

AS

Design and Technology:

# Food Technology

Unit 1 Materials, Components and Application (FOOD1)  
Mark Scheme

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2540  
June 2016

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Version/ Stage: 1.0 Final Mark Scheme

**Section A**

**1. Name two key food sources of phosphorus.**

**[2 marks]**

Answers will include two of the following sources:

Red meat e.g. beef, lamb dairy foods e.g. milk, cheese, fish, poultry, bread, rice, oats.

One correct source – one mark

Two correct sources – two marks

**2. Explain the effects of a deficiency of fats and oils in the diet.**

**[2 marks]**

One mark for each correct answer given.

Answers will include two of the following:

- A lack of energy, as fats and oils are two of the main energy providing food sources
- A lack of omega 3 and omega 6 fatty acids to aid brain development and general bodily health
- A lack of protection for delicate internal organs e.g. kidneys
- A lack of insulation to retain bodily warmth leading to a risk of hypothermia
- A lack of the fat soluble vitamins ADEK – which in turn could result in contributing to associated deficiency diseases e.g:
  - i. Vitamin A – night blindness
  - ii. Vitamin D - rickets, tooth decay, osteoporosis as is needed to aid Calcium uptake
  - iii. Vitamin E – a break down in **cell structure**
  - iv. Vitamin K – problems with **blood clotting, and wounds healing properly.**
- Poor vitamin distribution around the body
- Ineffective hormone production
- A lack of satiety
- Weight loss
- Eating disorders
- Poor quality skin, hair etc

Credit will be given for any other acceptable answer.

**3. State one function of water in the diet, and how much should be consumed daily.**

**[2 marks]**

One mark for a correct function from the list below.  
One mark for the recommended intake.

Suggested functions:

- The body needs water to support most of the chemical reactions that happen in body cells, allowing them to function properly
- Water is also needed to help avoid dehydration
- We also need water so that our blood can transport nutrients to where they are required
- Water is also needed to aid the elimination of waste products.

Recommended daily intake:

2-3 litres. Actual amount needed for a correct answer

**4. Define the term 'thermogenesis'.**

**[2 marks]**

Two marks for a correct explanation of the term.  
One mark can be allocated if part explanation correctly given.

Explanation:

Thermogenesis, is the process of energy production in the body, creating heat and caused directly by the metabolizing of food consumed.  
Thermogenesis is influenced by factors relating to the composition of the food and the physical state of the individual.

**5. Which nutrient interaction is involved in the production of human energy?**

**[2 marks]**

Carbohydrate and the B group vitamins (in particular B1 Thiamine and B2 Riboflavin)

One mark can be given for Carbohydrate

One mark can be given to reference to the B vitamins mentioned below. B6 can also be credited even though it does not appear in the Specification

6. Explain two different roles of retinol in the diet.

[2 marks]

One mark for each correct explanation of the different roles.

Answers could include the following:

- Strengthening immunity against infections
- Helping vision in dim light
- Keeping skin and the linings of some parts of the body, such as the nose, healthy

7. Describe two health symptoms that would result from a deficiency of Vitamin B12 in the diet, and give two food sources that could be eaten to avoid this deficiency.

[4 marks]

1 mark for each correct health symptom

1 mark for each correct food source.

Maximum 2 marks in each section

Health symptoms could involve any of the following:

- Development of anaemia, as Vitamin B12 is involved making red blood cells
- A lack of energy, as Vitamin B12 plays a key role in energy release from carbohydrates
- Central nervous system defects such as spina bifida in unborn babies, as Vitamin B12 plays a key role in the processing of folic acid

Credit will be given for any other acceptable answers.

Good sources of vitamin B12 include:

Meat, salmon, cod, milk, cheese, eggs, and some fortified breakfast cereals, Marmite, Nori seaweed

8. Explain why colourings are used in many processed food products.

In your answer give examples of natural and artificial colourings and the foods in which they are used.

[4 marks]

**One mark** to be given for each correct example given. **Maximum of two**

**One mark** to be given for each correct example given. **Maximum of two**

**Food colourings are** any dyes, pigments or substances that impart colour when they are added to that are being processed

Food colours come in many forms consisting of liquids, powders, gels and pastes and are used both in commercial food production and in domestic cooking for a variety of reasons:

- To develop the natural colour of a product e.g. Tartrazine (E102) in orange squash or mushy peas, Quinoline (E104) in smoked haddock and pickles and Allura Red (E129) in cocktail sausages, carotene and beetroot to colour cakes
- To disguise poor quality foods e.g. cheap cuts of meat used in some pies
- To add the illusion of a natural colour to food made from completely synthetic ingredients e.g. some ice creams
- To offset colour loss due to exposure to light, air, temperature extremes, moisture and storage conditions
- To allow consumers to identify products on sight e.g. chocolate flavoured ice cream

## Section B

**9 (a) Research has shown that British families throw away on average of the equivalent of six meals per week in food waste.**

**What can consumers do to help reduce the amount of food waste?**

**[10 marks]**

Answers could include the following:

- Plan meals for the week to allow you to calculate approximate foods needed
- Always have a shopping list to avoid over shopping and avoid the attraction of bulk buys
- Try to shop just once a week
- Rotate the stock in the fridge to use the oldest foods first
- Design meals where any leftovers can easily be reheated or used as the base for another meal e.g. leftover roast chicken being used to make stock, soup, curry
- Develop culinary skills so that you buy less processed foods and more base ingredients, which can be used in more than one meal
- Become familiar with the difference between best before and sell by

dates

- Use your freezer more often to store foods going out of date, rather than throwing them away
- Gain a better understanding of low, medium and high risk foods to that you take a more informed view of the foods you are throwing away
- Pass on to food banks
- Compost and use to grow foods for the following year

Any other correct responses can be credited.

Mark Range 8-10:	Responses will reflect a full discussion with most of the points suggested with reference to the initiatives consumers can take to help reduce good waste
Mark Range 4-7:	Responses will include a discussion of some of the points suggested with reference to the initiatives consumers can take to help reduce good waste, but in places superficially.
Mark Range 1-3:	1 or more relevant points made but may be superficial and lack accuracy and complete understanding
Mark Range 0:	No points worthy of credit

**9 (b) Tooth decay is one of the main reasons children under 9 years of age are admitted to hospital in the UK.**

**How could food manufacturers help to reduce the problem of tooth decay when developing ‘tooth friendly’ products for children?**

**[10 marks]**

Answers could contain any of the following:

Manufacturers could develop products which focused on:

- having lower monosaccharide content e.g. using sugar replacers such as Stevia or foods such as apple, carrot or beetroot, to sweeten cakes and biscuits
- products could be designed to contain the nutrient combination Calcium and Vitamin D to aid the development of strong teeth e.g. sandwiches made with a low fat soft cheese filling
- keeping acid levels as low as possible helps to reduce the impact on the developing enamel, by incorporating minerals such as phosphorus to neutralize any acids present e.g. milk
- crunchy fruit and vegetables e.g. apples, pears, celery, and carrots — are good for teeth in two ways. The crisp texture can act to rub away food left on teeth that can cause plaque. These foods require a lot of chewing, which also increases the production of bacteria-neutralizing saliva.

Any other correct responses can be credited.

Mark Range 8-10:	Responses will reflect a full discussion of justified points raised, with reference as to how food manufacturers could respond to the challenge of developing tooth friendly products
Mark Range 4-7:	Responses will include a discussion of some justified points with reference as to how food manufacturers could respond to the challenge of developing tooth friendly products, but may be superficial in places
Mark Range 1-3:	1 or more relevant points made with reference to how food manufacturers could respond to the challenge of developing tooth friendly products, but they may be superficial and lack accuracy and complete understanding
Mark Range 0:	No points worthy of credit

**10 (a) Type 2 Diabetes is now a serious health issue in many countries in the world.**

**Explain the factors that you think are responsible for the increase in this health issue**

**[10 marks]**

Answers could include any of the following:

- Increasing levels of obesity in the UK population as some individuals now consume more calories than are needed for their energy output
- The impact of media and advertising on people's food choices, encouraging a greater consumption of processed/takeaway foods
- A lack of regulation of the food industry to curb sales of sugary snacks and drinks and promotions such as Buy One Get One Free schemes
- A lack of food preparation/nutrition knowledge, allowing consumers to make more informed food choices
- A lack of understanding of food labels and the ability to spot sugar and fat ingredients in foods
- A lack of exercise as the UK becomes more sedentary and individuals favour online entertainment instead of exercise and fitness activities
- Increase in unhealthy diets due to the popularity of processed/takeaway foods
- An ageing population, as individuals become less active but do not lower their energy intake
- Ethnicity – being of south Asian, Chinese, African-Caribbean or black African origin (even if you were born in the UK)

Any other correct answers can be credited.

Mark Range 8-10:	Responses will reflect a full explanation of the diet-related factors that may be responsible for the increase in Type 2 Diabetes
Mark Range 4-7:	Responses will include explanation of some diet-related factors that may be responsible for the increase in Type 2 Diabetes, but answers may lack detail
Mark Range 1-3:	1 or more relevant points made but may be superficial and lack accuracy and complete understanding
Mark Range 0:	No points worthy of credit

**10 (b) Our food choices have both a positive and negative impact on the environment.**

**Explain what is meant by this, giving examples to illustrate your answer. [10 marks]**

Answers could include reference to the following:

Consumers could choose to buy foods that have a positive impact on the environment:

- Organic – lack of pesticide use on soils
- Seasonal – crops grown in relation to the seasons encouraging variation and rotation, keeping food affordable and reducing the need for some pesticides e.g. through nitrogen fixing in the soil from peas and beans
- Local - foods produced locally, so transport /storage/refrigeration costs are minimized
- Sustainable – choosing products that have been sustainably produced, protecting positive future production e.g. fish

Alternatively consumers could purchase foods that have a more negative impact on the environment, and these could include:

- Heavily packaged products which then requires disposal of the packaging
- Foods bought out of season that may involve the use of a lot of air miles
- Foods that have been harvested at the cost of the environment e.g. products containing palm oil

Any other correct responses can be credited.



Mark Range 8-10:	Responses will reflect a full explanation of the impact of food choices on the environment, giving examples as appropriate. A conclusion will be evident
Mark Range 4-7:	Responses will include some explanation of the impact of food choices on the environment, giving examples as appropriate, but answers may lack detail in places
Mark Range 1-3:	1 or more relevant points made but may be superficial and lack accuracy and complete understanding
Mark Range 0:	No points worthy of credit

**Section C**

**11 (a) Describe how one or more dessert products could be developed to:**

- **reduce the saturated fat content** **[5 marks]**
- **reduce the sugar content** **[5 marks]**
- **increase the soluble NSP (non-starch polysaccharide) content**
- **improve the taste.** **[5 marks]**

**You may use annotated sketches to illustrate your answer, but these are not essential.**

Maximum of 5 marks for each section.

Suggestions will vary based on the dish / dishes chosen.

Some candidates may choose to describe one dessert product, others may describe more than one in their answer.

**Reduce the saturated fat content by:**

- using low fat spreads rather than butter or lard
- using 'lite' versions of products such as cheese, yoghurt, milk etc.
- trimming fat from foods such as bacon
- using different cooking methods e.g. grilling rather than frying

**Reduce the sugar content:**

- using artificial sweeteners (e.g. Canderel)
- using natural sugar replacers such as Stevia

- replacing granulated sugar with grated natural alternatives such as carrot, beetroot and apple.

**Increase the soluble NSP (non-starch polysaccharide) content with:**

- oats
- gram flour
- soya flour
- barley and rye flours
- bananas and apples
- carrots and potatoes
- golden linseeds

**Improve the taste:**

This will vary with the given dish(es). Points can be credited as appropriate.

Any other correct responses/ alternatives can be credited for each section.

- 11 (b) With regard to the preparation, cooking and storage of food explain how ‘Safer Food, Better Business’ helps advise food handlers to help keep food safe for consumers.**

**[10 marks]**

Answers should include reference to some or all of the following:

Advice is divided into **5 areas** that include:

- 1. Cross contamination** - Personal hygiene, Cloths, Separating foods, Food allergies, Physical and chemical contamination, Pest control, Maintenance
- 2. Cleaning** - Cleaning: Hand washing, Cleaning effectively, Clear and clean as you go, A cleaning schedule, use of UV light to clarify hand hygiene
- 3. Chilling** - Chilled storage and display, Chilling down hot food, Defrosting, Freezing, use of temperature gauges
- 4. Cooking:** Cooking safely, Use of temperature probes, Foods that need extra care, Reheating, Checking menus, Hot holding, Ready-to-eat food
- 5. Management** - Management: Opening and closing checks/Extra checks, Prove it, Training and supervision/Customers, Suppliers and contractors/Stock control, Product withdrawal and recall, Safe method completion record

A **diary** designed in conjunction with food businesses allows tracking of all 5 of these areas.

Any other correct responses can be credited.

Mark Range 8-10:	Responses will reflect a full explanation of the areas of advice ' <a href="#">Safer Food, Better Business</a> ' gives food handlers, to help keep food safe for consumers
Mark Range 4-7:	Responses will include some explanation of the areas of advice ' <a href="#">Safer Food, Better Business</a> ' gives food handlers, to help keep food safe for consumers, but answers may lack detail in places
Mark Range 1-3:	1 or more relevant points made but responses may be superficial and lack accuracy and complete understanding
Mark Range 0:	No points worthy of credit

**11 (c) (i) Outline four different factors that affect the growth of bacteria in food products.**

**[4 marks]**

Any of the following responses can be credited:

- **Temperature:** – bacteria thrive between 6-63 °C, but most are destroyed above this. Temperatures below 5°C slow bacterial growth or keep bacteria dormant
- **Oxygen** – most bacteria need an atmosphere containing oxygen in which to multiply
- **Food** – bacteria need food to multiply and high risk foods are the ideal medium for this e.g. cooked chicken
- **Acidity level** – bacteria require low PH levels to enable reproduction so foods with a high acidic content prevent this e.g. foods that have been pickled
- **Time** – given the correct conditions bacteria reproduce by binary fission and can multiply into millions within 10-20 minutes. Food should be left at room temperature to cool for no longer than 1 hour before being refrigerated at 0-5°
- **Moisture** - bacteria need water to dissolve and ingest the food they use for energy and growth.

Mark range 3-4	Three to four different factors given with a correct explanation of each
Mark range 2	2 relevant factors given with some explanation of each but not all points may be relevant or accurate
Mark range 1	1 relevant factor given made but explanation may be superficial and lack accuracy and complete understanding
Mark range 0	No relevant responses

**11 (c) (ii) What checks could a food technologist handler put in place to help reduce the risk of bacterial contamination and growth in food production?**

**Give examples to illustrate your answer.**

**[6 marks]**

The following checks need to be in place by food handlers to make sure that the risk of bacterial contamination and growth is kept as low as possible:

1. To avoid cross-contamination of bacteria- good personal hygiene, use of different coloured boards e.g. red for meat, green for vegetables, and clean knives for different foods
2. Effective cleaning of foods (as relevant), work surfaces and equipment, using detergents and anti bacterial sprays to avoid transfer of bacteria to foods
3. Checking temperatures when:
  - i. Chilling – ensuring that hot food is left to cool down for a maximum of one hour at room temperature, before being refrigerated (0-5 degrees Celsius) and/or frozen, (-18 to -25 degrees Celsius)
  - ii. Cooking – ensuring that foods are cooked to the correct temperature (above 70 degrees Celsius) and for the correct amount of time

Mark Range 5-6:	Responses will reflect a full explanation of the checks that food handlers could carry out, to help keep the risk of bacterial contamination as low as possible
Mark Range 3-4:	Responses will include some explanation of some of the checks, but answers may lack detail in places
Mark Range 1-2:	1 or more relevant checks may be noted but responses may be superficial and lack accuracy and complete understanding
Mark Range 0:	No points worthy of credit