

# GCSE Food Preparation and Nutrition Core Questions

## Set 3: The science of food

Q No.	Question	Answer
1.	Why do we cook food?	I. To aid digestion, II. To improve the palatability (taste, texture and appearance), III. To avoid food contamination
2.	What are the 3 types of heat transfer?	I. Conduction II. Convection III. Radiation (infra-red and microwave)
3.	How is heat transferred to food by conduction?	Heat is transferred by direct contact with a hot surface
4.	Give some examples of how food is cooked using conduction?	Dry-frying, griddling, searing, sautéing.
5.	How is heat transferred to food by convection?	Heat is transferred when heated particles (liquid or gas) move into a cooler area.
6.	Give some examples of how food is cooked using convection?	Baking, roasting, deep frying, boiling, simmering, poaching
7.	How is heat transferred to food by infra-red radiation?	Heat is transferred using electromagnetic waves of heat or light.
8.	Give some examples of how food is cooked using infra-red radiation?	Toasting, grilling, barbequing
9.	How is heat transferred to food by microwave radiation?	The microwave oven converts electrical energy to microwaves which penetrate the food
10.	Give some examples of how food is cooked using microwave radiation?	Defrosting frozen food, heating up leftovers, ready meals.
11.	Give an example of a dish which uses more than one method of heat transfer in its production.	E.g. roast potatoes are cooked by convection in the air around them in the oven and conduction from the pan in which they sit.
12.	Give an example of a choice of cooking method which preserves nutritional value?	E.g. steaming rather than boiling retains the water-soluble vitamin content of vegetables.
13.	Describe how starch can be used to thicken a sauce by gelatinization.	When starch is heated in a liquid the starch granules soften and absorb water and the mixture thickens. Gelatinization (when a gel is made) happens at 66°C and above.
14.	What happens when starchy foods are cooked in a dry heat?	Dextrinisation – the food turns brown and the flavour changes.
15.	What happens when sugar is cooked?	Caramelisation – the food turns brown and the flavour changes.
16.	Describe the two ways fats are used to create texture in cakes and pastry?	1. Shortening - fat coats the flour particles, making a waterproof (or hydrophobic) coating, so the flour doesn't absorb water and gluten development is prevented. 2. Aeration – when creamed with sugar, fats aerate the mixture (trap tiny air bubbles) which helps make it rise.
17.	What happens to fat as they are cooked?	They soften and liquify and add flavour and colour.
18.	What do we mean by the plasticity of fats?	Plasticity is the ability of fats to be spread and shaped.

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19.	What does the plasticity of different fats depend on?	Each fats plasticity depends upon the temperature at which it liquifies.
20.	What is an emulsion?	A fine mixture of droplets of one liquid in another.
21.	What is a stable emulsion?	A stable emulsion is one that won't separate.
22.	How can we make a stable emulsion?	Using an emulsifier, like egg yolk.
23.	What happens to proteins when they are cooked, beaten or have acid added to them?	The structure of the protein is irreversibly changed as the molecules denature (unravel) and coagulate.
24.	What happens when protein rich foods, like meat, are cooked in a dry heat?	The Maillard reaction – the food turns brown and the flavour changes.
25.	How is a foam created? Give some examples of foams.	A protein is aerated, by whisking or whipping, which denatures the proteins making them light and airy. E.g. beaten egg whites, whipped cream.
26.	How is gluten formed?	When flour is mixed with water two proteins in it (gliadin and glutenin) combine to create gluten strands. These strands will get stronger as the dough is kneaded.
27.	What is strong flour, what would you use it for and why?	Strong flour contains more of the proteins which form gluten, which makes the dough elastic. It is used to make breads, pasta and choux pastry, which need a chewy texture.
28.	What is soft flour, what would you use it for and why?	Soft flour contains less protein so less gluten is formed and is used to make cakes, biscuits and scones which need a light texture.
29.	What effect does oxygen have on fruit and vegetables?	Oxygen reacts with the enzymes in cut fruit and vegetables making them brown – enzymic browning.
30.	How can enzymic browning be slowed down?	Put cut vegetables in cold water and toss sliced fruit in lemon juice (citric acid).
31.	Whys do we use raising agents?	They produce a risen, light airy texture in food.
32.	How do mechanical raising agents work?	They trap air, which expands when heated.
33.	List 5 ways of incorporating air into recipes and give an example of each.	<ul style="list-style-type: none"> <li>i. Sieving flour (cakes)</li> <li>ii. Whisking eggs (meringue)</li> <li>iii. Rubbing in fat into flour (pastry)</li> <li>iv. Creaming fat and sugar (cakes)</li> <li>v. Lamination traps air between layers (flaky pastry)</li> </ul>
34.	Describe how steam is a physical raising agent.	In products containing a lot of water (like Yorkshire pudding or choux pastry) the water turns into steam and pushes the batter upwards. The heat of the oven set the flour and egg mixture around the hollows created by the steam.
35.	What products are used to add CO <sub>2</sub> to create a light, airy baked texture?	Bicarbonate of soda, baking powder and self-raising flour.
36.	Why should food be fried in hot fats or oils?	If the fat is not hot the food will absorb the fat or oil, becoming greasy.
37.	Why do cakes sink in the middle?	If they are not cooked for long enough or the oven door is opened during cooking.
38.	Why might a cake surface crack?	The oven was too hot or too much raising agent was used.

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39.	Why might a cake be too thin?	The tin was too small or not enough raising agent was used.
40.	Why is important to use lids on pans?	To prevent too much water from evaporating, making food dry or burn.
41.	Why should you beat sauces before they boil and scrape edges and base of the pan?	To combine all the starch to prevent the sauce becoming lumpy and to stop it sticking and burning.
42.	How could you rescue a lumpy sauce?	By liquidising or sieving it.
43.	What might make shortcrust pastry tough and shrink from the sides of a tin?	If it was stretched too much or too wet.
44.	What happens if shortcrust pastry is over-kneaded?	It will be tough.
45.	Why might puff pastry be flat?	If the oven was not hot enough or the door opened during cooking.
46.	Name some food products which use fermentation by lactic acid bacteria in their production?	Salami, chorizo, yoghurt and cheese.
47.	Name some food products which use fermentation by yeast in their production?	Bread, beer and wine.
48.	Name a food product which use moulds in their production?	Blue cheeses.
49.	How should ambient food be stored?	At room temperature in tightly sealed packaging or air tight containers.
50.	How should chilled foods be stored?	In a fridge between 4°C and 5°C.
51.	How should frozen foods be stored?	In a freezer at -18°C and not defrosted until required.
52.	What labelling information is useful in preventing food spoilage?	Use-by date and storage and preparation instructions.
53.	What 4 things cause food spoilage?	<ul style="list-style-type: none"> <li>i. Microorganisms – bacteria, mould, fungi and yeast.</li> <li>ii. Enzymes in the food.</li> <li>iii. Insects and rodents.</li> <li>iv. Chemical reactions (between the food and oxygen or water).</li> </ul>
54.	What do microorganisms need to grow?	<ul style="list-style-type: none"> <li>i. Warmth</li> <li>ii. Oxygen</li> <li>iii. Moisture</li> <li>iv. A specific pH</li> <li>v. Time</li> </ul>
55.	How can food spoilage be prevented?	<p>By making the conditions for microbial growth unfavourable, e.g making the environment:</p> <ul style="list-style-type: none"> <li>i. Too cold</li> <li>ii. Removing oxygen</li> <li>iii. Keeping the food dry</li> <li>iv. Changing the pH</li> <li>v. Using food quickly</li> </ul>
56.	What are the signs of food spoilage?	<ul style="list-style-type: none"> <li>i. Discoloration</li> <li>ii. Changes in texture</li> <li>iii. Visible mould</li> <li>iv. Unpleasant smell</li> <li>v. Changes in flavour</li> <li>vi. “Blown” cans of jar lids.</li> </ul>

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57.	Name and explain the 3 ways food can be contaminated?	<ul style="list-style-type: none"> <li>i. Physical contamination - objects falling into food</li> <li>ii. Chemical contamination – cleaning products and pesticides in food</li> <li>iii. Bacterial contamination – microorganisms (bacteria, viruses, moulds and fungi) in food</li> </ul>
58.	What type of bacteria cause disease?	Pathogenic
59.	How does the bacteria which contaminates food come from?	<ul style="list-style-type: none"> <li>i. Poor hygiene</li> <li>ii. Raw meat and poultry</li> <li>iii. High risk foods</li> <li>iv. Pests</li> <li>v. Dust, dirty bins, waste food</li> <li>vi. Contaminated water</li> </ul>
60.	What is cross-contamination?	When bacteria from one food is transferred to another, as a result of poor hygiene.
61.	List the high risk foods.	<ul style="list-style-type: none"> <li>i. All animal protein foods (dairy, eggs, meat, poultry, fish, shellfish)</li> <li>ii. Gravies, soups and stocks</li> <li>iii. Cooked rice and pasta</li> <li>iv. Ready-made meals</li> </ul>
62.	What are the symptoms of food poisoning?	Tummy pain, diarrhoea, nausea, vomiting, fever or chills.
63.	Name 4 pathogenic bacteria and say where they are found.	<ul style="list-style-type: none"> <li>i. Campylobacter – raw poultry, meat, milk, sewage</li> <li>ii. Salmonella – human gut, raw poultry, meat, eggs, milk</li> <li>iii. Staphylococcus A – in human skin, hair, throat, nose, mouth, cuts, spots</li> <li>iv. E. coli - human and animal sewage, water, raw meat, muddy vegetables</li> </ul>
64.	What is the danger zone?	Temperatures in between 8°C and 63°C, at which bacteria will grow rapidly.
65.	How can foods be preserved to keep them safe for longer?	<ul style="list-style-type: none"> <li>i. Heating, e.g. pasteurisation</li> <li>ii. Freezing – bacteria will stop reproducing at low temperatures, but will not be killed</li> <li>iii. Drying e.g. dried noodles or pasta</li> <li>iv. Removing air, e.g. in cans and other packaging</li> <li>v. Chemical, e.g. preserving in vinegar, salt, sugar, smoke</li> <li>vi. Irradiation – low doses of radiation will kill all microorganisms</li> </ul>
66.	How can mishandling of food lead to increased food waste?	If food is mishandled it becomes spoiled and has to be thrown away.
67.	What are the benefits of reducing food waste?	It helps the environment (less landfill) and saves us money.