

Wheat- Bread

Bread is staple food in the UK. There are many varieties of bread; wholemeal, granary, white, spelt, soda and rye. They can be shaped in a variety of ways. Bread dough can be enriched with ingredients such as dried fruit, sugar, milk, butter and eggs to produce baked items like buns and pastries. Bread is a relatively low cost food, extremely versatile and relatively easy to make yourself.

Food Science

Sifting the flour: the sifting process introduces air which acts as a raising agent and helps the bread to rise in the oven.

Adding warm liquid Water hydrates the flour. At 37°C the liquid provides the optimum temperature for the yeast to ferment and produce the raising agent CO₂. Moisture is needed for a soft dough. Sugars are produced by this fermentation which the yeast consumes. As it does so it creates alcohol and carbon dioxide gas as a waste products.

Mixing and Kneading Dough during the mixing and kneading, two of the proteins present in the flour (gliadin and glutenin) become hydrated and when the dough is kneaded an elastic protein complex called gluten is formed. This gluten gives bread its structure and prevents it collapsing.

Proving Dough during this step some of the starch present in flour is broken down and is fermented by the yeast. CO₂ gas is produced which causes the gluten network to expand and therefore makes the dough rise; the quality of the gluten is important if its too weak bubbles can burst causing lack of volume, if it's too strong the dough won't stretch enough.

'Knocking back' proved dough, the dough is 'knocked back' to remove the large CO₂ bubbles produced by the yeast. This ensures a more even texture and a better rise. Large bubbles of gas would make large holes in the finished bread.

Baking, the bread dough rises as the CO₂ produced by fermentation of yeast expands with heat. Yeast activity increases at first, but as the temperature of the dough rises it slows down until eventually the heat will kill the yeast. The water is absorbed by the starch granules in the flour, the starch grains swell and gelatinise this supports the firm structure of the loaf. A gluten network forms a sort of skeleton which traps the CO₂ gas. During baking the gluten strands are stretched as the CO₂ gas expands, this together with the coagulation of the gluten protein results in the finished bread structure.

Functions of Bread ingredients



Yeast: Raising agent: Is a living micro organism. When it's the ideal conditions for growth, it respire and produces carbon dioxide. Ideal conditions for growth are: Warmth, moisture, food and time.



Liquid: Moisture: it helps to create the right conditions for the yeast to grow. It also hydrates the flour, helping with gluten formation.



Salt: Structure: helps with gluten formation
Taste: a small amount improves the flavour of the bread.
Too much: will prevent the yeast from fermenting



Flour: Bulk: it gives bulk to the bread.
Taste: Different types of flour affect the flavour.
 Absorbs moisture flour can absorb a lot of water to make a dough
Strong flour has a higher protein content so will produce a good quality loaf without it collapsing
Nutrients provides starchy carbohydrates, protein and is fortified with vitamins and minerals.

Other ingredients in bread making

Fat: fat allows the other ingredients to slide over each other so the bread can rise.

Shortening – fat coats the particles of flour and stops it absorbing water, so only a small amount should be used.

Taste: Enhances the flavour.

Shelf Life: fat improves the texture of the bread, keeping it moist and preventing it from going stale quickly.

Other ingredients in bread making

Sugar: Food for the yeast: sugar provides food energy for the yeast so that they can respire and grow.

Browning: sugar turns to caramel when it's cooked and makes the crust brown.

Taste: Sugar adds sweetness to the bread.

Ascorbic Acid: Added mainly in the commercial manufacture of bread, it speeds up time it takes to make the bread.

Additional learning and challenge activities

- What does the term 'enriched dough' mean?
- List the key stages for traditional bread making Describe the difference between making bread using the bulk fermentation and the Chorleywood process.
- List the four ideal conditions needed for yeast to respire and produce carbon dioxide.
- Name the gas produced by the fermentation of yeast.
- Why is the formation of the protein gluten important in bread making?
- What does h term 'knocking back' mean and why is it necessary?

Nutritional Value of Bread:

Bread is a good source of starchy carbohydrate, protein, B vitamins, calcium and iron. Bread which is made with wholemeal flour is also a good source of dietary fibre.

Cereals - Wheat



Cereals describe edible grasses that are harvested for their grain. The **endosperm**, the **germ** and the **bran** have importance in cooking, nutrition and food science. The most popular cereals are wheat, rice, maize (corn) oats and barley. Other cereals such as rye millet, buckwheat, quinoa, sorghum and amaranth are growing in popularity.

Food Science

Wheat flour contains 2 proteins called **gliadin and glutenin**. When moisture such as water or milk is added to the flour **protein gluten** is formed. Strong flour such as bread flour contains a higher percentage of protein than softer flours.

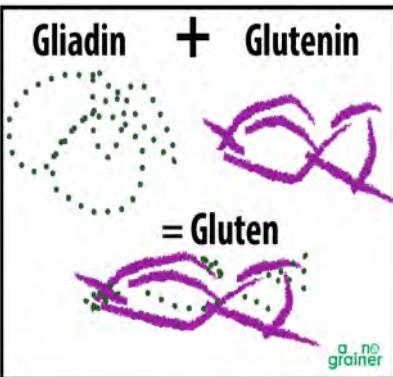
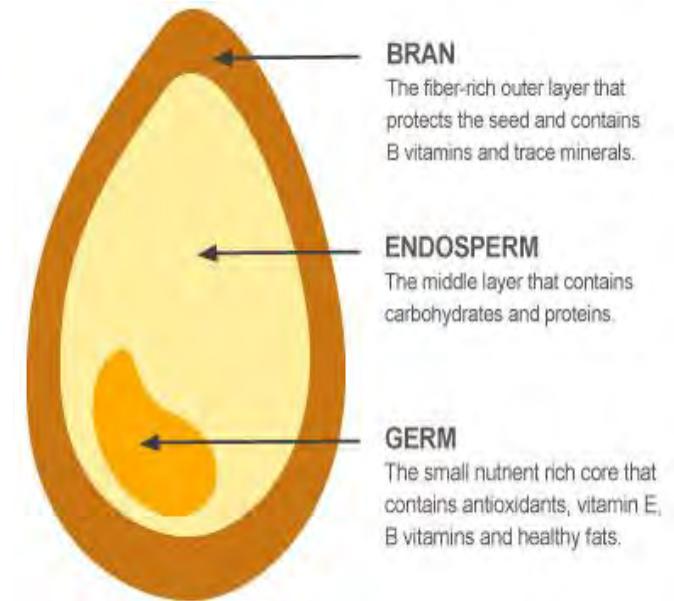
Some food products require more gluten development for **strength and structure** such as in the making of bread, also in puff, flaky and choux pastry. Softer flour should be used in cakes, batters and muffins where gluten development is to be avoided, as strong flours will result in an undesirable tougher and chewy texture.

Effect of heat:

Coagulation, in the case of a dough or cake mix heat will cause the protein present in the flour to coagulate

Gelatinisation: when starch is mixed with water it forms a suspension and with heat, the starch granules absorb moisture and swell. This thickens the mixture, resulting in a GEL.

Dextrinisation: When starch is exposed to dry heat the colour will change to brown. Dextrin causes the characteristic brown crust of baked products and toast.



- **Key points:** Starch is found in the endosperm
- Wholegrain cereals have a higher nutritional value than processed cereals
- Wholegrain cereal is grain left in its natural state.
- The endosperm from wheat provides starch and protein.
- Dietary fibre is found in wheat bran.
- Milling wheat grain into flour is an example of **primary processing**.
- **Secondary processing** of wheat is the making of food products using the flour such as biscuits, sauce, pasta and cakes.
- By law, the nutrients calcium, iron and the B vitamins (niacin and thiamin) must be added to flour, this is known as **fortification**.
- **Wholemeal flour** is made from the whole wheat grain, nothing is removed.
- **White flour** has most of the bran and wheat germ removed.
- Wheat provides energy in the form of starch
- Wheat bran provides dietary fibre and is a source of B vitamins.
- The more you knead dough or beat a mix with wheat flour the more **gluten** will be formed. Ok for bread, not for shortcrust pastry, cakes or shortbread biscuits.
- **Extraction rate:** How much of the original wheat grain is in the flour. 100% means that it is all the grain.
- **NSP:** (non starch polysaccharide) indigestible carbohydrates found in plant food, often called dietary fibre.
- **Phytic acid:** A form of phosphorus which limits absorption of calcium and iron in the body. Wheat stores the mineral phytic acid, it's present in the bran of the grain. The acid will bind with both calcium and iron to form phytates and this then limits the absorption of these minerals in the body.
- **Staple Foods:** Staple foods are usually starchy foods that grow well and can be stored for consumption throughout the year.

Types of flour produced from wheat:

- * Wholegrain
- * Brown
- * White
- * Granary
- * Stoneground
- * Organic

Nutritional Value of Wheat:

Wheat is a good source of starchy carbohydrate, found in the endosperm. It is also a good source of protein and provides a range of vitamins and minerals. If the wheat still has the bran it will provide dietary fibre in the form of (NSP). B vitamins are found in the bran layers. Flour sold in the UK is fortified with calcium, iron and B vitamins.

Processed wheat grain products:

Wheat Bran: Added to biscuits, cakes, muffins to increase dietary fibre.

Puffed wheat: Flaked, puffed and extruded wheat is used to manufacture breakfast cereals.

Semolina: Mainly used for making pasta.

Couscous: made from semolina grains

Burghul: Also known as bulgur or cracked wheat, key ingredient in tabouli and kibbeh, can be used in soups, burgers and casseroles.

Additional learning and challenge activities

- Ensure you are able to explain the difference between primary and secondary processing
- What does the term 'extraction' rate of flour mean?
- Can you explain the nutritional differences between a food product made with wholemeal flour and one made with white flour?
- You need to know the key nutrients provided in cereals.
- Make sure you can explain how the nutritional value can be affected when cereal is processed.
- Can you discuss the health benefits of a diet containing whole grain cereals?

Pasta

Pasta is a staple food of Italy and together with bread, rice and potatoes, it forms part of the staple food range in the UK. Pasta is usually bought fresh or dried and is available in a variety of shapes, flavours and colours. It can be filled or unfilled and can be served with a variety of sauces. Pasta is a **convenience food** and it is quick to cook, it requires little skill and is cost effective.

Pasta is made from durum wheat; durum wheat has a higher protein content than other wheat varieties. It produces a grainy, yellow coloured semolina on milling. Durum wheat makes good quality pasta because it requires less water to make the dough, making it easier to dry the pasta. Gluten free pasta is available and you can make your own by adding xanthan gum into gluten free flour.

Key terms

Convenience food – where some or all the preparation has been done in advance.

Durum wheat – high protein wheat used to make pasta.

Laminating – rolling out pasta into thin sheets.

Dies – machinery attachments used to make special pasta shapes that cannot be made by hand.

Extruded – pasta is forced through a die to achieve a special pasta shape, eg spaghetti and macaroni.

Food Science

Xanthan gum can be used in a gluten free pasta recipe to help give the pasta it's elasticity so it can be rolled through the pasta machine and give it its stability. Xanthan gum is a polysaccharide with a wide variety of uses, including as a common food additive. It is a powerful thickening agent, and also has uses as a stabilizer to prevent ingredients from separating.

Rice flour and potato flour can be used for **gluten free** recipes
Dehydrating pasta is possible rather than air drying to ensure complete moisture removal to preserve the pasta.

Various ingredients can be added for colour which add to the pasta's **nutritional content**.

Al dente: 'To the tooth' – usually used to describe when pasta is perfectly cooked, with a little 'bite' in the middle.

Starch, should be removed from the pasta by cooking in boiling salted water, this prevents the pasta from being too sticky.

Colouring Pasta:

Spinach: Verdi – Green

Tomato puree: Pomodori - Red

Beetroot: Barbabietola rossa – Purple

Squid ink: Nero - Black

Nutritional Value of Pasta:

Pasta is a good source of starchy carbohydrate, protein and B vitamins. Whole wheat pasta also provides dietary fibre. Pasta is not suitable for a coeliac as it contains wheat flour.

Why is some pasta unsuitable for coeliacs?



Storage

- Dried pasta can be stored in a cool, dry cupboard and has a long shelf life. Fresh pasta should be kept chilled. Packing should be clearly labelled with details of 'best before' or 'use by' dates and storage instructions.

Additional learning and challenge activities

- **Investigate how to make gluten free pasta**
- **How could xanthan gum help create a gluten free pasta dough?**
- **Create a page investigating the various types of pasta, their names and what they look like.**

Cereals

Barley is the second most widely grown crop in the UK after wheat. The most common product is **pearl barley**. It is also used in beer making. It can be used in **sweet & savoury** dishes and also bulks out soups & casseroles. Barley is a good source of **starchy carbohydrate, iron & vitamin B3**.



Oats are a good source of **starchy carbohydrate, protein and fat**. They are high in **fibre**. Pure oats do not contain gluten, however a lot of supermarket oats are not pure.

Oats are grown in **cold climates**, such as Scotland. They are **rolled** rather than crushed and are partially cooked during this process. Oats can be **processed** further to make them cook more quickly.



Maize (corn) has a similar nutrient content to other cereals and is a good source of starchy carbohydrate. Yellow varieties of corn also contain **carotene**, which is converted to **Vitamin A** in the body.



Many cereals are processed into **breakfast cereals**. The most common cereals are wheat, maize, oats and rice. They are processed in different ways, such as puffed shredded, flaked or rolled. They are often mixed with other ingredients, such as nuts, dried fruit and honey to improve their flavour, texture and nutritional value. Some cereals have sugar added to them, which makes them less healthy.



Rye is mainly grown in Northern Europe. It is **hardy** and likes cold, wet climates. Rye bread has a close, **dense** texture and is often combined with wheat flour so it is not too dense and sticky. Rye flour has a **longer** shelf life than wheat flour due to its' **higher gliadin protein** content. It can also be used to make alcoholic drinks, such as whiskey & beer. It is a good source of starchy carbohydrate, fibre, minerals and vitamin B1 (**thiamin**).

Other grains:

Sorghum; cereal grain grown in Asia & Africa. Milled into a soft, fine flour to make flat breads and has a nutty taste.

Quinoa; pronounced 'keen- wah', is often called a superfood. It is a good source of protein- providing all the essential amino acids and is a HBV protein. It is gluten free, cholesterol free and also wholegrain so has plenty of fibre too. There are red, black and white quinoa and they are cooked similar to rice/ barley.

Arrowroot; comes from the maranta plant and is used to thicken sauces. Can also be used as a glaze for fruits in the form of a smooth, clear gel.

Sago; comes from sago palm and is used for milky puddings.

Tapioca; comes from a tuber called cassava and is also used for milky puddings as well as a thickener in soups & stews.



Key words

- **Humid**: damp, warm environment. Not a good environment for cereals to be stored in; they need to be cool & dry.
- **Best before date**: When cereals should be consumed by.
- **Maize**: sometimes called **corn**. Staple food grown in South America, Asia & Africa.
- **Masa harina**: finely ground corn flour treated with slaked lime; main ingredient in corn tortillas.
- **Beta- glucan**: found in oats; lowers blood cholesterol.
- **Coeliac disease**: an auto immune condition where a person has an adverse reaction to gluten.

Additional learning and challenge activities

- Do a poll to find out which breakfast cereals your class mates eat; which are the most popular? Why do you think this is? Discuss the advantages & disadvantages of the most popular cereals; are they healthy?
- Research the name of the deficiency disease caused by lack of niacin (vitamin B3) where maize (corn) is used as a staple food.
- Can you explain the difference between soluble and insoluble fibre?
- Get a map of the world and colour code where each crop is grown/ produced.
- Research into the most likely contaminants that can affect the quality of the cereal crops and how they can be prevented.
- Create a dish using one of the cereals listed on this page!

Rice

Rice is the most widely consumed staple food for a large part of the world's human population, especially in Asia. Rice grows well in hot and humid conditions in flooded fields called paddies. Rice is processed in a similar way to wheat. It is cost effective and versatile, it has a long shelf life as it's a dried food. Storage should be in a cool dry area (usually in a kitchen cupboard)

Growing and processing:

Many different types of rice are grown and used in cooking. In order to grow rice the land is firstly ploughed to 'till' or dig up, mix and level the soil. In most Asian countries the ancestral methods for cultivating and harvesting are still practised. The fields are often ploughed using water buffalo. Rice seedlings are planted by hand in the fields which have been flooded by rain or river water.

Key terms

Brown rice contains bran. White rice has the bran removed. Cooked long grain rice should be fluffy and individual grains will be visible.

Cooked short grain rice will be stickier and starchier. Rice can be made into many different products including wine, vinegar, milk and noodles.

Beri Beri a muscle wasting disease occurring in places where white rice is a staple food. The diet is deficient in thiamine (vitamin B1)

Types of Rice

Long grain:

Brown long grain rice (whole grain rice) – nutty flavour, nutritionally complete, higher vitamin, fibre and mineral content. Chewy texture and takes longer to cook.

White long grain rice – cooks quickly and is white in colour
Basmati rice – fragrant flavour, can be white or brown. The preferred rice for Indian cuisine.

Jasmine Rice (Thai fragrant rice) – Aromatic like Thai food, soft and sticky texture when cooked.

Wild rice – An aquatic wild grass. Takes a long time to cook, nutty flavour, nice texture and dark in colour. Usually sold as a mixture of rice.

Short Grain Rice:

Arborio Rice – an Italian variety which is used to make risotto
Pudding Rice

Glutinous rice – when cooked properly this rice is very sticky, used in various Asian cuisine.

Sushi Rice – higher ratio of the starch amylopectin compared to the starch amylose. This makes this rice much stickier when cooked.

Secondary Processing of rice:

This is when rice is processed into other products such as:

Rice bran, rice bran oil, rice milk, rice vinegar, rice flour, rice wine, rice cakes, rice noodles, rice starch, rice tea and rice wine.

Why is rice associated with food poisoning? What are rice spores?



Nutritional Value of Rice

Rice is about 90% carbohydrate, 8% protein and 2% fat. It is a good source of iron and B vitamins. It is low in fibre.

Brown Rice is wholegrain. It is about 85% carbohydrate, 8% protein and 7% fat. And contains as much as four times the amount of fibre and more minerals than white rice. It is a good source of B vitamins.



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Additional learning and challenge activities

- Give 5 examples of products obtained from secondary processing of rice.
- For each one suggest one way that it can be used in cooking.
- Ensure you know the various rice varieties and dishes that can be made using these types of rice.
- What is the difference between white and brown rice?

Fruit and Vegetables

Potatoes: A staple food in the UK. The part of the potato we eat is called the Tuber. They come in a variety of colours but we are most familiar with the red and white varieties. The most common potatoes we eat in the UK are Maris Piper, King Edwards and Desiree. Sweet potatoes are also popular and are a common alternative to traditional potatoes.

Different varieties of potatoes have different textures. Some can be floury, sticky and waxy or granular. This is due to the potato cell changing during cooking. All potatoes have the same structure. The outer layer is the skin, the flesh is the area under the skin. The pith is the watery core. They can be cooked in a variety of ways including, boiling, roasting, baking and frying. Good source of vitamin C, complex carbohydrates (starch) and a small amount of B vitamins. They also contain water.

Storage of potatoes
 Stored in cool, dry and dark places
 Such as hessian bags, racks or paper bags
 Left in the light they will turn green - the green part is toxic
 Not in plastic bags as they will sweat and rot
 Storing in the fridge can affect the taste and cause discolouration

We are encouraged to eat a wide variety. Eaten as part of a main meal or a snack. Can be eaten raw. Cooking destroys some of the nutritional value. The eatwell guide suggests a third of our diet is made up of fruits and vegetables. They are a good source of carbohydrates, fibre vitamins and minerals and are low fat.

Vegetables are categorised according to the part of the plant they represent. They can be grown above or below the ground.

Group	Examples	Above or below
Roots	Beetroot, Carrots, swede	Below
Bulbs	Onions, leeks, spring onions	Below
Tubers	Potatoes, sweet potatoes, yams	Below
Stems	Asparagus, celery	Above
Leaves	Cabbage, brussel sprouts	Above
Flowers	Cauliflower, broccoli	Above
Fruits and seeds	Peas, courgettes, aubergine	Above
Fungi	mushrooms	Above

Vegetable Structure
 The structure of vegetables is a collection of cells made of cellulose. The type of vegetable and its age can mean that the structure varies. Vegetable cells contain high amounts of water and this keeps the vegetable firm (e.g. cucumber 70% water). If they start to lose water the cells lose their firmness and they become limp and flabby.

Vegetable Storage
 Salad and some green vegetables can be stored in the fridge to keep them fresh. Most other vegetables should be stored in cool, dry, well ventilated areas. Most vegetables should be eaten as soon as they are purchased to avoid nutrient and flavour loss.

Ripened fruits are more attractive to eat. They will change in colour, texture and taste (sweeter) when they ripen.

Fruit
 There is a vast array of fruits available to eat in the UK. These may be home grown or imported. Many fruits are seasonal (the times of the year when the food is at its peak, in terms of harvest, flavour or cost).
 There are four main groups of fruit. Some fruits (bananas, pineapple, mango) do not fit into any of the categories and tend to be sold as exotic or tropical fruits.

Group	Examples	Storage
Citrus	Oranges, lemons, limes, grapefruits	Cool, dry place
Hard	Apples, pears	Room temperature, do not refrigerate
Soft or Berry	Strawberries, raspberries, blackberries	fridge
Stone	Plums, cherries, peaches	Fridge. Room temperature for faster ripening.

Milk, Cheese and Yoghurt

MILK

Cow's milk is the dominant milk drank in the uk. Alternative include goats milk and soya milk.

Milk contains bacteria - it must be heated to destroy the bacteria - to make it safe to drink. This makes it last longer too. Milk can be pasteurised. HTST - High temperature short time. Heated to 72 degrees for 15 seconds. Then cooled rapidly and bottled. UHT - ultra heat treatment - heated for 1 second to 132 degrees. Makes milk sterile (no bacteria). Rapidly cooled and packaged. Lasts longer than pasteurised milk.

Type	Details
Whole	3.9 % full fat. Blue cap. Recommended for children
Semi-skimmed	1.7% fat. Half fat. Green cap
skimmed	0.1-0.3% fat. Red cap
Evaporated	Concentrated, sterilised and canned. Reduced liquid content - thicker
Condensed	As condensed but with sugar added - helps to preserve the milk
Dried milk powder	Water removed to dry. Water added then can be used and stored as fresh milk
Alternative	Dairy free - soya, almond, oat and rice

Complete food - provides many nutrients - the only food needed for babies (all mammals) for the first few weeks of life.

Protein - HBV

Fat - Saturated

Carbohydrate - simple - lactose - sugar in milk

Minerals - calcium, phosphorus, potassium and iron

Vitamins - A, D and B some C

Water - high volume content.

Storage

Perishable - refrigerated and away from strong smelling foods.

Cheese can be described as solid or semi-solid (soft cheese) milk. Can be referred to as fermented dairy food.

CHEESE

Type	Examples
Hard pressed	Cheddar, leicester
Soft (or ripened)	Camembert, brie, goats
unrippeded	Cottage cheese, cream cheese, mascarpone
Blue veined	Stilton, danish blue
processed	cheese slices and spreads

Protein - HBV

Fat - Saturated. High content depending on milk used

Minerals - calcium, phosphorus, sodium

Vitamins - A, D and B some C

Uses: flavour, colour, texture and increased nutritional value

Storage

Refrigerate between 0-5 degrees. Soft cheese use within a few days. Hard cheese last longer. Airtight box - prevents drying out

YOGHURT

Protein - HBV

Fat - Saturated.

High content depending on milk used

Minerals - calcium, phosphorus, sodium

Vitamins - A, D and B some C

The bacteria convert the lactose (milk sugar) to lactic acid, which thickens the milk and gives it the tangy taste characteristic of yogurt. The yogurt is then cooled and can be flavoured with fruit, sugar, other sweeteners or flavourings. Stabilizers, such as gelatin, may also be added

Yoghurt is made from different types of milk. Some yoghurts contain other ingredients to flavour them such as sugar and fruit.

Set yoghurt - firm texture - set in pot it is served in

Love yoghurt - fermented with live culture bacteria - still living

greek (strained) yoghurt - cows or ewes milk- thick and high in fat.

Storage

Refrigerate between 0-5 degrees. Eat within use by date.

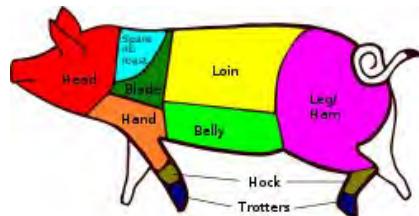
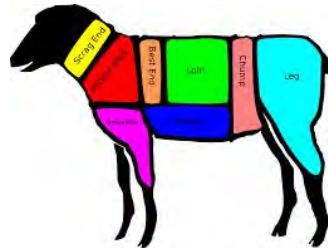
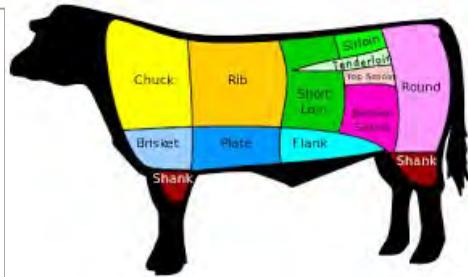
MEAT

There are 3 animals we generally eat in the uK - pigs, sheep and cows.

Meat is made up of protein, water and fat.

Fat in meat is either visible (seen around the edge) or invisible (in the connective tissue)

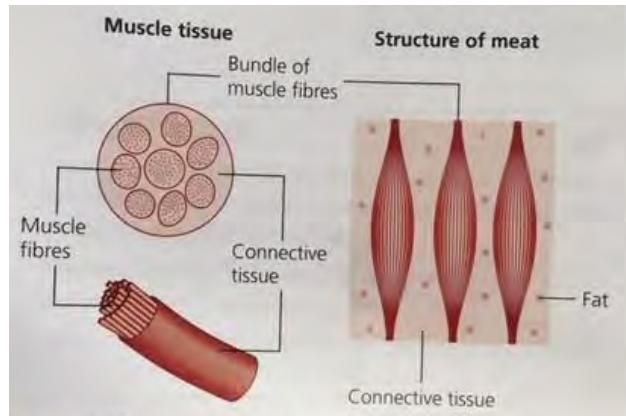
Beef, veal	Steaks - sirloin, fillet, rump Joints - topside, brisket, silverside Cuts - skirt, chuck, minced
Lamb, mutton	Steaks - shoulder, fillet, Joints - leg, saddle, neck Cuts - chump, loin., noisettes, minced
Pork, bacon, gammon and ham	Steaks -shoulder, loin Joints - spare rib, leg, shoulder, loin Cuts - belly, chops



Protein - HBV
 Fat - Saturated
 Minerals - iron
 Vitamins - (fat soluble) A, D and B
 Water - high volume content.

Cooked for: kill bacteria, flavour, to make tender, to make more appealing, to make nutrients more digestible

Storage
 Meat is a high risk food, it must be cooked and stored correctly to avoid food poisoning. Raw meat should be refrigerated, cooked meat covered and refrigerated



Raw meat = muscle + connective tissue + fat.

The muscles are bundles of fibre which are surround and held together with connective tissue. These muscle fibres can be different lengths depending on the part of the animal they are from. part of the animal that does a lot of work such as the leg have longer fibres and can be tougher. Cooking is used to make the meat tender. The fibres contain water and mineral salts.

Digestible - some foods are broken down more easily by the body (by the action of enzymes) than others. Meat needs to be cooked to make it more digestible. They are broken down into macronutrients and micronutrients and absorbed through the wall of the intestines.

FISH

Fish is made up of protein, water, minerals and fat.

Type	Examples
White fish	Sole, halibut, trout, tuna
oily	Mackerel, salmon, trout
shellfish	Crabs, lobster, prawns

Fish Flesh = muscle + connective tissue.
Fish muscle has short fibres and the connective tissue is very thin, this means that fish can be cooked quickly and still be tender and moist.
Cuts - whole, fillet, goujons, steaks

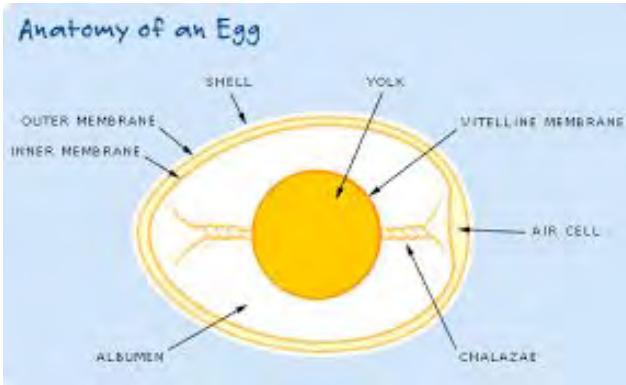
High in Protein - HBV
 Low in Fat , good source of fatty acids
 Minerals - calcium if bones are eaten - sardines
 Vitamins - A, D
 Shellfish can be high in cholesterol

Storage
Spoil quickly - eat same day or quickly after - can be unsafe to eat after longer
 Refrigerate between 0-5 degrees.

EGGS

Eggs are produced by hens, ducks, quails and geese. The most popular are hen (chicken) eggs.

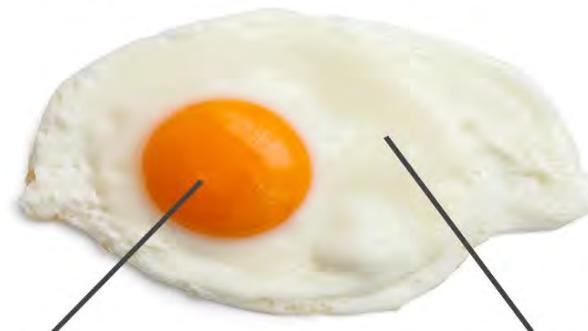
Eggs can be brought in 4 different sizes; small, medium, large and extra large.



Structure:
 10% shell, 30% yolk, 60% white

Storage
 Away from strong smelling foods as they are porous (contains tiny holes) and will absorb strong odours. Consume by use by date.

Egg Nutrition



Cooked by:
 boiling,
 frying,
 poaching,
 scrambling

Yolk

Fat 4.5 g
Sat. Fat 1.6 g
Cholesterol 184 mg
 Carbohydrates 0.5 g
 Protein 2.5 g

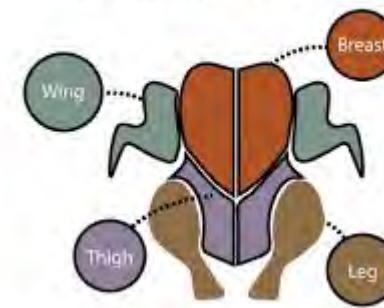
White

Fat 0 g
 Sat. Fat 0 g
 Cholesterol 0 mg
 Carbohydrates 0 g
Protein 4 g

Protein - HBV white and yolk
Fat - Saturated in the yolk
Minerals - iron
Vitamins - (fat soluble) A, D and E in yolk. B in the egg white.
Water - in white and yolk.

BEST ← → WORST

Label	Pasture Raised	Certified Organic	Free Range	Cage Free	Conventional
Living Space	Natural fields or pasture, most space for natural behaviors	Aviaries/barns without cages, space varies, buy local when possible	Aviaries/barns without cages but very crowded	Aviaries/barns without cages but very crowded	Grouped in small cages with little room to move
Outdoor Access	Live outside with access to barn	Required but not regulated	Limited and not regulated	None	None
Diet & Feed	Natural foraging, feed varies from farm to farm	Organic vegetarian, pesticide-free and non-GMO	Typical chicken feed	Typical chicken feed	Grain-based, fortified, basic needs met in cheapest way possible
Hormones & Antibiotics	Less common, less necessary	None	Common practice	Common practice	Common practice
Nutritional Value of Eggs	Most nutritious	More nutritious than conventional	Similar to conventional	Similar to conventional	Least nutritious



POULTRY

Chicken is the most popular poultry used in the UK. There is also duck, turkey, goose, guinea fowl and pigeon.

Chicken	Most popular, large bird, sold whole or jointed into legs, wings, breast and legs.
Turkey	Similar to chicken but larger. Associated with Christmas
Duck and goose	Richer tasting birds, fatty in comparison

Poultry = muscle + connective tissue.

Breast is softer than the legs that can be tough (hardest working part of the bird) older birds are tougher than younger birds which tend to be tender. Nutritional value varies according to the age of the bird, how it is reared and the parts eaten.

High in Protein - HBV
 Lower in Fat than meat, saturated
 Minerals - calcium if bones are eaten - sardines
 Vitamins - good source of B, some A and D

Storage
 High risk food, it must be cooked and stored correctly to avoid food poisoning. Should be refrigerated, thawed and cooked thoroughly to kill bacteria.

Milk, Cheese and Yoghurt

Soya and Tofu

Soya comes from the soya bean pod. Part of the legume family. Beans, peas and lentils are also part of this family.

Soya can be processed into many different forms - milk, sauce, paste, flour tempeh. It can be bought dried, canned or fresh in the form of desserts, yoghurts and margarines. Contains Fibre, HBV protein and magnesium.

Tofu can be called bean curd. Made from fresh soya milk, that has been curdled and pressed into a block and then cooled.

It is made in the same way as traditional cheese.

Bland tasting so needs to be favoured.

Contains HBV protein, iron, calcium and other minerals. Some B vitamins.

They are both bought in sealed containers and should be stored in the fridge.

Nuts

- Some nuts are edible kernels from which the fruit wall has been removed. Some are seeds and some are pulses.
- Nuts are used in savoury and sweet dishes
- Nuts can cause allergic reactions
- Nuts can be bought in many forms , shelled, ground, chopped, whole
- Nuts have high energy values due to the high fat content
- They provide LBV protein
- They contain B vitamins
- They provide fibre
- Need to be stored in airtight containers or will turn rancid due to the high levels of oil
- Kept away from moisture and strong odours
- Consume before use by date.



Beans

Beans are legumes, normally referred to as pulses. Pulses are edible seeds that grow in a pod.

Most popular bean is the baked bean - a haricot bean in tomato sauce. Beans are added to dishes for bulk, flavour or to nadd to the nutritional value.

High in protein and fibre , some carbohydrates, calcium and B vitamins.

bean	storage
fresh	fridge
frozen	freezer
dried	Airtight, cool dry place
canned	cool dry place

Seeds

- Include poppy, pumpkin and sunflower
- Used as a healthy snack
- Used as topping on food
- Roasted or toasted to add texture and flavour
- Ground to add flavour
- Used to manufacture oil
- Provide protein
- Provide essential fatty acids
- Provide iron and zinc
- Vitamins B and E
- Need to be stored in air tight containers in a cool dry place.



Butters

Butter is the dairy product made from churning milk or cream. The churning process separates the butterfat (the solids) from the buttermilk (the liquid). The **butter** we most often buy is made from cow's milk, although other varieties — made from the milk of sheep, goat, yak, or buffalo — are also available. Butter comes in salted and unsalted varieties.

Uses:

Melting - pouring over vegetables
 Spreading - crackers and sandwiches to avoid moisture
 Creaming - making cakes
 Shallowing frying - eggs
 Shortening - rubbing in to make pastry

Nutrients:

High in fat
 Vitamins A and D
 Sodium - salt

Storage:

Kept in fridge
 Away from strong odours
 Fully covered or can go rancid if left open to the air.

Oils

Oils are liquid at room temperature. They are lighter than solid fat such as butter and easier to digest.

Vegetable oils are natural oils found in seeds, nuts and fruit. Examples include sunflower oil, sesame oil, rapeseed oil and olive oil. Oils are used for frying, basting, marinating and dressings. The main nutrient found in oils is fat, this is an unsaturated fat and considered healthier than saturated fats. Oils should be stored in cool, dry places.

Margarine

Margarine was introduced as an inexpensive alternative to butter. It was made from vegetable oils and is **fortified with vitamins A and D**. Margarine is sold in solid block or as a soft margarine in a tub.

Uses:

Block margarine is used for baking. Soft margarine is used for baking and frying and for spreading when making sandwiches. Some soft margarines have a very low fat content so not suitable for making cakes, pastries and biscuits. High in fat. Provide vitamins A and D, water and minerals such as sodium (salt).

Sugars

- Comes from sugar cane (a tall grass grown in hot climates) or sugar beet (a root crop similar to parsnip grown in climates with warm and cold seasons)
- Pure carbohydrate - give quick release energy. Provides empty calories as does not provide other nutrients
- Primary function in cooking is to provide sweetness. Can provide colour and crunch to some dishes

Type	Description	Uses
granulated	White, coarse, small crystals	Sweetening- drinks, cereals,
caster	White, made from ground granulated sugar, finer crystals	Cake making - victoria sandwich cake
icing	White, made from ground granulated sugar, fine powder	Decorating - cakes, making icing
demerara	Pale brown, made from raw sugar, larger coarse crystals than granulated sugar	Adding crunch - flapjacks
Soft brown	Small sugar crystals containing molasses, a dark syrup.	Flavour in cakes - christmas cake

Syrups

Golden syrup is the most familiar

Bought in various forms - jar - can- squeezey bottle. Very sweet.

Black treacle is also a syrup, much darker in colour and thicker with a stronger flavour
 Black treacle is used for making christmas cake, gingerbread and some curry sauces.

Best stored in cool, dry places and used within three months of opening



Golden syrup or light treacle is a thick, amber-coloured form of inverted sugar syrup made in the process of refining sugar cane or sugar beet juice into sugar, or by treatment of a sugar solution with acid. It is essentially white sugar/sucrose in a different form. This has been inverted, meaning that the sucrose has been broken down into two simpler sugars, fructose and glucose. The fructose content gives a heightened perception of sweetness so that, 25% less golden syrup can be used than granulated white sugar.

A British tablespoon of golden syrup contains about 60 calories, whereas a British tablespoon of white sugar is about 50 calories. By volume, golden syrup has more calories: by weight sugar has more calories. Golden syrup and white sugar have a very similar glycaemic value, meaning that the body processes both at about the same rate.

Macronutrients

Macronutrients are needed in large amounts to make the body function properly.

Protein:

These are made up of **essential amino-acids** and **non-essential amino-acids**. (Our bodies can make non-essential amino acids, but we need to get essential amino acids from our food).

Source

- HBV – these have all the essential amino acids
- Meat, fish, dairy, eggs (animal sources)
 - Tofu
- LBV – these are missing at least one essential amino acid
- Seeds, nuts, beans, pulses, cereals, Quorn (plant sources)

Function

Growth
Repair
maintenance



Not enough

Kwashiorkor
Oedema
Anaemia
Slow growth in children

Too much

Excess protein can be converted to energy. If unused turns to fat.

Complementary actions

Combining 2 or more LBV proteins helps get a balance of essential amino acids. e.g. beans on toast.

Dietary Reference Values

Age	Amount
1-3	15g
4-6	20g
7-10	28g
11-14	42g
15-18	55g
19-50	55g
50+	53g

Fats, oils and lipids:

Too much fat is bad for you, but so is not enough.

Source

Saturated Fats

(From Animal sources. They are also called unhealthy fats. They are generally solid at room temperature)
Sausages / Bacon / Lard / Dairy



Unsaturated Fats

(These are healthier. They are often liquid at room temperature.)
Monounsaturated fats – olive oil / avocados
Polyunsaturated fats – sunflower oil / seeds



Omega-3. These are Polyunsaturated and called "healthy" fats as your body needs them but can't make them. They are good for your heart.
– Oily fish / Nuts / Seeds



Function

Energy
Warmth
Protection of organs
Source of fat soluble vitamins
Hormone production

Dietary Reference Values

DRI	Men	Women
Total fat	95g	70g
Sat fat	30g	20g

Too much

Obesity
Heart disease
Type 2 diabetes
Stroke
Cancer

Not enough

Vitamin deficiency (fat soluble)
Unprotected organs

Carbohydrates

There are 2 kinds, simple or complex.



Source

Simple - these are sugars (monosaccharides, disaccharides)
Cakes, jam, soft drinks
Complex - these are starches (polysaccharides)
Bread, potatoes



Function

Simple

Quick burst of energy

Complex

Longer lasting energy

Free sugars

These give you no nutritional benefit other than energy.

Dietary advice

- Reduce the amount of sugar that we eat, no more than 5% of our diet.
- Complex Carbohydrates should make up half of the energy we eat.
- Wholegrain cereals are a good source of fibre

Not enough

Can make blood sugar level drop
• hunger,
• dizziness,
• Tiredness
• Lack of energy
Our body will use protein for energy (leads to loss of muscle)

Too much

- Excess is turned into fat
- Can cause obesity
- Too much sugar leads to dental problems
- Can lead to type 2 diabetes

Micronutrients

Micronutrients are needed in small amounts to make the body function properly.

Vitamins

They all have different functions, but generally

- Help the body release energy
- Prevent some diseases
- Keep the body healthy
- Repair cells

Fat soluble vitamins: vitamin A, and vitamin D

- Don't need to be eaten every day as the body can store them in the liver and fatty tissues.
- Too many in our diet can cause us harm

Water soluble vitamins: B vitamins: vitamin C

- Not stored in the body so need to be eaten
- To maximise the intake and prevent loss, steam instead of boil the food, or use the water in gravy
- Excess vitamins are eliminated in the urine

	Source	Function	Deficiency
B1 Thiamin	Bread / Pasta / rice / peas / eggs / liver	Energy release	Tiredness
B2 Riboflavin	Milk / eggs / leafy greens	Energy release / repair	Tiredness / dry skin
B3 Niacin	Wheat / nuts / meat / fish	Energy release / skin	Tiredness
B9 Folic Acid	Liver / peas / leafy greens	Growth / healthy babies / red blood cells	Anaemia / tiredness
B12 Cobalamin	Milk / eggs / meat / fish	Red blood cells	Tiredness / nerve damage
C	Citrus / tomatoes / green veg	Immune system / absorbs iron	

Minerals

Minerals help chemical reactions in our body.

	Source	Function	Deficiency
Calcium	Dairy, green leafy veg, bread	Strong bones	Weak bones, rickets and osteoporosis
Iron	Meat, green leafy veg	Red blood cells	Anaemia
Potassium	Fruit and veg	Heart health	Bad for your heart
Magnesium	Green leafy veg	Release energy and bone health	Nausea

Water

Keeps us hydrated.

Source

Drinks, fruit and vegetables, soup.

Function

- Normal physical and cognitive functions,
- Normal regulation of the body's temperature.
- Gets rid of waste substances in the body.

Deficiency

- Even mild dehydration can lead to headaches, irritability and loss of concentration.
- Groups at risk include children, old people and active people.

Trace Elements

Trace elements help chemical reactions in our body.

	Source	Function	Deficiency
Fluoride	Fish, toothpaste	Strengthens teeth	Weak teeth
Iodine	Seafood and dairy	Hormone development	Complications in unborn babies

Fibre

Fibre is also known as "roughage" or "non-soluble polysaccharides (NSP)".

Insoluble fibre

Source

Wholegrain, whole wheat and wholemeal cereals

Function

- Insoluble fibre goes through the body and collects rubbish and waste before pushing it out as poo.
- This acts like a sponge by expanding to hold water and waste
- Helps keep poo soft
- Prevents constipation

Deficiency

Constipation, bowel cancer

Soluble Fibre

Source

Peas, beans, lentils, apples and citrus fruit

Function

- Lowers cholesterol, helping reduce the risk of heart disease.
- Helps to control the level of blood sugar by slowing down the release of food from the stomach (good for diabetics)

RDA

30g per day

Food Preparation and Nutrition:

We use the eatwell guide to get a balance of healthier and more sustainable food. It shows how much we should eat from each group.



4. Eat less saturated fat and sugar

Too much fat is bad for you and causes dietary health problems (heart disease, obesity, stroke)

How?

- Cut visible fat from the meat
- Choose lean cuts of meat
- Offer low fat spreads

Too much sugar caused type 2 diabetes, heart disease, obesity and dental problems (heart)

How?

- Use sugar substitutes for puddings, cakes and biscuits
- Offer fresh fruit alternatives
- Use less processed foods – especially sauces

5. Eat less salt

Eat no more than 5g a day.

Too much salt causes high blood pressure, strokes and dehydration

It is highly addictive!

How?

- Cook dishes using fresh ingredients
- Don't add salt at the table
- Don't add salt to the cooking water

2. Eat lots of fruit and veg

We should eat at least five a day.

How?

Choose from fresh, frozen, tinned, dried or juiced.

Add vegetables to meals

Add vegetables or fruit to cakes and desserts

3. Eat more fish

Fish is a good source of protein, contains vitamins, minerals and omega 3.

How?

Aim for at least two portions of fish a week

8. Eat breakfast

Breakfast is the most important meal of the day as it gives energy for the day..

It should be made up of complex carbohydrates for a slow release of energy and stop us snacking.

We also follow the 8 government healthy eating guidelines:

1. Base your meals on starchy food

Most of the food on your plate should consist of starchy foods

These supply important energy and give important minerals and dietary fibre.

Whole grain and whole wheat versions are best

How?

Have a side of starchy food like potato, rice, pasta or bread.

6. Get active

If you eat more energy than your body needs, it is turned into fat. If you don't eat enough energy your body cannot function properly.

Being overweight can lead to heart disease, high blood pressure or diabetes.

Being underweight also affects your health and leads to bulimia or anorexia.

How?

- Only eat as much food as you need
- Exercise for 30 minutes a few times a week.

7. Drink plenty of water

Our bodies are 2/3s water. It is vital to drink enough water to stay hydrated.

Even mild dehydration can lead to headaches, irritability and loss of concentration.

How?

- Drink loads of water
- Fruit, soup and other drinks also count

Food Preparation and Nutrition:

Life Stages

Toddlers

Eatwell guide doesn't apply
 High calcium
 Small meals
 Variety of different foods

Young Children

- Protein for growth and development
- Given small, attractive portions of food
- Introduce to new foods gradually
- Avoid fatty and sugary food
- Calcium and Vit. D for bones and teeth

Teenagers

- Should be given protein for growth and development
- Risk of obesity and poor skin - Eat 5-a-day to help
- Good supply of iron (esp. for girls during period)
- Avoid fatty or sugary food
- Try to develop good habits

Early and middle Adulthood

Follow eatwell guide
 Men need more calories
 Women need more iron
 Calcium and vitamin for strong bones



Elderly

- Should be given protein to repair worn out body cells
- Need a good supply of calcium and vitamin D for healthy bones
- Good supply of iron to keep the body healthy
- Need more fat in the winter to stay warm
- Fresh fruit and vegetables for vitamins and minerals
- May struggle to cut (arthritis) or chew food (false teeth) and digestive problems.

Special Dietary Needs

Allergy: an adverse reaction by the body to certain substances

Intolerance: condition that makes people avoid certain food because of the effects on their body

Allergic reaction: the way someone responds to certain food.
 - For example: a rash/swelling/anaphylactic shock

Type 2 Diabetes	Starchy food/high in sugar
Low fat diet	Foods naturally high in fat Foods cooked in a lot of fat
Low salt diet	Processed food Smoked meat Chinese food with MSG
Nut allergy	Avoid nuts, blended cooking oil, margarine with nut oils and often seeds
Lactose intolerance	Avoid milk, cheese, yogurt, processed food
Gluten intolerance (coeliac)	Avoid Wheat, wholemeal, bran, pasta, rye, beer.
Iron deficiency anaemia	High iron food – red meat, dark green leafy vegetables
Calcium deficiency	High calcium food – dairy High Vit. D food – tuna, salmon
Dental Caries	Limit sugary food
Cardiovascular disease and obesity	Correct portion size Reduce Saturated fats Fruit and veg to replace fatty food

Specific Lifestyle Choices

Religious/cultural

Muslims

- do not eat pork
- Meat must be halal
- No alcohol or shellfish



Hindus

- Do not eat beef (a cow is considered sacred)
- Many are vegan, although some do eat meat

Jews

- No pork or shellfish
- No milk and meat together
- Meat must be kosher



Vegetarians - Ethical or moral choices

- Dishes with vegetables generally healthy
- Need protein from other sources
- Risk of iron, B1, B9 and B12 deficiency
- Protein from Quorn/tofu

	Eat	Avoid
Pescatarian	Fish/animal products (eggs and dairy)	Meat 
Lacto-ovo vegetarian	Animal products (eggs and dairy)	Meat, fish 
Lacto-vegetarian	Dairy 	Meat, eggs, fish
Vegan		Animal products

Physical Activity

People may have high energy needs if they are physically active, such as sports people or people who are on their feet a lot.

GCSE Food Preparation and Nutrition

Bacteria

What are bacteria?

A micro organism that multiply in certain conditions.

Where can bacteria be found?

Everywhere!

Are all bacteria bad?

No- some are good and essential for normal bodily function.

How can you reduce the risk of bacteria?

- Storing food separately
- Storing and cooking foods at the correct temperatures

Can we kill bacteria by putting them in the fridge?

No- but keeping food chilled at the correct temperatures will slow bacterial growth.

Storing Food

Temperature is really important to keep food safe.

The following temperatures should be used:

Refrigeration	°C
Freezing	Freezing of food at -18°C or below will stop bacteria multiplying.
Cooking	Temperatures of 72°C or above kills almost all types of bacteria.
Danger Zone	The temperature range where bacteria is most likely to reproduce: 8°C - 63°C .

The 4 C's

Cleaning - wash your hands properly

Cooking - make sure you cook food properly or you could make someone very ill

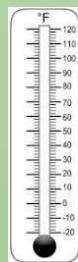
Chilling - keep it chilly silly

Cross contamination - keep raw meat and cooked food apart

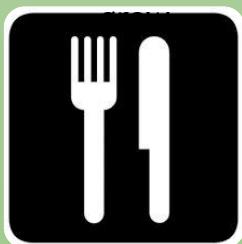
What do bacteria need to multiply?



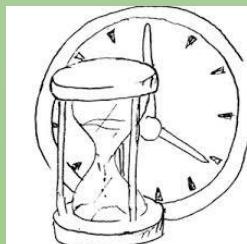
Water: bacteria need moisture to



Temperature: bacteria grows when warm



Food: provides the energy for bacteria to grow, multiply and produce toxins



Time: if food is exposed to these things for a long time they will quickly multiply

What is cross contamination?

Cross contamination is spreading bacteria from one place to another.

What are the four C's to help prevent spreading bacteria?

- Clean
- Cook
- Chilling
- Cross contamination

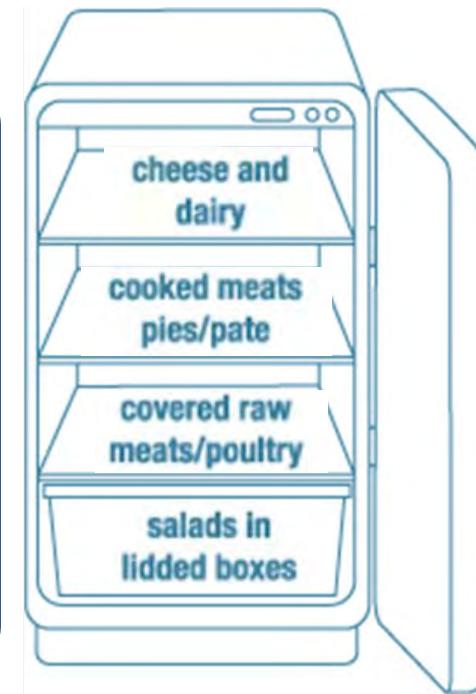
Why do we use different coloured chopping boards when preparing food?

To prevent the spreading of bacteria (to avoid cross contamination).

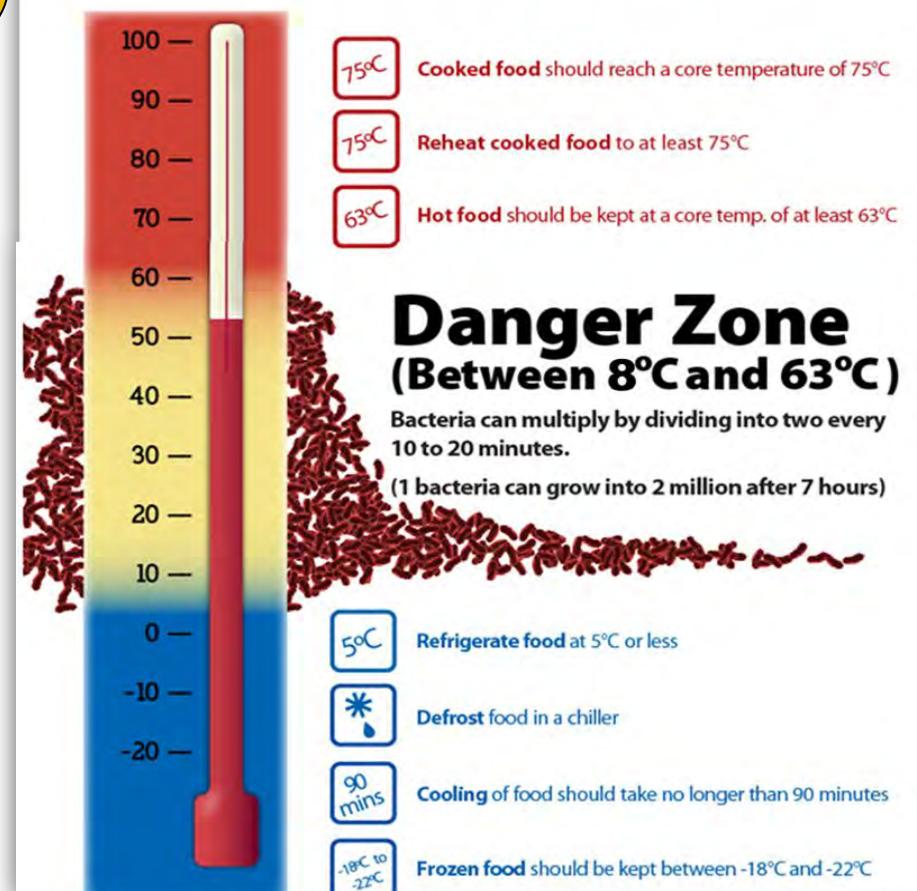
Cross Contamination



To prevent cross contamination (the spreading of bacteria), foods must be stored separately. Follow the rules of food storage within a fridge:



Keep food out of the Danger Zone



GCSE Food Preparation and Nutrition

Sources of contamination:

Food can get contaminated in a number of ways.

Name	Natural contamination	Additional contamination	Prevention
Biological 	Food poisoning bacteria	Bacteria from another source	Store food properly Cook food properly No cross contamination Clean hands
Chem 	Chemical - poison, or pesticides	From cleaning chemicals,	Store your cleaning chemicals away from food Always label chemicals Always wash fruit and vegetables
Physical 	Bones	Foreign objects (hair, plasters, flies, screws)	Tie your hair up Remove jewellery Wear blue plasters

Methods of cooking food

Method	How	Example	Advantage	Disadvantage
Moist heat method				
Boiling	Starchy food boiled vigorously	Potatoes	Healthy (no extra fat)	Water soluble vitamins lost
Poaching	Food gently cooked in a small amount of liquid	Meat, fish or eggs	Healthy (no extra fat)	Water soluble vitamins lost
Steaming	Food cooked in the steam of boiling water	Vegetables, fish	Healthy (no extra fat) Water soluble vitamins kept	Takes a long time
Dry Heat Method				
Baking	Dry, hot air of oven	Cakes, bread	Good colour and texture, Many products cooked at once	Specific times and temperatures needed
Roasting	Dry, hot air of oven. Food is basted to stop it drying out	Joints of meat, vegetables	Flavour and texture, multiple products at the same time	Takes a long time, food can dry out
Grilling	Small pieces of food cooked by radiant heat	Sausages, bacon	Healthy (fat drips out of meat)	Needs supervision, easy to under/overcook
Frying Method				
Shallow frying	Small items cooked with a little fat	Chicken, vegetables, sausages	Quick method, minimal fat added	Not very healthy, needs constant supervision
Deep Frying	Food submerged in hot oil	Chips, chicken, fish	Golden colour and crunchy texture Quick and versatile	Very unhealthy Needs supervision dangerous
Stir frying	Food kept moving in small amount of oil	Thin strips of meat, vegetables	Quick, limited vitamin loss	Lots of prep needed, constant supervision

Signs of Spoilage

Discolouration - Change in colour

Change in texture - Slimy, wrinkly, lumpy, hard

Visible mould

Smell - Sour, bitter or sharp

Change in flavour - Sour, rancid, acidic

Positive use of Microorganisms:

1. Mould is added to blue cheese
2. Yeast is used to make bread
3. Bacteria is used to make yoghurt

Food Preservation:

Food need to be preserved in a way that reduces the bacterial growth, moulds or spoilage.

Controlling temperature
Removing moisture/air
Changing pH
High cooking temperature

Why Bother?

Prevents food poisoning
Reduces food waste
Saves money
Helps planet

Methods of Preservation:

1. Freezing: Freeze foods to slow growth/make organisms dormant. e.g. meat
2. Chilling: Keeping food in the fridge or a chiller cabinet slows down growth of microorganisms. e.g. meat
3. Jam Making provides a sugary medium which inhibits growth of bacteria and mould e.g. strawberries
4. Pickling: alters the pH levels inhibiting growth of bacteria and moulds e.g. onions
5. Salting: the salt draws moisture from the food which therefore prevents/inhibits growth of bacteria and moulds e.g. fish
6. Canning: food contents are processed and sealed in an airtight container. e.g. fruit

Why food is cooked:

- To make it safe to eat
- To improve the shelf life
- To develop flavour
- To improve texture
- To give variety

Methods of heat transfer

Convection - when the environment (air, water or oil) is heated up.

- e.g. - baking a cake
- boiling an egg

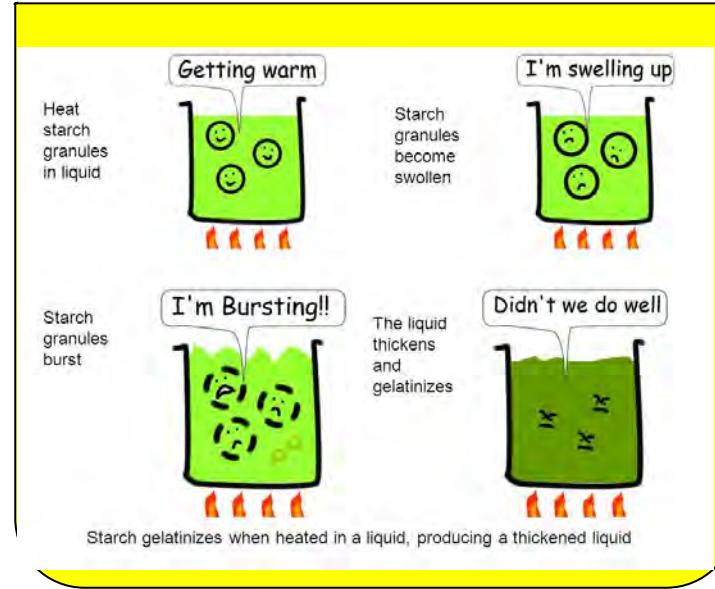
Conduction - when heat is transferred directly.

- e.g. - frying an egg

Radiation - when heat radiates

- e.g. - toast

Gelatinization



Why do things go wrong?

Problem	Result
Too much flour	Stodgy, dry and stiff
Too little flour	Lacks bulk, volume and too soft or runny
Too much fat	Greasy and rubbery or crunchy
Too little fat	Dry, lack of flavour
Too much sugar	Too brown and sweet, crisp, brittle
Too little sugar	Affects flavour, dry, no volume
Too much egg	Eggy flavour, like and omelette, dense texture
Too little egg	Poor coagulation
Too much liquid	Wrong consistency
Too little liquid	Dry mixtures
Too much raising agent	Cracked cake surface, cake spilling
Too little raising agent	Unrisen, dense texture

What happens when food is cooked:

Changes to:

Taste

Colour

Texture

Smell

Protein denaturation:

the process of altering a protein's molecular characteristics or properties



Proteins: Coagulation

The process of turning a liquid into a solid

Example: Egg

Carbohydrates: Gelatinization

When heated a mixture thickens as starch particles absorb water

Example: White sauce

Carbohydrates: Caramelisation

Sugars change colour and flavour when heated

Example: Onions

Carbohydrates: Dextrinization

the browning that happens when starches are cooked



Example: Toast

Fats: Plasticity

the ability of fat to hold its shape

Water: Evaporation

when water is heated it turns into a gas

Effect of pH, Oxygen and Enzymes of Food:

Effect of pH

Acid denatures protein, and preserves food

Causes milk to coagulate and split
Vinegar can preserve or pickle
Denature proteins in marinade to make them more tender

Alkali

Bicarbonate of soda acts as a raising agent by reacting with acids to produce gas

The effect of oxygen

Fruit and vegetables

Go brown when peeled or sliced. This is known as enzymic browning. To slow it down, put them in water (this stops the oxygen getting to it)

Meat, poultry and fish

Makes the blood in meat brown. It is still safe to eat.

Fats and oils

Gradually makes them go rancid

Enzymes:

(Biological catalysts that speed up biochemical reactions.)

Digestive enzymes break food down in your digestive system.

Enzymes cause food to ripen

Enzymes to break down connective tissues and develop flavour in meat

Seasonal Foods



What is seasonal food?

Food grows at different times of year in England. The time that food is ripe for eating is known as its season. Food grows in different countries at different times, so if food is not in season in England, it can be transported from another country.

Why is eating seasonal food whenever you can a good idea?

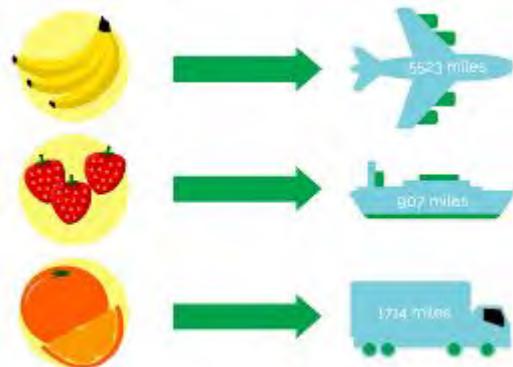
- Seasonal foods are fresher.
- Seasonal foods taste better, as they are full of flavour.
- Seasonal foods have less environmental impact because carbon footprints are reduced.
- Local foods supports the local community.

What are Food Miles?

The distance food has travelled. Less food miles are better for the environment.

How to reduce them:

Eat seasonal, local food where possible



What is a Carbon Footprint?

The amount of energy you use during your lifetime.

How to reduce it:

- Don't fill the kettle (only boil what you need)
- Reduce food waste
- Eat seasonal, local food where possible
- Reuse/Recycle food packaging

To generate electricity, power stations need to burn fossil fuels. This causes gases such as carbon dioxide to be released into the atmosphere.



Using recycled materials to manufacture new products uses less energy, which means less pollution from greenhouse gases and less global warming.

Food Waste

What is food waste?

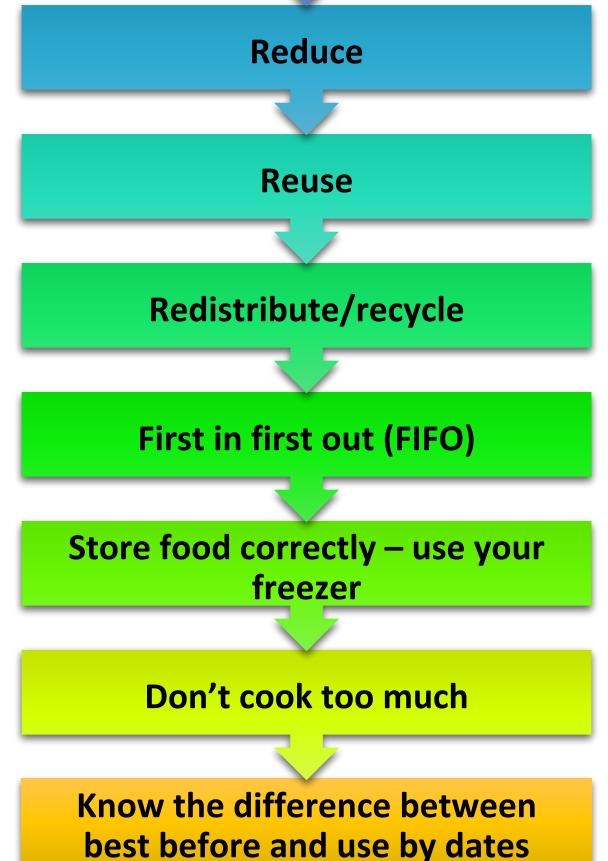
Food waste is food that is discarded, lost or uneaten.

What is the difference between best before, use by and sell by date?

- Best Before date: It means the product will taste best up until that date. It is still edible and okay to eat a little past the listed date, though you may notice a slight change in texture, flavour, or colour.
- Use by date: The date that food should be used by. After this it may be unsafe.
- Sell by date: a date marked on a perishable product indicating the recommended time by which it should be sold.



Tips for reducing food waste



Food Processing

Primary Processing

Primary processing is the turning raw food materials to foods that can be eaten or to ingredients that are used to make food products.

Techniques

- Washing
- Milling
- Trimming
- Squeezing
- Peeling
- Butchery
- Shelling and chopping

Examples

- Pasteurising Milk
- Preparing Vegetables
- Milling Flour
- Cutting Chicken
- Cutting Steaks
- Removing husk from Rice



Secondary Processing

When you turn primary processed food into food products.

Techniques

- Mixing
- Heating
- Cooling
- Drying
- Fortifying

Examples

- Using flour to make bread
- Using milk to make butter or cheese
- Making meat and fish products
- Making complete ready to eat meals.
- Fortifying flour
- Using flour to make biscuits



Food Additives

Food additives are added to products for a specific function (to do a job)

Examples of these jobs are adding colour, flavour or texture, and preserving food.

They are tested to make sure they are safe, but can have side effects like hyperactivity and have been linked to cancer, depression and allergic reactions.



Advantages

Disadvantages

Why Process Food?

- Makes it last longer
- Makes it look nicer
- Makes it easier to digest
- More convenient

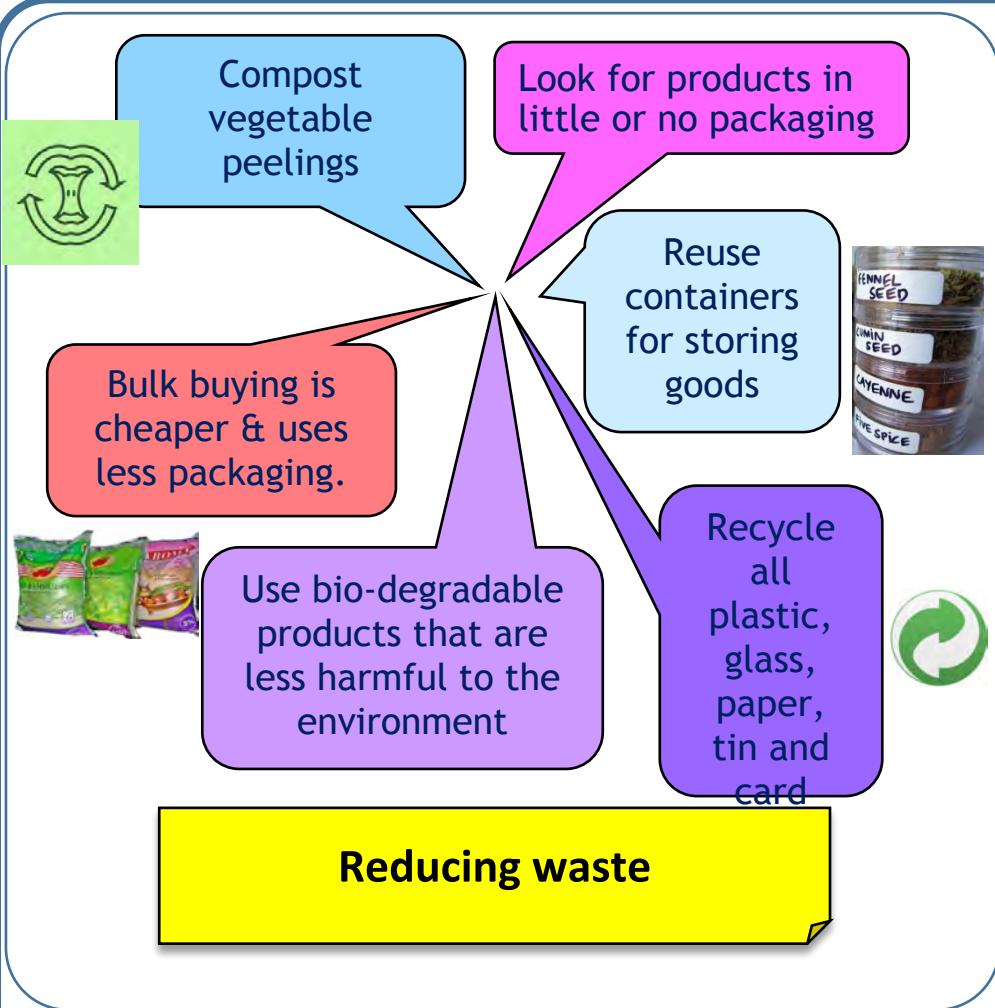


- Nutrients can be added in secondary processing
- Makes it safer
- Makes it easier to use
- Makes it easier to market or brand



- Nutrients are lost in primary processing
- Food additives can be dangerous
- Can be high in fat, salt and sugar





Sustainability of food

Food production is one of the greatest causes of environmental damage

We need to produce more food with less environmental impact

- Meat production increases air and water pollution
- Crops used for animal feed reduces bio-diversity
- Crop production uses lots of pesticides which harm insects
- Deforestation for crop growth damages the environment

Challenges include

- Increased demand,
- Stability in supplies,
- Use of antibiotics in meat farming

Solutions include

- Buying organic food
- Buying local food
- Eating less meat
- Growing your own
- Buying sustainable fish (MSC)
- Buying Fairtrade products

Food security

- Having enough food
- Having the resources to get food
- Knowing how to use food for a healthy diet
- Having enough water and sanitation

Causes

- Poverty
- Trade
- Conflict
- Disasters
- Population
- Health

Conserving an ecological balance by avoiding depletion of natural resources is known as **sustainable**.

Reduce means to cut down on the amount of waste being thrown out.

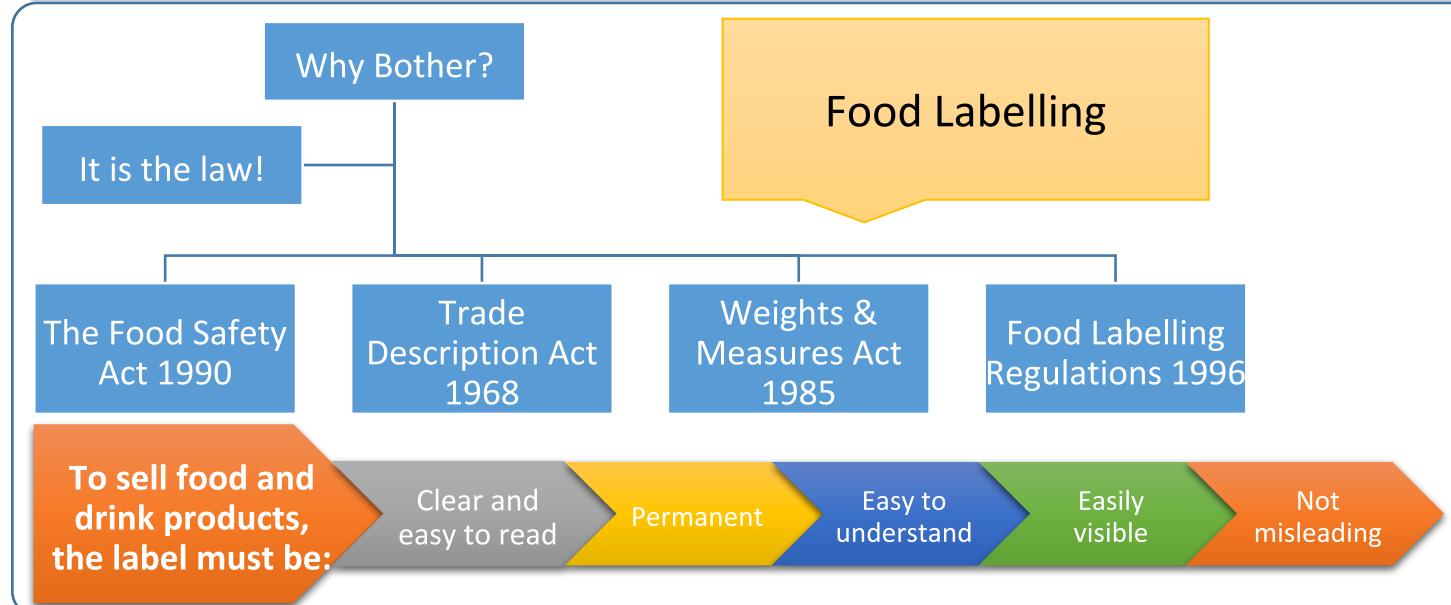
Conservation means to preserve (or make them last) for the future.

Something that is used over and over again, is called **reuse**.

To re-use an item and create something else with it, is known as **recycle**

Something that is able to rot naturally is called **bio-degradable**,

Energy provides the fuel to cook on or the power we use both electricity and gas.



Food labelling - what you must show

On the front of the product:	Anywhere else (side/back or front)
<ul style="list-style-type: none"> The name of the food A 'best before' or 'use by' date Any necessary warnings Quantity information 	<ul style="list-style-type: none"> A list of ingredients The name and address of the manufacturer The batch number Any special storage conditions Instructions for use or cooking, Barcode Place of origin



- Packaging

Properties of Packaging

Strong	Keeps food hot	Portion control	Hygienic	Light weight	
Will not leak	Does not react with food	Can be written on	Provides protection	Environmentally friendly	Keeps food fresh



Example	Use	Reasons	
Cardboard boxes	Pizzas	Easy to print Soak up grease	Protect pizza when carrying Keep pizza hot
Polystyrene boxes	Burgers, fish and chips	Strong Light to carry	Do not react with food Keep food warm (insulator)
Clear plastic boxes	Sandwiches	Easy to print Light to carry	Keep fresh Hygienic
Foil trays with cardboard lids	Indian/Chinese TA	Keep hot Easy to write on	Stack easily lightweight
Plastic containers with lids	Indian/Chinese TA	Keep hot Seals mean no leaks	Reuse Do not react with food



Takeaway Packaging

Types of packaging

Why Package Food?

- To protect the contents
- To hold the contents
- To keep food fresh
- To reduce food waste
- To make food easier to handle, transport and serve
- To improve hygiene
- To make it look more attractive
- To give information on contents, storage and use

Reducing Food Packaging Waste



- Reduce**
 - Avoid packaged products
 - Take re-usable bags with you when shopping
- Reuse**
 - Buy refill packs
 - Glass milk bottles are returnable
 - Use jars or tubs for storage at home
- Recycle**
 - Paper, card, metal and some plastics
 - Collected by the council, or you could take them to a recycling bank

Sustainable packaging should

- Be sourced manufactured, transported and recycled using renewable energy.
- Maximise the use of renewable or recycled materials.
- Be designed to optimise materials & energy
- Be low toxic in it's manufacture, use and disposal
- Use local materials and resources where possible
- Be able to meet market criteria for performance and cost.
- Be beneficial, safe and healthy for throughout it's lifecycle

Packaging	Advantages		Disadvantages	
Paper and Card	Easily printed Can be recycled	Strong when dry Lightweight	Crushes easily Weak when wet	Recycled paper and card cannot be used
Glass	Easily printed Can be recycled Can be reused	Strong Can carry liquids Quality	Brittle (breaks easily)	Expensive
MAP (Modified Atmosphere Packaging)	Gives food a stronger atmosphere (fresh meat, fresh fish and salads)		Once opened food deteriorates quickly	
Metal	Recyclable Easily printed	Strong Rigid	Must be coated or it will react with food Cannot microwave	Uses energy to produce them
Plastic or Polystyrene	Strong Flexible	Easily printed Does not react with food	Litter Limited resource	Can be hard to recycle Chemicals

You need to be able to use sensory descriptors to correctly describe the sensory qualities (how food looks, tastes, feels and smells) for a range of foods and combinations.

Sensory Testing

Humans taste with their tongue and nose.

Tongues have thousands of taste buds that detect 5 things

- Salt
- Sweet
- Sour
- Bitter
- Umami (savoury)



We use our **taste buds** together with **olfactory receptors** in the nose (which detect smells) to identify the flavour of foods.

People use a combination of these senses to decide whether food is appetising.



Sight	Smell	Taste	Touch
Food must look appealing; colourful, fresh, attractively presented.	Smell helps us to taste food. How it is cooked and flavoured will affect the aroma that it gives off.	Must be enjoyable. Cooking method, freshness of ingredients, herbs and seasoning all affect overall taste	Texture can make a big difference. Crunchy not soggy veg, firm not soggy pasta, crunchy not soft biscuits.

Sensory Testing needs to be fair and unbiased. Your test should allow you to find out other people's opinions of your food so you can improve it.

1. Use enough tasters to gather a range of opinions
2. Consider a blind test - where tasters are not told what they are testing
3. Allow tasters to work alone so they are not influenced by others
4. Give tasters clear instructions of what you want them to do
5. Only use small samples to avoid filling up your tasters!
6. Allow tasters to drink water in between each sample to wash away previous tastes
7. Tests should be carried out in clean, hygienic and quiet locations

Results can then be analysed to allow you to improve your product.

Ranking Test

Foods are tasted and put in order from lowest to highest for a particular characteristic or quality e.g. sweetness. The scores are totaled at the end.

Profiling Test

Tasters rate certain characteristics of food and the average rating of each is worked out to create a profile of the food. This can be displayed visually on a star diagram. Star diagrams can be overlapped to compare two different foods.

Paired Preference Test

Two slightly different food products e.g. biscuits (one made with margarine and the other with butter) are tasted and the taster chooses their favourite.

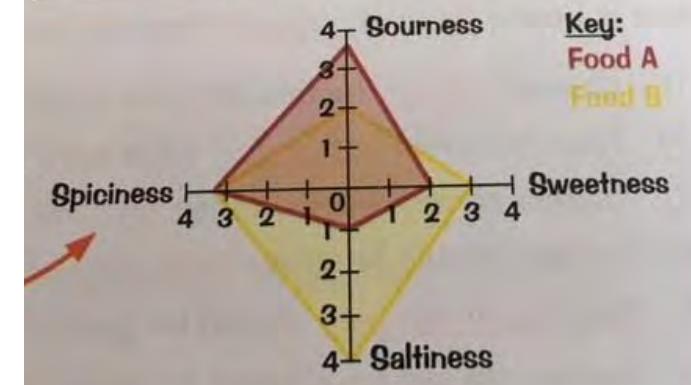
Triangle Test

This is a type of discrimination test. Three foods are tested where two are the same and one has a tweaked recipe. The taster has to identify which product differs from the others.

Hedonic Rating Test

People rate a variety of foods using a scale e.g. 1-5, hate/love, or smiley face and sad face..

Characteristic	Taster Ratings				Average
	A	B	C	D	
Sourness	5	3	2	4	3.5
Sweetness	2	3	2	1	2
Saltiness	0	1	1	2	1
Spiciness	5	3	2	3	3.25



There are a great deal of factors that influence someone's food choices.

Factors affecting food choice

- Physical Activity Level (PAL)
- Healthy eating
- Cost of food
- Income
- Culinary Skills
- Lifestyle
- Seasonality
- Availability
- Special Occasions
- Enjoyment
- Allergies
- Intolerances
- Animal welfare
- Working conditions (fair trade)
- Environmental impact
- Eating naturally

Different Religions Have Different Views on Food

Hinduism

Many Hindus are vegetarian. Some vegetables are avoided as they are seen as harmful, including garlic, onions and mushrooms. Some Hindus do eat meat but it must be slaughtered using a quick painless method called Jhatka. Cows are considered sacred and cannot be eaten.



Christianity

No strict dietary rules
During lent some Christians give up certain foods or drinks
Specific food traditionally eaten during celebrations. Hot cross buns on good Friday, pancakes for Shrove Tuesday.

Sikhism

Baptised Sikhs are prohibited from eating ritually slaughtered meat (kosher and halal), may be vegetarian. Sikhism teaches against overindulging and only to eat what is needed.



Islam

Meat eaten by Muslims must be halal - the animal is slaughtered in a specific way whilst being blessed. Muslims cannot eat pork or product made from pigs such as gelatine. They cannot drink alcohol. During Ramadan Muslims fast between sunrise and sunset.



Buddhism

Buddhists believe all living things are sacred and most are vegetarian or vegan. Most do not drink alcohol. Some choose to fast from noon until the following sunrise.



Judaism

Follow Jewish dietary laws (kashrut). Food must be kosher - fit for consumption. Kosher animals have split hooves and chew the cud - cows and deer. Can eat fish with fins and scales but no shellfish. Slaughter of animals must be quick and painless. Cannot eat pig, rabbit, hare, camel and many other animals. Dairy and meat products cannot be cooked or mixed together.



Rastafarianism

Eaten pork is forbidden. Many eat a clean and natural diet called I-tal, mainly made up of vegetables. They can eat fish under 30cm. Many do not drink alcohol. They drink things made from naturally grown produce such as herbal tea or fruit juice.



Food labels help people to make informed choices about what they eat. The information is controlled by different regulations.

Compulsory Information

Food Labelling Regulations

- Food Information for Consumer (FIC) updated in 2014 must be followed by all European Union countries (EU)
- From 2016 it was compulsory for nutritional information to be included on the label
- The food standards agency (FSA) is responsible in the UK for ensuring manufacturers follow the regulations
- In the UK food labels must not mislead, be easy to read and all allergies must be emphasised.

Sucrose-Free Plain Milk Chocolate		
Nutrition Facts		
Serving Size: 1 Chocolate Bar (50g)		
Typical Nutritional Information	Per 100g	Per 50g Serving
Energy (kJ)	1691	846
Protein (g)	9	4.5
Glycaemic Carbohydrates (g)	7.5	3.75
of which total sugars* (g)	6.8	3.4
of which Polyols (g)	48	24
of which Starch (g)	1	0
Total Fat (g)	16.56	8.28
of which saturated fat (g)	11.5	5.8
of which trans fat (g)	0	0
of which monounsaturated fat (g)	4.4	2.2
of which polyunsaturated fat (g)	0.7	0.3
Cholesterol (mg)	12	6
Dietary Fibre# (g)	5	2.5
Total Sodium (mg)	66	33

AOAC 991.43 | *Sugar from Cow's Milk (Lactose)

Each nutrient must be given per 100g of the food

Energy is given in kilojoules, and the rest in grams

Any pre packaged food labels MUST have this *highlighted information on.

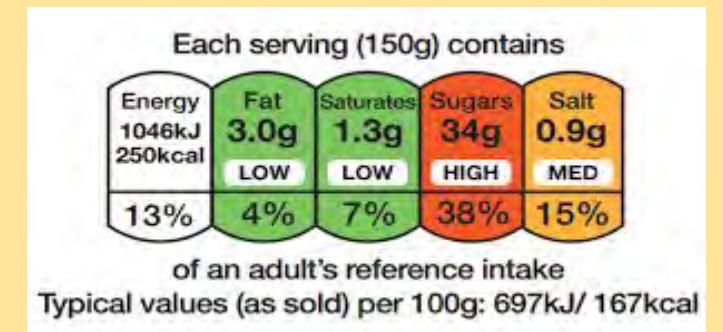


Any genetically modified ingredient need to also be shown.

Non - Compulsory Information



- Manufacturers will often add information or claims about their products to make them more attractive to the consumer
- Traffic light labelling allows people to see how healthy the product is at a glance. These are useful but not required by law.



- Products can state whether they are suitable for certain groups, such as religious groups or dietary choice e.g. vegan
- Country of origin 
- Serving suggestions. 

Companies use marketing tools to try to get you to buy their food and drinks.

Special offers

Very common in supermarkets and wherever food is sold.

Designed to **convince** you to buy the food - perhaps even more than you actually need

Loyalty card schemes - where you collect points

for your shopping - record your food choices then they can send you matching offers.

Point of sale marketing - placing products near the till to tempt you as you queue to pay.



Celebrity Brand Endorsements

Some companies are endorsed by **celebrity chefs** to **boost sales**, the chefs name can be used to **convince** you that it's a **high quality product**.

Celebrities from **TV or films** may also be used on advertising, their association again suggests a high quality product.

Food companies may **sponsor sports teams or individuals** e.g. **Lucozade** has had links with many sport stars past and present. They may pay to have their **product name displayed at sporting events** too so it is seen by a wide audience.



Health Claims

Manufacturers may **promote particular health benefits**.

Such claims make the product look **healthy** and may **boost sales**.

They may launch a **low sugar** or **low fat** version of a product e.g. **Coke Zero**.

Gluten or lactose free products target individuals with a specific **dietary need or choice**.



Promotion of Ethical Values

Fair Trade products may cost more to produce but they can **charge more** and the product may appeal to a **wider audience**.

Organic food again can be sold at a **higher price** and can target a **specific audience**.

Packaging may be **environmentally friendly** - it may be **biodegradable or recyclable**.

Some products may be **labelled as natural or fresh** even if they contain artificial chemicals,



You need to be able to use sensory descriptors to correctly describe the sensory qualities (how food looks, tastes, feels and smells) for a range of foods and combinations.

Knife Skills



Meat, fish and alternatives

- fillet a chicken breast, portion a chicken
- remove fat and rind,
- fillet fish,
- slice raw and cooked meat and fish or alternatives (such as tofu and halloumi) evenly and accurately

fruits and vegetables

- bridge hold,
- claw grip,
- peel,
- slice,
- dice
- cut into even size pieces (i.e. batons, julienne)

Prepare fruits and Vegetables



- mash, shred, scissor snip, scoop, crush, grate, peel,
- segment, de-skin, de-seed,
- blanch, shape, pipe, blend,
- juice and prepare garnishes
- demonstrate the technical skills of controlling enzymic browning and spoilage and preventing food poisoning (wash and dry where appropriate)

Tenderise and Marinate



Demonstrate how acids denature protein and marinades add flavour and moisture when preparing vegetables, meat, fish, and alternatives

Prepare combine and shape



- Roll, wrap,
- skewer, mix,
- coat,
- layer meat, fish and alternatives,
- shape and bind wet mixtures (such as falafels, fish cakes or meatballs)
- demonstrate the technical skill of preventing cross contamination and handle high risk foods correctly

Select and adjust a cooking Process



Select and adjust the cooking process and length of time to suit the ingredient, for example to match the cut of meat, fish and alternatives

You need to be able to use sensory descriptors to correctly describe the sensory qualities (how food looks, tastes, feels and smells) for a range of foods and combinations.

Making Sauces

- Make a blended white sauce (starch gelatinisation) a roux and all in one blended sauce, infused sauce, veloute, bechamel, to demonstrate understanding of how liquid/starch ratios affect the viscosity and how conduction and convection work to cook the sauce and the need for agitation
- Make a reduction sauce such as pasta sauce, curry sauce, gravy, meat sauce (including meat alternatives such as myco-protein and textured vegetable protein) to demonstrate how evaporation concentrates flavour and changes the viscosity of the sauce
- make an emulsion sauce such as a salad dressing, mayonnaise, hollandaise to demonstrate the technical skill of how to make a stabilised emulsion

Water based methods using the hob

Demonstrate the following techniques:

- steaming
- boiling and simmering
- blanching
- poaching

Weigh and Measure

Demonstrate accurate measurement of liquids and solids

Dry heat and fat based methods using the hob

Demonstrate the following techniques:

- dry frying
- pan (shallow frying)
- stir frying

Preparation of ingredients and equipment

Demonstrate the following techniques:

- grease/oil, line, flour, evenly and with attention to finished product

You need to be able to use sensory descriptors to correctly describe the sensory qualities (how food looks, tastes, feels and smells) for a range of foods and combinations.

Using Raising agents



Demonstrate the following techniques:

- Use egg (Colloid foam) as a raising agent—create gas in air foam—whisking egg whites, whisked sponge
- Use Chemical Agents—self raising flour, baking powder, bicarbonate of soda
- Use Steam in a mixture (Choux Pastry, Batter)

Set a mixture - removal of heat (gelation)



Demonstrate the following techniques:

- use starch to set a mixture on chilling for layered desserts such as custard or cheesecake

Set a mixture - heating (coagulation)



Demonstrate the following techniques:

- use protein to set a mixture on heating such as denatured
- protein in eggs for quiche, choux pastry

Using the oven



Demonstrate the following techniques:

- baking
- roasting
- casseroles and/or tagines
- braising

Use of Equipment



Demonstrate the following techniques:

- use a blender, food processor, mixer, and microwave

Using the grill



Be able to demonstrate the following
Demonstrate the following techniques with a range of foods, such as vegetables, meat, fish or alternatives such as halloumi, seeds and nuts:

- char
- grill or toast

You need to be able to use sensory descriptors to correctly describe the sensory qualities (how food looks, tastes, feels and smells) for a range of foods and combinations.

Shaping and finishing dough



Demonstrate the following techniques:

- roll out pastry, use a pasta machine, line a flan ring, create layers (palmiers), proving/resting
- glazing and finishing such as pipe choux pastry, bread
- rolls, pasta, flat breads, pinwheels, pizza, calzone

Test for Readiness



Demonstrate the following techniques:

- use a temperature probe, knife/skewer, finger or 'poke' test, 'bite', visual colour check or sound to establish whether an ingredient or recipe is ready

Judge and manipulate sensory Properties



Demonstrate the following techniques:

- how to taste and season during the cooking process
- Change the taste and aroma through the use of infusions, herbs and spices, paste, jus, reduction
- how to change texture and flavour, use browning
- (dextrinisation) and glazing, add crust, crisp and crumbs
- presentation and food styling – use garnishes and
- decorative techniques to improve the aesthetic qualities,
- demonstrate portioning and presenting