

FOOD TECHNOLOGY (basic knowledge)



FOOD TECHNOLOGY

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FOOD TECHNOLOGY

DESIGN CONSIDERATIONS

1-Food product development

Development starts with a brief and market research. The design specification is tested and a manufacturing specification is written for production. There also need to be quality-control checks, part of a process called quality assurance.

➤ Food development

Foods are developed in a number of stages. They need to be tested and evaluated throughout these stages to ensure they are meeting requirements.

☐ Brief

The first stage of food development is the brief, which is the problem that needs to be solved.

☐ Market research

Market research means finding out information about what people want from a product. It includes studying market trends and shopping habits. This can be done by conducting surveys, questionnaires, and telephone interviews.

FOOD TECHNOLOGY

DESIGN CONSIDERATIONS

1-Food product development

➤ Food development

☐ Design specification

The design specification is the first attempt at listing the needs of the product. It includes:

- size
- shape
- shelf life
- weight
- sensory characteristics (taste, texture, appearance, etc)
- costs
- ingredients (with quantities)
- equipment

FOOD TECHNOLOGY

DESIGN CONSIDERATIONS

1-Food product development

➤ Shortlisting and testing

Initial ideas are generated following the design specification. These are then shortlisted based on **concept screening**, where five or six ideas are chosen, based on which ideas best meet the design specification.

☐ Sensory testing

It is essential to test *sensory qualities*. The results are analysed so that the product can be improved or changed. This is called **sensory analysis**.

•**Ranking tests:** Similar products are tested for a specific characteristic, for example saltiness. Samples are given randomly coded names, and testers sort the products from most to least salty.

Rating tests: Products are tested for a specific characteristic to find out if there is a noticeable difference between two products. For example, manufacturers can test a new low fat version of a product to see if it is similar to the original. The products are randomly coded and testers rate them using a scale:

1. dislike a lot
2. dislike a little
3. neither like or dislike
4. like a little
5. like a lot

In one type of test the testers are given two identical products and one different product. They are asked to pick the different product.

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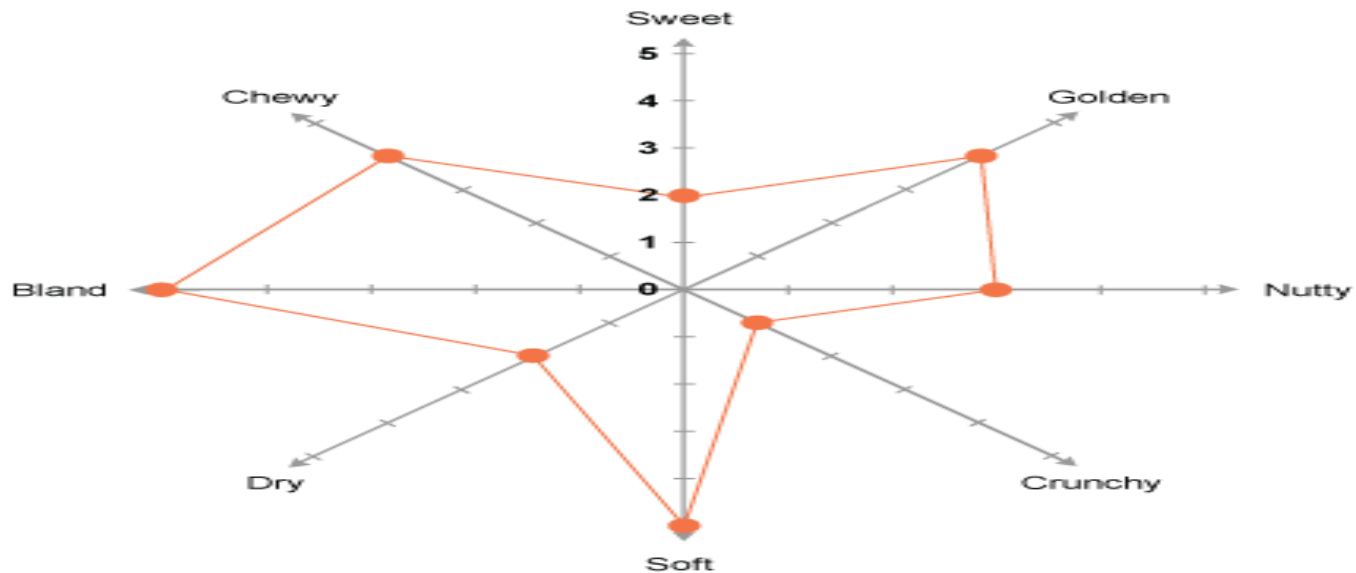
DESIGN CONSIDERATIONS

1-Food product development

➤ Shortlisting and testing

☐ Sensory testing

Profile test: The profile of a product can be recorded as a **star diagram**. Testers rate characteristics on a five point scale (1 being the lowest and 5 being the highest). The results are plotted on the star.



FOOD TECHNOLOGY

DESIGN CONSIDERATIONS

1-Food product development

➤ Shortlisting and testing

❑ Modifications

Any changes to the design specification need to be made before the final manufacturing specification is prepared. For example, sensory testing may reveal that the food is too spicy, so the ingredients may need to be modified.

➤ Manufacturing specification

▪ The **manufacturing specification** lists information a manufacturer needs to produce the product. The specification records the stages of the production process, with details of all the **characteristics** (shape, size, texture, colour, flavour etc) required in the final product.

▪ It also lists where **standard components** can be used. A standard component is a pre-prepared ingredient used in the production of a food product, like pizza bases or ready-made sauces.

➤ Quality control

Quality assurance (QA) guarantees that food meets a clear, consistent set of standards. At key stages in production there should be **quality control checks** so manufacturers are alerted to any problems. The results of these checks are recorded. Checks can be done by hand or by computer.

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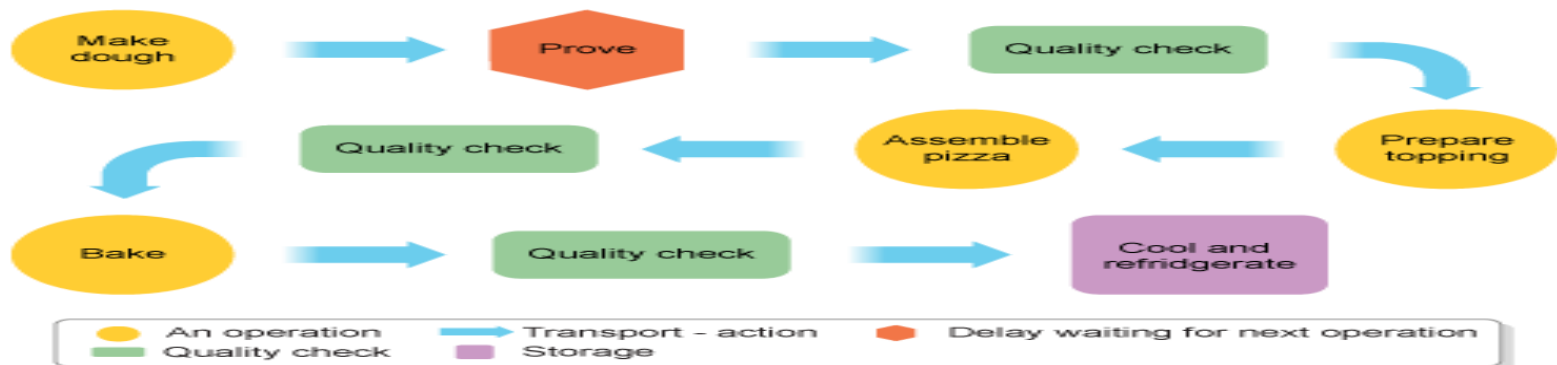
DESIGN CONSIDERATIONS

1-Food product development

➤ Quality control

Quality control checks will normally include:

- **weight checks** to make sure the product is the required weight
- **visual checks** to make sure it looks the way it should
- **temperature checks** to make sure it is being kept at an appropriate temperature
- **pH checks** to make sure the food has the correct acidity/alkalinity
- **microbiological checks** to make sure bacteria are not at harmful levels
- **chemical checks** to guard against chemical contamination
- **metal checks** to guard against contamination by metals (usually at the packing stage, using a metal detector)
- **organoleptic checks** to check flavour, texture and aroma by sampling the food product



FOOD TECHNOLOGY

DESIGN CONSIDERATIONS

2-Food packaging and labelling

Food packaging protects and preserves food. A range of materials can be used for packaging, some of which are environmentally friendly. Labels carry information for the consumer. Some of this information is required by law.

➤ Packaging functions

The main purposes of food packaging are:

- to preserve the product
- to protect the product from damage
- to make the product more attractive to the consumer
- to make it easier to transport the product

➤ Packaging materials

☐ Plastics

Plastics are widely used in food packaging because they are ((Note: not all plastics have all the below qualities.):

- versatile - plastics can be flexible or rigid, and can be moulded into shapes.
- resistant to acids and other chemicals
- easy to print on
- lightweight
- cheap to produce

FOOD TECHNOLOGY

DESIGN CONSIDERATIONS

2-Food packaging and labelling

➤ Packaging materials

☐ Plastics

❖ Modified-Atmosphere Packaging (MAP)

Air in a plastic container can be modified to prolong shelf life and slow down colour deterioration.

MAP is used to package:

- cold meats
- smoked fish
- cheeses
- salads
- fresh pasta

☐ Other packaging materials

Paper, card, metal and glass can also be used for packaging.

FOOD TECHNOLOGY

DESIGN CONSIDERATIONS

2-Food packaging and labelling

Material	Advantages	Disadvantages	Uses
Glass	<ul style="list-style-type: none">•- reusable•- heat-resistant•- recyclable•- keeps shape•- low cost	<ul style="list-style-type: none">•- fragile•- safety issues•- heavy	<ul style="list-style-type: none">•- baby foods•- salad cream•- pickles
Metal	<ul style="list-style-type: none">•- recyclable•- lightweight•- impermeable•- withstands heat processing	<ul style="list-style-type: none">•- may react with food	<ul style="list-style-type: none">•- soup cans•- take-away containers•- bottle tops
Card/paper	<ul style="list-style-type: none">•- easy to print on•- cheap to produce•- biodegradable•- recyclable•- can be moulded•- can be coated•- lightweight	<ul style="list-style-type: none">•- not water-resistant•- easily damaged	<ul style="list-style-type: none">•- fruit-juice cartons•- egg boxes

FOOD TECHNOLOGY

DESIGN CONSIDERATIONS

2-Food packaging and labelling

➤ Environmentally friendly packaging

Environmentally friendly packaging causes less damage to the environment. There are three types:

- **Reusable packaging** can be cleaned and re-used. For example, glass milk bottles are reused.
- **Recyclable packaging** is made of materials that can be used again, usually after processing. Recyclable materials include glass, metal, card and paper.
- **Biodegradable packaging** will easily break down in the soil or the atmosphere

Recyclable packaging should carry standard symbols that show what the product is made from and how it can be recycled.

➤ Layers of packaging

- **Primary packaging** is seen at the point of sale. It needs to contain and protect the food product, as well as display it and provide information.
- **Secondary packaging** is the middle layer of packaging - for example a cardboard box with a number of identical products inside.
- **Transit packaging** is the outer container that allows easier handling during transfer between factory, distribution centres and retailers

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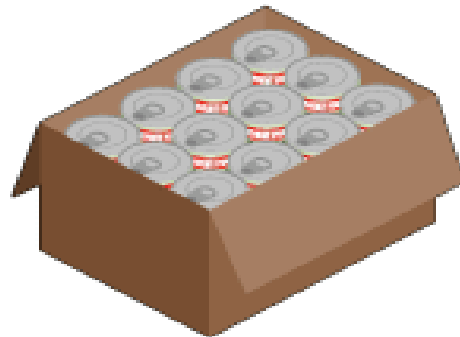
DESIGN CONSIDERATIONS

2-Food packaging and labelling

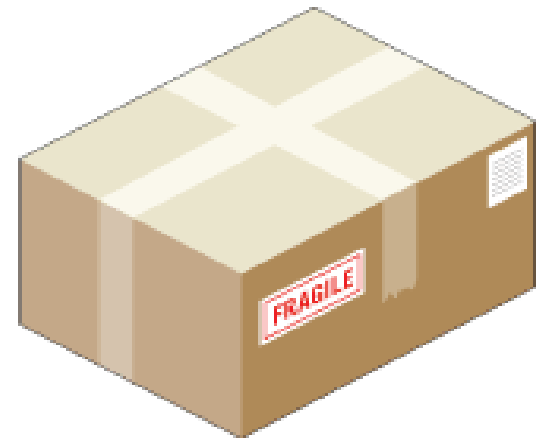
➤ Layers of packaging



**Primary
packaging**



**Secondary
packaging**



**Transit
packaging**

FOOD TECHNOLOGY

DESIGN CONSIDERATIONS

2-Food packaging and labelling

➤ Labelling

The **Food Labelling Regulations** of 1996 require certain information to be given on all pre-packed foods. These requirements are written by the EU.

☐ Food labelling



FOOD TECHNOLOGY

DESIGN CONSIDERATIONS

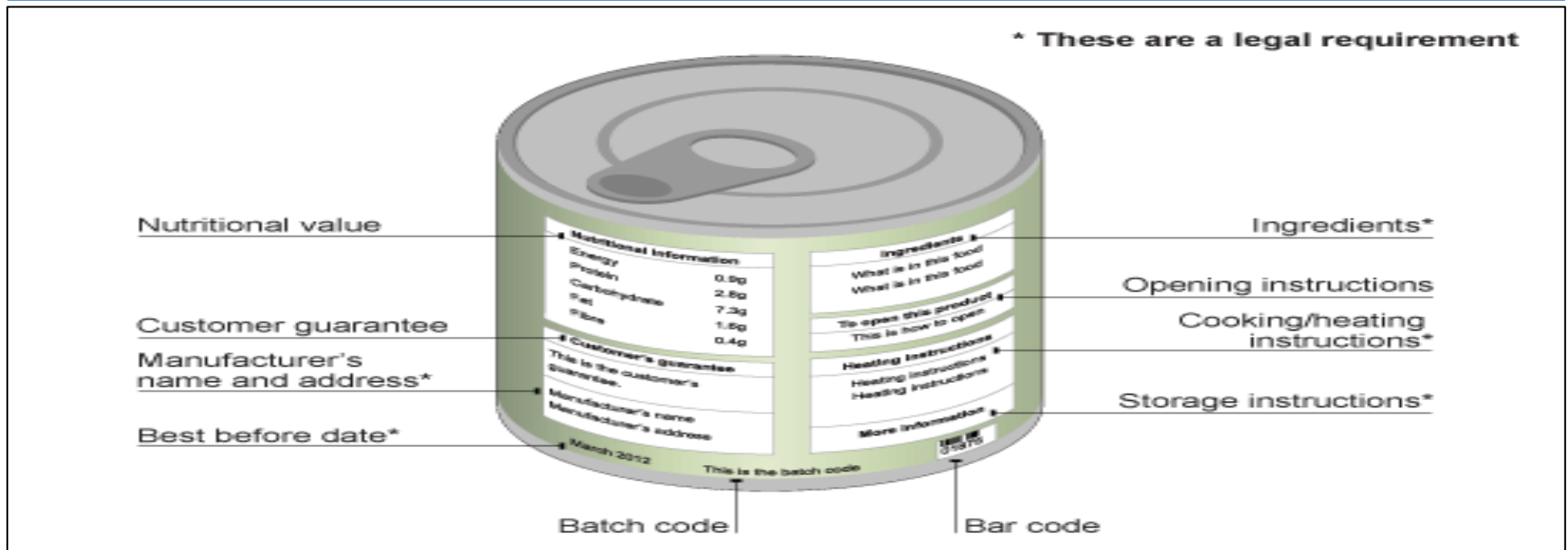
2-Food packaging and labelling

➤ Labelling

These are the items on the label that are required by law	The following items are not legal requirements, but are nevertheless good practice and often included on packaging:
<ul style="list-style-type: none">✓ manufacturer's name and contact details✓ name of the product✓ description of the product✓ weight (some foods are exempt, for example bread)✓ ingredients (listed in descending order of weight)✓ cooking/heating instructions✓ storage instructions✓ shelf life✓ place of origin✓ allergy information	<ul style="list-style-type: none">✓ illustration of product✓ price✓ nutritional values of the product✓ customer guarantee✓ the batch-code and bar-code numbers✓ opening instructions

FOOD TECHNOLOGY

DESIGN CONSIDERATIONS



☐ Nutritional Information

- The Food Standards Agency (FSA) devised a traffic light system to make it easier for consumers to know the nutritional content of food.
- Nutritional software can be used to analyse the nutritional content of foods.



FOOD TECHNOLOGY

DESIGN CONSIDERATIONS

3-Social and environmental issues

Social, environmental and ethical factors affect the foods that consumers buy. Diets can be affected by allergies and intolerances. A balanced diet is needed to prevent health problems.

➤ Social factors

Social factors are things that affect **lifestyle**, such as religion, family or wealth. These can change over time. Food developers need to be aware of these changes to make foods that meet the needs of consumers.

For example, consumers now expect to find a wide range of foods. This is because:

- communities are more **multicultural**, meaning they are made up of different races and religions, often with their own traditional cuisines
- TV cookery programmes encourage people to try new foods
- increased travel abroad means exposure to new foods
- improved transportation and technology means less reliance on local or seasonal produce

➤ Environmental and ethical factors

Food choices can be based on environmental and ethical factors.

FOOD TECHNOLOGY

DESIGN CONSIDERATIONS

3-Social and environmental issues

☐ Environmental factors

Environmental factors are things that help reduce the impact of food production on the environment and might cause someone to choose to buy a product. For example, locally produced food doesn't have to be transported as far, so less CO₂ is produced. This means there is less of an impact on the environment.

☐ Ethical factors

Ethical factors are things that can be seen as morally right. For example, buying fair trade food which provides farmers with better working conditions.

Fair trade food production aims to provide fair prices and better working conditions for farmers and farm workers.

Farm assured means that the farms and food companies meet high standards of food safety and hygiene, animal welfare and environmental protection.

Food miles means the distance that food travels from where it is grown to where it is bought. This is an environmental concern because of the CO₂ emissions from transport.

Free range is a method of farming where animals are allowed to roam freely.

Genetically modified food is grown with genetic manipulation technology. Some people consider this a risk to the environment and choose GM-free products.

Organic foods have been grown without the use of chemical fertilisers or pesticides.

Seasonal foods means foods that are in season. Choosing these reduces food miles

Sustainability is food production that aims to preserve the world's natural resources for future generations

FOOD TECHNOLOGY

DESIGN CONSIDERATIONS

3-Social and environmental issues

➤ Diets

Diets can be adopted for **health reasons** such as allergies, intolerances or needing to lose weight. Examples of diets are:

- **Calorie controlled** - food energy is measured in calories. Keeping calorie consumption below the energy your body uses up causes weight loss.
- **Coeliac disease** - an intolerance to **gluten**. Gluten is found in foods containing wheat, eg bread, cakes, and pasta.
- **Diabetes** - is where blood sugar level is higher than normal. Diabetics need to monitor carbohydrate intake.
- **Lactose intolerance** - is an inability to absorb the sugar that naturally occurs in cow's milk.
- **Nut allergy** - means a sensitivity to nuts, causing a reaction which can be severe.
- **Vegetarian** - means not eating meat and fish. Protein must be obtained from dairy products, nuts and pulses.

☐ High fibre diet

Fibre or **non starch polysaccharide (NSP)** is not absorbed by the body but is needed to help maintain a healthy digestive system. There are two types of fibre:

- **Soluble fibre** - found in fruit, vegetables, pulses and oats. It helps to reduce blood cholesterol.
- **Insoluble fibre** - found in cereal such as bread and pasta. It helps to stimulate the digestive system.

FOOD TECHNOLOGY

DESIGN CONSIDERATIONS

3-Social and environmental issues

➤ Healthy eating guidelines

The **eatwell plate** shows the proportions of food groups that should be eaten daily in a well-balanced diet. It shows a healthy diet should be high in fruit and vegetables, and starchy foods like bread and pasta. A smaller amount of dairy products like milk and cheese, and sources of protein such as meat or fish are also needed. Foods that are high in sugar or fat, like chocolate and crisps, are needed in a much smaller quantity.



❑ Effects of an unbalanced diet

An unbalanced diet includes **too much or too little** of the recommended food groups. This can lead to health problems, such as:

- coronary heart disease
- high blood pressure
- obesity
- tooth decay
- diabetes

FOOD TECHNOLOGY

MATERIALS & COMPONENTS

1-Nutritional properties

The main nutrients are **proteins**, **carbohydrates**, **fats**, **vitamins** and **minerals**. Each nutrient has a **different purpose**.

➤ **Nutrients**

☐ **Proteins**

- Proteins assist with **growth** and **repair** of the body.
- Proteins are found in **animal** products like meat, fish, cheese, milk and eggs. **Vegetable** sources include soya-bean products, pulses and nuts.

☐ **Carbohydrates**

Carbohydrates are needed to give the body **energy**. There are two types of carbohydrate - **starch** and **sugar**.

- Starch is found in cereals, cornflour, potatoes, pasta and flour.
- Sugar is found in fruit, vegetables, honey, milk and malt products.

☐ **Fats**

Fats help to provide concentrated sources of **energy** and help to **insulate** the body in cold weather. There are two main types.

- **Saturated fats** are usually obtained from animal sources, for example butter and lard. The exceptions are coconut and palm oils.
- **Polyunsaturated fats** come from vegetable sources, such as sunflower oil

FOOD TECHNOLOGY

MATERIALS & COMPONENTS

➤ Vitamins

Vitamins are needed in very small amounts for growth and health. The main vitamins are vitamin A, the B complex of vitamins, vitamin C and vitamin D. →→ **Uses and sources of vitamins**

Vitamin	Need for	Sources
Vitamin A	<ul style="list-style-type: none">•- good vision•- healthy skin•- growth	<ul style="list-style-type: none">•- green and yellow vegetables•- dairy products
•Vitamin B •(thiamin, riboflavin and niacin)	<ul style="list-style-type: none">•- release of energy from foods•- healthy skin	<ul style="list-style-type: none">•- breads•- milk•- eggs
Vitamin B12	<ul style="list-style-type: none">•- red blood cells	<ul style="list-style-type: none">•- meat•- milk•- fish
Vitamin C	<ul style="list-style-type: none">•- healthy skin•- protects cells•- helps absorb iron	<ul style="list-style-type: none">•- fruit•- vegetables
Vitamin D	<ul style="list-style-type: none">•- helps absorb calcium•- strong teeth and bones	<ul style="list-style-type: none">•- margarine•- oily fish

FOOD TECHNOLOGY

MATERIALS & COMPONENTS

➤ Minerals

Minerals are needed in small amounts to help the body function properly and stay strong. **Calcium** and **iron** are two important minerals.



❖ Calcium

Calcium is needed for the growth of **healthy teeth and bones**. Sources of calcium include milk, cheese, eggs, wholegrain cereals, green vegetables, bread and tofu.

❖ Iron

Iron is needed for the **formation of red blood cells**. Sources of iron include red meat, green vegetables, eggs, lentils and bread.

❖ Other minerals

Other minerals that the body needs include potassium, sodium, magnesium and zinc.

FOOD TECHNOLOGY

MATERIALS & COMPONENTS

2-Functional properties

Foods have different functional properties which can be treated and combined. They can be finished to improve palatability. Additives are used for a number of reasons and can be artificial or natural.

➤ Nutritional properties

☐ Tarch

- **thickens** a liquid by forming a *suspension* such as a sauce
- forms a **gel** when the suspension is heated, like adding cornflour to a custard powder and milk mix

☐ Sugar

- **flavours** by sweetening
- **colours** by *caramelising* when heated
- *aerates* when beaten with a fat such as in a cake mix

☐ Proteins

- can **coagulate** which is when a liquid becomes firmer, for example when an egg is heated
- can aerate a mixture, like whisking egg whites in a meringue mix

☐ Fats

- **shortens** pastry (makes it more crumbly) by making it less stretchy
- can act as an *emulsifying agent* to stop two liquids from separating
- **moistens** a baked mixture such as a cake

FOOD TECHNOLOGY

MATERIALS & COMPONENTS

2-Functional properties

➤ **Treating foods**

Some foods have different working properties when treated in certain ways. They can be treated by:

- ☐ **Aerating** incorporates air by sieving, creaming, whisking, beating, folding and rolling, or rubbing in. **Raising agents** can be used to make a mixture lighter, for example, baking power is used in cakes.
- ☐ **Coagulation** is when something thickens from a liquid to a solid. For example, raw eggs are clear and runny but become white and solid when heated.
- ☐ **Preserving** helps food to last longer through freezing, canning, jam-making, or pickling. Fats, sugar and oil are used in preserving.
- ☐ **Tenderising** tough meat makes it easier to eat. Lemon juice, vinegar or wine can be used as a marinade, or meat can be tenderised with mechanical action using a meat mallet or slow cooking.
- ☐ **Thickening** uses eggs, pulses, cereals and fruit to thicken liquids such as milk, and heat is usually applied. Egg custard is made like this.

FOOD TECHNOLOGY

MATERIALS & COMPONENTS

2-Functional properties

➤ Combining foods

Most of these working properties can be found in many different foods. The functional properties of different foods can be combined by

- ☐ **Binding** uses fats, eggs, cereals and flour to bind ingredients. For example, egg is used to bind together a biscuit mixture.
- ☐ **Bulking** forms the main structure of a food product, such as flour in biscuits and cakes.
- ☐ **Enrobing** means coating a food with another ingredient, for example, dipping fish in beaten egg and then breadcrumbs.
- ☐ **Enriching** is the addition of an ingredient to improve the quality. Nutrients are sometimes added to increase nutritional value.
- ☐ **Fermentation** uses yeast to convert carbohydrates into alcohol and carbon dioxide. In bread making, yeast is added to flour and water causing the dough to rise.
- ☐ **Flavouring** can be savoury, like herbs and spices, or sweet, like sugar or sweeteners. Sugar helps to soften the sharp taste of grapefruit.
- ☐ **Shortening** uses of oils and fats to reduce the development of gluten in pastry to make the dough less stretchy.
- ☐ **Stabilising** helps food keep its structure. Eggs and flour are used for stabilising.
- ☐ **Setting** means using ingredients to make foods firm, such as gelatine to set cold desserts.

FOOD TECHNOLOGY

MATERIALS & COMPONENTS

2-Functional properties

➤ **Finishing**

Finishing techniques are used to make the food look good. For example:

- ☐ **Browning** uses fats, eggs, sugar, milk, flour or oil, which darken a food when heated.
- ☐ **Glazing** adds a shiny coating, for example, pastry brushed with beaten egg before cooking.
- ☐ **Icing** can add colour and texture.

Finishing can help improve **palatability**, which is the appeal of the food, and includes taste, colour and smell.

FOOD TECHNOLOGY

MATERIALS & COMPONENTS

2-Functional properties

➤ Food structures

When ingredients are combined they can form many different kinds of mixture or structure.

- ☐ **Solution** is when one substance is dissolve in another one, for example when sugar is dissolved in water we get a sugar solution.
- ☐ **Colloid** is a general term for when two substances are mixed together. For example milk has a colloidal structure, because it is made from microscopic drops of fat dispersed in a water-based liquid.
- ☐ **Emulsion** is when two unblendable liquids are mixed together, for example, oil and vinegar. An emulsifier like egg yolk is needed to stop them from separating. Emulsions are a particular type of colloid. Mayonnaise is an emulsion.
- ☐ **Foam** is when air bubbles are incorporated into a liquid, such as in whipped cream and meringue
- ☐ **Gel** contains a small amount of a solid in a large amount of liquid. A small amount of gelatine can set a large amount of liquid.
- ☐ **Suspension** is when a solid is held in a liquid. The solid may sink if the mixture is not stirred. Flour (solid) is suspended in milk (liquid) when making a cheese sauce.

FOOD TECHNOLOGY

MATERIALS & COMPONENTS

2-Functional properties

➤ Additives

Food additives can be classified as natural or artificial.

- **Natural additives** occur naturally in foods. They are extracted and put into other foods. Caramelised sugar is used as colouring in cola.

- **Artificial additives** do not occur naturally. They are made synthetically for a certain purposes. For example tartrazine is a synthetic colouring added to some sweets to make them yellow.

❑ Uses for additives

Both natural and artificial additives are used for many different reasons:

- ❑ **Preservatives** extend the shelf life of a product. Salt is used in bacon and sausages.

- ❑ **Colouring** makes food products look more appealing and appetising.

- ❑ **Flavourings** can be used to add or improve the flavour of a food product. Vanilla flavouring is often added to cakes and biscuits.

- ❑ **Emulsifiers** are used to prevent ingredients from separating. For example, lecithin, which is found in eggs, is used to stop the ingredients in mayonnaise from separating.

FOOD TECHNOLOGY

MATERIALS & COMPONENTS

2-Acidity and temperature

Foods can be acidic, alkaline or neutral. The rate a food deteriorates is determined by acidity and temperature. Foods must be reheated properly to prevent food poisoning.

➤ Food acidity

Acidity or **alkalinity** of food is measured on the **pH scale**, which runs from 1 to 14. A strong acid will have a pH of 1, and a strong alkali will have a high pH value, like 14



Some foods, such as citrus fruits, are acidic. Others, like sodium bicarbonate, are alkaline. Foods that are neither acid nor alkaline, like pure water, are called **neutral** and have a pH value of 7. Acidity or alkalinity affects: 1-the taste of final product 2- the rate at which microorganisms grow within and upon food

Acidic fruit mixed with milk will cause the mixture to curdle.

Vinegar (acid) is added to meringue to give it a soft marshmallow texture

Bicarbonate of soda (alkaline) acts as a raising agent during baking.

Lemon juice (acid) helps prevent fruits like apples from discolouring.

FOOD TECHNOLOGY

MATERIALS & COMPONENTS

2-Acidity and temperature

➤ Food temperature

☐ Microorganisms in food

Bacteria, mould and **yeast** are all types of *microorganism*. They cause food to change, sometimes making food unpalatable.

Heating and cooling can make food less resistant to microorganisms. This affects its ability to stay fresh.



☐ **Chilling:** Dairy produce, cooked foods and raw ingredients should be kept at a temperature **between 0°C and 5°C**. This will slow the growth of microorganisms, but won't stop i

☐ **Freezing:** Meats, vegetables and ready meals can be frozen. Freezing maintains high standards of freshness and safety. Freezers store products at **-18°C or below**. Freezing does not kill microorganisms, but will keep them dormant until the food is unfrozen.

☐ **Reheating foods:** Food must be reheated to **at least 72°C** to avoid the risk of food poisoning. Leftovers should be disposed of quickly.

FOOD TECHNOLOGY

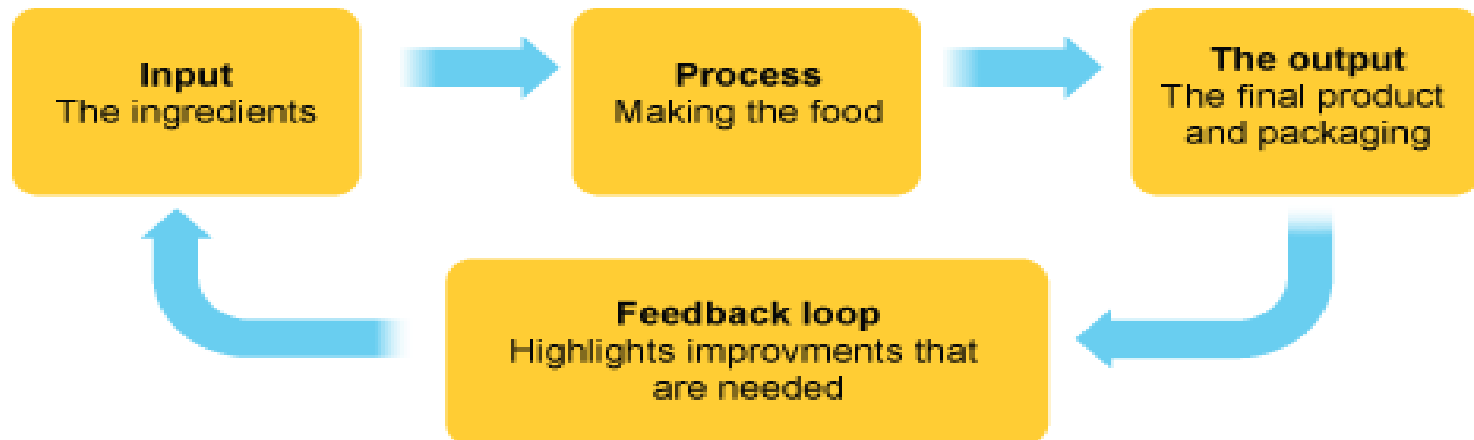
FOOD PRODUCTION

1-Systems and practices

Production systems consist of inputs, processes, outputs and feedback. There are different scales of food production that require different kinds of equipment. CAD and CAM can be used to design, test, and monitor processes. Standard components can be used to speed up production. Safety is ensured through hazard analysis and critical control point checks.

➤ Production systems

The production process can be viewed as a system, incorporating the following elements:



FOOD TECHNOLOGY

FOOD PRODUCTION

1-Systems and practices

➤ Production systems

- ☐ **Inputs** are everything that goes into the system, such as the ingredients.
- ☐ **Processes** include weighing, mixing, shaping and forming of mixtures, cooking, cooling, and packaging. Checks are carried out throughout the process.
- ☐ **Output** is the end product, complete with packaging.
- ☐ **Feedback** can happen throughout the production process. Control checks flag up the need for alteration and improvement to the inputs or processes.

➤ Manufacturing methods

There are different types of manufacturing systems which are suitable for different scales of production.

- ☐ **One-off production** is when a single product is made, for example a designer wedding cake. This is classed as a luxury food item.
- ☐ **Batch production** involves making of a set number of identical products. Typically batch production is used in a bakery, where a certain number of different types of loaves will be made every morning.
- ☐ **Mass production** is used to make foods on a large scale. The **production line** involves repetitive tasks so machines are often used. This saves time and helps lower the cost of production.
- ☐ **Continuous-flow production** is a high-volume production method where machines run 24 hours a day. It is often used to produce milk and packet pizzas.

FOOD TECHNOLOGY

FOOD PRODUCTION

1-Systems and practices

➤ Computer aided design

Computers are essential in the **development** and **manufacture** of food products. **Computer Aided Design (CAD)** helps create, modify and communicate information efficiently. **Computer modelling** allows designers to test models and changes without carrying them out.

CAD is used for:

- ☐ **Nutritional analysis software** provides nutritional information to help create foods for a balanced diet
- ☐ **Simulate changes to inputs and processes** so the impact of modifications can be predicted
- ☐ **Calculate costs and amounts** of ingredients needed for batch production
- ☐ **Packaging design and advertising decisions** using graphics and 3D modelling software
- ☐ **Sensory profile software** is used in testing and can analyse and rank results
- ☐ **Production flowcharts** show where Hazard Analysis Critical Control Points (**HACCP**) checks need to be included in the factory processes.

FOOD TECHNOLOGY

FOOD PRODUCTION

1-Systems and practices

➤ Computer aided manufacture

Computer Aided Manufacture (CAM) efficiently controls and monitors production using computers. Multiple processes can be carried out at the same time.

CAM is used to:

- ☐ monitor temperature
- ☐ monitor weight
- ☐ check pH control conveyor belt speed
- ☐ monitor quantities of ingredients

Advantages	Disadvantages
<ul style="list-style-type: none"><input type="checkbox"/> more consistent results<input type="checkbox"/> reduces labour costs<input type="checkbox"/> improves accuracy, reducing waste<input type="checkbox"/> faster for high-volume production<input type="checkbox"/> improved safety and hygiene<input type="checkbox"/> easier monitoring	<ul style="list-style-type: none"><input type="checkbox"/> expensive to set up<input type="checkbox"/> needs skilled operators<input type="checkbox"/> can be slower for one-off or low-volume production

➤ **Equipment:** A range of electrical and mechanical equipment is used to make sure that products are **consistent**, or to reduce the **time and effort** required.

FOOD TECHNOLOGY

EQUIPMENT NAME	EQUIPMENT PURPOSE
Electronic scales	Weigh food accurately
Depositor	Put exact amounts of ingredients into different containers at the same time
Mandolin	Slice food portions equally
Food processor	Blends and mixes ingredients
Hand blender	Used to purée food eg in soups
Dough hook	Mixing and kneading dough
Electric whisk	Whisks ingredients saving time and effort
Cutters	Ensure food is the same shape and size eg biscuit cutters
Temperature probe	Check temperatures in high risk foods
Tunnel oven	Ensures continuous even cooking using a conveyor belt
Deck oven	Cooks a batch of several foods at the same time
Boiling vats	Huge drums used for cooking liquids eg soups, chocolate
Date-stamping machine	Label packaged food with a date stamp

FOOD TECHNOLOGY

FOOD PRODUCTION

1-Systems and practices

➤ Standard components

A standard component is a **pre-prepared ingredient** that is used in the production of a food product.
Examples of standard components are:

- pizza bases
- ready-made sauces
- ready-made cake mixes
- frozen pastry
- ready-made icing
- stock cubes

Advantages of using standard components

- ensures consistency
- saves time and effort
- less skill required by staff
- less specialist equipment needed
- can reduce costs
- components bought in bulk
- reduces risk - high risk foods prepared elsewhere

Disadvantages of using standard components

- less reliable - one manufacturer depends on another
- components can be more expensive
- *sensory qualities* may not be as good as fresh ingredients
- large amount of storage space
- time needed for ordering and delivery

FOOD TECHNOLOGY

FOOD PRODUCTION

➤ Reducing hazards

Potential hazards in food production can be reduced by a system called **hazard analysis critical control points (HACCP)**. This identifies what could go wrong in the production process and establishes checks that will prevent or reduce risks. This is called **hazard analysis**.

☐ Hazard analysis

- ✓ **Biological hazard** - foods become dangerously infected by bacteria which might lead to food poisoning. Symptoms of food poisoning can include diarrhoea, vomiting, headaches and fever.
- ✓ **Physical hazard** - foreign materials can cause injury to the consumer. These could come from metal or plastic from factory machinery, or natural hazards like bones in fish.
- ✓ **Chemical hazard** - potentially dangerous chemicals like cleaning fluids or pesticides contaminate food. These could cause severe illness.

☐ Critical control points

Critical control points (CCPs) are pre-determined checks that take place at specified points in the food production or preparation process. They include: 1.temperatures, using probes and thermometers 2.cooking times 3. ensuring food is handled correctly The checks are documented and include the processes being checked, any faults and any action taken. Checks can be done by hand or using CAM.

☐ **Personal hygiene** :Good personal hygiene is essential during food preparation and production because it helps to reduce hazards. It is a legal requirement to report any illness to a supervisor.

FOOD TECHNOLOGY

LINKS

[1-FOOD STANDARDS AGENCY](#)

[2-UK FOOD & DRINK INDUSTRY EVENTS AND NEWS](#)

[3-BRITISH RETAIL CONSORTIUM](#)

[4-INTERNATIONAL FEATURED STANDARDS – IFS](#)

[5-EUROPEAN FOOD SAFETY AUTHORITY](#)

[6-HTTP://WWW.FOODNAVIGATOR.COM/](http://WWW.FOODNAVIGATOR.COM/)

[7-HTTP://WWW.FOODMANUFACTURE.CO.UK/](http://WWW.FOODMANUFACTURE.CO.UK/)

[8-HTTP://WWW.FOODPROCESSING.COM/](http://WWW.FOODPROCESSING.COM/)

[9-HTTP://WWW.ALLABOUTFEED.NET](http://WWW.ALLABOUTFEED.NET)

[10-HTTP://WWW.DAIRYVIETNAM.COM/EN/DAIRY-IN-THE-WORLD.HTML](http://WWW.DAIRYVIETNAM.COM/EN/DAIRY-IN-THE-WORLD.HTML)

SOURCES

- *The British Broadcasting Corporation*
- <http://www.bbc.com/>