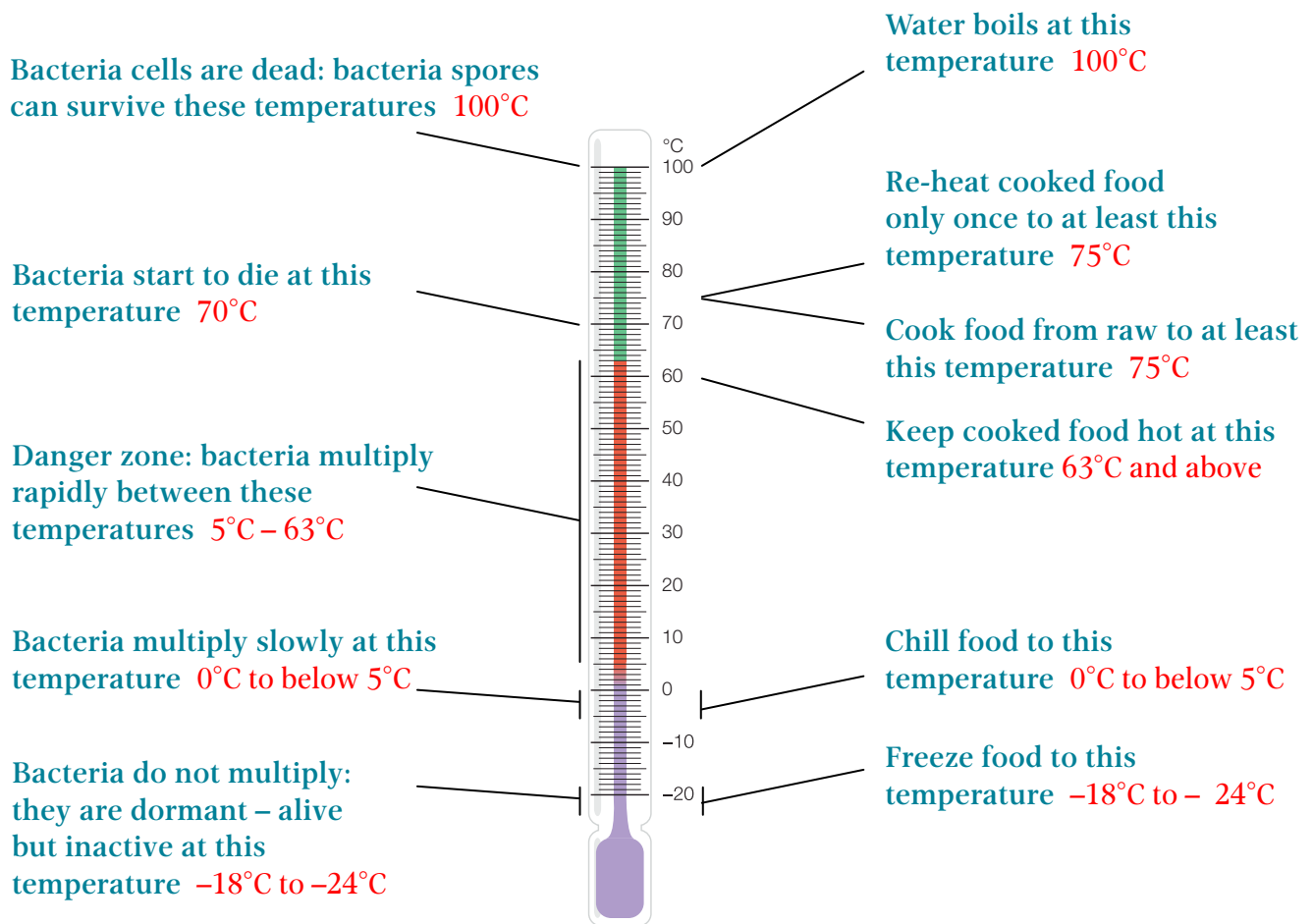
B. Yes – the bananas will taste sweeter and their texture will be very soft but they are not harmful.

C. No – although the brown substances are safe to eat, the mould that is growing is not.

ACTIVITY 5.3

Label (annotate) the thermometer with each of the phrases given in the box:

- Danger zone: bacteria multiply rapidly between these temperatures
- Bacteria cells are dead: bacteria spores can survive these temperatures
- Bacteria do not multiply: they are dormant – alive but inactive at this temperature
- Bacteria multiply slowly at this temperature
- Bacteria start to die at this temperature
- Water boils at this temperature
- Chill food to this temperature
- Keep cooked food hot at this temperature
- Freeze food to this temperature
- Cook food from raw to at least this temperature
- Re-heat cooked food only once to at least this temperature



ACTIVITY 5.4

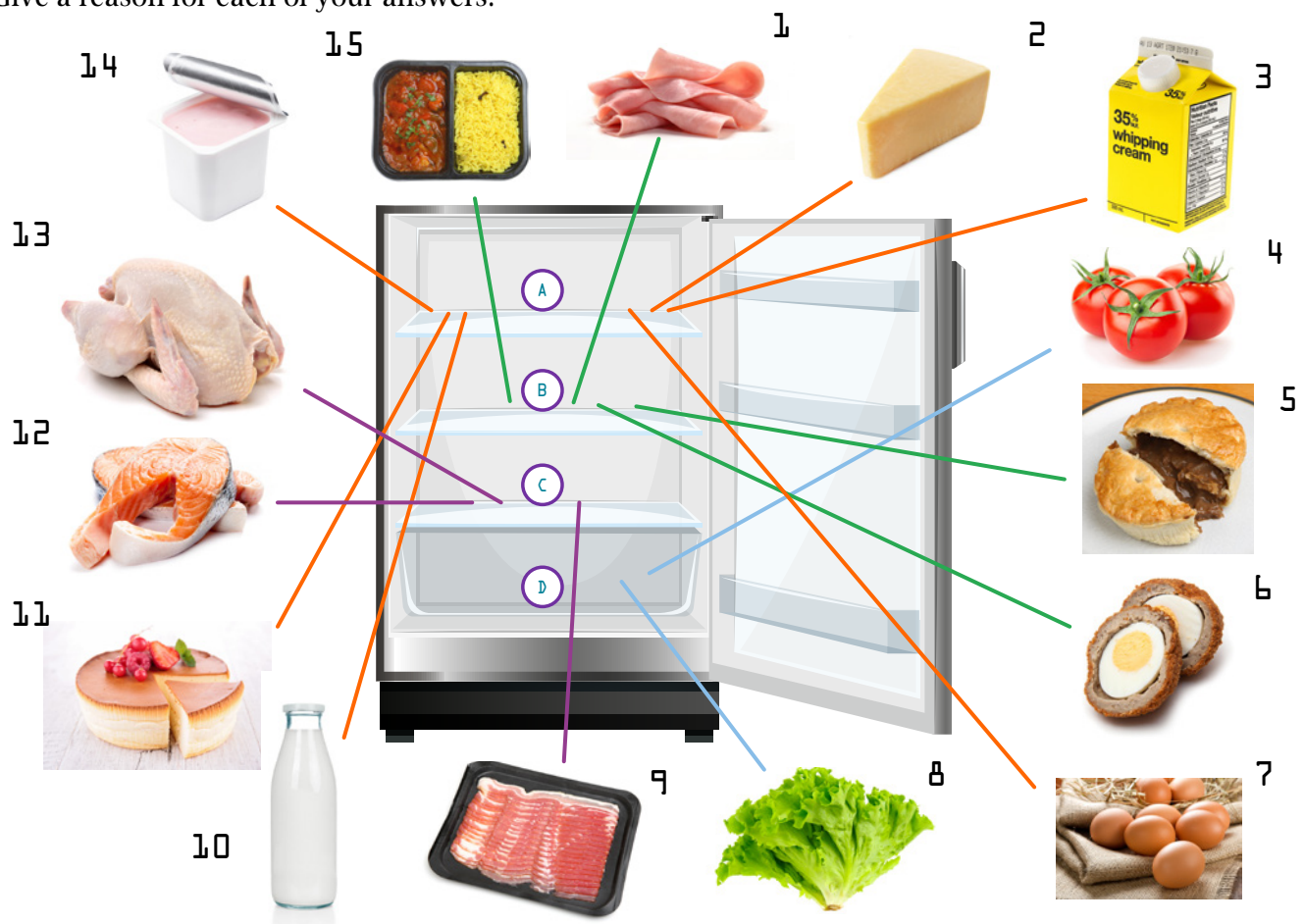
Fill in the table below:

How to prevent cross-contamination of micro-organisms when you are handling food:	Explain why each is necessary and important (2 marks each):
1. Wear clean clothing; tie long hair back; have clean, short finger nails; don't wear jewellery or nail polish.	1. Clothing forms clean barrier between food and food handler. Bacteria live under finger nails. Nail polish can flake off and go in food. Jewellery can have bacteria and dirt on it. Hair can fall out into food.
2. Wash your hands before, during and after handling food; after using the toilet; after handling rubbish.	2. Bacteria are found in many places especially the hands. Hands are a common source of cross-contamination. Food poisoning bacteria particularly found in faeces, so washing after using the toilet is essential. Must wash hands regularly during food preparation, especially after handling raw meat, poultry, fish and eggs and rubbish.
3. Do not cough or sneeze over food.	3. Many bacteria found in nose, mouth, throat, especially Staphylococcus Aureus which causes food poisoning. Sneezing spreads bacteria and viruses for several metres into the air.
4. Do not lick fingers or a spoon and put them back into food.	4. Many food poisoning bacteria found in mouth. Bacteria will transfer from mouth to spoon and into the food if spoon is put back in.
5. Separate raw foods from cooked food during storage and preparation.	5. Raw foods, e.g. meat, poultry, fish and eggs, contain many types of food poisoning bacteria. If stored next to cooked foods, cross-contamination of these bacteria will occur either from direct contact or from raw foods dripping onto cooked ones.
6. Store food correctly at the right temperature.	6. Bacteria multiply rapidly between 5 and 63°C. If high risk foods such as raw meat, poultry, fish and cream are stored at these temperatures, food poisoning bacteria they contain will rapidly multiply. High risk foods must be stored between 0 and below 5°C and wrapped/covered to prevent cross-contamination.
7. Check that the refrigerator/freezer temperatures are correct.	7. If refrigerator temperature is too high, bacteria will multiply and food will become a food poisoning risk. If freezer temperature is too high, food may start to defrost, which will be a food poisoning risk.
8. Check the use-by dates on high risk foods.	8. Use by dates indicate when food is safe to eat. After the use-by date there is an increasing risk that the food may become unsafe due to bacterial growth.
9. Check the quality and freshness of fresh foods such as meat and fish.	9. To make sure that food is in its best condition when you buy it. Look for signs of spoilage, e.g. wrong colour, off-putting smell, wrong texture, e.g. soft, dry, and slimy.
10. Check that food packaging is not damaged.	10. Packaging is designed to protect the food from physical damage and prevent contamination by micro-organisms. Check for damage to packaging, e.g. splits, tears, dents, holes where bacteria could get in, or for signs of bacterial contamination, e.g. vacuum pack is loose because air has got in, can or jar of food has a 'blown' lid due to build-up of gases in the food, food has changed colour.

11. Make sure food is cooked right through to at least 75°C.	11. Bacteria start to die due to heat at 63°C. Cooking food to at least 75°C helps ensure all harmful bacteria are destroyed.
12. Use coloured chopping boards for different foods.	<p>12. Bacterial cross contamination can occur when the same pieces of equipment are used for different foods, e.g. same chopping board for raw and cooked foods.</p> <p>Different coloured boards for different foods can help prevent cross contamination:</p> <p>Red – raw meat and poultry</p> <p>Green – fruits, leafy and salad vegetables</p> <p>Brown – root vegetables</p> <p>Blue – raw fish</p> <p>Yellow – cooked meat, poultry and fish</p> <p>White – dairy foods and baked foods</p>
13. Thoroughly wash, rinse and dry equipment used to store, prepare and serve food.	<p>13. Equipment used for food can harbour small pieces of food debris if not washed properly.</p> <p>Bacteria can grow in food debris on equipment and cross-contaminate other foods.</p> <p>Equipment should be cleaned in very hot water and detergent, rinsed and dried to prevent bacterial growth and multiplication.</p>
14. Cover any cuts/sores on your hands and arms.	14. Bacteria can multiply inside cuts and sores on the skin. This can cause cross-contamination of food with bacteria.
15. Protect food from dust and pests – insects, animals, and birds.	<p>15. Dust and pests all carry bacteria cells and spores. These are easily spread to foods if these come into contact with it.</p> <p>Food needs to be covered to protect it from dust and stored correctly to prevent contamination by pests.</p>
16. Get rid of rubbish regularly and away from the food preparation area.	<p>16. Rubbish attracts pests and bacteria grow in it.</p> <p>Cross-contamination of food will occur if rubbish is stored near to food preparation area.</p>

ACTIVITY 6.1

Draw lines to show on which shelf in the refrigerator you would store each of the foods shown below:
Give a reason for each of your answers.



A = top shelf; B = second from top; C = third from top; D = salad drawer at bottom of fridge

- | | | |
|----|--------------------------|---|
| 1 | Cooked ham or beef joint | B |
| 2 | Cheese | A |
| 3 | Carton of cream | A |
| 4 | Tomatoes | D |
| 5 | Meat pie | B |
| 6 | Scotch eggs | B |
| 7 | Eggs | A |
| 8 | Lettuce | D |
| 9 | Pack of bacon | C |
| 10 | Milk | A |
| 11 | Cheesecake | A |
| 12 | Raw fish | C |
| 13 | Raw whole chicken | C |
| 14 | Carton of yogurt | A |
| 15 | Ready meal curry | B |

ACTIVITY 7.1

For each of the case studies below, explain the factors that will influence their food choices, giving reasons for your answers:

Case study 1

Jo is a student at university and is living in a flat where the kitchen is shared with seven other people. Jo has a cupboard, one shelf in a refrigerator and one shelf in a freezer in which to store foods. Jo has a low income and limited cooking skills. Jo is allergic to nuts.

- The cost of food – whether she cooks her own food / buys ready-made meals and / or eats out with her limited skills and low income
- The ingredients in foods – being aware of any nuts that may be present – this may mean Jo needs to cook most of her own food to be sure
- Storage space available for food – Jo's space is limited so she may have to shop frequently for fresh foods

Case study 2

Mia and Karl are in their early thirties and have two young school-aged children. They both work full time and the children go to a variety of clubs after school four evenings a week. The family have a lot of bills to pay, but want the family to eat well, so try to spend their money wisely on food.

- Cost of food – how much of their income they spend on cooking their own food / buying ready-made meals / or eating out
- Buying food locally and in season – will save some money
- Busy lifestyle – will limit the amount of time they have to shop for food and cook meals
- Following the Eatwell guidelines – to ensure they maintain their health and allow their children to develop well

Case study 3

Dan and Amy are both 21 years old. They both work full time and like to socialise and eat out with their friends a couple of evenings in the week and at weekends. Dan is a keen gymnast and Amy plays hockey for a local team. They both like to cook when they have time.

- Cost of food – how much of their income they spend on cooking their own food / buying ready-made meals / or eating out
- Following the Eatwell guidelines – to ensure they maintain their health, provide enough nutrients to meet the needs of their sports activities and reach their peak bone mass








Case study 4

An elderly couple who are both 82 years of age, live in a small flat in a town. Their only income is their state pension. They are both independent and cook their own meals. They do their own shopping and travel by public transport to purchase their groceries.

- Cost of food – how much of their pension they have available to spend on cooking their own food
- Availability of food – how easy it is for them to go and buy foods and bring them back home. They may have to shop in local shops that are more expensive.
- Following the Eatwell guidelines – to ensure they maintain their health and provide enough nutrients to meet their needs
- Storage space available – this will limit how much food they can buy in bulk to save money

ACTIVITY 7.2

Using your knowledge of the dietary laws of different religions, match up each religion with the correct foods that are allowed or not allowed to be eaten:

Religion		Foods that are allowed or not allowed to be eaten
 Buddhism	A	1 Allowed: natural and clean food, fruit, vegetables Not allowed: pork, fish longer than 30cm
 Christianity	B	2 Allowed: vegetarian or vegan Not allowed: alcohol; meat and dairy foods avoided by some
 Hinduism	C	3 Allowed: Kosher foods; meat and dairy foods not prepared or eaten together Not allowed: pork, shellfish
 Islam	D	4 Allowed: vegetarian foods Not allowed: alcohol, tea, coffee (for some people)
 Judaism	E	5 Allowed: no dietary restriction
 Rastafarianism	F	6 Allowed: Halal foods Not allowed: pork, pork products and alcohol
 Sikhism	G	7 Allowed: vegetarian foods Not allowed: beef, alcohol

Connections: A to 1, B to 2, C to 3, D to 4, E to 5, F to 6, G to 7

ACTIVITY 7.3

Using your knowledge of food labelling, identify which information on the food label below is required by law. Explain how each piece of information will help to the consumer to choose their food.

Only responsibly sourced fish used in this product



Sea shanty pie

By one, get second half price

Serves 2
600g

Use by 22nd March 2017

Haddock, salmon and prawns in a parsley sauce, topped with creamy mashed potato and cheese

Nutritional information:

	Per 100g	Per 300g serving
Energy value (kJ or kcal)	85 kcal/356kJ	255kcal/1,068kJ
Protein (g)	9.5g	28.5g
Total fat (g)	1.9g	5.7g
Saturated fat (g)	0.7g	2.1g
Total carbohydrate (g)	11g	33g
Sugars (g)	1.8g	5.4g
Salt (g)	0.2g	0.6g
Fibre (g)	1.2g	3.6g

Storage

Keep refrigerated.
Consume by the use-by date.
Suitable for freezing.

Preparation and cooking:

Remove outer cardboard sleeve and plastic film. Place product on a baking tray and bake at 200°C/ gas 6 for 30 minutes, until golden brown on top and piping hot.

Ingredients: Potatoes, milk, haddock, salmon, prawns, cheese, flour, butter, parsley, ground black pepper, salt

No artificial colourings, flavourings or preservative.

Allergy information

Contains shellfish, milk, gluten, cheese and wheat flour



Made in the UK using salmon and prawns farmed in Scotland and haddock responsibly sourced from the North Atlantic

L. Goodfoods Ltd., Unit 8, London Way, Anytown, UK.

- Net quantity (weight or volume) of the food (i.e. the amount of food you actually have to eat)
To check for value for money and for quantity that may be required for a recipe
- The name and description of the food product
To inform people exactly what the product is
- Nutritional information: Per 100g /100ml and serving quantity of the food product
All of these will give the consumer information about how consumption of the food will influence their health
- The shelf-life (use-by and best before dates)
To ensure consumer knows when food is safe to eat
- How to store, prepare and cook the product (food safety)
To prevent the chance of food poisoning happening through incorrect handling of the food
- Ingredients list (in descending order by quantity in the food)
To check quality (e.g. % of meat in product) and for any ingredients they may not choose to eat
- Information about additives put into the food
To inform consumer and avoid possible health problems
- Allergy warnings, e.g. contains milk /gluten /nuts
To inform consumer and avoid allergic reactions
- The place of origin of the food
Consumer may not want to purchase food from certain countries for various reasons e.g. political situation, how food is grown /reared
- Name and address of food manufacturer, distributor or retailer
To be able to contact them about the food product for any reason

ACTIVITY 7.4

Using your knowledge of how foods are marketed to consumers, look at the foods below and list the method(s) you think are being used to market the foods and the target market(s) for each. Here is an example to help you:

A new brand of low-fat, fruit flavoured yogurt

The marketing methods that could be used to promote the yogurt may include:

Price deal: e.g. a lower introductory price/buy one, get one free/buy two get third free/buy one get second half price

Healthy eating: to promote the yogurt as containing less fat than other brands

Ethical marketing: the yogurt may be made with local ingredients/the packaging may be recyclable

Marketed in different media: e.g. phone apps, TV, advertising leaflet, free sample, and coupon with money off

1



Reduced sugar and salt baked beans

Healthy eating: to promote low sugar /low salt consumption

Marketed in different media: e.g. phone apps, TV, advertising leaflet, free sample, and coupon with money off

Price deal: e.g. a lower introductory price /buy one, get one free/buy two get third free /buy one get second half price

6



Value brand sausages and top end of the range sausages

Marketed in different media: e.g. phone apps, TV, advertising leaflet, free sample, and coupon with money off

Price deal: e.g. a lower introductory price / buy one, get one free /buy two get third free / buy one get second half price

Marketed to highlight the use of these products to different target groups according to their income, lifestyle, life stage

2



Fair trade cocoa or coffee

Ethical marketing: to promote the work of farmers in developing countries;

Highlight sustainability of food production; recyclable packaging

7



Recycling label on a food label

Ethical marketing: to promote the use of and careful disposal of recyclable packaging

3



Organic vegetables

Ethical marketing: sustainability of food through organic production

Healthy eating: to promote the growth of food without pesticides

8



Product with a special offer logo

Marketed in different media: e.g. phone apps, TV, advertising leaflet, free sample, and coupon with money off

Price deal: e.g. a lower introductory price / buy one, get one free /buy two get third free / buy one get second half price

Marketed to attract specific target groups according to their income, lifestyle, life stage

4



Vegetables grown locally

Ethical marketing: sustainability of food through reduction in food miles /supporting local farmers and growers

9



Convenience foods, e.g. ready-made soup, salad in a bag or box, ready prepared fruit

Marketed to attract specific target groups according to their income, lifestyle, life stage

Marketed in different media: e.g. phone apps, TV, advertising leaflet, free sample, and coupon with money off

Price deal: e.g. a lower introductory price / buy one, get one free /buy two get third free / buy one get second half price

5



Food products with a celebrity chef endorsement/cartoon character

Marketed in different media: e.g. phone apps, TV, advertising leaflet, free sample, and coupon with money off

Price deal: e.g. a lower introductory price /buy one, get one free /buy 2 get third free /buy 1 get second half price

ACTIVITY 8.2

Cuisine picture search.

Look at the images in the picture search below. For each of the countries in the following chart, identify and write down the numbers of three images that are typical of their cuisine.



Country	Which images?	Can you name the foods/dishes?
England	1	Cornish pasty
	10	Roast beef and Yorkshire puddings
	14	Stilton cheese
Italy	7	Tomato, basil and mozzarella cheese salad
	16	Panna cotta
	18	Lasagne
Japan	3	Sushi
	12	Noodle soup
	17	Tempura
Mexico	4	Enchiladas
	11	Tacos
	15	Guacamole
Denmark	5	Danish pastries
	8	Smørrebrød open sandwich
	13	Frikadeller
Spain	2	Churros
	6	Gazpacho soup
	9	Paella

ACTIVITY 9.1

Sensory descriptors are used to describe the characteristics of a food.

For each of the following foods, describe the characteristics you would expect using sensory descriptors. An example is given below (the sensory descriptors are highlighted):

A freshly baked loaf of bread: Freshly baked bread should have a **crusty, chewy** outer layer, which is **golden brown** in colour. The inside of the loaf should be **soft** and **light** in texture, and be a little **moist**. The loaf should have a **fresh, slightly yeasty smell** and the crust should have a characteristic **toasted smell** due to the action of dry heat on the starch which turns to dextrin in the oven. When the loaf is tapped with the finger, it should sound **hollow** which means it is cooked right through.



Have a go at describing these foods. Imagine you are describing them to someone who has never seen or tasted these foods before. You must be as descriptive as possible – remember not to use words such as ‘lovely’, ‘horrible’, ‘nice’, as these are your opinion, not descriptive words.

1. A grilled beef burger

Should be moist and tender, with a brown colour. It should have tasty extractives on the surface from the squeezing out of extractives during the coagulation of the protein in the meat. It should be cooked all the way through for safety.

2. Sautéed onions

Should be tender and soft. They should be slightly transparent and have a golden brown colour due to the caramelisation of the natural sugars they contain.

3. A cheese scone

Should be well risen and have a light, airy texture and a golden brown crust due to the dextrinisation of the starch from the heat in the oven. The cheese should have melted, making the scones well flavoured and moist inside.

4. A shortbread biscuit

Should be light and crisp with a melt-in-the-mouth texture, due to the shortening of the gluten strands by the butter. They should be a pale golden colour due to the dextrinisation of the starch and the caramelisation of the sugar from the heat in the oven.

5. A baked jacket potato

Should be soft and fluffy inside, due to the gelatinisation of the starch by the heat and moisture they contain. It should have a crisp skin due to the action of the heat.

6. A lemon meringue pie

Should have a crisp and short pastry base with a melt-in-the-mouth texture, due to the shortening of the gluten strands by the butter. The filling should be smooth and tangy and thickened, due to the gelatinisation of the starch in the cornflour and coagulation of the egg yolk proteins. The meringue should have a light, crisp and foamy texture due to the air being whisked into the protein and sugar mixture. The colour should be a light golden brown due to the caramelisation of the sugar.

7. A lamb curry with rice

Should have meat with a tender texture due to the action of heat and moisture on the collagen which is turned into gelatine. The curry sauce should be rich and spicy and contain tender vegetables. The rice should be tender, soft but not sticky.

8. A fresh orange

Should be juicy and sweet, and tangy due to the citric acid it contains.

9. A choux pastry éclair

Should have a crisp shell of pastry and contain soft cream inside and smooth chocolate on the top.

10. A chocolate mousse

Should have a light, airy texture and a smooth mouthfeel that melts in the mouth due to the fat in the chocolate melting in the mouth.

ACTIVITY 10.1

Using your knowledge of food provenance, complete the following table. An example has been given to help you:

Animal and plant food production methods	Type of food provenance shown in the picture	Points to consider both positive and negative, about this type of food provenance
	<ul style="list-style-type: none"> Free range farming Organic egg production 	<ul style="list-style-type: none"> The hens have space and freedom to move around, peck the ground and live naturally There is less chance of diseases being spread between the hens because they are outside and not all together in one place The hens will be given organic food to eat The hens will not be given drugs, antibiotics or other medicines The cost of land is expensive to keep hens in this way Natural predators, e.g. foxes can be a problem
	<ul style="list-style-type: none"> Intensive chicken meat production 	<ul style="list-style-type: none"> Hens have little space for moving around Hens must be given medicines to prevent infections spreading Hens live indoors all the time Chicken meat is cheaper to produce in large numbers in this way
	<ul style="list-style-type: none"> Intensive crop (plant) production 	<ul style="list-style-type: none"> Crops need to be sprayed with pesticides to prevent weed growth and attack by pests, which may have effects on the environment and wildlife There are concerns about the effects of pesticides on people's health Artificial fertilisers have to be used to put nutrients back in the soil. These may have an effect on the local ecology of the soil, rivers, etc. Most crops can be grown in large numbers and harvested efficiently by machines rather than people, which reduces production costs and the price consumers pay
	<ul style="list-style-type: none"> Intensive fish farming 	<ul style="list-style-type: none"> Large numbers of fish, e.g. salmon, are produced which has reduced the price of these to the consumer Living together in large numbers in a small space may lead to disease spreading easily or injuries as the fish are living close together Medicines have to be added to the water to prevent diseases and pests from affecting the fish There are animal welfare rules in place about how the fish should be managed
	<ul style="list-style-type: none"> Organic mixed crop (plants) production 	<ul style="list-style-type: none"> Organic farming does not use artificial fertilisers Pesticide use is severely restricted Natural fertilisers, e.g. manure, are used which are better for the environment Crops are rotated so that the soil can recover naturally Weed control, etc., often has to be done by people, so the costs of production are often higher
	<ul style="list-style-type: none"> Hydroponic plant production (plants grown in water with nutrients added) in a poly-tunnel 	<ul style="list-style-type: none"> Plants grow in water with nutrients added Soil not needed, so may be cheaper to produce on a large scale Poly tunnel helps to protect crops from pests Crops are easy to harvest and do not need to be cleaned

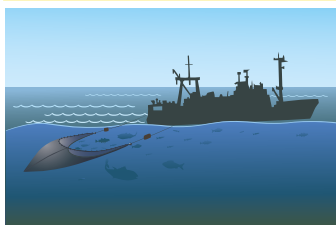
ACTIVITY 10.2

Using your knowledge of environmental and sustainability issues around food production, processing and consumption, complete the following table. An example has been given to help you:

Environmental and sustainability issues around food

Environmental and sustainability issue shown in the picture

Points to consider about this issue



Destruction of the marine (sea) environment by over fishing

Sea fishing is unsustainable because:

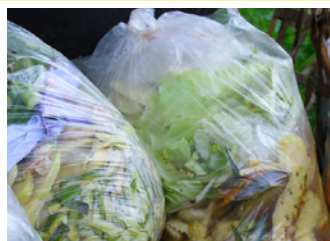
- Trawler fishing has led to a decrease in fish stocks
- The natural ecology of the sea has been damaged
- Many fish that are caught are not eaten and thrown back in the sea because they are too young or small
- This reduces the number of fish able to breed so the fish stocks decline

To make sea fishing more sustainable:

- The numbers of fish need to be conserved so that they can breed normally

This could be done by:

- Limiting the number of fish that can be caught (quotas)
- Increasing the size of holes in fishing nets to allow small fish to escape
- Using sustainable fishing techniques, e.g. line fishing rather than trawlers
- Consumers should buy fish from sustainable sources



Food wastage

Wasting food is unsustainable because:

- A lot of food is wasted – about 20% of what people buy
- Wasted food goes to landfill which has effects on the environment because of methane gas produced

How to avoid wasting food:

- Plan meals carefully
- Buy only what you need
- Serve appropriate sized portions for different people
- Store food correctly
- Understand what use-by and best-before dates mean
- Use left-over foods for other meals



Climate change leading to drought

How is climate change affecting food production?

- Food production is a major cause of greenhouse gas production
- Greenhouse gases cause global warming, which causes climate change, including drought, floods, high winds, and storms in many parts of the world
- Without water, plants cannot grow, soil blows away, waterways dry up and fires are more likely to start
- Hunger, thirst and starvation are often the result of drought
- Floods and storms damage crops, kill livestock and pollute/wash away soil so crops cannot grow
- Foods and water then have to be imported, which makes them much more expensive and causes more pollution from transportation

What can/should be done to slow down climate change?

- Avoid food wastage
- Reduce greenhouse gas emissions by eating less meat and dairy products, the production of which produces a lot of greenhouse gases
- Stop deforestation to grow crops, e.g. palm oil, which affects local ecology, uses a lot of water and damages soils

- Reduce the transportation of foods (food miles) by road, sea, rail and air to reduce the use of non-renewable fossil fuels and the emission of greenhouse gases caused by pollution
- Eat locally produced foods
- Eat foods in season rather than importing them from other countries all year round



Fairtrade foods

How is the Fairtrade Foundation helping with food security and sustainability?

- Fairtrade foundation was established to help farmers and farm workers in developing countries receive better and fairer prices for their crops and their labour and have better living and working conditions
- Sustainable farming is also encouraged and supported by the foundation



Misshapen and undersized vegetables and fruits are often thrown away because supermarkets will not sell them

Why is throwing away misshapen and undersized vegetables and fruits unsustainable?

- Producing vegetables and fruits uses a lot of resources: land, water, fertiliser, pesticides, time, labour, non-renewable energy (fuel for machinery)
- Vegetables naturally grow in different shapes and sizes and are edible
- Supermarkets demand particular shapes and sizes for vegetables and fruit, so many crops are wasted
- By throwing away misshapen and odd sized crops all the resources that went into growing them are wasted
- If the wasted crops are put into landfill they produce greenhouse gases as they rot, which contributes towards climate change
- If enough crops are thrown away for this reason, it could put a farmer out of business
- Wasting crops in this way does not give any social benefits to people – the crops could be eaten if the farmer was allowed to sell them to the supermarkets
- Wasting crops in this way gives the wrong message to people about the value of food

How can supermarkets and people be encouraged to sell and buy these crops?

- Reduce the price of them
- Send out promotional recipe leaflets
- Carry out some promotional tasting of products made with them
- Celebrity chef endorsement
- Provide educational information about the natural variations that occur when crops are grown and the problems caused by food wastage



The transport of food Food miles

What are the effects of food miles on the environment?

- Many foods and ingredients travel large distances before we buy them: the distance travelled is called 'food miles'
- This contributes to environmental pollution and global warming
- Food miles use a lot of non-renewable energy (oil)

How can food miles be reduced?

- Buying locally produced food
- Eating foods in season rather than importing them out of season from other countries

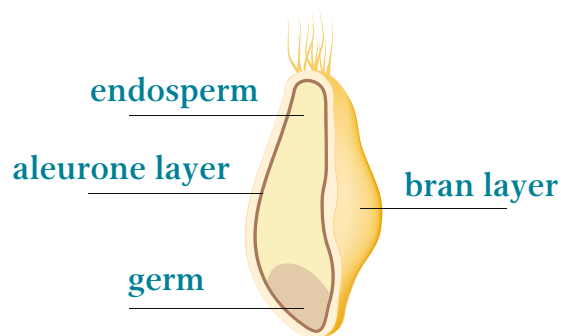
ACTIVITY 11.1

The primary processing of foods often involves several stages.

Primary processing of wheat into flour

- a) Label the enlarged drawing of a wheat grain with the different parts and layers:

germ
aleurone layer
endosperm
bran layer

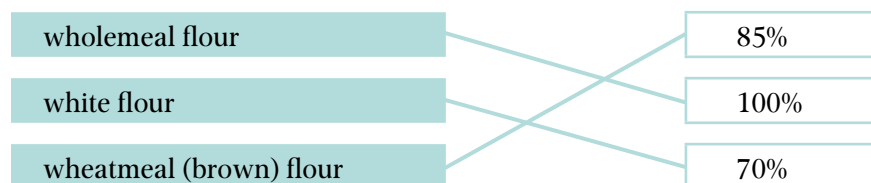


- b) Set out below are the stages involved in turning wheat into flour, but they are in the wrong order.

Rearrange the stages into the correct order by numbering them 1 to 4:

- 3 Grains are milled to crush them and separate the layers
- 2 Grains are cleaned and dried
- 1 Grains are harvested
- 4 Grains are sieved to produce different types of flour

- c) Match the different types of flour with the correct amount of the wheat grain each contains:



Why is wholemeal flour considered to have the best nutritional profile out of the three types of flour?

None of the nutrients are removed during processing.

Name five different recipes which could be adapted to include the use of wholemeal flour.

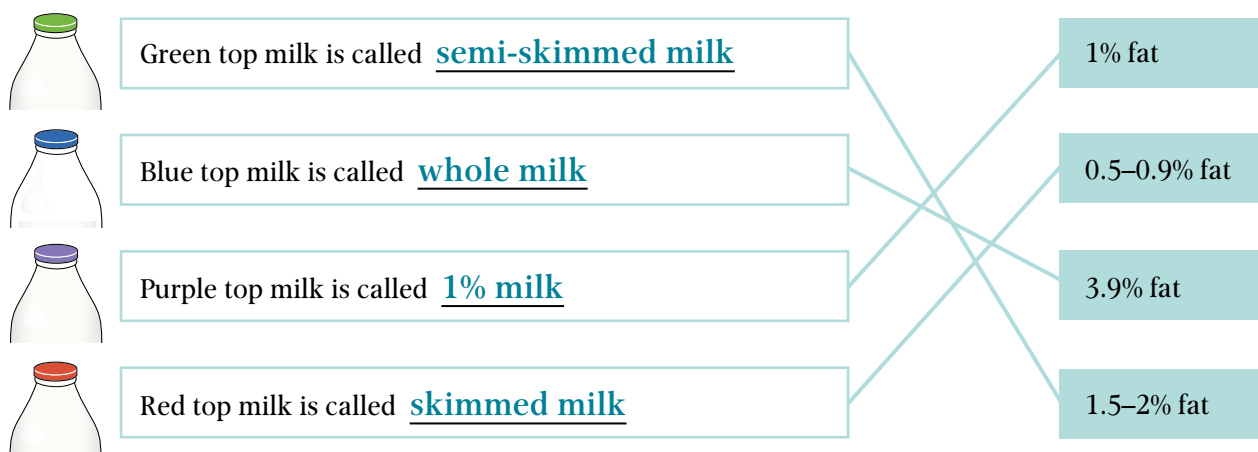
Suggestions: pastries, cakes, biscuits, breads, scones.

Primary processing of milk

- a) Milk can have the fat (cream) removed from it by **skimming**.

There are four types of milk available, each with a different fat content, depending on how much was removed by skimming.

Name each of the four milks:



- b) Fill in the missing words and temperatures about the next primary stage of processing milk. The missing words are shown below to help you:

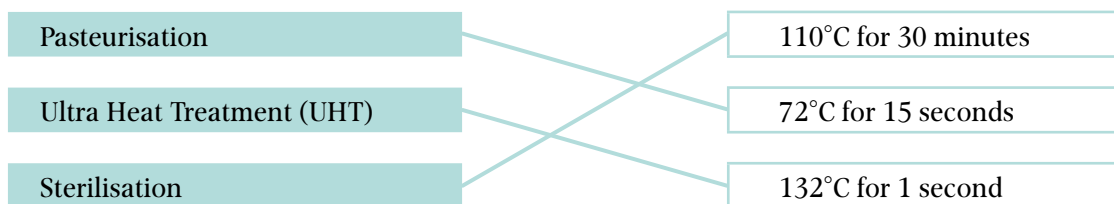
Fresh milk is heat treated to kill pathogenic bacteria and make it safe to consume for several days when stored in the refrigerator at 0° and below 5°C. Milk is usually homogenised during the first stage of processing. This prevents the cream from separating from the milk and rising to the surface. This ensures that the texture and flavour stay consistent all the way through. The milk is forced through thousands of tiny holes under pressure, which breaks up the fat and stops it from separating out.

Missing words:

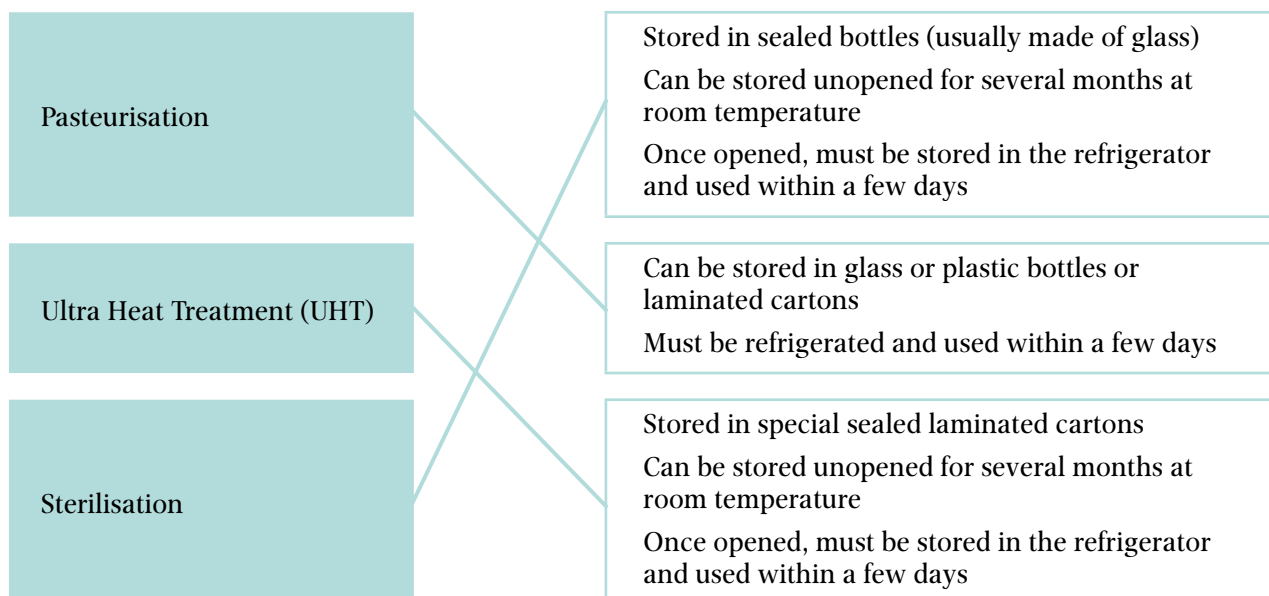
texture holes pathogenic heat treated 0° and below 5°C
homogenised cream fat flavour refrigerator

- c) There are three types of heat processing of milk. They involve heating the milk to a specific temperature for a specific amount of time and then rapidly cooling it.

Match the three different types of heat processing of milk with the correct temperature and time they are processed for:



- d) Match the three different types of heat treated milk to the correct way in which they are packaged and stored:



Explain why milk must be stored in a refrigerator and used within a few days.

It is a high-risk food. Refrigeration prevents the growth of pathogenic and souring bacteria.

ACTIVITY 12.1

Have a go at cutting down the following topic on foams below into small pieces of information.

Now have go at cutting down the following topic on how foams are formed. You could also draw some diagrams to help you to remember it.

Information to cut down: How foams are formed

The light texture of some foods such as mousses and meringue is produced by creating a **foam**.

Foams are formed when gases (often air) are trapped inside a liquid to form a **gas-in-liquid foam**.

Gas (air)-in-liquid foams, are produced when making recipes such as meringue and whisked sponges.

To make meringue, egg whites are a liquid made of a mixture of proteins and water.

Egg white is capable of holding up to **7 times** its own volume of air, due to the ability of **egg white protein** to **stretch**.

When egg whites are whisked to make meringue, the action of the whisk rotating very fast traps lots of air bubbles to make a **gas (air)-in-liquid foam**.

The action of the whisk also makes some of the compact egg white protein molecules **denature** by breaking the bonds that hold them together and causing them to unfold.

The denatured protein molecules start joining up and bonding with lots of other denatured protein molecules – this is called **coagulation**.

They then surround the air bubbles and make a 'wall' around them, which holds the air bubbles and water in place so that the foam is **stabilised**.

The foam will not form properly if there is any egg yolk, or traces of fat in the mixing bowl.

If you over-whisk the egg whites, the foam will start to collapse and become watery and loose.

This is because over-whisking makes the coagulated protein molecules bond together too tightly so that they squeeze out the water they were holding.

Heating the meringue in the oven coagulates some of the other protein molecules in the egg white and drives some of the water out, so that the foam sets and becomes more solid.

Cut down topic

- **Foams give light textures, e.g. meringue, whisked sponge, mousse**
- **Foam = air trapped in a liquid (gas-in-liquid foam)**
- **Meringue: egg whites = protein + water**
- **Protein stretches so egg white holds $7 \times$ its own volume of air**
- **Whisking traps air and creates foam**
- **Whisking denatures and coagulates proteins**
- **Proteins make a wall around air bubbles – holds air and water in place – foam is stabilised**
- **If egg yolk in mixture – foam cannot form**
- **Over-whisking – foam collapses (coagulated protein tightens and squeezes out water)**
- **Heated meringue = more coagulation, water evaporates, foam sets**

WORD COUNT = 285

WORD COUNT = 91

ACTIVITY 12.2

Look at the questions below in which a variety of different command words have been used. Have a go at answering the questions in the ways in which the command words instruct you to. Try to include examples in your answers:

Questions 1–6 are about fish

1. **Explain** why poaching and steaming are more suitable cooking methods for white fish (e.g. cod, haddock) than grilling. (5 marks)
 - Little fat in flesh of white fish – so if grilled, fish will dry out easily because there is no fat melting
 - Protein in fish has very little connective tissue, so cooks very quickly – grilling would easily overcook it and dry the texture
 - Poaching and steaming are gentle, moist methods of cooking, so protein denatures and coagulates without the texture drying out.
2. **Identify** how the following foods should be stored, giving reasons for your answers:
 - a) Frozen prawns that need to be defrosted for use in a meal tomorrow. (2 marks)

In covered dish or box in refrigerator; high risk food so needs to be kept chilled. Covered to prevent any drip which could cause cross contamination of bacteria to other foods.
 - b) Fresh haddock bought in the morning for an evening meal. (2 marks)

In covered dish or box in refrigerator; high risk food so needs to be kept chilled. Covered to prevent any drip which could cause cross contamination of bacteria to other foods, and to prevent transfer of fish smell to other foods (taint).
 - c) Left-over canned tuna. (2 marks)

In covered dish or box in refrigerator; high risk food now that can has been opened, so needs to be kept chilled. Removed from can to prevent any reaction between the tuna, the metal of the can and oxygen. Covered to prevent any drip which could cause cross contamination of bacteria to other foods, and to prevent transfer of fish smell to other foods (taint).
3. **Compare** the nutritional values of white fish (e.g. cod) and oily fish (e.g. mackerel). (6 marks)

<u>White fish</u>	<u>Oily fish</u>
HBV protein	HBV protein
Very little fat	Oil in flesh
Some B vitamins	Vitamins A and D
	Essential fatty acids
Sodium (especially dried fish)	Sodium (especially canned fish)
Fluoride	Fluoride
Iodine	Iodine
	Calcium (softened bones of canned fish)
4. **Suggest**, with reasons, three ways in which young children could be encouraged to eat fish. (3 marks)

Fishcakes
Steamed fish in a cheese/parsley sauce
Fish stew
Baked fish with vegetables
Fish goujons
5. **State** the quality points to look for when you are buying fresh fish. (6 marks)

Bright red gills
Firm flesh
A fresh smell
Clear shiny eyes, not sunken
Firmly attached scales – not loose
Moist skin – but not slimy

6. **Discuss** the environmental concerns and sustainability issues around commercial sea fishing. (10 marks)

Answer should include these points:

- How modern sea fishing is carried out – type of boats, how fish are caught and processed
- The environmental concerns: damage to habitats and ecology; by-catch; over-fishing ; effects on life cycles of fish and stocks
- How fishing can be made more sustainable: laws need to protect from over-fishing (e.g. fish quotas); increase size of holes in nets; catching methods need to be changed, e.g. line fishing instead of nets.

Questions 7–11 are about shortcrust pastry

7. **Describe** why the pastry used for a quiche flan is called ‘short crust’. (4 marks)

Ingredients used – plain flour, fat, e.g. butter, and water

Flour contains gluten.

When fat is rubbed in, a waterproof layer is put around the flour particles so the gluten can't form long strands when water is added. The gluten strands remain ‘short’.

When baked, the pastry will have a ‘short’ texture that is not chewy because of the short gluten strands.

8. **Contrast** the preparation and handling of shortcrust pastry with bread dough in terms of:

- a) The ingredients used. (3 marks)

Shortcrust pastry

Plain flour

Fat, e.g. butter

Cold water

Bread

Strong plain flour – higher gluten content

No fat in many recipes

Warm water

Yeast

- b) The temperature during the preparation of each. (2 marks)

Shortcrust pastry

Cold water – to keep ingredients cool and prevent fat from melting and pastry dough becoming hard to handle

Bread

Warm water and ingredients to encourage yeast to produce CO₂ gas to raise dough

9. **Outline** what happens to the ingredients when shortcrust pastry is baked:

- a) The fat. (2 marks)

Fat melts and is absorbed by the starch in the flour

It helps to make the finished pastry have a crisp texture

- b) The flour. (2 marks)

Starch granules absorb the fat

Gluten denatures and coagulates which sets the pastry

Pastry may shrink because of gluten coagulation

- c) The water. (2 marks)

The water heats up and turns to steam, which helps to raise the pastry slightly and makes it light in texture

10. **Suggest** reasons why shortcrust pastry is a popular food product in many cuisines.

Illustrate your answer by giving examples. (6 marks)

- Can be used for sweet or savoury recipes – therefore very versatile
- Can be used as an ‘edible container’ to hold other ingredients, e.g. pies, flans, tarts, pasties – so useful for hand held food, packed lunches, picnics, etc.
- Energy dense therefore useful for people who need plenty of energy
- Adds crisp texture to a meal

11. **Summarise** why is it not advisable for people to eat a lot of pastry products on a regular basis. (4 marks)

- Pastry is energy dense because it contains flour (carbohydrate) and fat
- Often combined with other energy dense ingredients, e.g. cream, sugar, syrup, cheese, meat
- Over consumption of energy dense foods can lead to weight gain and obesity and fats (often saturated) can lead to heart disease

Questions 12–16 are about food production and processing

12. a) **Analyse** different methods of egg production. (4 marks)

Eggs produced by:

- Intensive, caged production – hens kept in a small cage all the time, eggs collected on conveyor belt. Hens given a special feed.
- Barn production – many hens kept in a large barn (free to roam about), with perches so hens can use them. Eggs laid in nest boxes provided. Hens given a special feed.
- Free range production – hens kept in a barn but have access to outside to roam about. Some are kept in fields in small hen houses and roam about following their natural instincts to scratch the ground and peck for insects and worms. Given special feed as well.
- Organic production – hens roam about following their natural instincts to scratch the ground and peck for insects and worms. Any feed they are given has to be organically produced. Eggs laid in hen houses in fields.

b) **Explain** how this information will help you to choose which eggs to buy. (2 marks)

It will help them choose if they have any concerns about/preferences for:

- Animal welfare
- Organic food production

13. Fairtrade food products are available in most supermarkets in the UK. **Comment** on the importance of the Fairtrade foundation for farmers and workers in developing countries. (3 marks)

It helps ensure that farmers and their workers:

- Receive fair prices for their products and labour
- Have the opportunity to sell their products in a wider market
- Have better working and living conditions

14. The Scientific Advisory Committee on Nutrition recommends that no more than 5% of daily carbohydrate intake should come from free sugars.

Consider the reasons why this has been recommended and what people should do to follow the advice. (5 marks)

Recommended because:

- Too many free sugars in the diet can lead to tooth decay, weight gain, obesity
- Free sugars found in many different foods and drinks and likely to be consumed in large amounts without people realising
- Consumers should check food labels for amounts of free sugars in foods and drinks

15. **Evaluate** the importance of the following when storing, preparing and cooking food:

a) Keeping raw and cooked foods separate from each other. (2 marks)

Bacteria in raw foods such as meat, fish, poultry can be easily transferred to other foods and cause food poisoning. If stored next to cooked foods, raw foods can drip on to them and cross contaminate them. Equipment used for raw and cooked foods should be kept separate for the same reasons.

b) To follow 'use-by' and 'best before' dates on food packaging. (2 marks)

Use-by dates are for high risk foods which are likely to have food poisoning bacteria, e.g. meat, fish, and indicate to consumers the date by which they should be consumed, in order to be safe to eat.

Best before dates are for non-high risk foods, e.g. biscuits, canned foods, and indicate when they will be at their best in terms of flavour, texture, etc. After the best before date some of their sensory qualities will change but they will be safe to eat.

c) To chill left-over cooked foods within 1½–2 hours. (2 marks)

Cooked foods should be chilled to 5°C or lower within 1½–2 hours so that any bacteria in them do not have enough time in warm food to multiply and pose a food poisoning risk.

d) To reheat left over foods only once to a minimum core temperature of 75°C for 2 minutes. (2 marks)

Left-over foods should only be reheated once to prevent bacteria from multiplying. Any bacteria in the food will be destroyed if heated to 75°C so will not be a food poisoning risk.

16. Vegetables can be grown by organic or intensive production methods.

a) **Contrast** the two production methods. (4 marks)

Organic

Variety of crops grown in one area of land

Very little pesticide allowed to be used times

Land fertilised with natural products, e.g. manure

Requires a lot of manual labour by people

Intensive

One crop grown in a large field

Crops usually sprayed with pesticides several times

Artificial fertilisers used on the land

Crop managed by few people with machinery

b) **Justify** which production method is better for environmental sustainability. (2 marks)

Organic

Growing methods encourage protection of the local ecology (insects, birds, plants, etc.)

Natural fertilisers improve the quality of the soil

Intensive

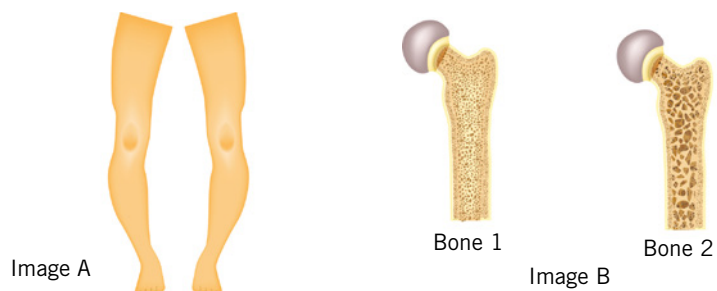
Pesticides can affect life cycles of other plants and animals and upset the local ecology

Artificial fertilisers can get into streams and rivers and pollute them

Question 17 is about nutrition

17. **Examine** the images on the right:

Write in detail, giving nutritional facts, about the causes of what has happened in Image A and bone 2 in Image B, and how each condition could be prevented. (6 marks)



- **Image A** – Vitamin D needed to help the body absorb calcium. Image shows Vitamin D deficiency leading to rickets in children/osteomalacia in adults. Not enough calcium in bones to make the strong enough to support body weight.
- **Image B** – Bone 1 shows normal, healthy bone with plenty of minerals. Bone 2 shows osteoporosis, where bones are fragile and easily break. It is a natural ageing process for minerals to gradually leave the bones after approximately age 30–35 years. If skeleton has reached peak bone mass before age 30–35 years, the bones should not develop osteoporosis

ACTIVITY 12.3

Here are three multiple choice questions where the distractor answers are close/similar to the correct answer. Find the correct answer for each one.

1. **Invisible plant oils are found in these foods:**

- ☐ a) Avocado pears, pumpkin flesh, walnuts, potato crisps
- ☒ b) Avocado pears, pumpkin seeds, walnuts, potato crisps
- ☐ c) Pears, pumpkin seeds, walnuts, potato crisps
- ☐ d) Avocado pears, pumpkin seeds, walnuts, potatoes

2. **Eating too much salt in the diet can cause:**

- ☐ a) Hyperventilation
- ☐ b) Hyperactivity
- ☒ c) Hypertension
- ☐ d) Hyperlinks

3. **When heat is transferred by the action of atoms vibrating and passing heat energy onto other atoms, it is called:**

- ☐ a) Coagulation
- ☐ b) Convection
- ☐ c) Concentration
- ☒ d) Conduction

ACTIVITY 12.4

Here are a variety of open-ended questions.

Identify which type of open-ended question each is and have a go at answering them.

1. Yogurt is a very popular dairy product in many countries.

Structured question

- a) Suggest two flavourings that can be added to yogurt. (2 marks)

Honey, vanilla, any fruit, coconut, caramel

- b) Explain why bacteria are added to milk during the production of yogurt. (2 marks)

- **Bacteria ferment the milk**
- **Lactose in the milk turned into lactic acid**
- **Yogurt sets due to action of lactic acid denaturing and coagulating the milk proteins**

- c) What does 'live yogurt' mean? (2 marks)

- **Live yogurt is not pasteurised**
- **The bacteria it contains remain alive but dormant (not active)**

- d) Explain why yogurt should be stored in refrigerator at 0°C to below 5°C. (2 marks)

- **To prevent the bacteria from continuing to grow and multiply, which would spoil the texture and flavour of the yogurt**
- **To prevent other micro-organisms which may be present from growing and multiplying, e.g. yeasts**

2. Many people are choosing to eat a vegetarian diet.

Free response question

Discuss the reasons why a vegan diet may be considered by many people to be:

- a) Healthier. (4 marks)

Answer should include information on:

- **Introduction: types of vegetarian diet: lacto-ovo /lacto /vegan – foods eaten /not eaten**
- **Health aspects of eating a mainly plant foods diet:**
 - (lower in saturated fat, good range of micronutrients, LBV protein (protein complementation is important), high fibre, antioxidants (vitamins A, C, E))
 - compared to diet containing animal foods, which have higher amounts of saturated fats, HBV protein
 - Lacto and lacto-ovo vegetarian diets need to ensure they do not have excess intake of high fat dairy foods

- b) More environmentally sustainable. (4 marks)

- **The production of meat, dairy foods and eggs has the highest carbon footprint**
- **The production of meat, dairy foods and eggs produces approximately 18% of all greenhouse gases**
- **Large amounts of land have been cleared to provide areas for livestock to feed and to produce crops to feed livestock – significantly alters the ecology of an area**
- **The production of plant foods has the lowest carbon footprint**

- c) Consider what advice you would give to a teenager who is considering changing to a vegan diet. (4 marks)

- **She must ensure that she eats enough of a variety of foods to provide all the nutrients she needs, especially:**
- **Iron – may not be so easily absorbed from plant foods, so a variety need to be eaten e.g., dried apricots, wholegrain cereals, lentils, beans, dark green leafy vegetables**
- **Protein – needs a mixture of LBV proteins (protein complementation) to provide all of the essential amino acids**
- **Calcium – she is at the stage where the skeleton is laying down minerals towards peak bone mass, so needs to ensure she has plenty of calcium and vitamin D. She could have calcium enriched milk substitutes e.g. soya, almond or oat milk; lentils, green leafy vegetables**

3. Ingredients used in recipes have different functional properties. **Structured question**

Explain in detail the functional properties of each ingredient in the recipe for a chocolate sponge cake:

- Self-raising flour (2 marks)
 - Contains baking powder which produces CO₂ gas and enables the mixture to rise
 - Contains gluten which denatures and coagulates during baking and sets to form the structure around the gas bubbles in the cooked mixture
 - Starch granules absorb moisture from the eggs and the melted fat
- Cocoa powder (1 mark)
 - Adds flavour and colour
- Vegetable fat spread (2 marks)
 - Due to its plasticity, the fat with sugar can be beaten and will trap air to raise the mixture and produce a light spongy texture
 - Adds moisture to the cake
 - Enables mixture to be spread
- Caster sugar (2 marks)
 - Adds flavour.
 - Traps air with the fat
 - Softens the gluten in the flour to give a tender crumb texture to the finished cake
 - Turns into a syrup and caramelises during baking which adds to the flavour and colour of the baked product
- Eggs (2 marks)
 - Egg protein molecules denature and coagulate, which helps to set the baked mixture.
 - Add moisture to the cake

4. Examine the food label on the right, then answer the questions about it:

Data response question

- State two pieces of information that are required to be shown on a food label by law. (2 marks)

Possible answers are highlighted in red on the label (right)

- How many grams of sugar are there in two biscuits? (1 mark)
20g
- What is the percentage of saturated fats in the biscuits? (1 mark)
12%

- Is the fat in the biscuits visible or invisible? Give a reason for your answer. (2 marks)
Invisible because it is in the chocolate chips and has been absorbed into the biscuit mixture during baking.

- Name two types of food additive in the biscuits. (2 marks)
emulsifiers, flavourings, preservatives

- State two reasons why storage instructions are given on the labels of food products. (2 marks)
 - To make sure the food is kept in the best condition so that its flavour, texture and nutritional composition are at their best
 - To ensure that consumers know how to store the food correctly to prevent a possible food poisoning risk

- Explain why the manufacturer recommends the following for the biscuits: 'Store in an airtight container once opened.' (1 mark)

Biscuits can pick up moisture from the air which makes them go soft and spoils their sensory qualities. Storage in an airtight container will prevent this.

Choc Oaties

A chocolate-flavoured shortbread and oat biscuit with chocolate chips.

Ingredients: Wheat flour, butter, sugar, rolled oats, chocolate chips (milk, sugar, cocoa butter, cocoa, emulsifiers, flavourings), salt, vanilla flavouring, preservatives (antioxidants)

Allergy information: contains gluten and milk

Storage instructions: Store in an airtight container once opened

Best before end of: December 2017

Net weight: 400g

Made in the UK by Tea Time Foods Ltd., 55, Any Street, London, England

Nutritional Information

Nutrient	Per 100g	Per biscuit (40g)
Energy	2070 kJ/495 kcal	828 kJ/198 kcal
Fat – of which:	22.5g	9g
Saturates	12g	4.8g
Carbohydrate – of which:	58.5g	23.4g
Sugars	25g	10g
Starch	33.5g	13.4g
Fibre	2g	0.8g
Protein	15g	6g
Salt	2g	0.8g