

MACRONUTRIENTS: Proteins, fats, carbohydrates

Key facts

- Food provides all the materials (**nutrients**) and **energy** that the body needs for growth, maintenance, repair and to work properly.
- Foods also contain (either natural or added): flavourings, colourings, enzymes, preservatives, texture
- **Diet** is the food eaten every day
- **Special diets** reduce or increase a nutrient or food, e.g. low salt diet, weight loss diet, high fibre diet.
- A **balanced diet** means eating right amount of nutrients and a variety of foods for our individual needs
- **Malnutrition** means 'bad' nutrition (too much or too little of one or more nutrients)

PROTEINS

- Protein molecules are made of **amino acids** - there are 10 **essential** amino acids that must come from food.
- **High biological value** (HBV) proteins contain all of the essential amino acids.
- **Low biological protein** (LBV) proteins are missing one or more of the essential amino acids.
- Mixing LBV proteins together supplies all of the essential amino acids; this is called **protein complementing** (e.g. baked beans on toast)

| Function (job in the body) | Found mainly in these foods | Result of deficiency (not enough) | |
|---|--|--|---|
| | | Children | Adults |
| <ul style="list-style-type: none"> • Growth • Maintenance • Repair and healing • Energy | <p>HBV: meat, fish, eggs, milk, cheese, soya beans, quinoa</p> <p>LBV: cereals, pulses, beans, some nuts, seeds, vegetarian alternatives, e.g. Quorn</p> | <ul style="list-style-type: none"> • Poor growth • Slow healing • Catch infections easily • Fluid under skin (oedema) • Thin, weak • Cannot digest food properly • Diarrhoea • Hair thinning | <ul style="list-style-type: none"> • Lose muscle, fat • Internal organs weaken • Dry hair and skin • oedema |

FATS

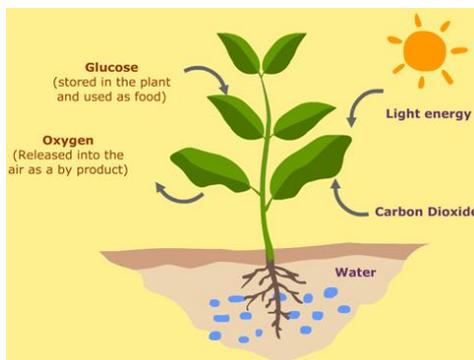
- Fat is **solid** at room temperature, Oil is a fat that is **liquid** at room temperature
- Fat molecules are made up of one part **glycerol** and three parts **fatty acids** - a **triglyceride**
- **Saturated** fatty acids are full of hydrogen
- **Unsaturated** fatty acids have one double bond
- **Polyunsaturated** fatty acids have two or more double bonds
- **Hydrogenation** means adding hydrogen to make a liquid oil become a solid fat
- Hydrogenation can make **trans fats**

Exam tip: You may be asked to state or describe ways someone can reduce their fat intake. A common mistake is to simply say 'eat less' or 'add less when cooking'; these are basic statements gaining limited marks.

Try instead to think about: different cooking methods - grilling rather than frying; cutting off visible fat; the types of fat chosen - lower fat options or leaner cuts of meat.

CARBOHYDRATES

- Carbohydrates are made by plants during **photosynthesis**
- Carbohydrates provide the main source of energy for the body
- One type, NSP (dietary fibre), helps the body get rid of solid waste
- Complex carbohydrates or polysaccharides are made of long chains of **glucose** units joined together in different ways.



The main sources of carbohydrates:

| Sugars | Complex carbohydrates (polysaccharides) |
|---|--|
| Monosaccharides: <ul style="list-style-type: none"> • Fructose: fruits, plant juices, honey • Glucose: vegetables, ripe fruits, sugars used in cooking • Galactose: milk | Starch: root vegetables (carrots, parsnips), potatoes, yams, plantains, bananas |
| Disaccharides: <ul style="list-style-type: none"> • Sucrose: (glucose and fructose): sugar (granulated, caster, brown); fruits and vegetables • Lactose: milk and milk products | |
| Maltose (glucose and glucose): cereals, e.g. barley, malted biscuits and milk drinks | |
| Lactose (glucose and galactose): milk and milk products | |
| | |

A deficiency of carbohydrate (not enough) can cause:

- Low blood glucose levels
- Weight loss
- Athletes to 'hit the wall'

If you eat too much carbohydrate, it provides you with more energy than you will use up in physical activity. The rest will be stored in adipose tissue. This leads to weight gain.

Check your understanding:

1. Name two high biological value (HBV) proteins. (2 marks)
2. Give four reasons why the body needs protein. (4 marks)
3. Give three reasons why the body needs fat. (3 marks)
4. What is meant by the term 'invisible fat'? (1 mark)
5. State 2 alternative names for sugars. (2 marks)
6. Identify one good source of NSP/ dietary fibre. (1 mark)

VITAMINS

Water soluble and fat soluble vitamins

- There are two groups of vitamins: water soluble (B group and Vitamin C) and fat soluble (A, D, E and K)
- Water soluble vitamins are destroyed by heat and light or dissolve in cooking water.
- They are natural substances needed in very small amounts.

| Name | Function (job in the body) | Found mainly in these foods | Result of deficiency (not enough) |
|---|---|---|--|
| Water soluble vitamins | | | |
| Thiamine (vitamin B₁) | <ul style="list-style-type: none"> • Releases energy from carbohydrates • Body growth • Helps nervous system | Yeast, yeast extract, cereals (especially wholegrains), cereal products, meat, eggs, milk, seeds, nuts and beans. | <ul style="list-style-type: none"> • Wet or dry beri-beri • Muscle wastage |
| Riboflavin (vitamin B₂) | <ul style="list-style-type: none"> • Releases energy from carbohydrates, proteins and fats • Body growth | | <ul style="list-style-type: none"> • Dry, cracked skin around mouth and nose • Swollen tongue |
| Niacin (vitamin B₃) | <ul style="list-style-type: none"> • Releases energy from carbohydrates • Can lower blood fat levels | As above but can be made in the body from the amino acid tryptophan | Pellagra (three D's diarrhoea, dementia, dermatitis) |
| Pantothenic acid (vitamin B₅) | <ul style="list-style-type: none"> • Releases energy from food | A wide range of foods | Rare |
| Pyridoxine (vitamin B₆) | <ul style="list-style-type: none"> • Helps the body use protein, fat and carbohydrate | Wide range of foods (small amounts in each) | Headaches, weakness, aching, anaemia, skin problems |
| Folate (vitamin B₉) (folic acid is its man-made form) | <ul style="list-style-type: none"> • Helps body use protein • Helps make DNA in cells, especially in the bone marrow and digestive system • Helps prevent spinal cord defects in the unborn baby | Green leafy vegetables, liver, potatoes, fruits (oranges, berries), asparagus, okra, beans, seeds, wholegrain cereals, nuts. Added to some breakfast cereals (fortification) | <ul style="list-style-type: none"> • Nutrients not absorbed properly in the digestive system (loss of appetite, nausea, diarrhoea, mouth soreness) • Faulty bone marrow cells that cannot deliver oxygen round the body - this is megaloblastic anaemia |
| Cobalamin (vitamin B₁₂) | <ul style="list-style-type: none"> • Makes a protective coating around nerve cells • Important for the correct production of new cells | Can be stored in the liver found in animal foods (dairy foods, meat, fish, poultry) NOT found in plant foods - could be a problem for vegans. | <ul style="list-style-type: none"> • Nerves don't work properly which leads to memory loss, confusion, paralysis • Pernicious anaemia |
| Ascorbic acid (vitamin C) | <ul style="list-style-type: none"> • Helps the body absorb iron from food • Needed for the production of collagen, which makes connective tissue that holds body cells together • Antioxidant-protects body from harmful chemicals • Keeps skin and digestive | <p>Rich sources: blackcurrants, citrus fruits (oranges, lemons, grapefruit, etc.)</p> <p>Important sources: Brussel sprouts, broccoli, beansprouts, potatoes, peas, cabbage, green leafy vegetables (not lettuce)</p> | <ul style="list-style-type: none"> • Anaemia (iron not absorbed) • Severe deficiency leads to scurvy (loose teeth, bleeding gums, red spots under the skin [leakage from blood vessels], tiredness, weakness, weight loss, poor wound healing) |

| Name | Function (job in the body) | Found mainly in these foods | Result of deficiency (not enough) |
|---|---|--|--|
| system healthy | | | |
| Fat soluble vitamins | | | |
| Retinol (vitamin A, found in animal foods) | <ul style="list-style-type: none"> • Body growth • Healthy skin • Keeps the mucous membranes in the throat, the digestive system and the lungs moist and healthy | Dairy foods, milk, butter, cheese, egg yolk, oily fish (e.g. tuna, herring, mackerel, sardines), fish liver oils, liver and kidney | <ul style="list-style-type: none"> • Poor growth • Frequent infections • Night blindness leading to • Irreversible blindness (keratomalacia) |
| Beta carotene (vitamin A found in plant foods) | <ul style="list-style-type: none"> • Makes visual purple in the retina (night vision) • Antioxidant - protects body from harmful chemicals) | Margarine (fortified by law), carrots, spinach, apricots, watercress, parsley, dark green leafy vegetables, tomatoes, palm fruit | <p>It is also a problem to eat too much vitamin A</p> <ul style="list-style-type: none"> • Poisonous to the body • Pregnant women need to be careful • Supplements only by medical advice |
| Cholecalciferol (vitamin D) | <ul style="list-style-type: none"> • Helps the body to absorb calcium for strong bones and teeth • Important for making sure the bones reach peak bone mass (at their strongest) | <ul style="list-style-type: none"> • Fish liver oils, liver, oily fish, milk, butter, cheese, eggs, margarine (added by law) • Made in the body by the action of sunlight (UV light) on the skin and stored in the liver | <ul style="list-style-type: none"> • Weak bones leading to rickets in children (osteomalacia in adults) • Poor growth |
| Tocopherol (vitamin E) | <ul style="list-style-type: none"> • Antioxidant - protects body from harmful chemicals) • Keeps cell membranes healthy • Helps protect against heart disease and cancer | Vegetable oils, lettuce, grasses, peanuts, seeds, wheatgerm oil | Rare |
| Vitamin K | <ul style="list-style-type: none"> • Helps the blood to clot when the body is injured | <ul style="list-style-type: none"> • Leafy vegetables, cheese, liver, asparagus, coffee, bacon, green tea • Made by bacteria in the intestines | <ul style="list-style-type: none"> • Rare in adults • May occur in new-born babies • All babies are given a dose when born |

Exam tip: A common exam mistake is to identify the B group vitamins as 'vitamin B'. there is no such thing! Stating 'B group vitamins' or a specific vitamin, e.g. (thiamine), is correct.

Check your understanding:

1. State three good sources of Vitamin B₁ (thiamine) (3 marks)
2. Describe the main functions of Vitamin C (4 marks)
3. Identify the condition caused by a deficiency of Vitamin A (1 mark)
4. Name two fat soluble vitamins (2 marks)

Minerals, water and fibre

- Adults need between 1mg and 100mg of **minerals** per day (calcium, iron, magnesium, potassium, sodium, chromium, copper, manganese, selenium, sulphur, zinc).
- Adults need less than 1mg of trace elements per day (fluoride, iodine, cobalt, molybdenum, silicon),

| Name | Function (job) in the body | Found mainly in these foods | Result of deficiency (not enough) |
|-----------------|---|--|--|
| Calcium | <ul style="list-style-type: none"> • Growth • Makes strong bones and teeth • Physical, load-bearing exercise stimulates the bones to take up minerals including calcium • Especially important in childhood and adolescence • Helps the blood to clot • Keeps muscles and nerves working properly | <ul style="list-style-type: none"> • Vitamin D is needed to help the body absorb calcium from food • Milk and dairy products (yoghurt, cheeses) • Wholegrain cereals, seeds, nuts, lentils, green leafy vegetables • Added to some foods to enrich them e.g. soya milk, fruit juice, yoghurt • Added to bread and flour by law | <ul style="list-style-type: none"> • Bones do not reach peak bone mass • Bones gradually become weaker as people get older and are more likely to break • Bones of pregnant women will weaken because calcium goes to the baby • Blood will not clot • Nerves and muscles will not work properly - leads to tetany |
| Iron | <ul style="list-style-type: none"> • Helps produce haemoglobin in red blood cells, which carry oxygen around the body so energy can be produced in body cells • Especially important for adolescent girls and women (menstruation) • Pregnant women need extra to supply the baby • Babies have a supply for the first three months of life | <ul style="list-style-type: none"> • Good sources: red meat, liver, kidney, corned beef, cocoa, plain chocolate, curry spices, dried fruit (especially apricots), lentils, treacle • Some in egg • Green leafy vegetables - contain some iron but not all of it may be available to the body • Often added to breakfast cereals (fortified with iron) • Added to bread by law • Vitamin C is needed to help the body absorb iron | Iron deficiency anaemia <ul style="list-style-type: none"> • Tiredness • Weakness • Lack of energy • Pale complexion • Pale inner eyelids • Weak or split fingernails |
| Sodium | <ul style="list-style-type: none"> • Controls amount of water in the body • Helps the body use energy • Helps control the nerves and muscles | <ul style="list-style-type: none"> • Salt (sodium chloride) • Added to many foods - crisps, salted nuts, ready meals, takeaway foods, instant foods (e.g. soups), stock cubes, cheese, yeast extract, canned fish, smoked foods such as bacon • Baking powder (sodium bicarbonate) in cakes, biscuits • Monosodium glutamate, which increases the flavour of takeaway foods and ready meals • Some bottled mineral waters have high sodium levels | <ul style="list-style-type: none"> • Muscle cramps (happens in hot conditions through sodium loss in sweat, or through sickness or diarrhoea) It is also a problem to eat too much sodium: <ul style="list-style-type: none"> • Most people eat too much salt • High blood pressure, which puts strain on the heart • Kidney damage, especially in babies and young children |
| Fluoride | Strengthens enamel of teeth | <ul style="list-style-type: none"> • Sea water fish, tea, naturally found in some water supplies • Added to some toothpaste brands | Teeth may develop more holes (cavities) |
| Iodine | Makes thyroid hormones, which control metabolic rate (rate of chemical reactions in the body) | <ul style="list-style-type: none"> • Sea foods • Milk, dairy foods, some plants (depending on the levels in the soil) | <ul style="list-style-type: none"> • Tiredness • Lethargy • Goitre (thyroid gland swells up in the neck) |

The importance of water in the diet

- Water is essential for life (the body is approximately 60% water). Adults need to drink up to 2 litres per day - more in a hot climate or if very physically active
- We get it by eating naturally watery foods (fruits, vegetables, milk)
- Water is also added to some foods, e.g. soups, porridge, sauces



| Function (job) in the body | Result of deficiency (not enough) | Result of excess |
|--|--|---|
| <ul style="list-style-type: none"> • Found in all cells and tissues • Used for chemical reactions in the body • Contained in all body fluids - blood, sweat, mucus, urine, joints, saliva, digestive juices • Removes waste products from the body - urine and faeces • Controls body temperature (sweating) • Used for digestion and absorption of nutrients • Keeps blood concentration correct • Keeps skin moist | <p>Hypothalamus in the brain makes us feel thirsty</p> <p>Lack of water results in dehydration:</p> <ul style="list-style-type: none"> • Headache • Dark, concentrated urine • Weakness, nausea • Overheating, confusion • Sunken eyes • Changes to blood pressure • Rapid heart beat • Loose, wrinkled skin • A loss of 20% of body water will result in death <p>Babies, young children, elderly people and kidney disease patients are vulnerable to dehydration</p> | <ul style="list-style-type: none"> • Water intoxication • Blood too diluted • Brain swells leading to headache, nausea, vomiting, muscle twitching, convulsions, death |

The importance of fibre in the diet

- Non-starch polysaccharide (NSP) is known as fibre
- The ideal intake for adults is 30g a day (minimum of 18g)

| Function (job) in the body | Where do we get it from? | Result of deficiency (not enough) |
|---|---|--|
| <ul style="list-style-type: none"> • Helps the body get rid of solid waste (faeces) • Ensures intestines are healthy and work well • Helps reduce the amount of cholesterol in the blood | Cellulose stems, leaves, leaf stalks, seeds, beans, peas, lentils, fruits and vegetables (especially the skins), wholegrain (wholemeal) cereals and cereal products such as flour, bread, pasta, breakfast cereals, brown rice (which has seven times more fibre than white rice), oat or wheat bran, nuts | <ul style="list-style-type: none"> • Constipation, meaning the faeces are hard and difficult to expel from the body • This causes discomfort, bloating, tiredness due to waste products being held in the body • Diverticular disease which causes pain and discomfort in the intestines. Small pouches develop in the intestinal lining, which can become infected with bacteria |
| | Pectin: fruit such as plums, apples, blackcurrants | |

Exam tip: Fibre is not considered a nutrient as it passes through the body undigested.

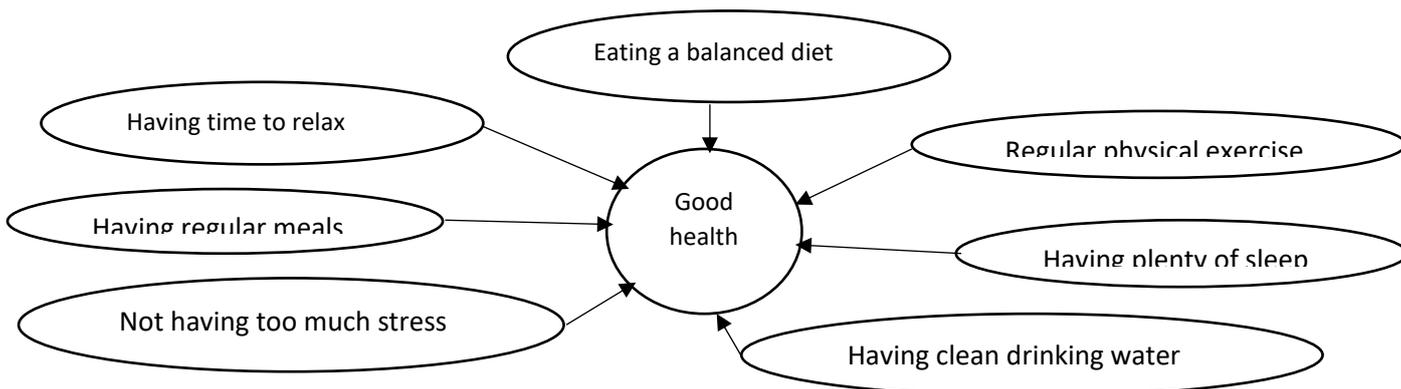
Check your understanding:

1. State two good sources of iodine. (2 marks)
2. Describe the function of calcium in the diet. (2 marks)
3. How much water are we advised to drink a day? (1 mark)
4. Give three functions of water in the body. (3 marks)
5. State 2 functions of fibre. (2 marks)

THE RELATIONSHIP BETWEEN DIET AND HEALTH

KEY TERMS

- **Malnutrition** means the diet is unbalanced (too much or too little of one or more nutrients) and the person's health is affected
- **Undernutrition** means not enough food is eaten to keep healthy
- **Overnutrition** means eating too much food or too much of one or more nutrients and a lack of exercise (in the UK and similar countries overnutrition is more common than undernutrition)
- A **risk factor** is doing or having something that makes you more likely to develop a diet-related health issue or condition



Factors for good health

Overnutrition can lead to one of several diet-related health issues or conditions.

The reasons for this include:

- Changing food habits; eating fewer fruit and vegetables and more processed food; eating between meals ('snacking' and 'grazing'); eating too much
- Less physical activity due to using cars or buses, sitting at a desk, watching TV, using computers, living in centrally heated homes, using labour-saving machines to do jobs.

MAJOR DIET-RELATED HEALTH ISSUES AND CONDITIONS

| Health issue or condition | Risk factors | Key facts |
|-------------------------------------|--|--|
| Obesity (too much body fat) | <ul style="list-style-type: none"> • Lack of physical exercise • Taking in more energy from food than the body requires • Having other obese family members | <ul style="list-style-type: none"> • Caused by taking in more energy from food than is used - energy is converted and stored as fat • Many foods are energy-dense (they contain lots of fat and sugar) - they are easy to eat without realising what they contain • An increasing problem worldwide • Obesity leads to: CHD, CVD, high blood pressure, stroke (blood clot in the brain), arthritis, breathing problems, depression |
| Coronary heart disease (CHD) | <ul style="list-style-type: none"> • High blood pressure • Eating fatty, salty and sugary foods • Being overweight or obese • Smoking • Drinking alcohol • Stress • A lack of physical exercise | <ul style="list-style-type: none"> • The heart is a pump to move oxygen-rich blood around the body • The heart muscle needs its own oxygen-rich blood supply from blood vessels called coronary arteries • Blocked arteries caused by poor diet prevent the heart muscle receiving oxygen - this leads to a heart attack • A high fat diet (especially saturated fats) can lead to |

| | | blood vessel damage |
|---|--|--|
| Health issue or condition | Risk factors | Key facts |
| Cardiovascular disease (CVD) | <ul style="list-style-type: none"> • Same as for CHD Also: <ul style="list-style-type: none"> • Too much fat and cholesterol in the blood • Having fat around the waist | <ul style="list-style-type: none"> • Blood vessels can become blocked anywhere in the body-this restricts oxygen supply and damages vital organs, muscles, nerves, etc. |
| High blood pressure (hypertension) | <ul style="list-style-type: none"> • Same as for CHD Also: <ul style="list-style-type: none"> • Family history of high blood pressure | <ul style="list-style-type: none"> • normal blood pressure reading for a healthy young adult is 120 over 80 • high blood pressure is 140 over 90 or above • no symptoms • increases risk of developing CHD or CVD • salt increases blood pressure • people eat too much salt |
| Diabetes | <ul style="list-style-type: none"> • high blood pressure • eating fatty, salty and sugary foods • being overweight or obese • a lack of physical exercise • getting older | <ul style="list-style-type: none"> • insulin is needed to enable glucose in the blood to enter every cell of the body (insulin is like a key to unlock the door) • insulin is made in the pancreas • diabetes means that the glucose stays in the bloodstream and damages the blood vessels • symptoms: thirst, frequent urination, tiredness, weight loss, blurred vision • Type 1 diabetes - usually diagnosed in children. The pancreas does not produce insulin, so injections have to be given every day and a balanced diet needs to be eaten • Type 2 diabetes - more common and an increasing number of people are developing it due to bad diets and eating habits, being overweight and obese. The pancreas produces some insulin but the body cannot use it • There is no cure - if untreated diabetes can lead to serious illness and damage to the eyes (blindness), skin, blood vessels in hands and feet • Should follow a balanced diet (eatwell plate) |
| Osteoporosis (porous bones) | <ul style="list-style-type: none"> • Being overweight or obese • A lack of physical exercise • Getting older • Smoking • Not enough calcium in the diet • Lots of fizzy drinks • Family history of osteoporosis • Drinking alcohol | <ul style="list-style-type: none"> • Bones mineralise when young - most minerals are added during adolescence • Peak bone mass is when bones are full of minerals (at 30-35 years) • The bones then gradually lose minerals (natural ageing process) • If peak bone mass is not achieved, the person is more likely to develop osteoporosis • When too many minerals have been lost, bones become brittle and break easily • A painful condition, causes spine to curve into a lump • Younger people develop it due to poor diet, not only physical activity, too many carbonated drinks |
| Cancer (growth disorder of abnormal cells) | <ul style="list-style-type: none"> • Diet • Being overweight or obese • Getting older • Smoking • Drinking alcohol • Exposure to some chemicals | <ul style="list-style-type: none"> • A tumour is a cluster of cells growing in an uncontrolled way • Can occur anywhere in the body • Carcinogens are substances that can start the process of cancer • Reducing risk of developing cancer: eat a healthy balanced diet with lots of fruit and vegetables and smaller amounts of red and processed meats; limit alcohol consumption; keep to a healthy weight; do not smoke |

Exam tip

You should be able to apply the information in this section. For example, a common question is: Describe four ways to reduce the risk of developing [named diet-related health issue or condition]. In order to answer this question, first think about each of the risk factors for the disease and then what steps you could take in day-to-day life to reduce these.

For example, one risk factor for diabetes is being overweight. So you could exercise more, which would help you lose weight by burning more calories, and this could also reduce your blood pressure and combat the risk factor of being inactive. You could also make links to healthy eating guidelines such as reducing salt intake, which would also help to reduce blood pressure.

Check your understanding

1. What does the term 'overnutrition' mean? (1mark)
2. Name three diet-related health issues or conditions. (3 marks)
3. State four risk factors for the development of cardiovascular disease (CVD). (4 marks)

- **Eight dietary guidelines** that apply to most people aged **over 5 years** in good health
- **Do not apply** to very young children, babies, pregnant women or people with special health conditions.
- The **eatwell plate** is designed to help you follow the guidelines



| Guideline | Why does it matter? | Other information |
|-------------------------------------|---|--|
| 1. Base your meals on starchy foods | Most food on your plate should be a starchy plant food to give you energy | Includes; rice, pasta, potatoes (but not just chips), bread (wholemeal is best), oats, millet, cassava, quinoa |
| 2. Eat lots of fruit and | <ul style="list-style-type: none">• To provide the body with a variety of vitamins, minerals, | 1 portion is 80g, e.g. <ul style="list-style-type: none">• 1 apple, banana, orange |

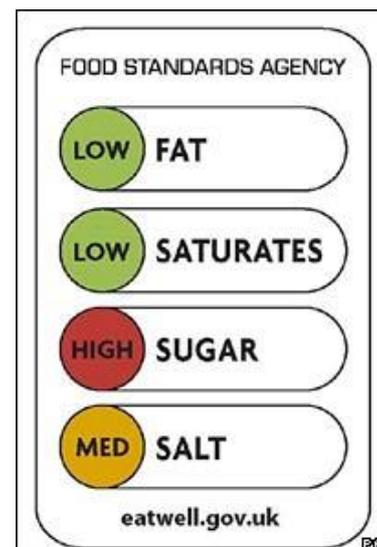
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|---|--|--|
| vegetables | <p>trace elements, fibre, antioxidants and other natural plant chemicals</p> <ul style="list-style-type: none"> • A minimum of 5 portions daily recommended | <ul style="list-style-type: none"> • 2 plums or similar • 1 slice of melon, pineapple • 3 large tablespoons of vegetables/ beans or lentils • 1 glass of fruit juice |
| 3. Eat more fish | <ul style="list-style-type: none"> • Provides a range of vitamins and minerals and protein • White fish is naturally low in fat • Oily fish contains essential omega 3 fatty acids for a healthy heart • Fresh fish has less salt than canned, dried or smoked fish | <p>Oily fish; salmon, trout, mackerel, tuna, sardines</p> <p>White fish; cod, haddock, plaice, lemon sole</p> |
| 4. Cut down on saturated fat (and eat less high fat foods) | <ul style="list-style-type: none"> • Saturated fat is found in: butter, cheese, cream, coconut oil, palm oil, pastries, cakes, biscuits, chocolate, meat, meat products • Fat in foods is often 'invisible' | |
| 5. Cut down on sugar | <ul style="list-style-type: none"> • Most people eat too much sugar • Sugars are often 'hidden' in drinks and other foods • Chemical names are often used on labels, e.g. dextrose, glucose syrup, inverted sugar, hydrolysed starch - many people do not know these are sugars | |
| 6. Try to eat less salt | <ul style="list-style-type: none"> • Many people eat too much salt • Salt is used in a lot of processed foods | |
| 7. Drink plenty of water | <ul style="list-style-type: none"> • Most people do not drink enough water • Approx. 2 litres a day should be drunk • Drink more in hot countries, during physical activity and when ill | |
| 8. Do not skip breakfast | <ul style="list-style-type: none"> • It is important to prepare the body for the day's activity • Helps you feel alert, able to concentrate and less likely to eat snacks | |
| Additional guideline: Get active and try to be a healthy weight | <ul style="list-style-type: none"> • As important as food intake • Helps maintain a healthy weight • Makes heart, muscles, bones and immune system stronger • Makes you feel good, confident and alert • Helps reduce the risk of developing some diseases, e.g. | |

Buying your food

- Read and understand food labels
- Use guidance systems on the labels, e.g. traffic lights
- Make and stick to a shopping list.
- Do not shop when you are hungry

Preparing food

- Try to adapt ingredients in a recipe to:
 - Cut down fat, sugar and salt
 - Increase fruits and vegetables
 - Use alternative ingredients, e.g. wholemeal flour or pasta
- Be aware of how much oil, sugar and salt you use



Exam tip

This topic is covered in many areas of the specification, so do not think of it as a standalone area. Make sure you are able to apply this knowledge to different groups of people, for example pregnant women, and are able to adapt meals/ diets to meet healthy eating guidelines.

| Adaptation | How to do it |
|--|--|
| Reduce fat | <ul style="list-style-type: none"> • Choose low fat or reduced fat versions of foods, e.g. canned fish, cheese, yoghurt, low fat spreads, biscuits • Choose lean meat • Cut fat off meat • Grill or oven bake instead of frying • When stir-frying, add a little water rather than more oil when the pan becomes dry • Use alternatives to mayonnaise e.g. low fat crème fraiche • Reduce the amount of spread or butter on bread |
| Reduce salt | <ul style="list-style-type: none"> • Use alternative flavours, e.g. herbs, garlic, spices, lemon zest • Buy reduced salt versions of foods such as crisps, baked beans • Check labels for sodium content, e.g. in cakes (sodium bicarbonate), ready meals (monosodium glutamate) • Eat naturally low salt fruit and vegetables, unsalted nuts |
| Reduce sugar | <ul style="list-style-type: none"> • Reduce amount in recipes • Use alternative sweet foods, e.g. carrots, ripe bananas, grapes, beetroot • Use sweeteners for flavour |
| Increase fibre and fruit and vegetables | <ul style="list-style-type: none"> • Use wholegrain (wholemeal) versions of foods • Add oat bran, porridge oats or wheat bran to recipes • Add dried fruits to recipes • Eat fruits and vegetables with the skin left on • Add peas, beans and lentils to recipes |

- | | |
|--|---|
| | <ul style="list-style-type: none"> • Add vegetables to meat dishes • Add seeds to recipes • Puree vegetables in soups, stews and sauces to 'disguise' them |
|--|---|

Check your understanding

- | | |
|---|-----------|
| 1. Identify four healthy eating guidelines. | (4 marks) |
| 2. How many portions of fruit and vegetables is it recommended that we eat per day? | (1 mark) |
| 3. State three ways someone could cut down their sugar intake. | (3 marks) |
| 4. What is meant by the term 'balanced diet'? | (1 mark) |
| 5. Give two reasons why eating a balanced diet may be difficult. | (2 marks) |

RECOMMENDED DAILY AMOUNTS OF NUTRIENTS

Dietary reference values (DRVs)

- DRVs are the amount of energy and nutrients different people need for growth and good health
- People are grouped according to age, gender (male or female), pregnant or lactating (breastfeeding) females.
- DRVs only apply to healthy people - energy and nutrient needs change during illness or with a health condition
- DRVs are only used for guidance - they are based on the needs of an average person
- DRVs are helpful for people planning meals for groups of people, e.g. in schools, hospitals, residential homes, prisons
- DRV figures for energy and nutrients are meant to be enough for 97% of a group of people
- Food manufacturers show DRVs as **guideline daily amounts (GDAs)** on food labels
- Energy values are given as kcals/ kJ, and for adults as a percentage (%) of their daily energy intake
- Macronutrient values are given as grams.
- Micronutrients values are given as:
 - milligrams - mg (1/1000g)
 - micrograms - μ g (1/1000000g)

Exam tip you are not expected to learn each age group's DRVs, but you should be aware that these values differ for each group and the reasons for this. For example, a pregnant woman needs more protein and energy for the development and growth of the baby.

Fats and carbohydrates

- adults should get about 35% of their daily energy from fat, 11% from added sugars and 39% from starches and natural sugars in their food
- adults are also recommended to eat 30g of fibre per day, or at least the very minimum 18g

Protein and energy

Below are extracts from DRV tables for protein and energy showing the variation between people at different life stages and between genders.

| Person | Protein DRV | Energy DRV (average) |
|-----------------------|----------------|----------------------|
| Male, 7-10 years | 28.3g | 1970 kcal |
| Female, 7-10 years | 28.3g | 1740 kcal |
| Male, 19-50 years | 55.5g | 2550 kcal |
| Female, 19-50 years | 45g | 1940 kcal |
| During pregnancy | Add another 6g | Add 200 kcal |
| Male, over 75 years | 53.5g | 2100 kcal |
| Female, over 75 years | 46.5g | 1810 kcal |

There are DRVs for **Micronutrients**

| Person | Vitamin A | Vitamin C | Calcium |
|----------------------------|-----------|-----------|----------|
| Male or female, 7-10 years | 500µg | 30mg | 550mg |
| Male, over 19 years | 700µg | 40mg | 700mg |
| Female, over 19 years | 600µg | 40mg | 700mg |
| During pregnancy | Add 100µg | Add 10mg | No extra |

Check your understanding

1. What does 'DRV' stand for?

(1 mark)

ENERGY AND FOOD

What is energy?

- Energy is needed by the body to work, move, keep warm, be active.
- **Basal metabolic rate (BMR)** is the amount of energy needed just to stay alive and keep everything in the body working
- **Energy is used** by the body for: movement, producing heat and sound, chemical reactions, electrical energy (brain and nerves), storage of energy
- **Energy production in living cells is called** respiration
- **Oxygen** (from breathing) is needed to release the energy
- When the energy is released, **water** and **carbon dioxide (CO₂)** are given off as waste products (breathed out)
- Factors that affect how much energy you need:
 - Your age (more is needed when younger, less when older)

- Your activity levels (physical activities require a lot of energy)
- Your state of health (fighting against infection may increase energy needs as the body may use up fat stores; pregnant and lactating women need more energy)
- Your gender (usually - but not always - males need more energy than females)

Energy comes from the sun and is trapped by plants, which are then eaten by animals.

How is energy measured?

- Calories (cal) or joules (J)
- 1kJ = 1000J
- 1 kcal = 1000 cal
- 1 kcal = 4.2 J

Sources of energy

- The main source is **carbohydrate**, which is broken down into **glucose** in the body. Glucose then travels to all cells in the body
- Glucose is stored as **glycogen** in the liver and the muscles to provide a **quick energy source**
- **Fat** supplies energy, but it must be changed to glucose in the body first - this takes longer.
- Energy is stored as fat in **adipose tissue**
- **Protein** can provide energy, but the body prefers to use protein for growth and repair
- Different foods have different **energy values**
- **Energy-dense foods** contain a lot of energy per gram. They are often high in fat and/or sugar

| Source | Amount of energy |
|----------------------|---------------------------|
| 1g pure carbohydrate | Provides 15.7kJ/3.75 kcal |
| 1g pure fat | Provides 37.8kJ/ 9.0 kcal |
| 1g pure protein | Provides 16.8kJ/ 4.0 kcal |
| 1g pure alcohol | Provides 29.4kJ/ 7.0 kcal |

Exam tip

The topic of energy and food is often linked to factors that influence energy requirements. Make sure you can describe why people's energy requirements are different. Think about meal adaptation, for example adapting a meal/ diet for someone trying to lose weight

Energy requirements

- More physically active people need more energy
- Energy requirements decrease as we get older
- When young, energy is needed to make the body grow and be active.
- Physical activities that use a **lot of energy** include running, climbing, swimming, digging, lifting heavy weights, cycling, walking fast or uphill.
- Physical activities that use **very little energy (sedentary activities)** include sitting in a chair, watching TV, driving a car, using a computer.

Energy balance

| Energy intake over a period of time | Effect on body |
|-------------------------------------|----------------|
|-------------------------------------|----------------|

| | |
|---|-----------------------|
| Equal to energy used for all body activities | Weight stays the same |
| Less than energy used for all body activities | Loses weight |
| More than energy used for all body activities | Gains weight |

Weight gain and weight loss do not happen quickly.

Someone trying to lose weight should aim to **increase their physical activity, eat less energy-dense foods** and lose **0.5-1kg** a week.

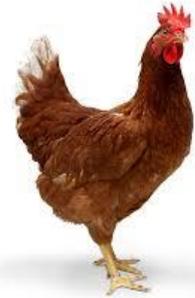
Check your understanding

1. Describe three factors that influence an individual's energy requirement (6 marks)
2. State the units used for measurement of energy. (1 mark)
3. What will happen if someone has a higher energy intake than expenditure? (1 mark)
4. If someone has a higher energy intake than expenditure, what will the effect be on their health? (1 mark)

Meat and poultry

Meat is the muscle fibres that come from animals and birds (poultry)

- It also includes internal organs such as liver and kidneys (called **offal**)
- The nutritional value varies according to the age of the animal or bird and how it is reared (what it was fed on, how much it moved around, how quickly it grew)
- Cooking meat makes it easier to digest and absorb nutrients.



| Main nutrients | Buying advice | Storage |
|--|--|--|
| <ul style="list-style-type: none"> • HBV protein • Fat (mostly saturated), found under the skin and between muscle fibres • Vitamins A (especially liver), B groups and D • Iron, especially in red meat and liver • Water (naturally occurring and some added) | Meat, poultry or offal should have: <ul style="list-style-type: none"> • Moist (not slimy or wet) texture • Firm, slightly springy flesh • Good colour • Fresh smell It should not be past its use by date | <ul style="list-style-type: none"> • Perishable (goes 'off' quickly) • Remove plastic packing • Store at 0°C-5°C • Use within 1-2 days • To freeze: wrap meat well to prevent freezer burn • Fast freeze to at least -18°C • Defrost on a tray in the bottom of refrigerator for several hours • Cool cooked meat dishes rapidly and refrigerate or freeze • Reheat leftover meat dishes rapidly only once to at least 70°C |

FISH AND SEAFOOD

- Either caught from seas, lakes or rivers, or farmed in large cages

- Eaten whole, cut into fillets or thick slices (steaks, sometimes called darnes)

| Type | Examples | Description |
|------------------|---------------------------------------|--|
| Flat white fish | Plaice, sole, halibut | Firm white flesh oil in the liver, not the flesh |
| Round white fish | Cod, haddock, monkfish, hoki | |
| Oily fish | Anchovies, eel, herring, salmon, tuna | Quite dark flesh Oil in the flesh |
| Mollusc | Mussels, clams, oysters, squid | Soft-bodied sea animals Live inside shells, except squid and cuttlefish |
| Crustaceans | Lobster, prawns, crab | Jointed sea animals Soft bodies covered by a hard outer skeleton |

Main nutrients in fish

- HBV protein which is easily digested
- Fat (mostly unsaturated oils) found in the flesh and skin of oily fish and the liver of white fish. An important source of omega 3 & 6 fatty acids
- Vitamins A & D (especially oily fish) and B group
- Calcium; in the bones of fish if eaten
- Fluoride and iodine; especially in sea fish
- Water; naturally occurring and some added

Guidelines for buying good quality fish

| Fish | Crustaceans | Molluscs |
|--|----------------------------|---------------------|
| Firm slightly springy flesh | Firm, springy flesh | |
| Fresh smell | Fresh, 'sweet' smell | Fresh smell |
| <ul style="list-style-type: none"> • Moist (not slimy or wet) skin • Good colour | Moist | |
| <ul style="list-style-type: none"> • Clear, shiny eyes • Not losing lots of scales • Bright red gills | No missing joints or limbs | Tightly shut shells |
| Not past its use by date | | |

Storage of fish and shellfish

- Perishable (goes 'off' quickly)
- Remove plastic packaging
- Store at 0°C-5°C
- Use within 1 day
- To freeze (must be done on day of purchase): wrap fish well to prevent freezer burn
- If previously frozen, do not refreeze (check with shop)
- Fast freeze to at least -18°C
- Defrost on a tray in the bottom of the fridge for a few hours
- Cool cooked fish dishes rapidly and refrigerate or refreeze
- Reheat leftover fish dishes only once to at least 70°C

Check your understanding

1. State three nutrients found in meat. (3 marks)
2. Give one reason why a pregnant woman shouldn't eat liver. (1 mark)
3. Describe how you would check if a chicken is well cooked. (2 marks)
4. Identify three nutrients found in fish. (3 marks)
5. Give two reasons people are recommended to eat more oily fish. (2 marks)

EGGS, MILK AND DAIRY PRODUCTS

Eggs

- Main types eaten are hen, duck, goose and quail
- Battery eggs come from hens kept in cages
- Free range eggs come from hens that have freedom to move around outside
- Barn or perchery eggs come from hens kept in large barns with perches
- Keep in fridge away from strong smelling foods
- If an egg shell is dirty wash your hands after handling it

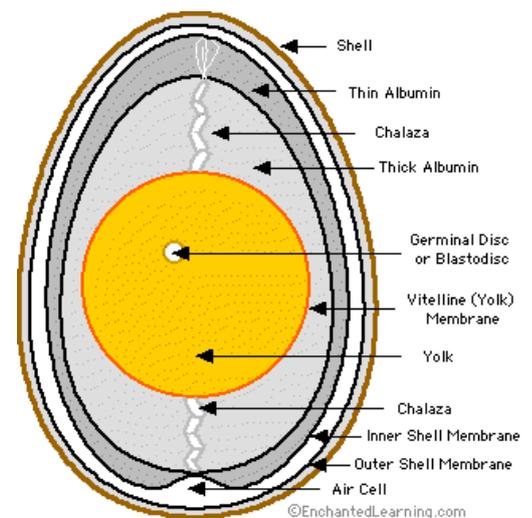
Nutrients in eggs

- HBV protein in white and yolk; this is easily digested
- Fat is found in the yolk
- Vitamins A, D and E are found in the yolk, and B group (especially B₂ and B₁₂) in the white and yolk
- Phosphorous, zinc and selenium found in the white, iron in the yolk
- Water, naturally occurring in the white and the yolk

Milk

- The main types used are cow's, goat's, sheep's
- Produced by mammals
- Designed to provide a baby mammal with all it needs, therefore milk is very nutritious
- Milk is **homogenised** (the fat is broken into tiny droplets)
- Milk is very **perishable** as it has the right conditions for bacteria to grow
- It is **heat-treated** to destroy harmful bacteria

Heat treatment and storage of milk



Exam tip questions about eggs often relate to how eggs are cooked and the functions of eggs.

- **Pasteurisation:** milk is heated quickly in a heat exchanger to **72°C for 15 seconds**. It is then cooled quickly to **4°C**. **HTST** means high temperature, short time pasteurisation. Refrigerate this milk and use it within a few days
- **Ultra Heat Treated (UHT):** milk is quickly heated in a heat exchanger to **132°C for 1 second**. It is then cooled quickly and packed in special sealed packs. It can be stored at room temperature, **unopened**, for several months. Once opened, store this milk in the refrigerator as for fresh milk.
- **Dried milk:** milk is dried and stored in packs to be made up with water.
- **Canned milk:** milk is **evaporated** (the water is removed) by heat then canned. **Condensed** milk is evaporated, has sugar added to it and is then canned.

Types of milk

- **Whole milk** has no fat removed (it is approx. 3.9% fat). It is usually sold in **blue**-labelled bottles.
- **Semi-skimmed milk** is 1.5% fat. It is usually sold in **green**-labelled bottles
- **Skimmed milk** is 0.1% fat (virtually fat-free). It is usually sold in **red**-labelled bottles.
- It is also possible to buy milk with approx. 1% fat (may be in **purple** or **orange** labelled bottles).
- **Other 'milks'** are available e.g. for people with allergies or vegans): soya, oat, rice, coconut. These are often enriched with vitamins and minerals.

Min nutrients in milk

- HBV protein; this is easily digested
- Fat; a mixture of saturated and unsaturated depending on what the cow has eaten
- Carbohydrate (lactose)
- Vitamins A and D (more in summer if the cows are outside), B group, very little Vitamin C
- Calcium, phosphorous, sodium, potassium. Very little iron
- Water; milk is about 95% water

Dairy products

Cheese

| Type of cheese | Examples | Additional information |
|-----------------------|--|---|
| Soft cheese (fresh) | Cream cheese, cottage cheese, mozzarella | |
| Soft cheese (ripened) | Camembert, brie, goats cheese | |
| Blue-veined cheese | Blue Stilton, Danish blue | Edible mould is added, giving a distinct flavour and blue 'veins' |
| Semi-soft cheese | Stilton, Wensleyday, Lancashire, Edam | |
| Hard cheese | Cheddar, Gruyere, Double Gloucester | |
| Very hard cheese | Parmesan | |
| Whey cheese | Ricotta | Made from whey with additional ingredients such as milk |
| Processed cheese | Cheese slices, cheese spread | Made by mixing pieces of cheeses and colouring |

Main nutrients in cheese (varying in quantity according to type of cheese)

- HBV protein; this is easily digested
- Fat; a mixture of saturated and unsaturated depending on what the cow has eaten (hard cheeses are 33% fat, full fat cream cheese 50%, cottage cheese 4%)
- Vitamins A and D (more in summer if the cows are outside), B group.
- Calcium, phosphorous and sodium
- Water; hard cheeses are 33% water, soft cheeses up to 80%

Buying and storing cheese

- Perishable, especially soft cheeses
- Make sure packaging is not damaged
- Store at 0°C-5°C in a sealed box to prevent drying.

Cream

- Cream is small droplets of butterfat, suspended in a liquid
- Cream is skimmed off milk at 35°C-54°C, then cooled to 4°C

| Type of cream | Fat content | Examples of use |
|---|-----------------|--|
| Double | 48% | Whipping Decorating cakes Adding to soups and sauces |
| Whipping Single | 38% | Whipping Decorating cakes |
| Single | 18% | Pouring Adding to soups and sauces |
| Soured | Up to 20% | Dips Jacket potato |
| Crème Fraiche | Up to 35% | Served with desserts Used in cheesecake |
| Clotted | 55% | Served with scones (cream tea) or desserts |
| Ready 'whipped' (with added sugar, stabilisers and gases) | Depends on type | Sold in cans; heat treated to increase shelf life Decorating cakes and desserts |

| Type of butter | Description |
|--------------------|--|
| Unsalted ('sweet') | Mild, slightly sweet |
| Salted | Salt is the only added ingredient (traditionally as a preservative, now for flavour) |

Main nutrients in cream

- HBV protein (small amount only)
- Fat; mostly saturated
- Vitamins A and D (more in summer if the cows are outside), small amounts of B group
- Some calcium and other minerals with trace elements
- Water; some naturally occurring

Storing cream

- Very perishable, cover and store in fridge and use within a few days
- Whipped cream (double and whipping) can be frozen

Butter

- Made from cream
- Made by 'churning' (stirring) cream to make butterfat droplets stick together and watery buttermilk to separate

Main nutrients in butter

- HBV protein (very small amount)
- Fat; mostly saturated
- Vitamins A and D (more in summer if cows are outside)
- Some minerals and trace elements, including sodium from added salt.
- Water (very small amount)

Storing butter

- Can be kept in a covered dish at room temperature (not too warm) for spreading
- Store in a fridge for other uses

Yoghurt

- Yoghurt is cultured milk (special bacteria have been added)
- Bacteria produce lactic acid to coagulate (set) the protein in the milk and to flavour the yoghurt
- Eaten as natural or flavoured yoghurt

| | |
|-------------------|--|
| Clarified | Used in butter sauces and for shallow frying. Made by slowly melting butter, skimming off the milk solids to leave only melted fat |
| Ghee | Clarified butter that originated in India. Has a strong flavour. Sold in cans |
| Spreadable | Vegetable oils are added so that the butter stays soft in the fridge |

Exam tip
Remember that all butters and margarines contain fat, just different types. Therefore it is incorrect to state 'use a low fat margarine instead of butter as a way of reducing fat intake.'

| Type of yoghurt | Description | Flavour |
|-------------------------|---|---------------------------|
| Set | Semi-solid as it is set in the pot it is bought in | Sold natural or flavoured |
| Stirred | Varies in thickness; can be poured | Sold natural or flavoured |
| Natural (plain) | Smooth, creamy texture | Fresh, tangy flavour |
| Greek (strained) | Made from cow's or sheep's milk High fat content | Mild flavour |
| Live | The bacteria in this yoghurt are still living | |

Main nutrients in yoghurt:

- HBV protein; a good source
- Fat; many types are now low-fat but some have cream added
- Carbohydrate; some lactose plus added sucrose and fructose in flavoured yoghurt
- Vitamins A and D (more in summer if the cows are outside), some B group vitamins
- Good source of calcium
- Water; a good source of water

Buying and storing yoghurt:

- Perishable
- Check the use by date
- Make sure the lid has not 'blown' (means yeast contamination has caused fermentation of the sugar in flavoured yoghurts)
- Store in fridge

Check your understanding

1. Circle the nutrients egg is a good source of. (5 marks)
Protein Fluoride Fibre Fat Vitamin A Calcium Iron
2. Identify two fat soluble vitamins found in cow's milk. (2 marks)
3. State two types of milk someone intolerant to lactose could use instead of cow's milk. (2 marks)
4. Cream is a perishable food. What is meant by the term 'perishable food'? (1 mark)
5. Identify two checks you could make when buying yoghurt to check that the product is of an acceptable quality. (2 marks)

FRUITS AND VEGETABLES

Key facts

- An important part of the diet - a minimum of five portions a day is recommended
- Uses: can be eaten on their own (many raw with and without skins and seeds); as side dishes or part of many recipes; in sauces, drinks, soups, stocks; as flavourings; garnishes; to give colour and texture
- Cooking can destroy vitamins (especially vitamin C). To conserve vitamins, the chosen method should be for the shortest time in a minimum amount of water until the fruit or vegetable is just tender. Serve immediately.
- Many can be frozen (not very watery ones, e.g. lettuce, cucumber), canned or dried.

| Type or fruit | Examples |
|-------------------|----------------------------------|
| Soft berry fruits | Raspberries, strawberries |
| Currants | Blackcurrants |
| Hard fruits | Apples, pears |
| Stone fruits | Plums, apricots |
| Citrus fruits | Oranges, lemons |
| Exotic fruits | Banana, passionfruit, kiwi fruit |



| Type of vegetables | Examples |
|--|--|
| Roots | Carrots, beetroot |
| Tubers (attached to root) | Potatoes, sweet potatoes |
| Bulbs | Onions, leeks |
| Stems | Asparagus, celery |
| Leaves | Cabbage, lettuce |
| Flower heads | Cauliflower, broccoli |
| Fungi | Mushrooms |
| Legumes (really seeds but used as vegetables) | Peas, broad beans, lentils, bean sprouts |
| Vegetable fruits | Tomatoes, peppers |

Main nutrients in fruit and vegetables

- LBV protein; in peas, beans, lentils (HBV in soya beans)
- Fat; some in peas, beans and lentils, more in avocados, nuts, sweetcorn
- Carbohydrate; made during photosynthesis in green plants, as sugars, starch, fibre (NSP)
- Vitamin C (a rich source), A (beta carotene), some B group, some E
- Minerals and trace elements; the quantity and range depends on where the plants grow and the quality of the soil
- Water; a very important source
- Fibre; a very good source
- Also contain other important substances that benefit our health such as **antioxidants**.

Buying and storing fruits and vegetables

- Avoid bruised, mouldy, damaged, soft or wilted ones
- Nutritional value, texture and flavour decrease after harvesting and picking, so use soon after purchase
- Store in a cool, dark place (potatoes go green if left in light and become poisonous to eat). Some, e.g. bananas and potatoes, go black if they are too cold.
- Always wash before using and eating

Exam tip

Fruit and vegetable intake is an important area and is covered in many topics. Ensure that you can link it to other areas like healthy eating, reducing the risk of some diseases and illnesses and encouraging people to increase their intake.

Check your understanding

1. Identify two fruits and vegetables that are a good source of beta-carotene. (2 marks)
2. Identify three ways to encourage a toddler to eat more fruit and vegetables. (3 marks)
3. State three things you should consider when buying and storing fruit and vegetables. (3 marks)

CEREALS AND CEREAL PRODUCTS

Key facts

Cereals are:

- Grains (seeds); mostly from cultivated grasses
- A **staple** food around the world
- A major source of energy

Most seeds are **processed** by milling into flour

- Some nutrients are lost during processing
- White flour has 30% of the seed removed, it contains 70% of the grain
- Wholemeal (wholegrain) flour has none of the seed removed, it contains **100% of the grain**
- Tougher outer layers (husks) are removed from rice by 'polishing'; from barley by 'pearling'; from oats by 'hulling'
- **Breads** are commonly made from cereal flours as a nutritious and filling part of a meal (loaves, rolls, sandwiches, wraps, tortillas, pitta, naan)
- Unleavened bread is flat, not risen by yeast
- Leavened bread is risen by yeast. Needs strong plain flour with a high gluten content to make the dough stretch and rise (that flour is also need for choux and puff/ flaky pastry)
- **Cakes, other pastries and biscuits** need soft plain flour (less gluten)

Nutrients in cereals

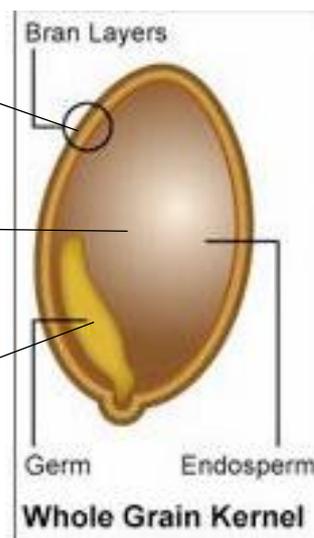
Whole seeds are very nutritious because they contain all the nutrients for plant growth:

- LBV protein
- Fat (a small amount)
- Carbohydrate; starch and NSP (wholegrain)
- B group vitamins and vitamin 'E
- A variety of trace elements
- Iron

Bran-most fibre vitamins, minerals and trace elements, some protein and fat

Endosperm-carbohydrate (starch); most protein found here; some vitamins

Germ-contains genetic info for the new plan to grow from seed; most protein, vitamins and trace elements found here



Exam tip

Bran, endosperm and germ are the three main parts of all cereal grains. Make sure you can label them on a diagram.

| Cereal | Uses | Important nutrients | Contains gluten? |
|--------|--|---------------------|------------------|
| Barley | <ul style="list-style-type: none"> • Animal feed • Beer and whisky • Bread • Soups and stews | | Yes |

| | | | |
|---------------------|--|--|---|
| | <ul style="list-style-type: none"> • Breakfast cereals • Malt (sweetener in foods, maltose) | | |
| Buckwheat | <ul style="list-style-type: none"> • Flour • Pasta • Eaten like rice | Good source of calcium | No |
| Corn (maize) | <ul style="list-style-type: none"> • Animal feed • Corn oil • High fructose corn syrup (sweetener for fizzy drinks) • Cornflour (thickener for sauces) • Cornmeal (polenta), for breads, cakes, biscuits, tortillas, muffins, fried snack foods • Sweetcorn, corn on the cob (vegetable) • popcorn | | No |
| Millet | <ul style="list-style-type: none"> • Breakfast cereals • porridge | Good source of iron | No |
| Oats | <ul style="list-style-type: none"> • oatmeal • porridge oats or jumbo oats used for porridge • oats or oat bran added to breads, cakes, • crumbles, biscuits, oatcakes, flapjacks, oat crackers | Good source of calcium | A little |
| Quinoa | Used as an alternative to rice | Rich in Protein | No |
| Rice | Many varieties; used in many sweet and savoury dishes | Very important for energy and B vitamins | No |
| Rye | <ul style="list-style-type: none"> • bread • breakfast cereals | | Yes |
| Spelt | <ul style="list-style-type: none"> • bread • pasta | More protein than wheat | Yes but different structure so can be eaten by some people with allergy to ordinary wheat |
| Wheat | <p>Very important cereal</p> <ul style="list-style-type: none"> • all baked products (breads, pastries, cakes, biscuits, puddings) • breakfast cereals • bulgur wheat eaten like rice • couscous from durum wheat (used for pasta) • wheat bran and wheat germ added to recipes • wheat products, e.g. semolina, added | | Yes |

| | | | |
|--|------------------------------|--|--|
| | to cakes, biscuits, puddings | | |
|--|------------------------------|--|--|

Check your understanding

1. Identify four nutrients found in cereals. (4 marks)
2. Name three types of cereal grain. (3 marks)
3. State why a coeliac cannot eat bread made from wheat flour. (1 mark)

SUGARS AND SWEETENERS

Key facts

- Sugar is used as a sweetener and a preservative
- Cane sugar (sucrose) is produced from a very tall grass (tropical countries)
- Beet sugar (sucrose) is produced from a plant root (temperate climate)
- Used in recipes to give colour (caramelisation) and texture (aeration)
- Can damage teeth and lead to obesity if eaten in excess
- Most recipes will work if sugar content is reduced
- Sweet alternative foods can be used in recipes. E.g. dried fruits, carrots, ripe fresh fruits
- Artificial food sweeteners add flavour but no sugar, e.g. saccharin, aspartame (dangerous for people with PKU/ phenylketonuria), acesulfame K, sucralose

Exam tip

Questions often focus on ways to reduce sugar intake or how to identify sugar on food labels

Main nutrients in sugars

- Carbohydrates and natural refined sugars (e.g. sucrose) are 100% carbohydrate
- Minerals and trace elements; some iron and calcium found in brown sugars (molasses); honeys contain varying amounts
- Some B group vitamins found in honey

| Type of sugar | Description |
|--------------------------------|--|
| Muscovado (molasses) sugar | Dark brown, strong flavour, moist Small fine crystals |
| Demerara (raw) sugar | Light brown, slightly moist, contains some molasses Medium crystals making it crunchy |
| Light, soft brown sugar | Light brown, syrupy flavour Fine crystals |
| White granulated sugar | Refined no molasses, used for all purposes Medium crystals |
| White caster (superfine) sugar | Refined (no molasses) Very small crystals |
| Icing (confectioners) sugar | White (no molasses) Ground into a fine powder |
| Type of syrup | Description |

| | |
|----------------------|--|
| Maple syrup | Made from the sap of the maple tree Distinctive flavour, sweeter than sugar |
| Golden syrup | Made from cane sugar Light, golden colour with a distinctive flavour |
| Black treacle | Made from refined molasses Thick, black, very sticky, with very strong, slightly bitter flavour |
| Molasses | Varies in colour and thickness Usually contains minerals and trace elements |

Check your understanding

- 1.State three functions of flour. (3 marks)
2. Identify two ways to reduce the sugar content of a Victoria sponge recipe. (2 marks)

CONVENIENCE, GENETICALLY MODIFIED AND ORGANIC FOODS

Convenience foods

- Definition: food products made by manufacturers and designed to save consumers time and effort when making meals

| Advantages | Disadvantages |
|---|--|
| Designed to make meal planning and preparation easier No specific cooking skills needed Have a long shelf-life Sold in portion-controlled sizes Useful for people who: <ul style="list-style-type: none"> • Are physically disabled • Cook only for themselves • Have limited kitchen facilities • Work in catering companies | Tend to use lots of packaging, therefore cause environmental and sustainability problems Often have a high fat, sugar and salt content which may be 'hidden in foods' May contain additives Reduce the need for cooking skills resulting in fewer people knowing how to cook. |

Types of convenience foods

- **Meals:** complete (ready-to-eat); cook-chill; frozen; bottled; canned; dried; fast foods; take-aways.
- **Parts of meals;** sauces; soups; salads; vegetables; desserts; meat and fish products; cakes; pastas.
- **Ingredients:** Stocks; packet mixes (batters, desserts, biscuits, burgers, breads); pizza bases; sandwich fillings, whipped cream, sauces.

Exam tip:

Remember to use the knowledge gained during the controlled assessment tasks and your own experience.

Think of a product such as scones made from scratch, from a packet mix and ready-made. Think about the advantages and disadvantages of each. Are there any limitations to each method? For example, could someone with limited cooking skills or space make scones from scratch? Think about cost, time, facilities available, skills needed, taste, nutritional value and shelf life.

Genetically modified (GM) foods

- Genes control the characteristics of plants and animals
- Genes are made of DNA containing four amino acids in different sequences to form a code of instructions for each characteristic
- Genetic modification copies a gene for a specific characteristic from a plant or animal and inserts it into another plant or animal, where it is then reproduced.
- GM foods include soya beans, sweetcorn, sugar, rapeseed, tomatoes, rice.

| Advantages of GM foods | Disadvantages of GM foods |
|---|---|
| <ul style="list-style-type: none"> • Resistance to weed-killing chemicals • Increased storage or shelf life • Better resistance to insects, fungi and bacteria which would harm a crop • Faster growing rates • Less fat • Better resistance to disease | <ul style="list-style-type: none"> • Effects on the ecology of the area where they grow • Development of resistant micro-organisms • Development of allergies if DNA from certain plants and animals are put into others • Infertile GM seeds means farmers have to buy new seeds from the GM companies every year. |

Organic foods

- Organic plant foods have been grown using farming methods where plants are grown in well-balanced, healthy soil without the regular use of pesticides and fertilisers
- Organic animal foods are reared in natural surroundings without the routine use of medicines (unlike intensive farming where animals are housed in large number inside production units)
- 'Organic' has a legal definition and foods have a symbol to certify they are organic.
- Organic foods are sold in most supermarkets, farmers markets, farm shops, box schemes (delivered to your home or a collection point), and mail order.



Exam tip

Currently the question of whether organic foods have a better nutritional value than their non-organic counterparts is highly contested by scientists; some studies suggest it does, while others suggest it does not. Therefore stating that 'organic food has more minerals/ vitamins/ nutrients' is incorrect and will not be credited. Stating that 'some studies have suggested they have a better nutritional quality..' would be credited.

| Advantages of organic foods | Disadvantages of organic foods |
|--|---|
| <ul style="list-style-type: none">• Considered to taste better because they are grown naturally in better soils• Considered to be better for health because pesticides are not used• Better for the environment and ecosystems | <ul style="list-style-type: none">• Often more expensive than intensively grown foods• Many have to be imported, which has implications for travel pollution |

Check your understanding

1. Describe two advantages and two disadvantages of convenience foods. (8 marks)
2. State two advantages of genetically modified food for consumers and/or manufacturers. (2 marks)
3. State two reasons for the increased popularity of organic food. (2 marks)
4. What is meant by the term 'organic food'? (1 mark)

FUNCTIONAL FOODS

Key facts

- Definition: foods eaten as part of a normal diet that contain natural substances to lower the risk of developing certain diseases and to maintain good health
- Plant foods contain many natural substances (**phytochemicals**) that give them their colour, flavour, texture, smell, acidity and nutritional value
- Some phytochemicals are thought to be active in the human body and very beneficial to health, e.g. as antioxidants

Many plant foods contain phytochemicals. These are just a few examples:

- Onions, garlic and shallots
- Broccoli, brussels sprouts and cauliflower
- Blueberries and blackcurrants
- Wholegrain cereals

Exam tip

Functional foods are a limited part of the specification. Your revision should concentrate on understanding what a functional food is and its role.

| Functional food | Suggested health benefits |
|---|---|
| Whole oats and oat products; foods made from soya beans; special margarines, e.g. Benecol | Lower blood cholesterol and reduce the risk of developing heart disease |

| | |
|---|--|
| Oily fish containing Omega 3 fatty acids | Reduces the risk of developing heart disease |
| Cranberry juice | Reduces the risk of developing urinary tract infections |
| Garlic | Lowers blood cholesterol levels |
| Tomatoes and tomato products | Reduce the risk of developing of developing some cancers, especially prostate cancer |
| Dark green leafy vegetables, e.g. spinach | Reduce the risk of developing serious eye illnesses that may lead to blindness |
| Probiotics, e.g. live yoghurt | Beneficial effects on the intestines and immune system |

Check your understanding

1. Give two reasons why functional foods have increased in popularity. (2 marks)
2. State three functional foods and their role or benefit. An example has been provided for you:
 Functional food: garlic
 Role: lowers blood cholesterol levels (6 marks)
3. What is meant by the term 'functional food'? (1 mark)

BABIES AND CHILDREN

Nutritional needs of groups

Our need for different nutrients changes throughout our life.

Meal planning should take into account the needs of different people, according to:

- Their age
- Their size
- Their state of health
- Their stage of development
- Their daily physical activities

Babies and children

Babies (birth-12 months)

- Should only have milk (preferably human breast milk) for the first 4-6 months.
- Human breast milk is specially designed for human babies; it provides immunity and is easy to digest, but is low in



iron.

- Babies are born with an iron store to last 3-4 months.
- If formula milk is used it must be to the right concentration
- After 4-6 months milk and small amounts of soft foods are given; this is called **weaning**
- New foods and larger portions should be **gradually introduced**.
- Foods that are known to cause **allergies** in some people should be gradually introduced after the baby is at least 12 months old
- Meals should be balanced
- Babies do not need added sugar and salt in their food

Young pre-school (1-4 years)

Dietary needs:

- Child is growing rapidly and physically active.
- Needs regular small meals and drinks; cannot eat large amounts of food in one go.
- The eatwell plate guidelines do not apply fully to this age group as a low fat high fibre diet would not give them enough energy.
- They need protein for growth.
- They need fat for energy and vitamins A, D, E and K for development of brain and nervous system
- They should be given whole milk
- They need carbohydrate for energy, preferably from complex carbohydrates (potatoes, rice, bread)
- Calcium and Vitamin D are needed for bone and teeth development
- Iron and vitamin C are needed to produce enough energy
- They need B vitamins to produce enough energy and maintain the health of the nervous system and muscles

Guidance for feeding children of this age:

- Introduce new foods to expand the range eaten
- Sit at table to eat to encourage meal enjoyment; invite friends to share meals
- Give child water to drink, not sweet drinks
- Serve small portions; eat until they are full rather than eating to clear the plate (helps them to recognise what their body tells them)
- Limit sweets, crisps, biscuits and snacks
- Involve child in the whole process of eating (including shopping, cooking); teach them where foods come from and how to prepare and cook food
- Make food fun
- Provide choice

School-aged children (5-12 years)

- A good variety and balance of nutrients is needed
- Growth spurts require more good food containing protein and minerals for bone growth
- Encourage children to try new foods
- This is the ideal age to teach them more about food and how to prepare and cook it

Exam tip

Remember that the eatwell plate and dietary guidelines do not apply in full to these age groups as they do not receive all the nutrients they need, especially energy

- From five years follow the dietary guidelines and eatwell plate
- Many children become inactive and an increasing number become overweight or obese
- They should be discouraged from 'grazing' and 'snacking' during the day to avoid taking in too much energy from food which is then turned into fat.

Check your understanding

1. Up to six months babies should only consume milk. What type of milk would be suitable for a baby of this age? (1 mark)
2. Identify two foods that should not be given to a baby until they are at least 12 months of age. (2 marks)
3. What is the main function of protein for pre-school children? (1 mark)

TEENAGERS

Key facts

| Facts about teenagers | Meeting the dietary needs |
|---|--|
| Body changing from child to adult | <ul style="list-style-type: none"> • Follow eatwell dietary guidelines • Eat foods containing sufficient energy, protein, Vitamins A, B group, C and D to enable bones, muscles and internal organs to grow properly |
| Growth spurts mean the need for food increases | Eat regular and well balanced filling meals |
| Tendency to sleep less and pressures of growth and school work can lead to tiredness and possible anaemia | Eat regular meals containing energy, iron and vitamin C |
| Skeleton should lay down most minerals during this age in order to reach peak bone mass when older | <ul style="list-style-type: none"> • Regularly eat foods containing calcium and vitamin D, e.g. milk, yoghurt, green leafy vegetables, bread, nuts and seeds • Avoid drinking lots of carbonated (fizzy) drinks because phosphoric acid in them can affect the rate of bone mineralisation • Take regular load bearing exercise (e.g. running, ball games) to stimulate bone mineralisation |
| Most growth occurs during sleep, so nutrients used for this must be replaced | Eat breakfast, particularly protein-rich foods (e.g. milk, egg, yoghurt) |
| Breakfast can also aid concentration at school | Eat wholegrain cereals in bread, porridge and some breakfast cereals because they release glucose slowly and gradually into the bloodstream to help maintain concentration |
| Eating processed, fast and snack foods provides a lot of salt and concentrated energy from sugar and fat with few other nutrients. This can lead to weight gain and diet- | <ul style="list-style-type: none"> • Eat regular meals containing a wide variety of fresh foods, especially fruit, vegetables and salads to provide a range of nutrients • Limit intake of processed, fast and snack foods • Drink plenty of fresh water |

related diseases such as heart disease and diabetes

- Keep **physically active**

Exam tip

The teenage years are a period of rapid change and growth. Be aware of the problems faced by teenagers trying to eat a healthy diet and be able to explain how these problems can be overcome at home and at school. For example, teenagers need to drink at least 2 litres of water per day, a school could help with this by providing free water at breaks and lunch but also ensuring there is access to water fountains around the school

Teenage girls

Blood losses during menstruation (periods) may make teenage girls become anaemic. They should regularly eat foods containing **iron** (e.g. red meat, wholegrain cereals, bread, lentils, dried apricots and dark green leafy vegetable) and **vitamin C** (e.g. kiwi fruit, peppers, new potatoes, guavas, dark green leafy vegetable and bean sprouts). The vitamin C helps the body absorb iron

Teenage boys

Between 15 and 20 years, a significant amount of muscle grows in the arms, legs, chest and abdomen of teenage boys.

They need to eat sufficient **protein** (e.g. meat, fish, milk, yoghurt, eggs, beans, lentils and cereal products), to encourage muscle growth.

Check your understanding

1. Name two nutrients a girl will require more of during her teenage years. (2 marks)
2. State which nutrient should be eaten with iron to help its absorption. (1 mark)
3. Identify one good source of protein for a teenager. (1 mark)
4. Name two sources of calcium suitable for a packed lunch. (2 marks)

ADULTS AND SENIOR CITIZENS

Key facts

| Facts about adults | Dietary needs |
|---|---|
| Body growth stops, so diet must maintain health and prevent diet-related diseases | Follow current dietary guidelines |
| Change in metabolic rate gradually slows down | Limit the amount of energy-dense foods that are eaten |
| Weight gain may occur due to the metabolic rate | Take regular physical exercise to control weight |
| Skeleton gradually starts to lose minerals | <ul style="list-style-type: none"> Regularly eat foods containing calcium and vitamin D, e.g. milk, yoghurt, green leafy vegetables, bread, seeds Take regular load bearing exercise (e.g. running, dancing) to maintain bone and muscle strength and to limit the rate of bone demineralisation |
| Women continue to menstruate until the menopause | <ul style="list-style-type: none"> Regularly eat foods containing iron (e.g. red meat, bread, black treacle, dried apricots, green leafy vegetables) and vitamin C (e.g. kiwi fruit, new potatoes, brussels sprouts, dark green leafy vegetables, bean sprouts) Vitamin C helps the body absorb iron |

| Facts about senior citizens (elderly people) | Dietary needs |
|--|--|
| Systems in the body slow down, e.g. digestive and circulatory(blood) systems | <ul style="list-style-type: none"> Eat plenty of fibre (NSP) to prevent constipation and diverticular disease Drink plenty of water to prevent constipation and help the kidneys to work properly |
| Absorption of nutrients may not be as efficient as before. This can lead to anaemia or to early signs of scurvy (lack of vitamin C) | <ul style="list-style-type: none"> Regularly eat foods containing sufficient iron (e.g. red meat, wholegrain cereals, lentils, some curry spices, dark green leafy vegetables) and vitamin C (e.g. citrus fruits, peppers, new potatoes, guavas, brussels sprouts) |
| <ul style="list-style-type: none"> Bones naturally lose minerals and become weakened (osteoporosis) Some parts of the body wear out e.g. joints | <ul style="list-style-type: none"> Regularly eat foods containing calcium and vitamin D, e.g. milk, cheese, green leafy vegetables, bones of canned fish, nuts Take regular load bearing exercise (e.g. walking, dancing) to maintain bone and muscle strength, limit the rate of bone de-mineralisation and stimulate the bones to take up calcium |
| Living indoors most of the time may mean limited exposure to sunlight to make vitamin D | <ul style="list-style-type: none"> Vitamin D supplements recommended for people over 65 Expose the skin to regular doses of sunlight |
| Metabolic rate gradually slows down | Limit the amount of energy-dense foods that are eaten |
| Weight gain may occur due to the | Take regular physical exercise to control weight |

| | |
|--|--|
| metabolic rate | |
| Appetite may get smaller | May need small, regular, energy dense meals to maintain energy intake |
| Eyesight becomes weaker | Eat foods containing antioxidant vitamins A, C and E to help prevent age related eye conditions |
| Blood pressure may increase | <ul style="list-style-type: none"> • Limit sodium/ salt intake • Limit intake of ready meals, which may have a high sodium/ salt content |
| Sense of smell and taste may weaken | Avoid adding extra salt to compensate-try other flavours e.g. herbs and spices |
| Memory loss may occur | This may be due to vitamin B ₁₂ deficiency - B ₁₂ is found in liver, shellfish, red meat, milk and fortified breakfast cereals; a B ₁₂ supplement may be needed |

Possible problems for senior citizens preparing, cooking and eating food

Oral (mouth) - chewing and swallowing problems may be caused by:

- Loss of teeth, false teeth or gum disease
- Effects of stroke or disease; e.g. Parkinson's disease

Manual dexterity - problems using the hands may be caused by:

- Arthritis, causing painful, swollen fingers
- Frail skin, easily cut or burnt
- Stroke or Parkinson's disease, making holding things difficult

Social:

- May lose interest in food due to loneliness, isolation, being widowed, loss of independence, living in a care home, ill health, depression
- May not be able to cook for themselves (lack of skills, lack of facilities)
- Difficulty buying and carrying food from the shops (walking difficulties, lack of transport, disability, distance to shops).

Poverty: limited amount to spend on food

Effects of medicine: some medicines effect how nutrients are absorbed and affect the taste of food

Changes to senses: loss of smell and taste may make appetite smaller

Help available for senior citizens

- Lunch clubs - hot meals provided in social settings for a small price
- Mobility buses - for shopping or outings to clubs
- Meals on wheels - meals (ready -to-eat or frozen) delivered to their home
- Food co-operatives - bring food for sale to an area in a van
- Home helps - people who can help with shopping and cooking

Exam tip

Questions related elderly people tend to focus on problems associated with healthy eating and how these problems could be overcome, or nutritional differences compared to other age groups. For example, as we age we have a reduced capacity to absorb nutrients such as iron, which can cause anaemia. Therefore, elderly people must have enough iron rich foods in their diet such as red meat, eggs, dark leafy green vegetables. They must also eat enough vitamin C to help absorb the iron.

Check your understanding

1. Give one reason an elderly person may need to take a vitamin D supplement. (1 mark)
2. Elderly people should increase their energy intake. True or False? (1 mark)
3. Describe three reasons why an elderly person may not eat a balanced diet. (3 marks)
4. Identify two nutrients important to maintaining the health of a person's bones. (2 marks)

Key facts

| Facts about pregnancy | Dietary needs |
|---|---|
| <p>Food is needed to maintain the mother's body and for the growing foetus (baby), but not enough food for two adults</p> | <ul style="list-style-type: none"> • Follow the current dietary guidelines • Eat foods containing sufficient energy, protein, vitamins A, B group, c, D to maintain mother's body and enable the bones, muscles and internal organs of the baby's body to grow properly • Eat regular, balanced meals |
| <ul style="list-style-type: none"> • The skeleton of the baby gradually changes from cartilage to bone as it mineralises • The baby gets calcium from the mother's blood supply • If the mother's diet lacks calcium and vitamin D the baby will take calcium from the mother's bones, which will weaken them • Young pregnant women must have enough calcium to mineralise their own bones as well as the baby's | <ul style="list-style-type: none"> • Regularly eat foods containing calcium and vitamin D (except liver as it contains too much vitamin A), e.g. milk, yoghurt, green leafy vegetables, bread, nuts • Avoid drinking lots of carbonated (fizzy) drinks because phosphoric acid in them may affect the rate of bone mineralisation • Take regular load bearing exercise (e.g. walking, gentle running, dancing), to stimulate bone mineralisation • Avoid alcohol, caffeine and nicotine, which prevent calcium being taken up in skeleton |
| <ul style="list-style-type: none"> • The volume of the mother's blood increases by 50% • In the last 3 months of pregnancy, the baby must build up a store of iron to last it throughout the first 3-4 months after birth | <ul style="list-style-type: none"> • Regularly eat foods containing iron (e.g. red meat, wholegrain cereals, bread, lentils, dried apricots, molasses) and vitamin C (e.g. citrus fruits, peppers, new potatoes dark green leafy vegetables, brussels sprouts) • Vitamin C helps the body absorb iron • Iron supplements may be needed to prevent anaemia |
| <ul style="list-style-type: none"> • The unborn baby can develop disabling defects in the spine, e.g. spina bifida; research shows that if the mother is lacking in folate (vitamin B9) in her diet, her baby may be at greater risk of developing spinal defects | <ul style="list-style-type: none"> • If possible take a folate supplement before becoming pregnant and for the first 12 weeks of pregnancy • Eat plenty of foods containing folate (e.g. potatoes, fruits, asparagus, okra, beans and seeds, fortified breakfast cereals) |
| <ul style="list-style-type: none"> • Pregnancy hormones slow down the muscles in the intestines and this can lead to constipation | <ul style="list-style-type: none"> • Eat plenty of fibre (NSP) to prevent constipation and diverticular disease • Drink plenty of water to prevent constipation and help the kidneys work properly |
| <ul style="list-style-type: none"> • Weight gain should be regular and carefully monitored • Fat is stored in the pregnant woman's body to provide energy for breastfeeding | <ul style="list-style-type: none"> • Limit the amount of energy-dense foods that are eaten • Take regular physical exercise to control weight |

Foods to avoid during pregnancy

Pregnant women need to avoid foods that may either cause food poisoning or contain too much of a nutrient which could harm their growing baby. These are:

- pâtés, soft cheeses, e.g. Brie, Camembert, Chevre (goat's cheese) - may contain Listeria bacteria
- soft blue cheeses and cheeses made with unpasteurised milk
- raw or lightly cooked meat, especially products made with minced beef (e.g. burgers) - these should be cooked through to at least 70°C in the middle
- liver, liver products and vitamin A supplements (e.g. cod liver oil)
- raw or partly cooked eggs - may contain salmonella bacteria
- some types of fish, e.g. tuna, swordfish - may contain mercury, which may affect the baby's brain and nervous system
- alcohol and caffeine - may cause baby to be underweight

Exam tip

People often think that a pregnant woman should eat for two during. However, a woman should only make a small increase in certain macro-nutrients to ensure a balanced diet. Make sure that you know what these nutrients are and why they should be increased.

Lactation (breastfeeding)

Weight gained during pregnancy will be gradually lost as fat stores are used to produce milk. Breastfeeding women are advised to:

- eat a balanced diet. Energy needs will increase, but some of this comes from the fat stores built up in pregnancy
- eat foods containing iron and vitamin C to make up for the blood losses during birth
- eat foods containing calcium and vitamin D to provide for the baby's growing skeleton and maintenance of the mother's skeleton
- eat foods containing protein to enable milk to be made and so help the mother's body recover from the birth
- drink plenty of fluid to allow milk to be produced
- keep physically active

Check your understanding

1. Give one reason why a woman planning to have a baby should increase her intake of folate (1 mark)
2. Identify three foods that should be avoided during pregnancy (3 marks)
3. Explain why those three foods (from above) should be avoided during pregnancy (3 marks)

PEOPLE TRYING TO LOSE WEIGHT

Key facts

Being overweight or obese:

- makes people likely to develop
- heart disease
- diabetes
- high blood pressure
- osteoarthritis in the hips and knees
- makes people depressed about their looks
- is a risk factor if a person needs surgery
- leads to breathing problems because of fat on the chest
- causes skin infections because bacteria are trapped under fat folds

People put on weight because

- over a period of time they take in more energy from food than they use in physical exercise
- they change their eating habits, e.g. they eat more energy-dense processed, fast and snack foods
- they eat between meals (snacking and grazing)
- they have a less active (sedentary) job
- they do not take physical exercise and spend a lot of time sitting and being inactive

Losing weight permanently

- takes a long time
- takes motivation, determination and support from friends and family
- requires someone to use more energy in a day than they take in from food so that fat stores in their body are used up
- requires someone to gradually and permanently change their eating habits

Exam tip

Questions on this topic often cover meal or diet adaptation and healthy eating. Be prepared to suggest some ideas and reasons for changing a given diet. For example, if someone does not currently eat breakfast but at 9 a.m. eats a large slice of cake and a milkshake, you could suggest that they eat a breakfast consisting of poached eggs on seeded bread with a cup of tea in the morning. The eggs would provide them with protein, which is filling, so is likely to reduce the chance of snacking later in the day, so may reduce the overall energy/fat intake, which will help them to lose weight in the long term.

Changing eating habits and behaviour

- Eat fewer **energy-dense foods**, e.g. crisps, biscuits, cakes, fried foods, pizzas, mayonnaise and sweet milky drinks such as café latte
- Eat more **low energy foods**, e.g. fruit salads, wholegrain cereals
- Eat more **low fat or low sugar versions** of foods, such as cheese, spreads, sweetened drinks, yoghurts
- Change **methods of cooking** – grill, steam, bake rather than fry

- Change **food portions** - try using a smaller plate and resist second helpings
- Increase **physical activity**, e.g. walking, cycling, running, swimming, climbing stairs, playing a sport

Check your understanding

1. Identify three health or social problems associated with being overweight or obese. (3 marks)
2. Identify four reasons people gain weight. (4 marks)
3. Identify four lifestyle changes someone could make to help them lose weight. (4 marks)

VEGETARIANS

Key facts

A vegetarian diet

- Is based mostly on plant foods
- Does not include foods or food products where an animal, bird or fish has had to be killed

Reasons for following a vegetarian diet

- Do not want to eat flesh from dead animals, birds or fish
- Disagree with raising and killing animals, birds or fish for food (consider it to be cruel, a waste of land, water, energy food)
- Consider a vegetarian diet to be healthier than a meat-eating diet
- Religious reasons

Types of vegetarians

- **Lacto-ovo vegetarian** - eat animal products, e.g. eggs (**ovo**), milk (**lacto**), that have not required a bird or animal to be killed or suffer physically
- **Lacto vegetarian** - as above but will not eat eggs
- **Vegans (strict vegetarians)** - do not eat **any** animal food products, only eat plants

Exam tip

Have an understanding of the different types of vegetarian, including what they do and do not eat. Think about how a vegetarian or vegan could consume a balanced diet.



Food labelling helps vegetarians to identify suitable and unsuitable foods using the logos above.

Dietary and nutritional needs

Follow current dietary guidelines.

It is particularly important to include enough iron, vitamin C, protein and vitamin B₁₂.

Iron:

- Iron from plant foods is less easily absorbed by the body
- Plant sources of iron: wholegrain cereals and cereal products, bread (added by law), fortified breakfast cereals, lentils and beans, dried apricots and figs, nuts, seeds, some curry spices, black treacle, green leafy vegetables, okra, broccoli, peas, brussels sprouts, cocoa and dark chocolate, molasses
- If the need for iron is high (e.g. after loss of blood or due to heavy periods), a vegetarian iron supplement may be needed

Vitamin C helps the body to absorb iron

Protein

- HBV proteins mostly found in animal foods except soya beans and quinoa
- Lacto and lacto-ovo vegetarians gain enough protein from animal products
- A combination of LBV plant proteins should be eaten to provide all essential amino acids (**protein complementing**) - this is very important for vegans
- Soya milk and soya products are available, e.g. desserts, yoghurts, drinks, tofu, tempeh, custards
- Quorn is manmade from a **mycoprotein**. It is made into meat substitute products such as burgers and sausages. It is unsuitable for vegans as Quorn is grown on egg protein and may contain milk.
- Protein complementing:
 - Lentil soup and bread
 - Nut, seed and bread roast
 - Nut stir fry and egg free pasta
 - Vegetable and soya bean curry and brown rice and naan bread
 - Hummus and bread

Vitamin B₁₂

- Mainly found in animal foods
- Found in dairy products and eggs - lacto and lacto-ovo vegetarians should ensure they get enough
- Found in yeast extract, soya milk, sunflower margarine and fortified breakfast cereals
- Vegans may need to take a supplement

Check your understanding

1. Give three reasons why someone may choose to follow a vegetarian diet. (3 marks)
2. Identify two sources of protein suitable for a vegetarian. (2 marks)
3. Identify one good food source of vitamin B₁₂ suitable for a vegan. (1 mark)

COELIACS AND DIABETICS

Coeliacs

- Coeliac disease is caused by intolerance to **gluten**
- Gluten is the protein in wheat, barley and rye and products made from them. Some people are also sensitive to oats, as the protein in oats is similar to that in gluten.
- The gut damage caused by coeliac disease prevents other nutrients from being absorbed in the small intestine
- A lifelong condition

Symptoms

- Weight loss (but not in all cases)
- Chronic lack of energy and ongoing tiredness
- Chronic diarrhoea
- Anaemia - due to poor absorption of iron
- Poor growth in children
- Other nutritional deficiencies

Food labelling helps coeliacs to identify suitable and unsuitable foods.



Foods that coeliacs **can** eat: agar, almonds, amaranth, buckwheat, carrageen, cassava manioc/tapioca), chestnuts, corn (maize), linseeds (flax), gram flour*, millet, polenta, potato flour, peas, beans, lentils, quinoa, rice, sago, sorghum, soya flour*, lentil flour*. Those with an * need checking for gluten content.

Exam tip

Be prepared to be given a recipe and identify what ingredient(s) make the recipe unsuitable for a coeliac. For example, pancakes made with wheat flour would not be suitable; however, you could substitute the wheat flour for gluten-free almond flour

Diabetics

Exam tip

There are two types of diabetes Type 1 and Type 2. Type 1 is insulin dependent diabetes, which is mainly

- Diabetes is a health condition where the amount of **glucose** in the blood is too high
- Blood glucose is controlled by the hormone **insulin**
- Insulin is like a key, it 'unlocks' body cells to let glucose in
- Diabetics either don't produce enough insulin or their body is unable to use it
- **Hypoglycaemia** means low blood glucose
- **Hyperglycaemia** means high blood glucose (damages blood vessels in the eyes, feet, hands and kidneys, etc.)
- Diabetics are more likely to develop high blood pressure, heart disease, strokes
- No cure, but diabetes can be managed to control symptoms and limit long term damage

Two types of diabetes

| Type 1 | Type 2 |
|--|--|
| <ul style="list-style-type: none"> • Insulin dependent (need regular daily injections) • Develops in childhood or early adulthood • Immune system destroys insulin producing cells in the pancreas • Need to eat a balanced diet (eatwell plate) • Need to test blood and or urine for sugar levels | <ul style="list-style-type: none"> • Non-insulin dependent • Body does not produce enough insulin or insulin doesn't work properly • Linked to people being overweight or obese • Treated (and development prevented) by balanced diet (some people have to have tablets or injections as well), increasing physical exercise, losing weight |

There has been a large increase in the numbers of people developing type 2 diabetes, including many young people.

Symptoms of diabetes

- Weight loss (particularly type 1)
- Lack of energy, tiredness
- Thirst
- Need to urinate more often
- Blurred vision
- Genital itching

Dietary advice for diabetics

- Follow current dietary guidelines
- Limit sugar intake
- Eat complex carbohydrate foods to release glucose slowly into the body, so it does less damage and the body has time to deal with it
- No need to buy special diabetic foods
- Control intake of fat and salt to help prevent heart disease and high blood pressure
- Increase fruit and vegetables intake to provide antioxidants
- Read food labels to become aware of what different foods contain: look for 'hidden' sugars and chemical names of sugars, e.g. sucrose, dextrose, maltodextrin, glucose syrup.

Check your understanding

1. Identify one alternative to wheat flour that would be suitable for a coeliac. (1 marks)
2. State two symptoms associated with gluten intolerance. (2 marks)
3. Hypoglycaemia means a low level of blood glucose. True or false? (1 mark)
4. Explain three dietary guidelines that a diabetic (Type 2) could follow to help to control their diabetes. (3 marks)
5. Give one reason why a diabetic is encouraged to read food labels when buying food. (1 mark)

FOOD ALLERGIES AND INTOLERANCES

Key facts

- A **food allergy** means an allergic (bad) reaction to a food or ingredient
- An **allergen** is a substance in food that causes an allergy
- Allergens make the body produce **histamine** which causes these symptoms in a few seconds, minutes or hours
 - Skin rashes
 - Itchy skin and eyes
 - Runny nose
 - Swollen lips, eyelids, face
 - Wheezing, coughing
 - Anaphylactic shock
- **Anaphylactic shock** is a very sudden and very serious allergic reaction;
 - Mouth and throat swells
 - Cannot swallow, speak or breathe properly
 - Can be fatal
 - Must be treated very quickly
- **Foods that cause reactions** in some people include eggs, peanuts, other nuts, seeds, strawberries, kiwi fruit, seafood, e.g. prawns and shrimps (there are others)



Food intolerance

- Sometimes called **food sensitivity**
- **Symptoms**

- Pain and bloating in the abdomen
- Diarrhoea
- Nausea (feeling sick)
- Muscle and joint aches and pains
- General tiredness and weakness
- Hard to diagnose
- An example is **lactose intolerance** - cannot digest **lactose** in milk and dairy products. Bacteria in the gut break it down and cause the symptoms. Avoid all food containing milk, milk products, lactose and eat lactose-free products.
- Other intolerances - chocolate, cheese, some food additives, wheat gluten (but not always full coeliac disease)

Managing allergies and intolerances

- Eat a balanced diet
- Avoid known problem foods
- People likely to have anaphylactic shock should carry an **epipen** to inject into their arm or leg if they have a reaction. An epipen injects **adrenaline** into the blood to control the symptoms while the person goes to hospital for further urgent medical treatment.
- Read food labels carefully
- Well known allergens are always shown on food labels
- Beware of 'hidden' names e.g. peanuts are also called ground nuts (e.g. groundnut oil); 'arachis' is the Latin name for peanuts and might be an ingredient in medicines
- Check restaurant menus by asking about ingredients used if eating out
- Tell other people about your allergy so they understand and can help if needed
- Most food companies will provide a list of products containing possible allergic ingredients.



Check your understanding

1. What is meant by the term 'food allergy'? (1 mark)
2. Identify three foods that people may be allergic to. (3 marks)
3. What is meant by the term 'food intolerance'? (1 mark)

CORONARY HEART DISEASE

Key facts

- CHD is a disease where the **coronary arteries** (which give the heart oxygen) become blocked
- Risk factors:
 - **High cholesterol** in the blood
 - **Smoking** - makes the blood sticky so more likely to form blockages
 - **High blood pressure** - strains the heart and arteries, may be caused by eating too much **salt**
 - Being **overweight** or **obese**
 - **Lack of exercise** - the heart needs to be exercised to keep it well

Cholesterol

- made in the liver from the fats in the foods we eat
- eating a lot of **saturated fats** (in meat, cheese, butter, suet, lard and solid vegetable fats) makes more cholesterol. Sometimes called 'bad' cholesterol
- eating more **unsaturated fats** (in vegetable, nut and seed oils) makes less cholesterol. Sometimes called 'good' cholesterol

Dietary advice to prevent CHD

- Follow current dietary guidelines
- Eat fruit and veg - **antioxidants** and **fibre** in them help prevent damage to arteries by keeping cholesterol low and preventing other substances from damaging them
- Choose low fat foods
- Limit saturated fat intake
- Grill or bake rather than fry
- Trim fat off foods
- Reduce amount of fat spread on food
- Reduce salt intake -use other flavours, eat fewer salty snacks, ready meals and baked items that contain baking powder (baking powder contains sodium)

Other advice

- Don't start smoking: stop smoking if already a smoker
- Take more physical exercise
- Try to lose weight if necessary

Exam tip

This is a nutrition exam so you are not expected to know the detail of how coronary heart disease occurs, but you do need to understand the basic risk factors and how these could be avoided. Remember to make links to healthy eating and dietary guidelines in your answer.

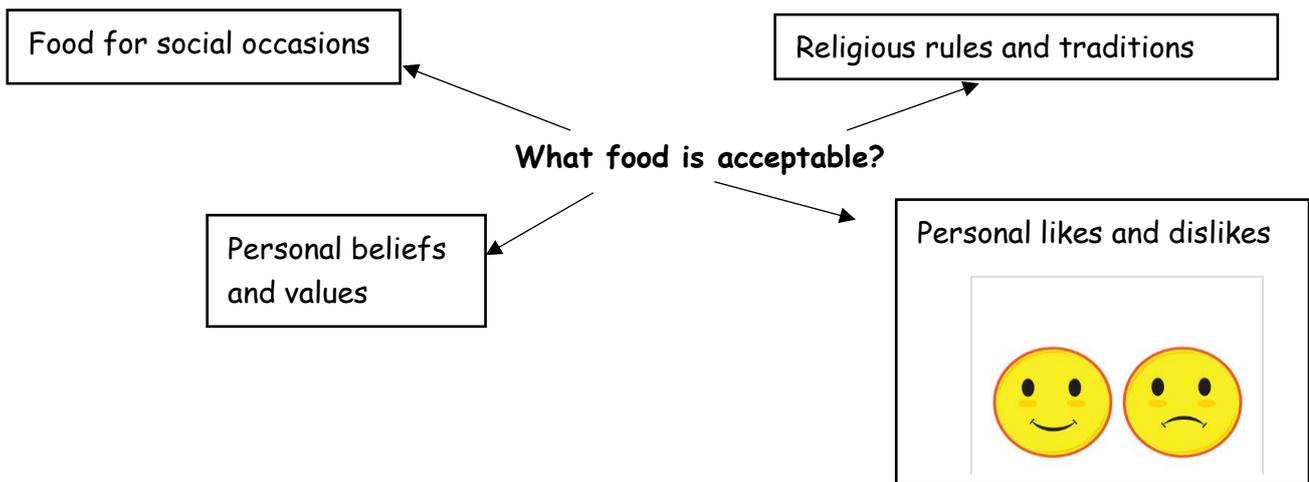
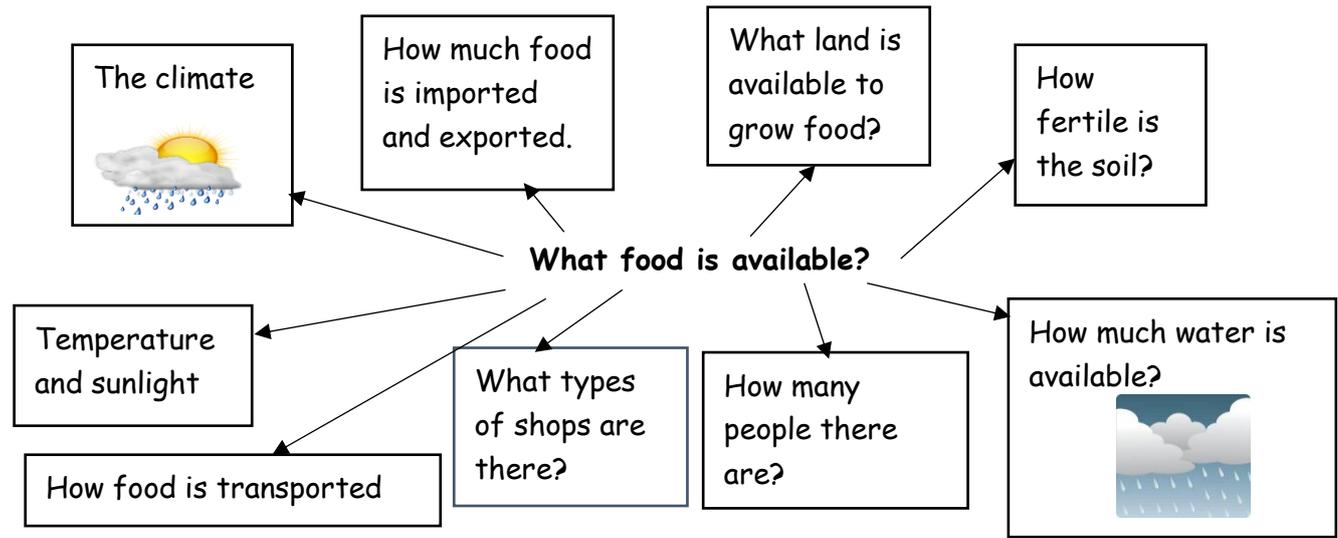
Check your understanding

1. Identify three factors that increase the risk of coronary heart disease. (3 marks)
2. Describe three ways to lower the risk of developing coronary heart disease. (3 marks)

SOCIAL AND ECONOMIC DIVERSITY

Key facts

Factors that influence our food choices:



What food is affordable?



Social and economic diversity

Economic diversity:

- **Economic diversity** means the different amounts of money that different people live on and can afford to spend on food.
- Rent, gas, electricity and other bills must be paid. People with a limited income may have to spend less on food in order to pay for these.
- Cheaper food products are often made with cheaper ingredients, such as sugar, fat and salt.

Saving money on a limited income:

- Use cheaper cuts of meat, e.g. shin beef, which may need longer to cook
- Use alternative, cheaper proteins, e.g. peas, beans, lentils instead of meat or to make meat go further
- Make your own food rather than buying ready-made - cook a large batch and freeze some
- Use foods in season, e.g. fruit and vegetables
- Make use of special offer, and collect money-off vouchers
- Use supermarket own brands and value line products

Social diversity:

Social diversity means the differences in people's interests, opinions, activities, friendship groups, values

Food is important in social diversity as it is used as:

- A gift
- A way of socialising, e.g. going out for a meal, sharing a drink with someone
- A reward
- A way of demonstrating your status, e.g. buying expensive wines or foods

Exam tip

A question asking about eating on a limited budget may link to a specific group of people such as students, families or the elderly. Do not panic; the majority of the facts apply to all groups, for example buy 'value' lines or use cheaper cuts of meat. Being able to apply the knowledge to different situations demonstrates a good level of understanding.

Check your understanding

1. Identify five ways someone living on a limited budget could prepare meals and meet their dietary guidelines (5 marks)
2. A family of four has a limited budget for food. Design a two-course meal that is balanced and meets current dietary guidelines, but is cheap to make. (4 marks)

CULTURAL AND RELIGIOUS DIVERSITY

Culture

Culture is:

- Ways of life and behaviour
- What we know and believe
- Customs, habits, laws, morals
- Inheritance and traditions
- Part of normal behaviour, e.g. eating certain foods
- A person's values, e.g. their perception of good and bad foods, good and bad behaviour

Food culture

Food reinforces bonds between people and is an important part of celebrations

Food culture is how, what, why when and where people choose to eat

How food culture has changed

| What has changed | What people used to do | How it has changed | Effect of these changes |
|-------------------------|---|---|--|
| Where food comes from | Home grown food and small shops | Food comes from large shops | Lack of knowledge about food |
| How we buy food | Buy food every day | Buy food once or twice a month | <ul style="list-style-type: none"> • Fewer small shops • Foods have a long shelf-life |
| How we prepare food | Women cooked fresh foods at home | <ul style="list-style-type: none"> • Ready meals eaten • More women at work • Less time for cooking | <ul style="list-style-type: none"> • Fewer people have cooking skills • Many convenience foods available • Not just women cooking |
| What we eat | <ul style="list-style-type: none"> • Traditional meals • Limited or seasonal choices, few food imports • Little packaging used | <ul style="list-style-type: none"> • Snack, fast and ready foods • Travel has widened food experiences • More types of foods available, many imported • Much packaging used | <ul style="list-style-type: none"> • Many energy-dense foods and not enough fruit or vegetables eaten • Many foods highly coloured and flavoured • Food from other cultures very popular • Many foods eaten out of season(imported) - consider energy use and environmental damage |
| Where we eat | <ul style="list-style-type: none"> • Most food eaten at home | Food often eaten outside the home or alone in front of the TV | <ul style="list-style-type: none"> • Eating out is a normal part of culture • Catering industry very large • Family meals are less common |
| When we eat | <ul style="list-style-type: none"> • Mostly at regular set meal times • Food shops opened six days a week during the day only | <ul style="list-style-type: none"> • People eat at different times in one home • Food can be purchased at any time | <ul style="list-style-type: none"> • Easy to overeat • Snacking may lead to weight gain |

Religion

Most religions have dietary rules or laws, often within traditional celebrations

| Religious faith | Dietary rules |
|-----------------------|---|
| Buddhism | <ul style="list-style-type: none"> • Mostly vegetarian; some avoid meat and dairy products • Buddhist monks fast and can only obtain food through donation by believers |
| Christianity | <ul style="list-style-type: none"> • Fasting is sometimes observed • Before Easter certain foods are given up for 40 days (Lent) • Christmas food celebration for the birth of Christ |
| Hinduism | <ul style="list-style-type: none"> • Do not eat beef or pork • Avoid foods that cause pain to animals; vegetarianism is encouraged • Believe food contains energies that are absorbed by people • Onions, garlic and alcohol may be avoided because they affect spiritualism • Dairy foods are believed to enhance spiritual purity • Sometimes fast |
| Islam | <ul style="list-style-type: none"> • Halal food is lawful, e.g. meat and poultry slaughtered in a ritual called zibah • Rules set out in the Qur'an • Haram foods are 'unlawful', e.g. pork and pork products (e.g. gelatine), alcohol, foods with emulsifiers made from animal fats, frozen vegetables with sauce, some margarines, drinks with caffeine, breads with dried yeast • Fast for a month during daylight hours during Ramadan. Not allowed liquids either • Eid is the festival at the end of Ramadan |
| Judaism | <ul style="list-style-type: none"> • Kashrut are Jewish food laws • Kosher foods are allowed - Fish (with scales and fins), animals that chew the cud and have cloven (split) hooves, e.g. cows, sheep • Trefah foods are not allowed, e.g. pork, shellfish • Dairy foods and meat must not be prepared in the same cooking area or using the same equipment • No work is allowed on Saturdays; food is prepared and cooked the day before, e.g. slow cooked stew • On Yom Kippur (day of Atonement) Jews fast from dusk to dusk • Feast days include Rosh Hashanah and Passover |
| Rastafarianism | <ul style="list-style-type: none"> • Eat strictly according to I-tal; food must be natural and clean • Do not eat pork or fish longer than 30cm • Eat many fruit and vegetables • Cook with coconut oil • Do not drink alcohol, milk or coffee but drink herbal teas |
| Sikhism | <ul style="list-style-type: none"> • Many are vegetarian • On special days foods are eaten in the temple • Eat together to show they are equal • Some do not drink alcohol, tea or coffee |

Exam tip

Religion and culture are complicated areas of revision. Be aware which religions encourage vegetarianism and appreciate what food cultures each religion adheres to. For example, Hindus do not eat beef and pork and avoid food that causes pain to animals, vegetarianism is encouraged.

Check your understanding

1. Explain four changes that have occurred in the last 25 years in relation to the way we buy, prepare and eat food. (4 marks)
2. Identify two religions where vegetarianism is encouraged. (2 marks)

Key Facts

Food is cooked

- To destroy harmful bacterial and prevent food poisoning
- To develop the flavour of foods
- To make food easier to bite, chew, swallow and digest#
- To make foods more appealing and attractive to eat
- To give a variety by using different cooking methods
- To provide hot food
- To destroy natural toxins (poisons) in some foods
- To enable foods to rise, thicken, dissolve, set

The transfer of heat to foods

- Heat is energy
- Foods are made up of atoms joined together as molecules
- Molecules receive energy and vibrate and move quickly
- Heat is produced - the quicker the movement the more heat
- **Conduction** means heat passed through solid materials, e.g. metals, food
- **Convection** means passed through liquid or gas
- **Radiation** means heat passed through space (NOT THROUGH SOLID, LIQUID OR GAS)