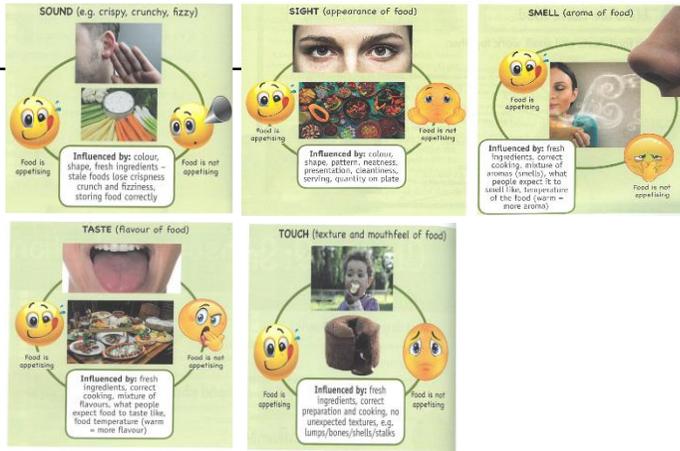


Sensory Testing

Examples of scales that can be used					
Scale example:					
1	1 (the best)	2	3	4	5 (the worst)
2	Least salty				Most salty
3					
4	Far too little sugar	Not enough sugar	Just right	A bit too much sugar	Far too much sugar

Sensory analysis is a way of measuring the sensory qualities of food. It is used to check the popularity of new food products and identify any changes which might need to be made to improve it further. It ensures that the product developed is one the consumer wants and needs. There are a variety of ways in which sensory analysis tests can be carried out, they are shown in the tables below.

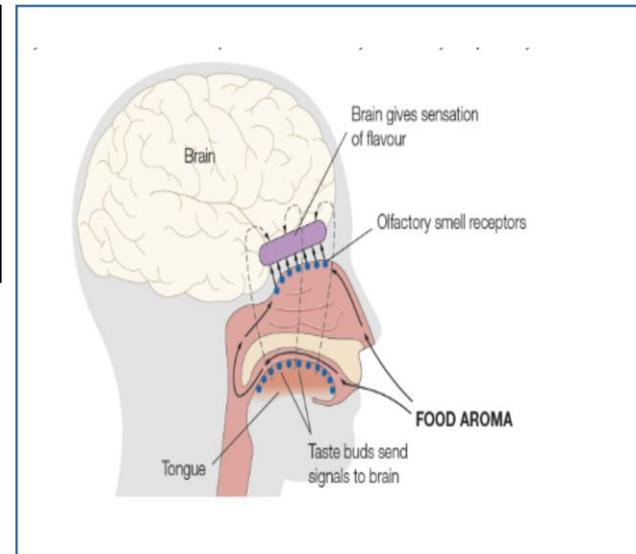


How we taste food

To enjoy the flavours of food, the sense of taste and smell have to work together. The flavours are detected by your taste buds on the tongue. These have tiny sensitive hairs that send messages to the brain. These detect 5 groups of flavours including salt, sweet, bitter, sour and umami.

Most foods are combinations of many different chemicals to give a unique flavour. These are released when food is cooked and detected by the nose and stimulate appetite. When we eat the food and chew it these chemicals go up the nose where special olfactory receptors pick them up and send messages to the brain about what they smell like.

The taste buds and receptors work together to give us the sensation of different flavours. The receptors give about 80% of flavour. A blocked nose and cold limits the strength of the flavour because the receptors don't pick up as many chemicals.



Discriminatory tests

These are used to find out if people can tell the difference between similar samples of food. There are 2 types of this test.

1. Triangle test

In this test 3 samples are given, two of them are identical the third one is different. The testers are asked to pick out the sample which is different. It is to see if they can discriminate between the food samples when something has been changed, for example, Bolognese sauce, where the salt content has been reduced in one sample.

2. A not A test

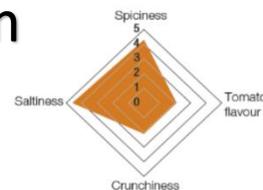
This is the opposite of the triangle test. People are given a sample to try (sample A). They are then given two more samples one of which is identical to sample A the other has had something changed. They have to identify which of the other two samples is the same as Sample A.

How senses influence food choice

The senses of sight, smell, taste, touch and sound work together to decide on our opinion about different foods. It is important to prepare appetizing food which appeals to the senses.

Sensory descriptors are words used to describe the specific qualities of food, for example, 'crunchy', 'sweet'.

Star diagram



Preference tests

These are used to find out which food product people like the best. There are 2 types of preference test.

1. Paired preference test

In this test people are given two similar samples of food and they say which one they prefer, e.g. mild cheddar and mature cheddar or burgers made with different meat.

2. Hedonic rating test

In this test people give their opinion of one or more foods products by filling out a table that uses a scale of preference. For children smiley faces can be used and numbers for adults. Random numbers are used to avoid bias and ensure a fair test.

Sample - use random codes, e.g. 567, 897, 343, or XYZ, ZXY, etc.*	 I liked it very much 1	 I liked it a little bit 2	 I didn't like or dislike it 3	 I didn't like it much 4	 I didn't like it at all 5
567					
897					
343					
281					

Grading tests

These tests are used to put into order a particular characteristic of a food product or the order in which people like a set of food samples.

1. Ranking test

In this test 5 samples are given and people are asked to rank them in order for the characteristic you are testing, e.g. crispness. Once testing it complete the results can be shown.

2. Rating test

In this test people are asked to rate a particular characteristic such as taste or how much they like it on a scale of 5. Numbers, words or smiley faces can be used. Examples are shown below:

3. Profiling test

People are asked to rate the intensity of a set of sensory descriptors for a food product out of 5. A sensory descriptor is another name for the characteristic of a food, e.g. sweetness. Add up the scores and divide by the number of people to get the average score. Plot the findings on a star diagram to give a visual profile.

How to set up a food tasting panel

Advice for setting up and carrying out	Reasons
Use a quiet area away from food preparation and cooking activities	To avoid food tasters being disturbed by other people
Use 5-10 people	To ensure realistic results
Use hygienic conditions e.g. separate spoons and samples	To avoid contamination by micro-organisms
Give clear instructions to the testers	So they know exactly what they need to do
Give charts to food tasters so they can fill them in as they taste the food	So that you can keep an accurate record of the results
Give tasters water or plain crackers to drink between samples	To clear their taste buds so they do not get confused between samples
Food samples should be coded randomly with numbers or letters	So the food tasters do not know which sample is wish to ensure a fair test called a blind test
Give tasters small samples and same sized servings of food	To prevent food tasters filling up and not tasting all the samples properly.
Samples should be presented at room temperature	To prevent the flavours being affected and so that tasters can taste them comfortably
Samples should be served on the same coloured plate usually white or black	To prevent the tasters senses from being distracted or influenced by the background colour

Food safety includes looking at food spoilage, micro-organisms, bacterial contamination, buying and storing food plus preparation and cooking.

Types of microorganism that can spoil foods: **Bacteria, moulds, yeasts.**

Micro-organisms make food unfit and unsafe to eat: Because they contaminate it with their waste products, their physical presence (being in the food) and the toxins (poisons) that they produce.

Conditions needed for micro-organisms to grow and multiply: The right temperature, food, moisture, time, the right amount of acidity/alkalinity (pH).

Pathogenic micro-organisms, e.g. bacteria/moulds cause food poisoning. • Non-pathogenic microorganisms do not cause food poisoning.

Yeasts are tiny plants in the air which settle on food

High risk foods are foods that will spoil quickly and are most likely to cause food poisoning because bacteria and other micro-organisms can grow and multiply very easily and quickly in it. • They have the right conditions for growth: nutrients (especially protein) and water/moisture. • These types of foods spoil very quickly and must be refrigerated, cooked thoroughly and eaten within a few days. • Examples: meat, poultry, fish, shellfish, cream, milk, cheese, eggs, yogurt.

Pathogenic bacteria examples are:
Campylobacter, E. coli, Salmonella, Listeria.

• The symptoms of food poisoning can include:



- bad abdominal pain (stomach ache)
- diarrhoea



- nausea (feeling sick)
- vomiting (being sick)



- headache
- dizziness



- a raised body temperature
- feeling cold and shivery

Food safety

Enzymes are • Natural substances (mostly proteins) found in foods and all living things. • Called biological catalysts, which means they have the ability to speed up chemical reactions.

Enzymes affect fruits and vegetables when they have been harvested they ripen and eventually break down the cells and tissues in them. They change colour and any starch they contain is broken down and converted to sugar so they soften and sweeten.

Some fruits, such as apples + bananas, go brown when exposed to air because enzymes and natural substances in them react with oxygen when they are cut or peeled. Enzymes are proteins. Proteins are denatured by acids. Lemon juice contains citric and other acids, which stop the enzymic browning process from happening because it denatures the protein. Salt, submerging in water or vinegar also delay enzymic browning

Moulds are air borne spores. Lots of types exist. In right conditions when mould spores land on food they germinate and send down a root system (mycelium) into food. Invisible waste products from the mould come out through the mycelium and into the food. They may be harmful (toxic), so even if the visible mould is scraped off, there may still be waste products present

Some micro-organisms do not cause food poisoning but are used in food production
Blue-veined cheese: A special culture containing non-pathogenic bacteria and the spores of a non pathogenic mould is added to the milk. • The bacteria set the milk into a semi-solid by turning the lactose sugar (in the milk) into lactic acid, which coagulates the protein, adds flavour and texture and helps to preserve the cheese. • The moulds germinate as the cheese ripens which adds blue veins and a particular flavour.

Bread: A special baker's yeast is used. If given the right conditions of warmth, moisture, food (sugar or starch) and time, it breaks down the starch in the flour and produces CO₂ gas bubbles, which make the dough rise. It also produces alcohol, which adds flavour, but evaporates in the oven. The yeast adds flavour to the baked bread.

Yogurt: made from milk fermented by two types of non-pathogenic bacteria. • The bacteria ferment the lactose sugar in the milk producing lactic acid. The lactic acid denatures and coagulates the milk proteins, which makes the milk become semi-solid. • The lactic acid and other natural substances that are produced give the yogurt its distinct, traditional flavour.

-18°C to -24°C Freezer.
Bacteria dormant

Chilled food 0°C to 5°C.
Bacteria multiply slowly



5°C to 63°C **Danger zone.** Bacteria multiply rapidly = ideal conditions for growth

75°C. Cooked from raw food
Reheat cooked food once

63+°C keep cooked food hot

Steps to prevent food poisoning when buying, storing and cooking food:

Buying foods: • Food should be bought from a reputable supplier and the shop should be clean. • The foods should be stored correctly in the shop, e.g., perishable foods at the correct temperature in fridges or freezers • The food should be in good condition, e.g. there should be no bruising on fruit or veg • The foods should be within the use-by date for high-risk foods (such as chicken, dips, burgers and cream) and best-before date for ambient foods, such as breads. The packaging needs to be checked to ensure that it is intact and there is no contamination from rodents.

Storing food: • Follow the instructions on packaging. • High risk foods need to be stored in a fridge at a temperature to slow down the growth of micro-organisms. Frozen foods should be stored in a freezer so that micro-organisms are dormant. • It is important to rotate the stock within a fridge and freezer so that foods are eaten within their use-by dates. This also helps to avoid throwing food away which is out of date. • Raw meats stored on the bottom shelf of the fridge to avoid any drip from the raw meat touching the cooked foods and causing cross-contamination. • All foods should be stored in the correct containers or sealed packages to avoid cross-contamination or damage to the food during storage.

Cooking food: The person cooking is following personal hygiene rules e.g. wearing a clean apron, cleaning hands before handling food, making sure long hair is tied back. • The area where food is being prepared should also be clean e.g. wiping surfaces with antibacterial spray, ensuring all equipment is clean. Any frozen foods should be thoroughly defrosted before cooking to ensure that the centre of the food is cooked thoroughly. • High-risk foods should be cooked to 75°C to ensure that harmful micro-organisms, such as Salmonella, are destroyed and to help prevent food poisoning. • A food probe could be used to ensure that this temperature is reached in the centre of food e.g. chicken

Key words: Buying and storing food

- **Ambient storage:** The food is stored at ordinary room temperature – usually about 20–21°C.
- **Shelf-life:** This is how long a food product will last before it becomes unsafe or unpalatable [not nice] to eat.
- **Use-by date:** It is not safe to eat the food after its use-by date.
- **Best-before date:** This tells you that after this date, a non-high-risk food will still be safe to eat, but may have begun to go stale (changed in texture and flavour). After the best-before date the food may not be at its best quality.
- **Temperature danger zone:** The danger zone is from 5 to 63°C. This is the temperature range in which bacteria grow rapidly.
- **Core temperature:** This is the internal temperature food must be heated to which to ensure it is cooked properly. A minimum core temperature of 70°C for 2 minutes (or an immediate reading of 75°C).

Points to look for when buying:

Fresh Fruit and vegetables • A good, bright colour • A firm, crisp texture (not wilted or soft) • An unblemished smooth skin • No mould growth • Not too much soil on the skin of root vegetables • No damage • Stored so air can circulate freely • Buy only when you can see the quality of the fresh produce • Buy food in season.

Fresh meat • Not too much fat • A bright red or pink colour for beef, lamb or offal • Creamy-white to pink clean flesh for poultry • A fresh smell • Moist flesh, but not wet, slimy or dried out • A firm, springy texture • No risk of cross contamination • Stored at the correct temperature of less than 5°C • Do not buy more than you need as it can deteriorate quickly.

Fresh fish: • Bright red gills • Firm flesh • A fresh smell, no fishy smell • Clear, shiny eyes that are not sunken • Scales firmly attached, not loose and flaking off • Moist (but not slimy) skin • Bright, natural colouring • White fish should be a pearly colour • Shellfish should be intact; shells should not be broken

Campylobacter Found in dirty water, raw poultry + meat. Milk. Incubation 48–60 hours. Diarrhoea, abdominal pain, nausea, fever
E.coli—beef (minced), raw milk, dirty water. Incubation = 12–24 hours. Diarrhoea, abdominal pain, vomit, fever + kidney damage
Salmonella—raw + undercooked poultry, eggs + meat, raw milk. 12–36 hours. Diarrhoea, abdominal pain, vomiting, fever
Listeria—soft cheese + made from unpasteurised milk; salad veg., pates. 1–70 days. Flu-like symptoms.
Staphylococcus aureus—people Hands, nose, mouth, skin. 1–6 hours. Abdominal pain, vomiting, low body temperature

Avoiding Cross contamination—Bacteria can spread. Occurs when juices from raw meats or germs from unclean objects touch cooked or ready-to-eat foods. Supermarket, check food stored separately; keep apart in shopping trolley + bags. • If using reusable bags, place raw foods in plastic bag to prevent juices leaking. • Keep raw meat, poultry and seafood on the bottom shelf of fridge in a sealed container or bag to ensure juices don't drip and cause contamination. • Keep eggs in the original carton and store on shelves of the refrigerator. • Store reusable bags in a clean, dry place + and often with hot, soapy water. Avoid leaving reusable shopping bags in the boot of vehicle. • Preparing food: Wash hands thoroughly with warm, soapy water for 20 seconds before, during and after handling raw meats + foods or other high-risk foods. • Wash plates between uses or use separate plates: for raw and another for cooked foods. • Place washed produce into clean storage containers, not back into original ones. • Never use the knife or preparation tool for raw meat, poultry or seafood to chop produce or ready-to-eat foods. • Use one cutting board for meat, poultry and seafood, and a separate cutting board for produce and ready-to-eat foods. • Use separate work surfaces for raw and cooked foods or be sure to wash the surfaces thoroughly between preparing raw and cooked food. • Cover prepared food to protect it from pests + dust. • Defrost frozen foods e.g. chicken thoroughly, in bottom of refrigerator on a tray to catch liquid that leaks.

1. Base your meals on starchy carbohydrates - They contain more fibre than white or refined starchy carbohydrates and can help you feel full for longer. Try to include at least 1 starchy food with each main meal. Keep an eye on the fats you add when you're cooking or serving these types of foods because that's what increases the calorie content – for example, oil on chips, butter on bread and creamy sauces on pasta

2. Eat lots of fruit and veg - A portion of fresh, canned or frozen fruit and vegetables is 80g. A portion of dried fruit (which should be kept to mealtimes) is 30g.

3. Eat more fish – including a portion of oily fish. Fish is a good source of protein and contains many vitamins and minerals. Aim to eat at least 2 portions of fish a week, including at least 1 portion of oily fish. Oily fish are high in omega-3 fats, which may help prevent heart disease

4. Cut down on saturated fat and sugar

6. Get active and be a healthy weight
- As well as eating healthily, regular exercise may help reduce your risk of getting serious health conditions. It's also important for your overall health and wellbeing. Being overweight or obese can lead to health conditions, such as type 2 diabetes, certain cancers, heart disease and stroke. Being underweight could also affect your health.

5. Eat less salt - Eating too much salt can raise your blood pressure. People with high blood pressure are more likely to develop heart disease or have a stroke. Even if you do not add salt to your food, you may still be eating too much. About three-quarters of the salt you eat is already in the food when you buy it, such as breakfast cereals, soups, breads and sauces. Adults and children aged 11 and over should eat no more than 6g of salt (about a teaspoonful) a day. Younger children should have even less.

7. Don't get thirsty - You need to drink plenty of fluids to stop you getting dehydrated. The government recommends drinking 6 to 8 glasses every day. This is in addition to the fluid you get from the food you eat.

8. Don't skip breakfast Some people skip breakfast because they think it'll help them lose weight. But a healthy breakfast high in fibre and low in fat, sugar and salt can form part of a balanced diet, and can help you get the nutrients you need for good health. A wholegrain lower sugar cereal with semi-skimmed milk and fruit sliced over the top is a tasty and healthier breakfast.

The 8 Tips for Healthy Eating

These 8 practical tips cover the basics of healthy eating and can help you make healthier choices.

Allergen labelling

There are rules that determine the way allergen information appears on labels and on food that is pre-packed, sold loose or served in a restaurant, café or take-away. Fourteen major allergens will be highlighted on the label within the ingredients list. The allergens are:

Foods containing gluten, present in wheat, barley and rye 	Crustaceans 	Eggs 	Fish 	Lupin 
Peanuts 	Soybeans 	Milk 	Nuts 	Molluscs 
Celery 	Mustard 	Sesame seeds 	Sulphur dioxide 	

The allergen could be identified in **bold**, highlighted, underlined or in *italics*.

The example below is for a basic Victoria sponge:

Eggs, **wheat flour**, **butter**, **sugar**, **vanilla essence**, **baking powder**

Food Labelling

Information that is mandatory	Notes
Name of the product	If its not obvious what the product is then a description must be given.
A list of ingredients	They are shown in descending order, with largest first. It is useful for people trying to avoid ingredients and see hidden sugars and fats.
Weight, volume or quantity	<ul style="list-style-type: none"> The label must show the net quantity (the actual weight or volume not including the weight of the packaging). This is useful for comparing with other products. The E symbol on food labels tells the consumer that the weight or volume is the average amount. Products sold in numbers do not need to show weight.
Manufactures name and address Place or origin or provenance	This is useful for raising issues with the manufacturer. Foods imported from outside the EU must show the country of origin.
Instructions for cooking	Heating and cooking instructions are important to prevent food poisoning.
Shelf life – shown as ‘best before’ or ‘use by’	Use by dates are found on high risk, perishable foods that become a food poisoning risk if stored for too long. Best before dates are found on products with a long shelf life like biscuits or canned foods.

Food labels are designed to give consumers a range of information about individual food products to inform them about what they are choosing to buy.

- The labels are made **eye-catching** and **colorful**. They appeal to the target group. This is all done to attract the consumer to buy the product . **Slogans** and **phrases** are also used.
- Some information on the label is **mandatory** (required by law) and some is not.

What the law says..

- The EU issues mandatory Food Information for consumers regulations for general and nutritional labelling. Revised in 2014 in 2016 nutritional labeling became law.
- The UK Government also issues guidance and regulations on labelling.
- The Food Standards Agency (FSA) oversees and enforces labelling
- The Department of Health is responsible for nutritional labelling

Storage instructions	These are given to ensure the produce is stored safely to prevent food poisoning.
Any necessary warnings	<ul style="list-style-type: none"> A warning is given if the product contains Genetically Modified ingredients. A warning is given if the product was preserved by irradiation. If a food is packaged using a gas the words 'packaged in a protective atmosphere must be shown. This extends the shelf life of the product. If foods contain certain ingredients, e.g. food colorings certain words must be used in the warning. <p>These warnings are given to allow the consumer to make choices about the products they buy.</p>
Additional issues	The label must show if the food contains a known allergen that may given a person an allergic reaction so they can avoid this product.

Nutritional labelling

Nutritional labelling is used to inform consumers about the nutritional profile of a food product (what nutrients it contains and in what amounts) From 2016 it became law to show nutritional information on pre-packaged food products. It must be clearly shown in a suitable sized font. The following nutrients must be shown:

- Protein
- Fat, including saturates
- Carbohydrates, including sugars
- salt

Vitamins and minerals can be included voluntarily. If a health claim is made then this information must be displayed in the label.

The information must be shown in the format below:

Nutrient	Per 100g	Per serving (150mg)
Energy	586 kJ/140 kcal	879kJ/210kcal
Fat	1.5g	2.25g
of which:		
Saturates	0.2g	0.3g
Monounsaturates	0.9g	1.35g
Polyunsaturates	0.4g	0.6g
Carbohydrate	50.0g	75.0g
of which:		
Sugars	2.5g	3.25g
Starch	42.0g	63.0g
Fibre	5.5g	8.25g
Protein	8.0g	12.0g
Salt	0.2g	0.3g

The Food Standards Agency has designed a simple, visual way called the 'Traffic Light System' for consumers to identify whether food products contain high, medium or low amounts of fat, saturated, sugar or salt, using the colours of the traffic light as a guide:

	Per 100g of food		
	Low	Medium	High
Fat	Less than 3g	3g - 20g	More than 20g
Saturated fat	Less than 1.5g	1.5g - 5g	More than 5g
Salt	Less than 0.3g	0.3g - 1.5g	More than 1.5g
Sugars	Less than 5g	5g - 15g	More than 15g



means the food is HIGH in fat, saturated fat, sugar or salt.



means that the food produce contains medium amount of fat, saturated fat, sugars or salt



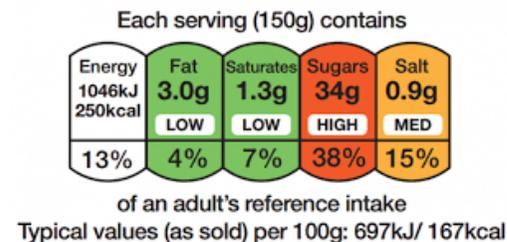
means that the product contains low amount of fat, saturated fat, sugars or salt

The traffic light labelling system helps the consumer with food choices because it:

- *Increases consumer awareness of suitability of foods for them and their age, gender and Physical Activity Level (PAL).
- *Allows consumer to make **informed** choices
- *Allows consumer to make comparisons between products/work out health benefits of food products.
- *Presents accurate up to date information on salt, fats, sugar content for their RNI (Reference Nutrient intake)
- *The information is linked to the %GDA (guided daily amounts) the person is recommended to eat.
- *Quickly identifies nutritional content levels of the food
- *Instant, visual information allowing quick access to nutrient content especially for people who do not have English as a first language.
- *Easy to read/interpret because it uses the traffic light colour where red is linked to stop or danger.

Consumers should aim for more green, less red and moderate amounts of amber foods.

Where red or amber are used, the consumer can adjust the other foods eaten in the day to balance out the ambers and reds.



Food Marketing

Food products are marketed to encourage consumers to buy them. This is done through a different range of media and includes:

- TV
- Internet and mobile phone adverts
- Social media
- Free samples
- Promotional leaflets in shops
- Produce placements in popular TV shows.
- Magazines and newspapers.
- Advertising hoardings on the street.

In supermarkets these methods are used to encourage consumers to purchase foods:

1. Price deals and one offs – this includes BOGOF, meal deals, price reduction, special buy, buy one get second half price. The use of loyalty cards and different price brands for similar products.
2. Linking a product to a celebrity or famous brand.
3. Ethical marketing – this might include fair trade logo, organic, locally grown, low carbon footprint or recycled packaging. It taps into consumers concern about the environment and the part they should be playing.
4. Healthy eating – as more consumers are aware of the need for a healthy balanced diet products will promote these qualities, .e.g. low salt
5. Time saving – manufactures promote food products that save time and effort which people often have little of in today's society.

Food additives are natural or synthetic (man-made) chemical substances that are added to foods during manufacture or processing to improve the quality, flavour, colour, texture or stability.

Food Additives

Type of food additive	Function	Name and E number	Possible side effects/problems
Colourings	To enhance or intensify the colour of food to attract consumers.	Tartrazine E102 Allura red AC E129 Green S E142 Annatto E160b	Cases of hyperactivity in children (unable to concentrate, very agitated, temper tantrums)
Flavourings	To improve or modify the natural flavour and odour in foods	Flavourings are not given E numbers	Often linked to a high salt intake.
Sweeteners	To use as a substitute sweetener to sugar in order to reduce sugar intake and prevent high blood sugar levels	Sorbitol E420 Aspartame E951 Sucralose E955 Saccharin E954	Some sweeteners can cause digestive upsets and are not thought to lower blood sugar that much
Preservatives	To prevent food from becoming spoiled by micro-organisms and to increase its shelf life so that it is edible for a longer period of time.	Potassium sorbate E202 Sodium nitrate E251	Some people are allergic to some preservatives
Emulsifiers, stabilisers	To develop certain textures in food so that the food does not change while it is being stored or used. Emulsifiers are used to prevent oil and water from separating out in products like salad dressings	Lecithin 322 Guar gum E412	None

The use of additives is regulated and controlled by law. E numbers are given to additives that have passed various safety tests and are approved for use in food. The other types of additives include: antioxidants, acidity regulators, gelling agents and thickeners.

Conduction – atoms in metal pans and baking trays start vibrating as heat energy from the cooker goes into the metal. Vibrations transfer heat energy to other metal atoms. Metal gradually heats up and passes heat energy to food. Metals are good conductors of heat.

Convection – when a pan of water is heated heat is conducted through the metal to the water molecules. These move upwards then downwards in a circular motion (convection currents) taking heat energy with them and passing it into the food. The more heat energy the faster the water molecules move in circular convection currents. This also occurs in the oven. Gas and ordinary electric ovens have zones of heat with the top shelf the hottest whereas the fan oven shelves are all the same temperatures.

Radiation – grilled/barbecued food are heated by radiant heat. Infrared heat rays heat the surface of the food and are absorbed. Food must be no more than 3.5 cm thick.

Heat Insulators

These are used to protect us from burning ourselves when cooking:

- Pan handles are plastic or wood making them comfortable to hold.
- HOLLOWED metal pan handles allow air to protect them from becoming too hot.
- Wooden and silicone tools protect us.
- Use insulated pan stands made from wood, cork, ceramic and metal to protect work surfaces.
- Wearing oven gloves because they are made of thick insulating material so the hands are protected from the heat.

Cooking Food

Why is food cooked?

- **To make food safe to eat** – some foods must be thoroughly cooked to destroy pathogenic bacteria which can cause food poisoning. Some foods contain natural toxins (poisons) which would be harmful if the food was eaten raw, e.g. red kidney beans. Cooking destroys the toxins and makes the food safe to eat.
- **To develop flavour in the food** – cooking concentrate and intensifies flavour by causing water to evaporate. To improve the texture and appearance of food and make it easier to swallow and digest. Cooking causes starch granules to swell, gelatinize and thicken to soften a food. Cooking softens the structure of the cells in vegetables to make them less bulky and easier to eat. Cooking tenderizes meat. This means the cooking process softens the meat so that it is easy to chew and digest.
- **To improve the shelf life** – cooking destroys harmful micro-organisms such as bacteria and moulds which preserves the food (makes the food last longer)
- **To give people a variety of foods in their diet** – foods can be cooked in different ways to give variety, think potato!

Dry heat	Moist (in liquid)	In oil
Baking in the oven	Boiling: cooking food in water at 100c	Roasting: in oven in hot fat.
Grilling/Toasting	Simmering: Cooking food in small quantities of liquid at just under 100°c	Sautéing: pan frying in hot oil
Dry frying in on added oil	Stewing: slow-cooking on hob or in slow-cooker with liquid	Stir frying in little oil over high heat.
	Poaching: cooking in water	Deep fat frying
	Steaming: cooking food	Shallow frying: frying in a small amount of oil
	Braising: slow-cooking using presealed meat and veg in oven.	Shallow frying: frying in small amounts of water.
Other		
Induction cooking		Microwave cooking

Retaining water soluble vitamins B and C

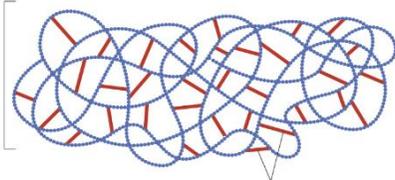
- Don't prepare veg too far in advance, vitamin c will be exposed to oxygen and lost when cut or peeled
- Put veg in a small amount of boiling water so they cook quickly as B and c will be lost in the water.
- Cook all veg for the minimum amount of time to minimize the damage by heat to vitamins B and C.
- Steaming will reduce the vitamin loss.
- Serve the vegetable cooking water in the gravy to conserve some of the vitamins that have gone into it.
- Add lemon juice to prevent enzymic browning and add acid to help stabilize vitamin C (ascorbic acid)
- Keep the fruit cold and in a box to minimize its exposure to oxygen and conserve the vitamin C.

FUNCTIONS

- Makes the body grow.
- Repairs the body when it is injured.
- Gives the body energy.

AMINO ACIDS

Proteins are made up of building blocks called amino acids. There are 20 different amino acids.



ESSENTIAL AMINO ACIDS

Amino acids which can't be made by the body but must come ready-made from the food we eat

Children need 10
Adults need 8

BIOLOGICAL VALUE OF A PROTEIN

Depends on the amount of essential amino acids that are present

SOURCES

Different sources of protein include:

(HBV) = high biological value –

- **These have all the essential amino acids (EAAs) needed for the body.**

Meat, poultry, fish, eggs, milk, cheese, yogurt, soya beans, quinoa.

(LBV) = Low biological value

- **These are protein foods that are missing one or more EAAs.**

beans, peas, lentils, cereals (rice, wheat, oats, barley, rye, millet, sorghum) and cereal products (bread, pasta, etc.), nuts, seeds, gelatine.

The Nutrition and Health of Protein



PROTEIN COMPLEMENTATION

LBV protein foods that lack one or more of the essential amino acids can be eaten together to compensate for the lacking amino acid. This is called the **protein complementation**.

PROTEIN ALTERNATIVES

Manufactured food products that are used as alternatives to meat. They are especially good for people who choose not to eat meat.

BENEFITS

- High protein and low fat
- Take up flavours well
- Can replace meat/fish in a wide range of recipes

EXAMPLES

Tofu – (soya bean curd)
Tempeh (tem-pay) – fermented whole soya beans
TVP – Textured vegetable protein from soya flour
Mycoprotein - made from a high protein fungus: e.g. Quorn.

PROTEIN DEFICIENCY

- Children will not grow properly, hair loss. Nails and skin will be in poor condition.
- Easily develop infections
- Not able to digest food properly

PROTEIN EXCESS

- Too much nitrogen in the body is dangerous. The liver and kidneys have to work harder to remove it and this can harm them

FISH (HBV)

TYPES – oily – sardines, mackerel, salmon
white – cod, haddock

NUTRITION – high in omega 3 & 6, vitamin D, B2, calcium and phosphorous amongst others

FRESHNESS CHECKS

- Bright eyes, not sunken
- Plump firm flesh
- Bright scales still on
- Moist skin fresh smell
- Bright red gills

STORAGE AND SAFETY

Keep in a sealed container at the bottom of the fridge, so that it can't touch or drip onto other foods. Always clean plates, utensils, surfaces and hands thoroughly, after they have touched raw or thawing meat, to stop bacteria from spreading. Use a blue chopping board.

Fish can be cooked to a minimum of 63°C.

SUSTAINABILITY OF FISH

Over fishing, catching fish too young and throwing fish away reduces the stock. To stop—reduce over fishing, holes in nets have got bigger, use of line fishing and buy fish with MSC or freedom food logo on it

EGGS (HBV)

OTHER NUTRIENTS

Vitamin A, D, E and K
Iron and phosphorus
Omega 3 fat

FRESHNESS CHECK

- Sink in brine water
- Plate test egg has raised yolk and plenty of thick white

LABELLING

Stamped with the Lion mark and date mark. Allows traceability and shows hens are vaccinated against salmonella

MILK (HBV)

TYPES (FAT CONTENT)

Fat (cream) can be skimmed off milk to reduce the overall fat content

Blue= whole milk 3.9% fat

Green=semi-skimmed milk 1.5-2% fat

Purple=1% fat milk

Red=skimmed 0.5-0.9% fat



CALCIUM (Example of a mineral)

FUNCTIONS—make strong bones and teeth, make nerves and muscles work properly and to enable blood to clot following an injury. It needs vitamin D to enable it to be absorbed

FOOD SOURCES

Milk, cheese, yogurt, green leafy vegetables, canned fish, enriched soya drinks, flour

EFFECT OF DEFICIENCY OR EXCESS

- Rickets in children and osteomalacia in adults
- Excess causes it to be deposited in organs



LACTOSE INTOLERANCE

People with this condition cannot digest the lactose in milk because the bacteria that live in the large intestine don't break it down or they don't produce the enzyme 'lactase' that breaks it down. This will cause a lot of abdominal pain, diarrhea and nausea.

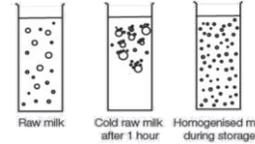
PRIMARY PROCESSING OF MILK

Primary processing is: When foods are processed straight after harvest or slaughter to make them ready to eat or be used in other food products.



HOMOGENISATION

Forcing milk under pressure through a fine sieve in order to break up the fat into tiny droplets. These are suspended in the milk and do not separate out into a layer of cream



PASTEURISATION —High temperature short time (HTST) Milk is heated very quickly in a heat exchanger to 72°C for 15 seconds then rapidly cooled to below 10°C. It has little effect on the flavour, colour or nutritional value

UHT (ULTRA HEAT TREATMENT) Milk is heated very quickly in a heat exchanger to 132°C for 1 second then rapidly cooled and packed in aseptic packaging called tetra pak. It can be stored for up to 6 months but must be treated like fresh milk once opened. It has little impact on the colour, flavour or nutritional value of the milk.

STERILISATION

Milk is put in special sealed bottles then heated to 110°C for 30 minutes. It can be stored at ambient temperatures for several months. Once opened it must be treated as fresh. It causes the milk to darken in colour and changes the flavour due to the effect of the heat on the lactose and proteins. It lacks B12 and less B1.

MICRO-FILTERED

In pasteurised milk the pathogenic bacteria are killed but the souring bacteria are left behind. In micro-filtered milk the souring bacteria are also removed by forcing it under pressure through very fine filtration membranes before it is homogenized and pasteurized.

SECONDARY PROCESSING OF MILK

Secondary processing is—when primary processed foods are either used on their own or mixed with other foods and turned into other food products such as pasta or bread

CHEESE (HBV)

STAGES FOR CHEESE

Pasteurized, bacteria added along with rennet (enzyme) to cause the milk to curdle and separate. Curds are cut and the whey drained off. The curds are dried and milled before pressing. Left to ripen and mature.

STAGES FOR YOGURT

Milk is homogenized and pasteurized and cooled to 40-43°C. Non-pathogenic bacteria is added and the milk is incubated at 37-44°C for 4-6 hours. The lactose turns to lactic acid and the yogurt sets. It is cooled to 4.5°C and pasteurized to kill the bacteria. Flavours are added and it is packed into cartons

The **Red Tractor logo** is a simple way for people to recognise food and drink that has been produced to high quality standards across the whole length of the food chain. Food is traceable, safe and farmed with care. The Red Tractor is only found on food and drinks that are sourced from UK farms and have been checked from farm to basket.



TRACEABLE, SAFE
&
FARMED WITH CARE