# Special dietary needs

<table>
<thead>
<tr>
<th>Dietary need</th>
<th>Foods to avoid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetarian choices</td>
<td>Meat, fish, eggs, <strong>Vegans</strong> – also avoid milk, cheese products</td>
</tr>
<tr>
<td>Nut allergies</td>
<td>Peanuts, almonds, cashews, hazelnuts</td>
</tr>
<tr>
<td>Wheat or gluten intolerance</td>
<td>Wheat, rye, oats, barley</td>
</tr>
<tr>
<td>Lactose and milk intolerance</td>
<td>Cow’s milk</td>
</tr>
<tr>
<td>Calorie controlled diets</td>
<td>Foods high in calories such as fatty and sugary food.</td>
</tr>
<tr>
<td>Diabetics</td>
<td>Cut down on fatty food especially food high in saturated fat.</td>
</tr>
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</table>
### Functional properties of food

<table>
<thead>
<tr>
<th>Property</th>
<th>Use</th>
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<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gelatinisation</td>
<td>Making sauces</td>
<td>Coagulation</td>
<td>Setting egg mixtures</td>
</tr>
<tr>
<td>Elasticity</td>
<td>Gluten in bread</td>
<td>Flavouring</td>
<td>Herbs and spices in products</td>
</tr>
<tr>
<td>Shortening</td>
<td>Fat in pastry</td>
<td>Colouring</td>
<td>Fats and eggs used in pastry</td>
</tr>
<tr>
<td>Aeration</td>
<td>Raising agents in cakes</td>
<td>Setting</td>
<td>Gelatine in mousses and jellies</td>
</tr>
<tr>
<td>Emulsification</td>
<td>Oil and vinegar in salad dressing</td>
<td>Fermentation</td>
<td>Bread production</td>
</tr>
</tbody>
</table>
Manufacturers buy ready made products called **standard components** to save time and money.

**Examples**
- Ready made pastry and pie fillings
- Ready chopped onions
- Prepared vegetables

**Advantages**
- Saves preparation time
- Fewer steps in the production process
- Less effort and skill required by staff
- Less machinery and equipment needed
- Helps make consistent products
- Saves money
- Food can be bought in bulk.

**Disadvantages**
- May be more expensive
- May not taste as good as fresh ingredients
- Needs to be stored if buy in bulk.
• **Bacteria** grow in warm conditions, between 20°C and 50°C.
• To control their growth, food should be kept out of the **danger zone** of 5°C to 63°C.

Most bacteria
• do not grow in the deep freezer
• grow slowly in the refrigerator at 5°C and below
• grow very rapidly at body temperature 37°C
• are killed when heated above 63°C.

**Chilled food** should be stored in a refrigerator between 0 and 5°C. Follow the use by date on food packaging.

**Frozen food** at -18°C.

**Ambient storage** is room temperature. Used for biscuits and canned products.

These are **critical storage temperatures**.

Food is **reheated** to 72°C at core.
Chilling

- Chilling extends the shelf life as most bacteria do not multiply quickly at low temperatures.
- Chilling slows down the growth of bacteria, yeast, moulds and enzymes.
- Chilled food should be stored in a chiller or refrigerator at or below 5°C.

Use a temperature probe to measure food temperature.

- Dip the metal point about 2 cm into the food and wait for the temperature to settle.
- Clean the probe point with an anti-bacterial wipe to prevent cross contamination from one food to another.
- Measure the temperature of freshly cooked food and reheated foods such as ready meals.

Food manufacturers monitor temperatures with computer controls.
Mass production means making foods on a large scale

Methods of food production

- **One off** – birthday cakes
- **Batch production** where products are made in batches such as lasagne
- **Continuous flow** is when the food is made 24 hours a day for products such as bottling milk.
The chart shows the process of making fish fingers.

Quality controls are in place at each stage:
- Fish is checked for freshness and quality.
- Fillets are cut, checked for bones and cut into same size planks (fish fingers).
- They are evenly coated in the correct colour of breadcrumbs.
- The fingers are fried at the correct temperature in oil.
- They are frozen to the correct temperature.
- Then put into packaging which has been designed with the required information.

What could go wrong at each stage?
Product quality control checks
These are made throughout production to produce consistent and safe food products.

**Visual Check**
Raw ingredients and finished products are checked by looking carefully at the product.

**Micro-biological check**
Samples are tested in a laboratory to see if there are dangerous levels of bacteria.

**Weight Check**
Products are weighed at the packaging stage. This is usually done by computer.

**Chemical Check**
Samples are tested in a laboratory to make sure they are free from contamination by dangerous chemicals.
Food labels

Information on the food label

- Name or description of the product.
- Name and address of manufacturer/importer/retailer.
- List of ingredients in descending order of weight.
- Weight, or quantity.
- Storage instructions, cooking instructions.
- Date mark – *use by* or *best before* date.

[Image of a food label showing Waitrose Smoky and savoury spaghetti carbonara.]

British pork - bacon

Serves 1

Use by date
CAD (Computer Aided Design) is used to designing food products.
CAM (Computer Aided Manufacture) is used to make a consistent product.

A consistent product is one that is the same size, shape, texture and taste each time. Computers monitor the food process and control when things need changing.

Advantages
• Less human error, greater accuracy
• Quicker, makes things cheaper
• Food products are same size, shape
• Makes products more efficiently
• Reduces waste.

Disadvantages
• Expensive to set up
• Needs skilled staff to operate.

What went wrong?
Sensory analysis is needed at each stage of product development.

**Types of test**
- product profile tests,
- ranking and rating tests,
- difference tests.

Learn how these tests are carried out and how they are used for product development.
Sensory analysis is carried out in controlled conditions so that the testing is fair.

Which senses are used?

- Sight – appearance
- Smell and taste – aroma and flavour
- Touch – texture and mouthfeel
- Sound – noise

These are sensory characteristics.

Name some sensory characteristics for crisps.
Additives

- Can be natural, nature identical or artificial
- Help food keep safe longer,
- Stop oils and fats from going rancid
- Add colour.

Types of additive

- **Preservatives** such as vinegar, lemon juice, salt and sugar help food to keep longer.
- **Anti-oxidants** prolong shelf-life and stop fatty food from going rancid.
- **Colours** such as caramel and tartrazine are added to food to make it look more attractive and to replace the colour which might be lost during processing.
- **Emulsifiers and stabilisers** like lecithin let fats and oils mix with water to make low-fat spreads and salad dressings.
- **Artificial sweeteners** such as saccharin, aspartame and acesulfame-K are much sweeter than sugar. They can help people eat less sugar as they are low in calories.
- **Flavourings** can be natural, nature identical or artificial. Monosodium glutamate MSG is a flavour enhancer sometimes used in many Chinese meals and foods.

Custard powder uses annatto for yellow colouring
<table>
<thead>
<tr>
<th>Food Poisoning Bacteria</th>
<th>Symptoms</th>
<th>Sources and causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salmonella</td>
<td>Diarrhoea, vomiting, pain, fever.</td>
<td>Raw meat, poultry and eggs. Spread by cross contamination and undercooked food.</td>
</tr>
<tr>
<td>Campylobacter</td>
<td>Fever, headache and feeling unwell, followed by diarrhoea.</td>
<td>Raw meat and poultry. Spread by cross contamination. Thorough cooking needed.</td>
</tr>
<tr>
<td>Listeria monocytogenes</td>
<td>Mild flu like symptoms and then illness.</td>
<td>Found in soil, vegetables and raw milk. Thorough cooking will destroy the bacteria.</td>
</tr>
<tr>
<td>E coli</td>
<td>Diarrhoea and in elderly can cause severe illness</td>
<td>Underwashed vegetables and undercooked meat. Cook food thoroughly.</td>
</tr>
<tr>
<td>Staphylococcus aureus</td>
<td>Severe vomiting, diarrhoea and pain.</td>
<td>Found on the skin, cuts and boils and transferred to food.</td>
</tr>
<tr>
<td>Clostridium perfringens</td>
<td>Diarrhoea, vomiting, pain.</td>
<td>Soil and animal faeces and makes spores which may not be killed in cooking.</td>
</tr>
<tr>
<td>Bacillus cereus</td>
<td>Diarrhoea, and sometimes vomiting.</td>
<td>Soil, dust and rice. Spores need to be destroyed by heat.</td>
</tr>
</tbody>
</table>
Hazards cause harm and can happen throughout the food production chain.

**Types of food hazard:**

**Biological** - bacteria such as salmonella in raw chicken, Campylobacter in seafood, meat, Listeria in soft cheeses and patés, E-coli in cooked meats.

**Chemical** – cleaning materials, pesticides, contaminated oil.

**Physical** - glass, metal from equipment, wood from boxes, insects from plants, jewellery, hair, fingernails, cigarettes.
Chilled products can be packed using modified atmosphere packaging (MAP) which changes the gases in the pack and extends shelf life. Used for fresh meat, salads, prepared vegetables.

Cook chill products are ready meals which have been cooked first.

Ambient food is stored at room temperature for food that is packed in cans, cartons or packs such as biscuits.

### Packaging

<table>
<thead>
<tr>
<th>Packaging material</th>
<th>Recycled</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper and card</td>
<td>Yes</td>
<td>Strong, lightweight, does not break, can be printed.</td>
<td>Crushes and does not protect from damp. Recycled paper can’t be used for food products.</td>
<td>Inexpensive but not as strong as other packaging.</td>
</tr>
<tr>
<td>Plastic and polystyrene</td>
<td>Not always</td>
<td>Strong and lightweight good barrier to water, does not react to food, sometimes can be recycled.</td>
<td>A litter problem as it does not biodegrade.</td>
<td>Inexpensive but does not biodegrade.</td>
</tr>
<tr>
<td>Metal – aluminium and steel, foil</td>
<td>Yes</td>
<td>Strong and rigid, good barrier to water, and can be printed.</td>
<td>Must be coated on the inside to prevent change.</td>
<td>Expensive but can be recycled and reused like cans.</td>
</tr>
<tr>
<td>Glass</td>
<td>Yes</td>
<td>Reusable and easily recycled, good barrier to water, can be printed.</td>
<td>Easily broken.</td>
<td>Inexpensive and can be reused like milk bottles.</td>
</tr>
</tbody>
</table>

Food companies and consumers need to reduce the amount of waste that goes to landfill to help improve our environment. Recycling schemes reuse materials and biodegradable packaging is being used by supermarkets – this will decompose in time. Food packaging cannot be reused for food products as it could contaminate.
## Sustainable issues

<table>
<thead>
<tr>
<th>Food issues</th>
<th>What it means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic food</td>
<td>Organic food is grown with fewer pesticides and chemicals but it is more expensive to produce and sell. Animals are free to range outside and not farmed intensively.</td>
</tr>
<tr>
<td>Genetically modified food (GM)</td>
<td>GM crops have been created to deal with future issues such as drought. They are not sold in the UK at the moment.</td>
</tr>
<tr>
<td>Farm Assured</td>
<td>These schemes such as Red Tractor and RSPCA check that animals are reared in good conditions.</td>
</tr>
<tr>
<td>Food miles</td>
<td>This is the number of miles food travels from field to plate. Many people try to buy local, seasonal fruit and vegetables and reduce purchases of out of season ingredients.</td>
</tr>
<tr>
<td>Fair Trade</td>
<td>This label makes sure that farmers in developing countries get a fair deal.</td>
</tr>
<tr>
<td>Seasonal, local food</td>
<td>Lower carbon footprint, food can be fresher and it reduces food miles.</td>
</tr>
<tr>
<td>Carbon footprint</td>
<td>This is to measure the impact a product has on the environment.</td>
</tr>
</tbody>
</table>
Future food problems
The world’s 6.5 billion population could reach 9 billion by 2050. Our demand for food will exceed our ability to produce it.
Issues to think about:
Climate change will worsen the problem, as droughts and floods prevent crops growing.
As new economies such as China and India eat a wider range of food products, demand on global food production increases.

Genetically modified GM crops can be more nutritious, resistant to drought and disease and grow without chemical fertilizers.
GM crops must be assessed for risks to the environment and human health before they are grown commercially as people are concerned about safety.
GM products include GM maize which is grown in the US, GM tomatoes and GM soya.
Nanotechnology is about changing things that are so small they are measured in nanometres.

- Nanotechnology is used in food production, farming, processing and packaging.
- There is debate about the effect of nanotechnology on the environment and safety.

Nano food

flavour and colour and release them when food is ready to eat.

Nano salt needs less salt in a recipe
<table>
<thead>
<tr>
<th>Key terms to learn</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5 a day</strong></td>
</tr>
<tr>
<td>Aeration</td>
</tr>
<tr>
<td>Allergies</td>
</tr>
<tr>
<td>Ambient temperature</td>
</tr>
<tr>
<td>Best Before Date</td>
</tr>
<tr>
<td>Bulking</td>
</tr>
<tr>
<td>CAD and CAM</td>
</tr>
<tr>
<td>Carbon footprint</td>
</tr>
<tr>
<td>Chilled Food</td>
</tr>
<tr>
<td>Consistency controls</td>
</tr>
<tr>
<td><strong>Binding</strong> uses fats, eggs, cereals and flour to bind ingredients together. Egg binds together a biscuit mixture or beefburgers.</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td><strong>Coating</strong> means covering the food in a protective layer such as breadcrumbs and egg on fried fish.</td>
</tr>
<tr>
<td><strong>Enriching</strong> is adding an ingredient to improve the quality. Nutrients are added to increase nutritional value.</td>
</tr>
<tr>
<td><strong>Glazing</strong> adds a shiny coating, for example, pastry brushed with beaten egg before cooking.</td>
</tr>
<tr>
<td><strong>Plasticity</strong> describes how a food can be moulded and shaped.</td>
</tr>
<tr>
<td><strong>Shaping</strong> means forming the shape of foods like biscuits or fish cakes.</td>
</tr>
</tbody>
</table>