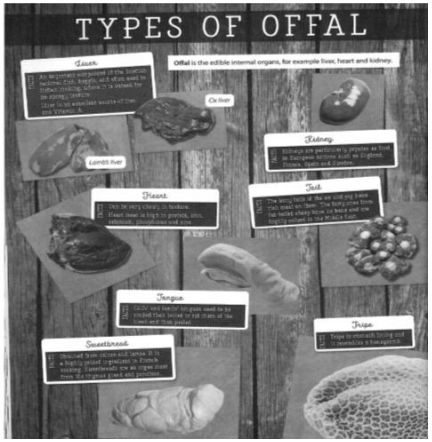
Topic: Commodities - Meat, Poultry, Fish & Eggs

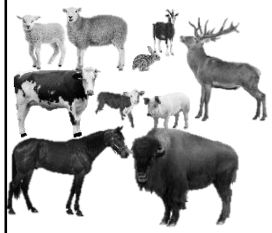
MEAT

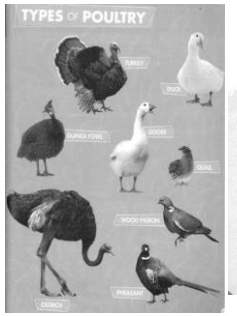
Meat is an important food commodity which provides nutrients essential for health. Meat is sourced from animals. Poultry is the name given to domestic fowl.

The muscle tissues of dead animals and birds are classified as meat and poultry, whereas the edible internal organs are called Offal. Game refers to wild animals



Sources of meat in the UK include:





Horsemeat	Horsemeat is one of the most controversial meats because for many people the killing of horses for meat is still an emotive subject. The facts remain that it is a healthy meat choice. It has a lower fat content and more omega-3 than to beef. Horsemeat is fairly similar in taste to beef but with a slightly sweeter or subtle game flavour.
Goat	Known as Cabrito/Chervon or kid or goat. It is believed that 80% of the world's population has goat in their diet, it is not as widely popular in the UK. It is typically found in 'ethnic' butcher shops, particularly those serving the Caribbean community, where goat is a staple.
Rabbit	Rabbit was popular in the UK in the 1940's and 1950's when meat was rationed during and after World War 2. It was freely available and if you could catch one. Rabbits were bread especially for meat purposes in homes during the war. The meat is low in fat, cholesterol free, high in protein and tastes similar to chicken.
Venison	Venison refers to the meat of a deer. It is classed as game and can either be farmed-reared (methods vary from free range to intensive) or park-reared in herds that roam parklands. Venison is a red meat, similar to beef but leaner and with a slightly richer taste. It is more communally eaten as 'made-up' commodities such as sausages, salami, burgers and rissoles.
Poultry	Poultry is a very popular food in the UK and is common on restaurant and takeaway menus. Domestic examples include: Chicken, turkey, goose, duck, guinea fowl, poussin (young chicken), quail and ostrich. Game examples include: Partridge, pigeon and pheasant. Poultry is reared in different ways: **Indoors in large numbers** – a standard chicken is about 40 days old when it is slaughtered **Free-range** – chickens are allowed outside and reared in large sheds: they are 56 days old when they are slaughtered. **Organic** – chickens are allowed to roam the fields and are given organic food to eat. They are 80 days old when slaughtered and their meat is usually more expensive to buy. Chicken is the most widely eaten poultry in the world. It has both white and dark meat and has much less fat compared to other poultry. Specialised breeds have been developed for meat (broilers) and eggs (layers)

Beef		British reared breeds such as Aberdeen Angus, Longhorn and Hereford have traditionally been considered to provide the best beef in the world.
Organic Beef		Organic beef and beef from rare breeds, is the most expensive to buy as the highest farming standards will have been needed at all stages of the animal's life. The length of time for which beef has been hung will also determine how flavoursome and tender it is. 10-14 days is a good length of time. Some super-premium beef is hung for up to six weeks.
Wagu Beef		Wagu meat comes from a group of Japanese breeds whose meat is renowned for its high level of fat marbling. Western beef has white streaks through it, wagu has more fat than flesh and looks with a splattering of pink. Wagu meat is extremely delicate. The soft fat has a low melting point, due in part to its high proportion of monosaturated fats, to go along with high levels of omega-3 and 6. Fat is where the flavour of meat resides. The taste of wagyu is smooth, velvety and sweet. Many consider it to be the juiciest richest steak in the world.
Veal		Veal meat comes from the male calves of cows bred for dairy, slaughtered when they are a few months old. For years' veal has been shunned by British consumers on welfare issue grounds. However, Freedom Food Laws and improved welfare standards for rearing calves have enabled veal to regain its popularity in supermarkets and on restaurant menus in recent years.
Meat from sheep		Lamb is sheep under one-year-old. Hogget is a lamb older than one year. Mutton is the meat of older sheep.
Meat from Pigs	**Pork**	This is all the meat that comes from pigs. To add extra choice pork can be cured and smoked.
	Ham	This is a specific cut of the thigh part of the pig which has been cured and or salted.
	Bacon	This is produced by curing pork with salt or in brine solution. After maturing it is sold as unsmoked bacon. It can be smoked to add extra flavour to the bacon. The meat is usually darker in colour and has a distinctive flavour.
	Gammon	This is cured whole leg of pork. It is cut into slices and eaten hot as gammon steaks. It could be eaten cold as ham. Some hams may be cured and smoked such as 'honey roast'. This adds a distinctive flavour and extends the shelf-life of the product.

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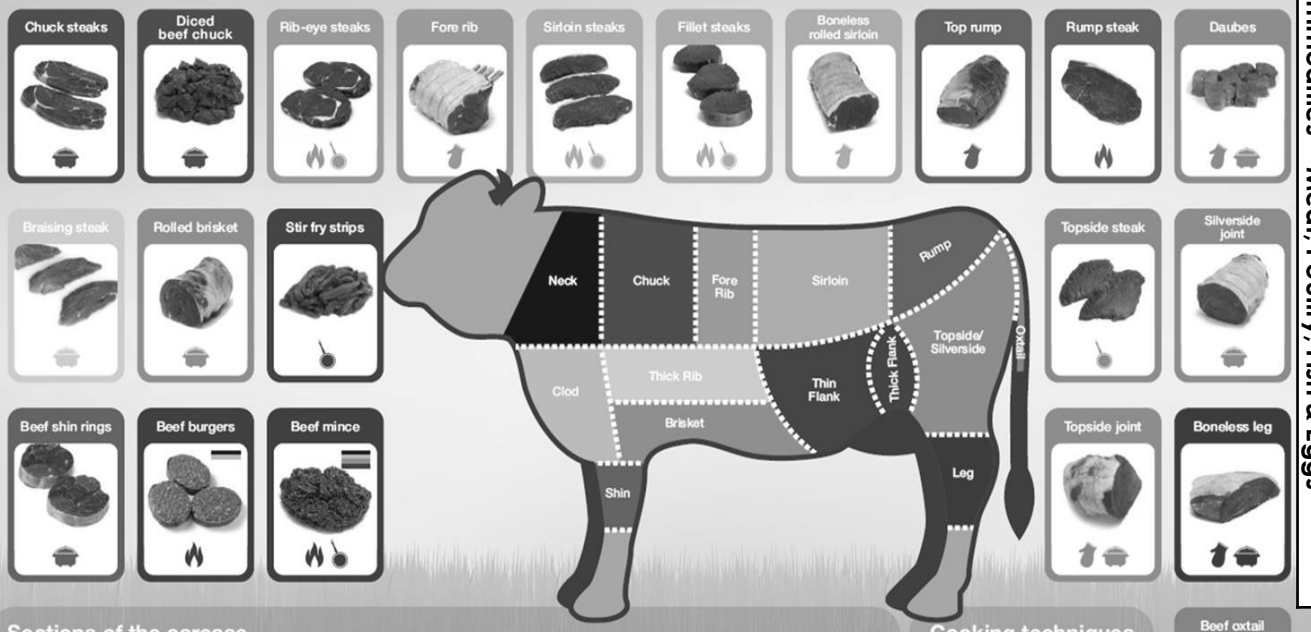
Know your **beef meat** cuts



Sections of the carcase

Neck
The neck produces a variety of cuts which are suitable for stewing and braising. Meat from this section is also commonly used to produce mince.

Clod
The clod produces economical cuts of meat which should be slow cooked. Meat from this section is also commonly used to produce mince and mince products, e.g. burgers.

Shin
Cuts from the shin consist of lean meat with a high proportion of connective tissue suitable for slow cooking methods such for stews, casseroles, soups and stocks.

Chuck
The chuck produces a fairly lean cut which is often sold as chuck steak and diced chuck. It is suitable for braising, stewing and used for pie fillings.

Thick Rib
Cuts from the thick rib are suitable for slow cooking. The meat is slightly more tender than other stewing cuts.

Brisket
This is a traditional cut of beef which is available either on the bone or boned and rolled and is also used to prepare rib-eye steaks before roasting. The fat marbling makes it a very succulent joint.

Sirloin
Produces tender cuts of meat which is a popular choice with consumers for grilling, frying and roasting. Sirloin meat is leaner than fore rib meat.

Fore Rib
This is a traditional cut of beef which is available either on the bone or boned and rolled and is also used to prepare rib-eye steaks before roasting. The fat marbling makes it a very succulent joint.

Leg
This can also be referred to as the hind shank and commonly deboned. The meat is sinewy and requires lengthy cooking at low temperature.

Thick & Thin Flank
Flank meat is flavoursome and tends to contain more fat lending itself to long, slow cooking methods. However, minced or cut into strips it can be cooked quickly. Thin flank steak, or skirt steak, can be flash fried and is traditionally used for fajitas.

Topside/Silverside
This is a lean cut of beef more often used for roasting and pot-roasting. Traditionally used for salting and sold sliced as salted beef.

Rump
The rump is a lean and tender cut, commonly sold in large steaks for grilling, frying and baibecuing.

Cooking techniques

- Barbecuing and grilling
- Roasting
- Frying and stir frying
- Slow cooking

Beef oxtail

For more information about meat, go to www.meatandeducation.com

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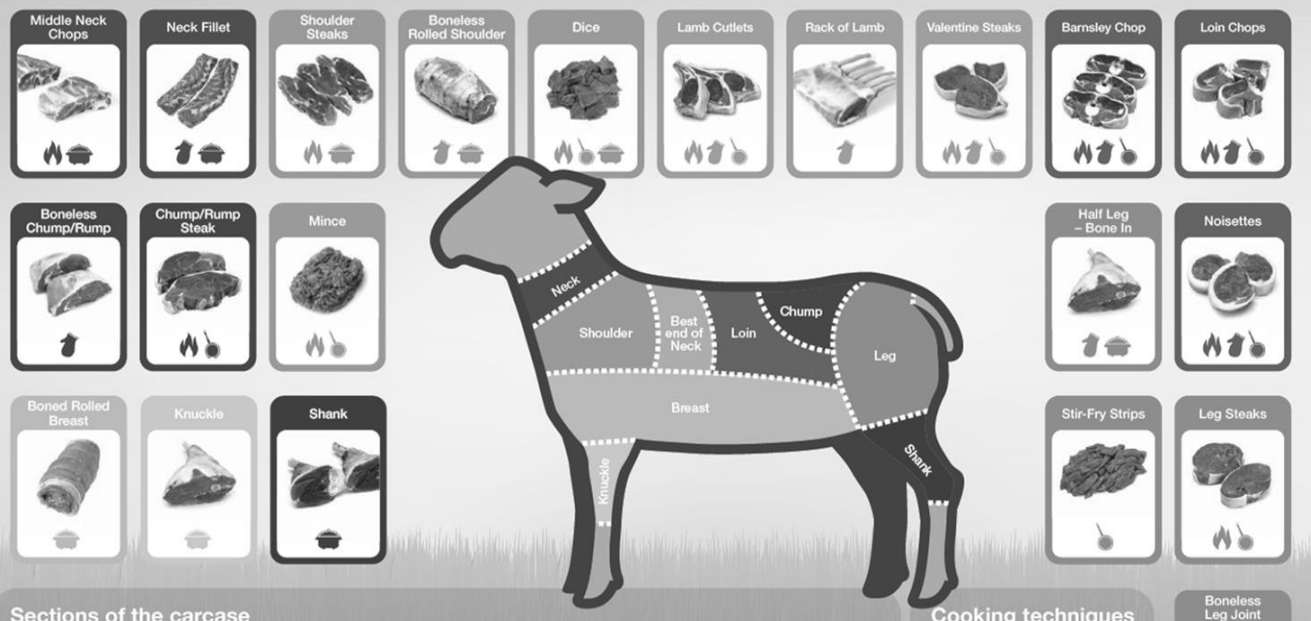
Know your **lamb meat** cuts



Sections of the carcase

Neck
Meat from the neck contains a high proportion of connective tissue and can require long moist cooking methods. Middle neck chops can be grilled. Neck fillets which are boneless and well trimmed can be cooked at higher temperatures for a shorter cooking time.

Breast
Breast meat requires slow cooking due to high amounts of cartilage and connective tissue. The meat is also used to produce mince.

Best end of Neck
Best end comes from the first eight ribs of the carcase known as a rack of lamb. Cutlets and valentine steaks can also be produced from the best end.

Shoulder
The shoulder produces succulent and tender roasting joints with good flavour; available either on the bone or boned and rolled. Shoulder meat is commonly used to produce mince, diced lamb and shoulder steaks.

Knuckle and Shank
The knuckle describes a cut from the fore leg; lamb shank is produced from the rear leg. In both cases, the meat is lean with a high proportion of connective tissue which requires lengthy cooking at low temperature.

Loin
Meat from the loin provides chops, steaks and noisettes. The loin can also be boned completely, stuffed and rolled to produce roasting joints.

Chump
The chump can be divided into chops or steaks and can be used for both quick cooking methods and slow cooking methods.

Leg
The leg produces an excellent roasting joint either on the bone or boned and rolled. The leg is also often cut into a range of leg steaks and stir-fry strips for quick cooking.

Cooking techniques

- Barbecuing and grilling
- Roasting
- Frying and stir-frying
- Slow cooking

Boneless Leg Joint

For more information about meat, go to www.meatandeducation.com

Know your **pork meat** cuts

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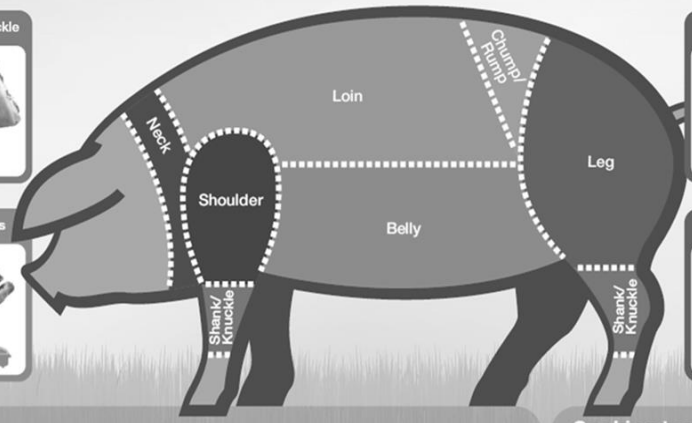
Collar joint | Collar steak | Valentine steak | Loin joint | Loin steak | Loin rack | Rump steak (chump steak) | T bone chop | Fillet | Stir fry

Shoulder steak | Shoulder joint | Shank/knuckle



Rib chop | Leg joint

Belly joint | Belly slices | Spare ribs

Leg daubes | Dice

Sections of the carcase

Neck
The neck (or collar) produces delicious meat which can be slow cooked to allow intramuscular fat to melt – keeping the meat moist and tender.

Shoulder
The shoulder produces a very tender, succulent joint which is suitable for either roasting or slow cooking.

Shank
Lean meat with a high proportion of connective tissue can be found in the shank. Cuts from this area are suitable for slow cooking methods such as stews, casseroles, soups and stocks.

Belly
Cuts from the belly are fatty and as such offer great taste and tender meat.

Loin
The loin is a very versatile and lean cut of meat. All cuts from the loin are suitable for grilling or frying.

Chump
The chump end is positioned at the rear of the loin. Chump steaks (sometimes called rump) are boneless, wider and leaner than those from the loin.

Leg
A wide range of roasting joints is produced from the leg. The meat is often divided into separate muscles from which a range of steaks and stir fry strips are prepared for quick cooking.

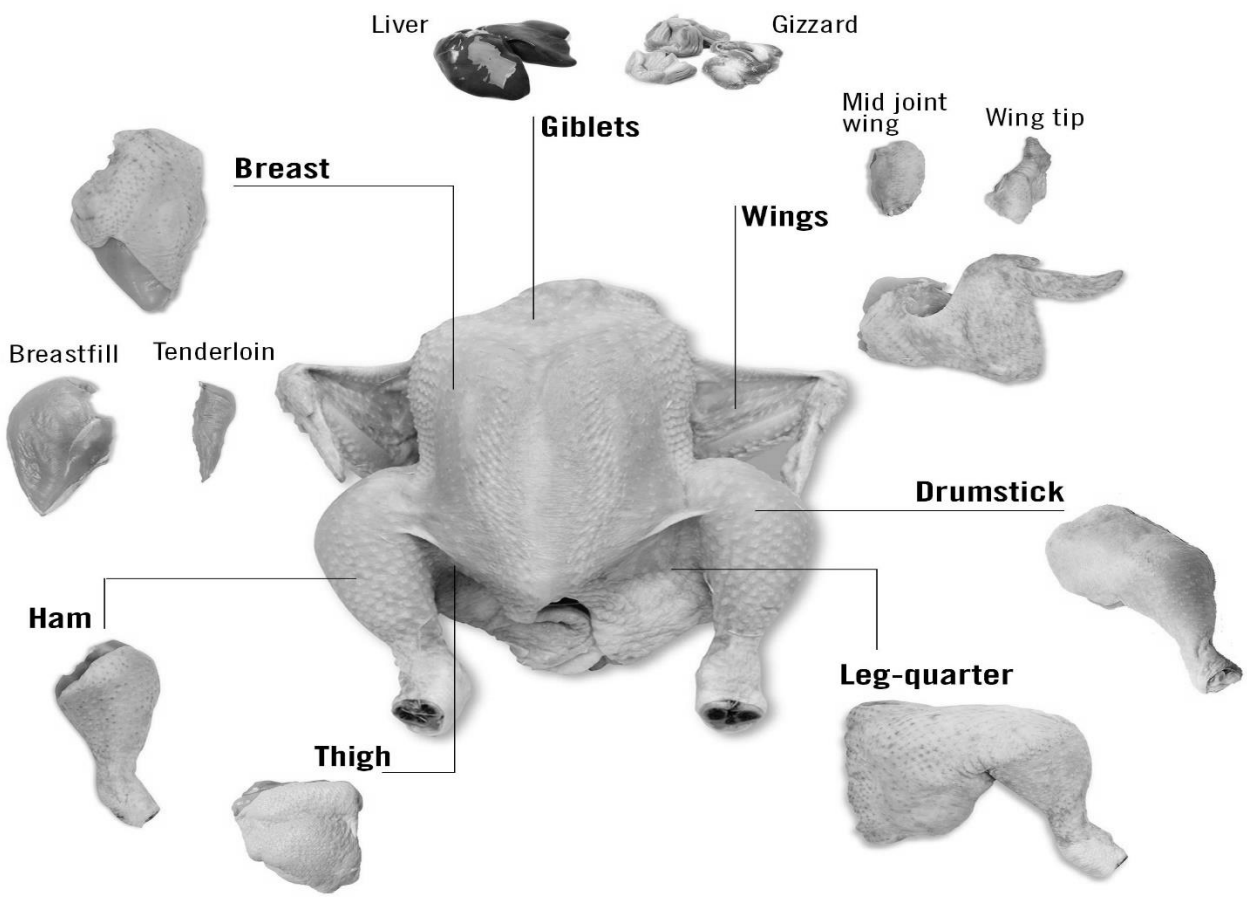
Mince
Pork mince is produced using forequarter meat.

Cooking techniques

- Barbecuing and grilling
- Roasting
- Frying and stir frying
- Slow cooking

Mince

For more information about meat, go to www.meatandeducation.com



Topic: Commodities - Meat, Poultry, Fish & Eggs

EU Law

Under EU law, all meat and poultry for human consumption has to show traceability. Under the law, traceability means the ability to track any food, feed, food-producing animal or substance that will be used for consumption through all stages of production, processing and distribution.

Animal Welfare

There are symbols on packaging to show that meat and poultry have met welfare standards. Animal welfare refers to the well-being of animals and covers areas such as the animals' access to fresh water and a diet to maintain full health. It also gives assurance that animals are reared free of any discomfort, pain, injury or disease, and are provided with adequate shelter and a comfortable resting area.

RSPCA Assured

Previously *Freedom Food*, this is the RSPCA's ethical food label dedicated to animal welfare. The RSPCA Assured label makes it easy to recognise products from animals that have had a better life. It is found on the packaging of meat and dairy products which have met animal welfare standards.

Red Tractor

The Red Tractor logo gives information on where the food has been farmed, processed and packed. Food given to animals on farms displaying the Red Tractor logo is safe from them to eat with no risk of contamination to the meat or milk produced. The animals' health and welfare is regularly checked. Farmers under this scheme must also use responsible farming methods not to pollute land and minimise the impact of their farming methods on wildlife, fauna and flowers.

Fish - Fish is an important food commodity, which provides nutrients essential for health. Fish provides a variety of different nutrients, including protein, fat, calcium and they are rich in vitamin D and Omega 3. Fish are usually classified according to their physical structure and composition.

White Fish

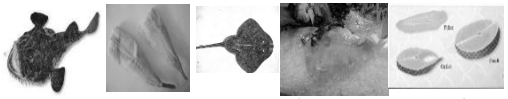
White fish have less than 5 per cent fat (oil) in their flesh, which is why their flesh appears white. Instead, they have oil in their liver. Examples of white fish are: cod, haddock, halibut, whiting, coley, plaice and Dover sole. White fish are round (e.g. cod, haddock and whiting) or flat (e.g. plaice and sole).
These have white skin underneath and dark skin on top for camouflage. Most white fish are sea water fish and live on the bottom of the sea bed. This group of fish are known as white fish because of the colour of their flesh—not the skin. Only minute traces of fat are found in this fish flesh.

Oily fish have between 10 and 20 per cent fat (oil) in their flesh, which makes their flesh quite dark. Examples of oily fish are mackerel, herring, pilchard, sprat, sardines and salmon. Oily fish that have fat distributed through the flesh in the muscles fibres— (never separate like in meat). They contain—on average 10% fat. They are **sea fish** such as herring, mackerel, sardines and tuna or **fresh water fish** such as trout. Or **both** such as salmon that live in the sea but return to the river to mate and lay eggs.

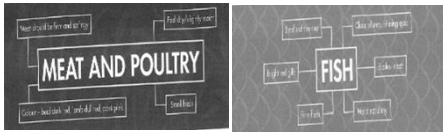
Shell fish are found in the sea. Shellfish are divided into: **Crustaceans** – these have a shell and legs. Examples include prawns, scampi, lobster, and crab. **Molluscs** – these have a shell but no legs and they often fix themselves to rocks. Examples include cockles, mussels, winkles and oysters.
Squid and **Octopus** - are also classed as molluscs—even though their shell is inside!
Fish produced in fresh water include trout and carp

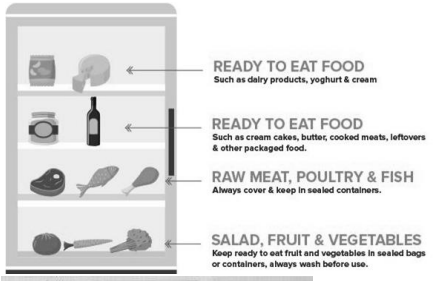
Cuts of fish:

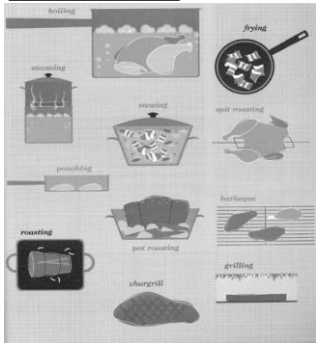
Large fish (e.g. cod, coley, haddock) are cut into fillets, steaks or cutlets.
Small and medium fish (e.g. herrings, mackerel, rainbow trout) are usually sold whole and can be filleted by removing the backbone, tail, head and fins.
Very small fish (e.g. sprats and whitebait) can be fried and eaten whole.



Fillets can then be cut again - or shaped into different cuts for different dishes. Some fish have different parts eaten! A skate fish's wings are the parts eaten. A monkfish's tiny tail is all that is eaten.







Storing Meat, Poultry and Fish

- Should be bought from a reputable supplier
- Should be stored in a leak-proof container
- Must be stored at 5'C on the bottom shelf of a fridge.
- Raw meat, poultry and fish must be stored on a shelf below cooked meat, poultry and fish
- Must be used as soon as possible or frozen to use later.
- Fish and offal should be used the same day as purchase because they 'go off' very quickly.

Raw meat, poultry and fish can cause food poisoning due to incorrect storage, cross-contamination from food handlers not washing their hands and equipment after preparation, and the meat, poultry and fish not being cooked thoroughly.
All raw meat, poultry and fish carry pathogenic bacteria such as Salmonella, Campylobacter and E. coli, with raw chicken being the main source for campylobacter contamination.

Ways of preserving fish.

Salting - If enough salt is used, then the fish may keep for up to a year.
Smoking - Fish can be smoked using different techniques. Hot smoked fish are moist, lightly salted and fully cooked. They can be eaten without further cooking. Cold smoked fish are generally saltier in flavour and have less moisture. Cold smoking does not cook the fish. It merely adds a smoked flavour. Smoked fish and salted fish such as kippers and bloaters should have a firm flesh, shiny skin and a good 'smoky' smell.
Pickling - Pickling fish was originally conceived as a way to preserve it. It is a common technique in Scandinavia. Pickling is now used widely to add flavour and sharpness.
Canning - Produces a moist, flaky product and makes the bones edible. Oily fish and shellfish such as tuna, salmon, and prawns can be canned in brine, tomato sauce or oil which adds flavour to the fish.
Drying - Fish are laid out to be dried.
Freezing - Packaged in blocks or freeze in water brushing glaze on top.

Sustainability

All fisheries and anglers have to operate under strict management regimes. Many stocks are currently very healthy. Many of the most plentiful species are exported, so there is scope to increase UK consumption of these fish stocks. The Fish Environmental Stewardship logo means that the fish are caught with minimal impact on stocks, ecosystems and the environment, which helps ensure that the fish we eat today will still be available in the future.

Topic: Commodities - Meat, Poultry, Fish & Eggs

Eggs

Eggs are an important food commodity which provides nutrients essential for health. Eggs provide a variety of different textures, colours and flavours to dishes. Eggs can be used in a variety of different ways.

Organic
These are more expensive as hens have to have access to organic land and eat an organic diet.

Free Range:
The hens are reared in large barns with daytime access to outside runs. There are no feeding guidelines (by products and GM foods to increase productivity and profit margins)

Barn:
The hens are reared in barns with no outside access. They are provided with perches, platforms, nest boxes and litter areas. Areas can be quite crowded with up to 16,000 hens in a barn—depends on the keeper.

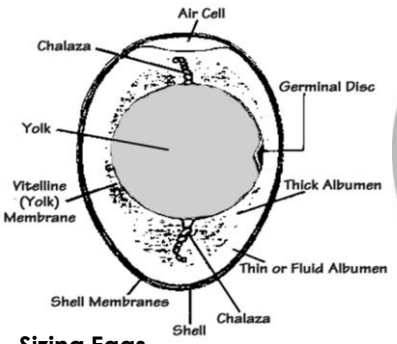
Caged;
This makes up approximately 78% of the market. Hens are crammed into a cage so small they can't stretch their wings. The space they have is about the size of an A4 (this page) piece of paper. They cannot follow their natural behaviour patterns. Their bodies suffer through lack of exercise. Birds can lay dead for days before they are taken out of the cage. Debeaking, brittle bones, tumours and pecking are common.

The structure of a hen's egg

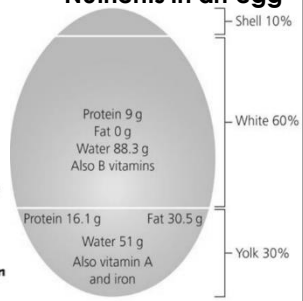
The shell: consists of an outer cuticle (a transparent, protective coating, a true shell and inner membranes. The shell is porous (pores are tiny holes), and therefore allows the developing chick to obtain oxygen. At one end of the egg, the membranes separate into an air space, to supply the chick with oxygen.
The air space: increases in size as an egg gets older, because water is lost from the egg and air is drawn in. The fresher the egg, the smaller the air space. This is why fresh eggs sink in water and rotten eggs float.

The yolk: full of goodness (vitamins A, D, E & K) and has a higher concentration of protein than the white.

The white: contains riboflavin and other B vitamins and a small trace of fat
The anchors/chalazae: white strands attached to the thick albumen which anchor the yolk in the middle of the egg.



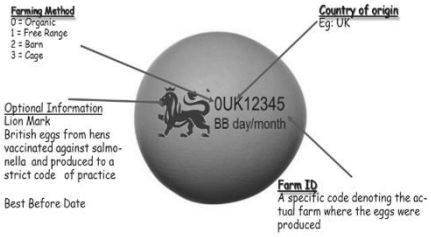
Nutrients in an egg



Sizing Eggs

Size	Weight
Small	53g + under
Medium	53 – 63g
Large	63 – 73g
Extra Large	73g + over

Labelling Eggs

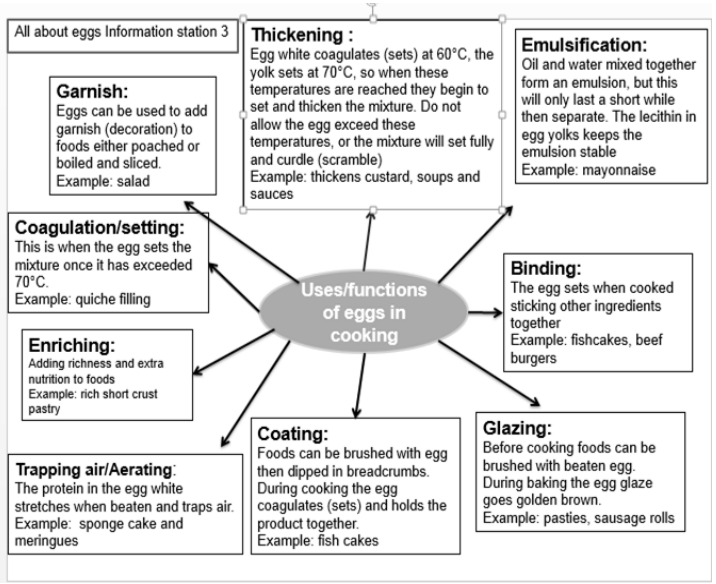


Storing eggs

Eggs should be stored in the fridge or a cool place away from strong smelling foods. Eggs should be stored blunt end upwards. They should be removed an hour or so before use, because cold eggs do not whisk well.

Eggs stay in good condition if stored correctly for two to three weeks. Eggs cannot be frozen whole but the whites and yolks can be frozen separately in containers. Always use eggs by the best before date.

Eggs can be preserved by pickling.



Testing for freshness

A bad egg will also feel extremely light in weight and give off a pungent smell. A very fresh egg will immediately sink to the bottom and lie flat on its side. This is because the air cell within the egg is very small. The egg should also feel quite heavy.
The second method to test the eggs freshness is by breaking the egg onto a flat plate, not into a bowl. The yolk of a very fresh egg will have a round and compact appearance and it will sit positioned quite high up in the middle of the egg. The white that surrounds it will be thick and stays close to the yolk. A less fresh egg will contain a flatter yolk, that may break easily and a thinner white that spreads quite far over the plate.

Cooking Eggs

Eggs are cooked for a variety of reasons.
To make it safe to eat and kill harmful bacteria.
To improve the flavour and texture and to make the colour more appealing
To make the nutrients more digestible and available to the body.
Eggs can be cooked by:

- Boiling
- Frying
- Scrambling
- Baking
- Poaching

How to grade Eggs

All eggs sold at grocery stores must meet strict standards. Only those of high quality reach the consumer. Eggs must be checked for interior quality by candling, a process where eggs are passed over a strong light to show the shell and interior.

Grade A:
- Thick white
- Round, well centered yolk
- Small air cell (less than 5mm deep)
- Clean, un-cracked shell with normal shape

Grade B:
- Mostly used for commercial baking or go to hospitals, restaurants, etc. very few are sold at retail stores.
- Yolk is slightly flattened; white is thinner
- Shell is un-cracked and may have a rough texture; and/or be slightly soiled and stained.

Grade C:
- The lowest egg grade, these are used in the production of processed egg products only. They are not sold in retail stores
- Yolk is flattened and may be oblong in shape; white is thin and watery.
- Shell may be cracked and/or stained

Topic: Commodities - Milk and Dairy Produce

Milk
Milk is an important food commodity which provides nutrients essential for health. Milk is considered nature's most perfect food. A variety of different foods can be made from milk.
Milk is a pale liquid produced by the mammary glands of mammals. It is the primary source of nutrition for infant mammals (including humans who breastfeed) before they are able to digest other types of food. Early-lactation milk contains colostrum, which carries the mother's antibodies to its young and can reduce the risk of many diseases. It contains many other nutrients, including protein and lactose.

Where does Milk come from?
Milk can come from, a cow, a goat, a sheep and even a horse. Milk can also be made from soya beans, rice and wheat.

How does a cow produce milk?
A dairy cow needs to give birth to a calf in order to produce milk. This chart represents a one-year period. The 'dry' period is similar to an adult going on maternity leave, where the cow will rest and prepare for the birth of her calf.
A dairy farmer's main concern is the health and welfare of their cows. The ***Freedoms*** below ensure that farmers keep their cows healthy on the dairy farms.

The Farm Animal Welfare Council's '*Five Freedoms*' are:
- Freedom from hunger and thirst;
- Freedom from discomfort;
- Freedom from pain, injury or disease;
- Freedom to express normal behaviour;
- Freedom from fear and distress.

Most dairy cows are housed during the winter and bad weather. The cows can move freely, socialise and eat and drink when they want in sheds that have natural light.
Dairy cows mostly graze outdoors during the summer, moving from indoor housing. Outside they can easily graze at their own leisure, exercise, get fresh air and natural light.

What if the weather turns bad?
In the winter and during bad weather, most dairy cows are housed.
Sheds are designed to be extremely spacious and airy, allowing the cows to rest, stand and move around freely to exercise and socialise.
Sheds are carefully designed to ensure that the 'Five Freedoms' are met, and to maintain the health and welfare of the cows.

Who helps the famer look after the health and welfare of cows?
Herd health checks are carried out regularly. The farmer works closely with a veterinarian and animal nutritionist to ensure the highest quality of health and welfare for the dairy cows.
Each dairy cow has an animal passport showing where the cow was born and any other places it has been moved to.

What do dairy cows eat?
Most British dairy cows eat grass during the summer and silage (dried grass or maize) in the winter.
This is usually supplemented with dry feeds such as cereals and protein feeds with added vitamins and minerals to ensure the cows have a nutritionally balanced diet.

The diet of a dairy cow
Each dairy cow eats between 25 and 50 kilograms of feed each day.
A dairy cow drinks around 60 litres of water per day.
Some cows may need up to drink 100 litres, or more, depending on how much milk they produce.

How often are cows milked?
Milking is very similar to a calf suckling. Dairy cows would feed their calves naturally, at four to six hourly intervals. Cows are milked at different times depending on the farm and the type of parlour used.

Milking
Here are three examples of different ways in which cows are milked:
In a herringbone parlour, the cows line up beside each other at an angle. The farmer accesses the udders from a sunken pit.
In a rotary parlour the cow stands on a circular raised platform which rotates slowly.
The farmer attaches the milking machine from below.
In a robotic milking parlour, the cows choose when to be milked.
The milking machine automatically connects to the cow's udders and turns off when the milking is complete.

The Environment
There is more to the farm than cows. Britain's hedgerows are regularly maintained by farmers to provide a breeding ground for birds and other wildlife.
Many dairy farmers leave a strip of grass around the edge of the pastures for planting trees and establishing ponds to attract wildlife. Some farmers will leave maize stubble in fields over the winter for ground nesting birds - this is so they can nest amongst the stubble.

Water conservation
Water is essential for dairy farming. Cows must drink and the farmer needs to clean the milking parlour and other equipment.
British dairy farmers are constantly looking at ways to conserve water and reduce costs without compromising either animal welfare or dairy hygiene. Water is often recycled on farms.

Red tractor scheme
The Red Tractor symbol on packaging helps consumers know that the milk and dairy foods have been produced according to the high standards of the Assured Dairy Farms scheme. This has been developed by dairy farmers, processors, the National Farmers Union and the British Cattle Veterinary Association.

LEAF Marque
The LEAF Marque is a food assurance scheme showing that food has been produced with environmental care.
Food displaying the LEAF Marque logo has been produced by farmers who carry out a wide range of activities to look after the environment and its wildlife. These include managing hedgerows for wildlife, using pesticides and fertilisers only when absolutely necessary, leaving a strip of land between hedgerows and crops to act as a habitat for wildlife, recycling on-farm waste, conserving energy and improving water efficiency and quality.

Whole milk	Milk with nothing added or removed. Fat content: 3.9%.
Semi-skimmed milk	The most popular type of milk in the UK. Fat content: 1.5%
Skimmed milk	Milk that has had most of the fat removed. Fat content: 0–0.5% (average 0.1%)
1% fat milk	Offered to consumers who like the taste of semi-skimmed, but want milk with a lower fat content.
Organic milk	Milk from cows that have been grazed on pasture that has no chemical fertilisers, pesticides or agrochemicals used on it.
UHT milk	Milk that has been heat treated to give it a longer shelf life. Once opened it must be treated in the same way as fresh milk.
Lacto-free milk	Milk that has had the milk sugar (lactose) removed, making it suitable for those who have an intolerance to lactose.
Soya milk	Made from the liquid of cooked soya beans. It is suitable for vegans who do not eat any animal products, or as a substitute milk for those who are allergic to dairy food.
Almond and coconut milk	An alternative for vegans or people with allergies.
Goat's milk	Another substitute milk for people allergic to cow's milk.
Evaporated milk	A concentrated, sterilised milk product. It has a concentration twice that of standard milk. Evaporated milk is heat treated and then evaporated under reduced pressure, at temperatures between 60°C and 65°C. The evaporated milk is poured into cans, which are then sealed. At this point the cans are moved to a steriliser where they are held for 10 minutes.
Condensed milk	Concentrated in the same way as evaporated milk, but with the addition of sugar.
Dried milk powder	Produced by evaporating the water content of milk using heat.

Topic: Commodities - Milk and Dairy Produce

How milk is used:
- As a drink on its own or flavoured – for its nutritional content.
- Added to cereal to improve the nutritional content, it changes the texture
- As an essential ingredient in batter, sauces and custards—it allows gelatinisation., combining with egg to coagulate into a soft product.
- In baked products such as cakes, biscuits and bread, providing moisture to help them rise and produces a soft texture as it stops starch and fat clumping together.
- The fat is separated from the rest of the milk to make cream
- When acid is added it curdles and becomes solid or semi-solid, making cheese
- Cream is churned (moved around quickly—beaten) to make butter
- Yoghurt is fermented milk. A bacteria culture is added. This breaks down the protein and makes it coagulate (thicken). Acid is also produced.

Single cream = 18% fat
Double cream = 48% fat
Whipping cream=35% fat
Clotted cream = 63% fat

- When cream is whipped it changes from a liquid into a foam. Air is beaten into it. The protein in the cream changes shape—it 'denatures' and surrounds the air bubbles.

Ways to preserve milk - Heat treatments

Pasteurised
- ✓ A mild heat treatment.
- ✓ It only kills pathogenic bacteria to make it safe to drink.
- ✓ It extends the shelf life.
- ✓ It needs to be kept chilled.
- ✓ There is no change in flavour or nutritional value.
- ✓ The fat (cream) rises to the top.

UHT or Long life
Milk is sterilised—heated to 100°C for 20 minutes to kill all bacteria. It also destroys the B vitamins. Milk is homogenised. Milk is packaged using aseptic packaging.

Evaporated Milk
Evaporated milk is a concentrated, sterilised milk product. It has a concentration twice that of standard milk. The process of producing evaporated milk involves standardising, heat treating and evaporating the milk under reduced pressure, at temperatures between 60°C and 65°C. It is then homogenised and cooled. The evaporated milk is poured into cans, which are then sealed. At this point the cans are moved to a steriliser where they are held for 10 minutes. A cooling stage follows and the cans are then labelled and packed.

Condensed Milk
Condensed milk is concentrated in the same way as evaporated milk, but with the addition of sugar. It is not sterlised but is preserved by the high concentration of sugar. It can be made from whole milk, semi skimmed or skimmed milk. The heat treatment used consists of holding standardised milk at a temperature of 110-115°C for one to two minutes. The milk is then homogenised, the sugar added and the sweetened milk is then evaporated at low temperatures (between 55-60°C). The concentration of the condensed milk is now up to 3 times that of the original milk. The milk is then cooled rapidly to 30°C and packaged. Sweetened condensed milk is commonly used in the sugar confectionary industry for the production of toffee, caramel and fudge.

Dried Milk Powder
Milk powder is produced by evaporating the water from the milk using heat. The milk is homogenised, heat treated and pre-concentrated before drying.
Skimmed milk powder can be mixed easily with water; however whole milk isn't easily reconstituted due to its higher fat content.
Whole milk powder contains all the nutrients of whole milk in a concentrated form with the exception of vitamin C, thiamin and vitamin B12. Skimmed milk powder contains hardly any fat and therefore no fat soluble vitamins. However, the protein, calcium and riboflavin content remain unaffected.
If stored correctly, skimmed milk powders can be kept for up to one year. Once they are reconstituted, they must be treated as fresh milk.

Cream is derived from the fat found in all fresh milk. Cream is the concentrated fat, which has been skimmed from the top of milk.
Cream has a high fat content ranging from 18-55% fat depending on the production process used. The levels of saturated fat in cream are the reason why it should really not be eaten too frequently because of its links with coronary heart disease and raise cholesterol levels. The different types of cream available in the UK are legally defined by the percentage of fat that they contain.

Cream also contains:
- Low levels of HBV protein
- Low levels of calcium
- Low levels of vitamins A and D

Types of cream:
- Single cream
- Double cream
- Whipping cream
- Clotted cream
- Ultra heat treated (UHT) cream

Uses of cream
Cream is used to add a creamy texture and flavour to dishes. The correct cream must be used for specific tasks because different types of cream have different properties – for instance single and clotted creams cannot be whisked for pipping whereas whipping and double cream will aerate when whisked.

How should cream be stored:
All fresh cream must be stored in a refrigerator at 5'C. sterilised/long life/ UHT cream has a long shelf life and can be stored, unopened, in a kitchen cupboard. However once opened this cream must be treated the same as fresh cream.

Butter is made from the fat found in the cream.

Cheese can be described as a solid or semi-solid form of milk. It is sometimes referred to as a fermented dairy food. It is made from cows', ewes', goats' or buffalo milk.

Uses of Cheese
Cheese can be used to make both sweet and savory dishes.
- ✓ Cheese can:
- ✓ provide flavour (e.g. when making a white sauce adding cheese gives improved flavour)
- ✓ provide colour (e.g. when sprinkled on top of dishes and grilled or baked it will turn an attractive brown colour)
- ✓ provide texture (e.g. when melted in can provide a soft, moist and stringy texture)
- ✓ increase the nutritional value of a dish (e.g. when sprinkled on top of a baked potato, it will provide additional nutrients such as protein, fat, calcium and vitamins).

Yoghurt is made from milk. It is made by adding harmless edible bacteria to the milk, which causes it to ferment. This means the carbohydrate (sugar) in the milk, which is lactose, is converted into lactic acid by the bacteria. The lactic acid will set the milk's protein, which will thicken it. The lactic acid will also give the yoghurt its characteristically tangy flavour.

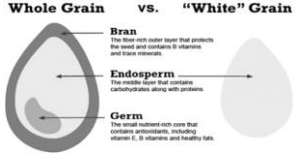
Different yoghurts can be made from different types of milk. Some yoghurt will include additional ingredients such as sugar, which is used to sweeten it (e.g. fruit and other flavours such as honey or vanilla).

Examples of types of yoghurt:
- Set yoghurt: is set in the pot in which it is sold. Has a firmer texture than other yoghurts.
- Live yoghurt: this has been fermented with live culture bacteria that are still living.
- Greek (strained) yoghurt: made from cows' or ewes' milk. It can be quite a thick yoghurt and is higher in fat.

Nutritive value of yoghurt
Yoghurt will provide the following nutrients:
Protein (high biological value).
Fat – this will vary according to the type of yoghurt. Some are made with whole milk which has a higher fat content; others are fat-free.
Calcium – a good source is provided by the milk.
Carbohydrates – in the form of lactose (sugar).
Vitamins B and some **A** and **D** (and **E** if it is a whole milk yoghurt).
Water – yoghurt has a high water content.
Storage of yoghurt - Store in the refrigerator between 1 and 5°C. Use before the use-by date.

Commodities: Cereals, Fruit & Vegetables

A 'wholegrain' is made up of three elements:
- ✓ a fibre-rich outer layer – the bran
- ✓ a nutrient-packed inner part – the germ
- ✓ a central starchy part – the endosperm.



Cereals provide a valuable source of energy in the diet, as well as other nutrients if the wholegrain is used. These include:
- Fibre
- Protein
- Carbohydrates
- Vitamin E
- B vitamins
- Fat
- Iron

How cereals are processed:

Processing the flour after milling

After the milling process, different grades of flour are produced by sifting, separating and regrinding the flour several times. These grades are combined as needed to produce different types of flour.

Small amounts of bleaching agents (to make the flour white) and oxidizing agents (to enhance the baking quality of the flour) are usually added to the flour after milling.

Nutrients calcium, iron and B group vitamins are added to. This is called fortification. Baking powder will be added to make self-raising flour.

Flour

Flour comes from different types of cereals, e.g. rye and wheat.

Wheat flour is one of the main flours produced. There are different strengths of wheat flour depending on its uses:

Strong flour is used in bread making and comes from winter wheat, which is a hard wheat.

Weak flour is used in cake and biscuit making and comes from spring wheat.

Wholemeal flour is made from the whole wheat grain, nothing is added or taken away. It is referred to as having 100% extraction rate. It is a good source of dietary fibre.

Brown flour usually contains about 85% of the original grain. Some bran and germ have been removed.

White flour usually contains around 70-72% of the wheat grain. Most of the bran and wheat germ have been removed during the milling process.

Granary flour is made by adding malted wheat (which has been toasted and flaked), to any type of flour but usually it is added to wholemeal or brown flour.

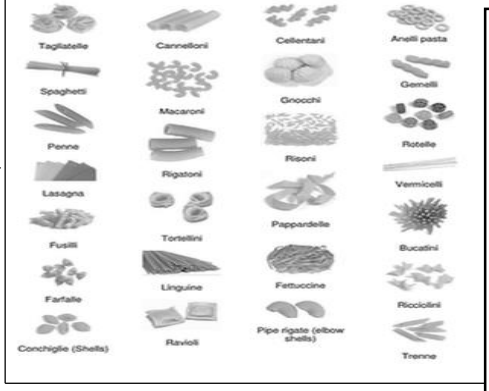
Stoneground flour is wholemeal flour ground in a traditional way between two stones.

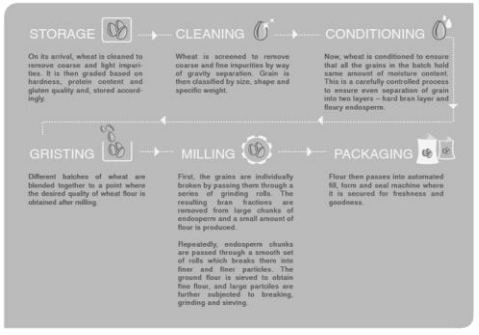
Organic flour is made from grain that has been grown to organic standards. Growers and millers must be registered and are subject to regular inspections.

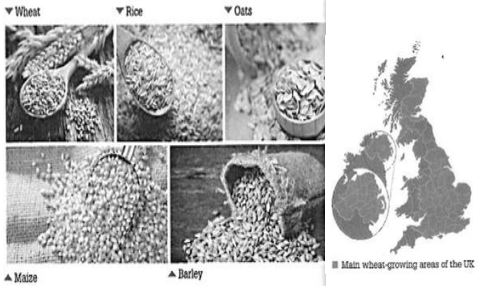
Pasta is made from strong wheat known as durum wheat. This type of wheat contains more protein than common wheat.
During the milling process the wheat produces semolina. This is the coarsest grade of the starchy endosperm.
To make pasta, water is added to form a dough, which can be shaped or extruded (forced though an opening in a shaped plate and then cut to a specific size) to produce the type of pasta required.
Other ingredients that can be added during the making of the pasta dough include eggs, oil, salt and various flavourings.
- Different shapes, sizes and styles of pasta are widely available to buy in shops. Various colours of pasta re alos sold:
- **Green pasta** is made using spinach, which provides the colour as well as some flavour.
- **Red pasta** is made using tomato paste.
- **Squid ink pasta** or **black pasta** is dark grey, almost black in clolur and is made using, as the name suggests, squid ink. This can sometimes give the pasta a mild seafood flavour.

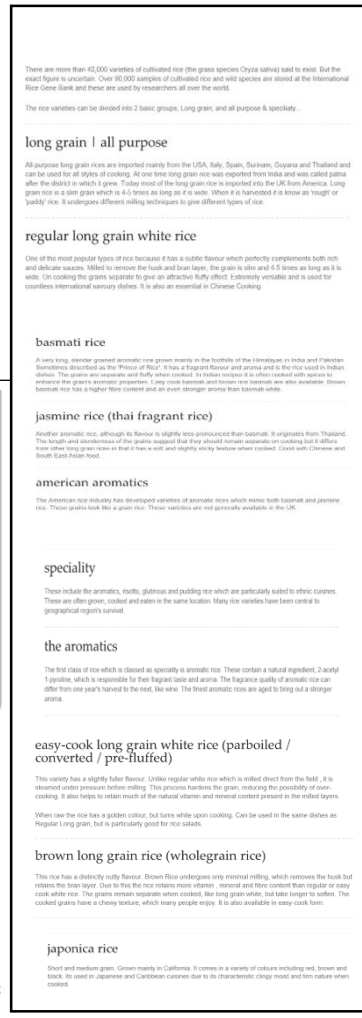
Storage of pasta

Dried pasta is popular due to its long shelf life and versatility. It can be combined with many other ingredients. When dried pasta is cooked it changes to a lighter colour and increases in size as it absorbs the cooking liquid.
- Dried, uncooked pasta can be stored in its original packaging, once opened, store in an airtight container in a cool, dry place away from strong odours.
- Fresh pasta must be stored in a refrigerator.
- Homemade pasta must be allowed to dry and then stored in an airtight container in the refrigerator.
- Fresh and homemade pasta can be frozen
- Cooked pasta should be stored in an airtight container in the refrigerator. Rinsing with cold water after cooking will stop it sticking together.









Rice is one of the most popular staple foods eaten by the world's population. It is a very versatile commodity because it can be used to make both sweet and savour dishes.

Rice is served as part of a meal to provide bulk and a feeling of fullness. It is quick to cook and is a good store cupboard ingredient as it has a long shelf life and is easy to store.

Rice can be quite bland in flavour. This can be improved by cooking it with flavoursome ingredients such as garlic and herbs, or by cooking the rice in stock instead of water. It can also provide a balanced taste to a meal if it is being served with strong or spicy flavoured dishes such as a curry or chill-style dishes.

Cooking methods for rice: You can cook rice using different cooking methods:
- Boiling on the hob
- Baking in the oven
- Stir-frying once cooked
- Cooked in a rice cooker

Harvesting rice;

When rice is harvested the grains are covered in a thick outer husk. This is removed during processing.

Varieties of rice:

There are many different varieties of rice available in supermarkets and it is sold in a variety of different forms, for example boil-in-the-bag, easy cook and pre-cooked. Rice can be short grain or long grain and most types are available as brown or white rice. Some of the different varieties of rice and their uses are in the table opposite:

Nutritive value of rice:

Rice is regarded as the poorest of all cereal foods in relation to its protein, fat and mineral content, but is an excellent source of energy.

Storage of rice: To store uncooked rice:
- Store in a cool, dry area.
- Once opened store in an airtight container
- It is recommended that cooked rice should not be stored and reheated as this can lead to food poisoning. Once cooked, rice becomes a high risk food. If it is necessary to store cooked rice:
- Store above 65'C for no longer than two hours.
- Rinse in cold water immediately after cooking, chill and refrigerate.

Fruits and Vegetables

Types of Fruits

Stoned
These include apricots, cherries, damsons, greengages, nectarines, peaches, plums.

Citrus
These include clementine, grapefruit, kumquats, lemons, limes, mandarins, pomelo, oranges, tangerines.

Hard
These include apples, pears, quince

Soft berry
These include blackberries, blueberries, bilberries, cranberries, gooseberries, raspberries, strawberries

Dried fruit
These include banana, pineapple, prunes, figs, raisins, currants, sultanas, apricots

Tropical
These include acerola, cape gooseberries, jack fruit, avocado, water melon, guava, dragon fruit, lychee, mango, passion fruit, tamarind, coconut

Miscellaneous
These include banana, dates, pashion fruit, figs, grapes, guavas, kiwi fruit, mangoes, melons, lychees, Sharon fruit, pineapple, pomegranate

Nuts
These include Brazil, cashew, peanut, alomond, walnut, hazelnut, pecan, pistachio macadamia.

Types of Vegetables

Root
These include beetroot, carrots, celeriac, parsnips, radishes, swede, turnips, cassava, galangal

Tubers
These include potato, sweet potato, Jerusalem artichokes

Bulbs
These include onions, leeks, shallots, garlic, fennel

Flower heads
These include broccoli, cauliflower, brassica, Brussels sprouts, cabbage, kale, Chinese cabbage, pak choi

Sea vegetables
These include kelp, nori, samphire, agar-agar

Stems
These include asparagus, celery, rhubarb, chicory, globe artichokes, kohlrabi, sea kale, endives

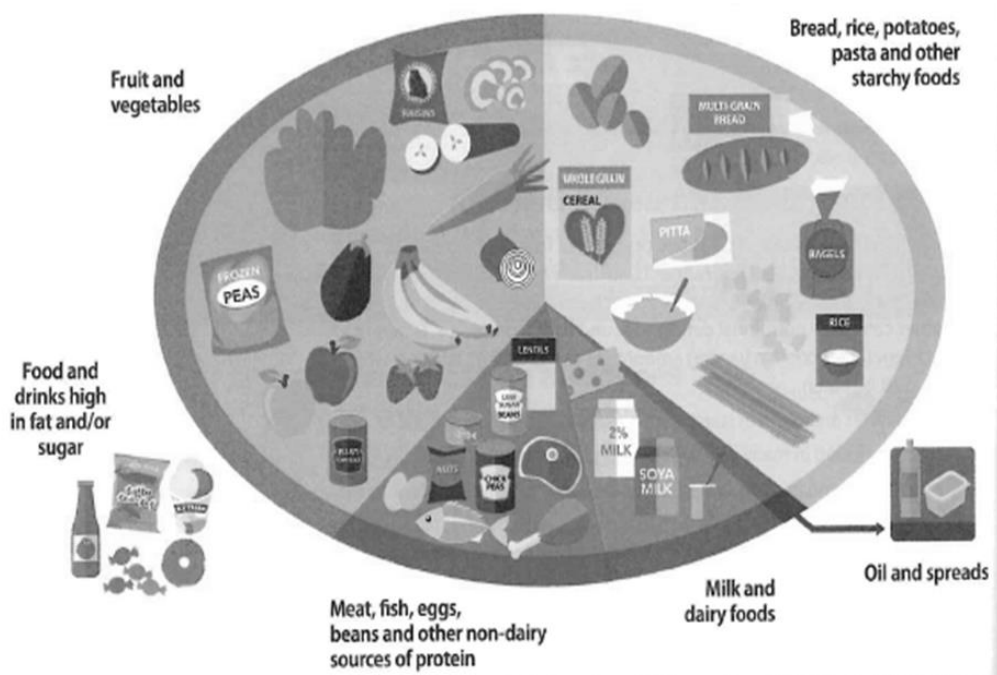
Fungi
These include mushrooms (chestnut, chanterelle, shiitake, oyster, morels, ceps, portabello, open)

Seeds and Pods
These include beans, peas, lentils, runner beans, bean sprouts, okra, sweetcorn, sugar snap peas, mange tout

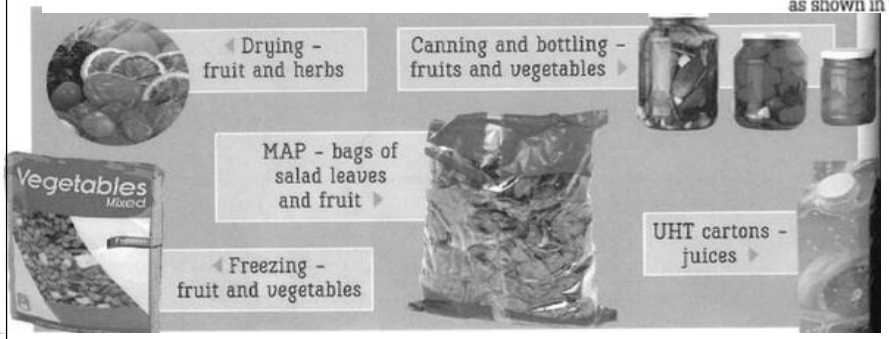
Leaves
These include cabbage, Brussels sprouts, lettuce, spinach, watercress, pak choi, kale

Vegetable fruits
These include aubergines, tomatoes, courgettes, marrow, peppers, pumpkin, squash, avocado, cucumber

Organically produced. All fruit and vegetables can be organically produced, that is grown using natural fertilizers and pesticide. They can also be locally sourced.



▲ Fruit and vegetables are important to include in your diet, as shown in the Eatwell Guide.



There are a few rules to remember when cooking fruit and vegetables:

1. Vegetables grown **IN** the ground such as potatoes should be submerged in water for cooking and often need a longer cooking time.
2. Vegetables grown **ABOVE** the ground – the stems and leaves – should be cooked in the **minimum** amount of water for the **least** amount of time.
3. Where possible, cook fruit and vegetables in their skins to preserve vitamins and add dietary fibre/NSP.
4. Consider which method of cooking to use, for example steaming preserves many water-soluble vitamins whereas boiled vegetables can have vitamin loss.
5. Serve cooked fruit and vegetables immediately to maintain the vitamins.
6. Never use bicarb when cooking vegetables because the vitamins will be destroyed.
7. Overcooked fruit and vegetables look dull, are very soft and will have lost nutrients.

Potatoes

There are many different varieties of potatoes grown in the UK. Some examples of these include Maris Piper, King Edward and Desiree. Sweet potatoes are also a popular choice as an alternative to traditional potatoes.
The part of the potato plant we eat is called the tuber. Potato tubers can come in a variety of colours; we are most familiar with red and white potatoes. When we make a choice between a red or white potato it is often related to the taste and the type of recipe being prepared.

Cooking methods for potatoes:
The variety of the potato used when preparing meals and dishes can result in a variety of different textures and outcomes. Cooked potatoes can be floury, sticky or waxy and granular: this is due to the potato cell changing during the cooking process. All different varieties of potatoes have the same structure. Outer layer is the skin. The flesh is the area under the skin. The pith is the watery core, the innermost part. Potatoes are regarded as a traditional staple food. In the UK, they are often eaten as the main accompaniment to dishes. They can be prepared and cooked in a variety of ways: baked, roasted, fried, boiled and steamed

Storage of potatoes
- Potatoes can be stored in hessian bags, paper bags or in racks. They should be stored in a cool, dry, dark, airy place.
- Storing potatoes in a light environment can cause them to turn green. This should be removed before cooking as the green part is toxic.
- Potatoes should not be stored in plastic bags as this can cause them to sweat and rot.
- Storing potatoes in a refrigerator can affect the taste and cause discolouration when they are cooked.

A food allergy involves an immune system response.
A food intolerance is a term applied to a range of adverse responses to certain foods and does not involve and immune system response.

Allergies

Some people are born with, or develop, an allergy, which means they have to avoid or drastically reduce intake of these foods.

Allergy to peanuts and tree nuts is the most common food allergy in adults and children. Recent studies have shown that peanut allergy is on the increase. People with nut allergies should avoid foods with peanuts and nuts altogether. Food labels need to be checked carefully for warnings about possible nut traces.

Allergic reactions to peanuts include a rash, eczema and vomiting. However, some allergic reactions can be severe, causing a difficulty in breathing due to asthma or throat swelling, or a drop in blood pressure. This is known as anaphylaxis, and can be life-threatening.

Other foods which can bring on allergic reactions include eggs and shellfish.

All pre-packed foods sold in the UK must clearly state on the label if they contain any of the 14 major food allergens. The food allergens are: peanuts, nuts, eggs, milk, celery, mustard, crustaceans (e.g. crab), molluscs (e.g. oysters), fish, sesame seeds, cereals containing gluten (wheat, barley, rue), soybeans, lupin and sulphur dioxide.

Allergens can be written in bold, italics, highlighted, contrasting colour, capitals and underlining on food labels. Allergen cross contamination risk warnings must also be used.

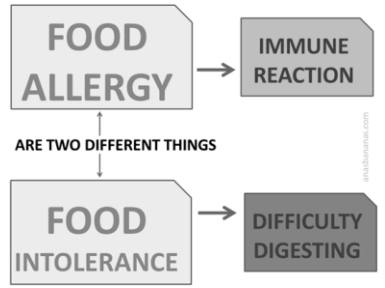
Lactose Intolerance means that a person must avoid cow milk. This can be replaced with other milks such as hazel, hemp, almond, rice or soy milk. Lactose-free products such as cheese are also available.

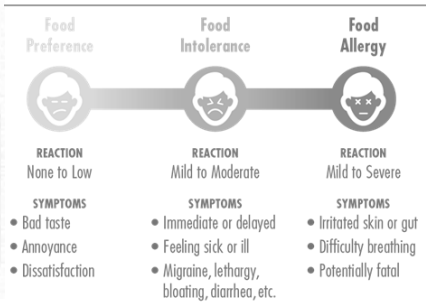
People with lactose intolerance cannot digest the milk sugar (lactose) because of an enzyme deficiency in the body. The body digests lactose using a substance called lactase to break down lactose into two sugars called glucose and galactose, which can then be easily absorbed into the bloodstream. People with lactose intolerance do not produce enough lactase, so lactose stays in the digestive system where it is fermented by bacteria, leading to the production of various gases, causing the symptoms associated with lactose intolerance.

Many food contain lactose. Lactose intolerant people should read the labels to check.

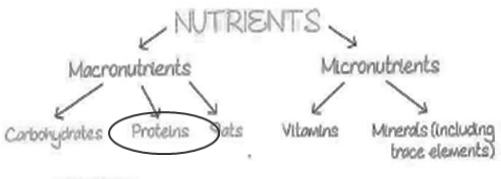
Food Allergy	Food Intolerance
Involves the immune system. The immune system causes a reaction by mistaking a certain type of food as an invader that needs to be attacked. When the body attacks the invader (the trigger food), symptoms occur.	Involves the digestive system. The digestive system causes a reaction for one of two reasons: - The food irritates the digestive tract - The food cannot be properly digested
Amount required to trigger a reaction: Any amount, even trace amounts, will cause a reaction.	Amount required to trigger a reaction: It varies from person to person. Some people can tolerate smaller amounts of the trigger food, while others can tolerate larger amounts. The severity of the reaction is equal to the amount ingested for each person affected with an intolerance.
Length of time from ingestion of trigger food until there is a reaction: The symptoms will be immediate. Unlike a food intolerance, complete avoidance of the offending food is the only way to prevent a reaction.	Length of time from ingestion of trigger food until there is a reaction: The symptoms will come on gradually. You may even be able to take steps that will prevent any symptoms when the trigger food is ingested, such as taking a lactase enzyme pill along with dairy products if you are lactose intolerant.
Example: Peanut allergy Even trace amounts of peanuts can kill a person who has a peanut allergy.	Example: Lactose intolerance Small amounts of dairy can be ingested with little or no side effects.

Food Intolerances & Allergies





Nutrients 1 - Protein



- Protein builds and repairs your body. This macronutrient is vital for growth, repair, maintenance of body cells and the production of enzymes and hormones, and provides energy at 4kcal/17kj per gram.
- Proteins are made from amino acid chains found in animal and vegetable sources.
- Proteins are very large molecules and are made of small units called amino acids
- They are the main component of muscle tissue and organs
- Some amino acids are know as essential amino acids. These are the amino acids that cannot be made by our bodies, so we must eat the proteins that contain them.
- Different amino acids that are joined together in different ways and different numbers to produce different proteins.

Functions of Protein

- Provides all the chemicals to make the body grow, in particularly in children and pregnant women
- Provides all the chemicals to help the body repair any damage after illness, accidents and surgery
- Maintains the body to keep it working well, producing enzymes for digestion, muscle activity, nerve function and hormones, which regulate some body functions
- Provides a secondary source of energy for the body

Guideline Daily Amount Values			
Typical values	Women	Men	Children (5-10 years)
Calories	2,000 kcal	2,500 kcal	1,800 kcal
Protein	45 g	55 g	24 g
Carbohydrate	230 g	300g	220 g
Sugars	90 g	120 g	85 g
Fat	70 g	95 g	70 g
Saturates	20 g	30 g	20 g
Fibre	24 g	24 g	15 g
Salt	6 g	6 g	4 g

What happens if we eat too little protein (protein deficiency)

If children have too little protein in their diet they:

- ✓ Stop growing or grow slowly
- ✓ May have thinning hair or hair loss
- ✓ May experience a change in skin colour and become paler
- ✓ Cannot digest food properly and may have diarrhoea
- ✓ Easily catch infections e.g. colds
- ✓ Have low energy levels
- ✓ Lose weight and become thin and weak
- ✓ May have a build –up of fluid under the skin (called oedema)

If adults have too little protein, it will have the following effects:

- ✓ Fat and muscle will be lost from the body
- ✓ Fluid may build up under the skin (oedema)
- ✓ Weight loss will occur
- ✓ Cuts and bruises may be slow to heal
- ✓ A lack of energy
- ✓ Hair and skin becomes dry
- ✓ Infections will be caught more easily

Protein deficiency is rare in the developed world. In a famine or starvation situation, children (in particular) will develop kwashiorkor illustrated by a failure to grow, brittle hair, and pot bellies, due to oedema.

What happens if we eat too much protein?

- ✓ Protein is processed by the kidneys and liver, so too much protein will put a strain on these organs
- ✓ You may put on weight; as extra protein is converted into fat which is then stored in the body

How much protein do we need?

This depends on our age, our lifestyle and our activities.

- ✓ Babies, children and teenagers are still growing and therefore need more protein for this as well doing all the other things in their bodies that require protein
- ✓ Adults still need protein to help their hair and fingernails grow and for the body to repair.
- ✓ Pregnant women need protein to allow their baby to develop, and women who are breastfeeding (lactating) need protein to make their milk.

Protein RNI

Protein reference nutrient intake (RNI) varies according to age and gender. On average, a person aged between 15 and 50 needs about 55g each day and a child aged 4-6 needs 20g daily.

Animal and vegetable proteins

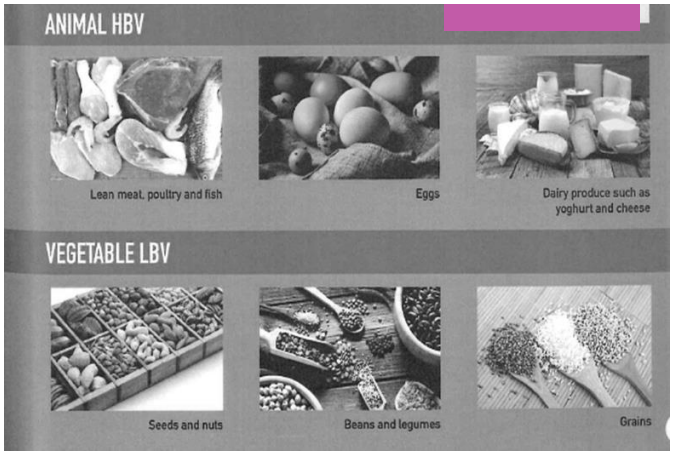
Animal proteins have high biological values (HBVs) and are found in milk, cheese, eggs and fish.

Vegetable proteins have low biological values and are found in seeds, nuts, beans, lentils and grains. The exceptions are soya, tofu and Quorn, which are HBV proteins.

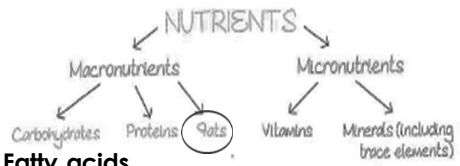
Complementary proteins

Putting two or more LBV proteins together will create dishes that have good amounts of essential amino acids, forming HBV meals, for example beans on toast and hummus with pitta bread.

HBV and **LBV** refer to the number of essential amino acids in foods. HBV animal proteins and soya products contain all the essential amino acids needed in the body. LBV vegetable proteins lack one or more essential amino acid. Adults need eight essential amino acids from foods and children need the same eight plus a further seven from foods.



Nutrients 2 – Fats and Oils



Fatty acids
Essential fatty acids are vital for good health and are found in eggs, meat, oily fish and vegetable oils.

Cholesterol
This is a fatty substance that is naturally occurring in the blood. It is made in the body and obtained from fatty foods. Raised cholesterol levels in the blood stream can cause arteries to block. LDL cholesterol is unhealthy and the intake of it should be reduced. HDL cholesterol is a healthier type of fat that helps to reduce the risk of heart attacks and strokes.

Fat RNI
All diets must contain fats – and the RNI is 70g for women and 95g for men. A fat deficiency can mean a lack off vitamins A, D, E, and K, which can lead to night blindness, dry and brittle nails and hair, and depression. The Western diet makes it very difficult to become deficient in fat.

Sources of Fat

Animal sources
- Meat and meat products
- Dairy products, e.g. milk, cheese, butter and cream
- Fish, particularly oily fish like tuna, sardines and salmon

Plant sources
- Avocadoes and olives
- Nuts and pulses, e.g. peanuts and walnuts
- Seeds such as sesame, sunflower and soya

Fat is needed for:

- Insulation and body warmth
- Protecting the vital organs (e.g. heart, liver, kidneys and lungs)
- Acting as a carrier for the fat soluble vitamins: Vitamin A, D, E and K
- Hormone production
- Supplying essential fatty acids, which the body is unable to make for itself

How much fat should we eat per day?
- Most people eat too much saturated fat
- A gram of fat provides 9 kcal
- The average man should not eat more than 95g of fat per day, of which not more than 30g should be saturated fat
- The average woman should not eat more than 70g of fat per day, of which not more than 20g should be saturated fat
- A child's diet should aim to have about 35% of total intake of food as fat

What happens if we eat too much or too little fat?
- Weight gain (fat is a high energy source: if we do not use up the energy consumed from fat, it is stored in the body as fat)
- Excess fat may be stored in the liver and may cause health problems
- Increased risk of stroke
- Eating food high in saturated fat can raise blood cholesterol levels and increase the risk of heart disease
- Hydrogenated fats can increase the risk of cancer, diabetes, obesity and bone problems

What happens if we eat too much or too little fat?
- If babies and children lack essential fatty acids their normal growth will be affected
- If we do not get enough energy from fat or carbohydrate, we will use up our fat stores and become thinner
- We may feel colder

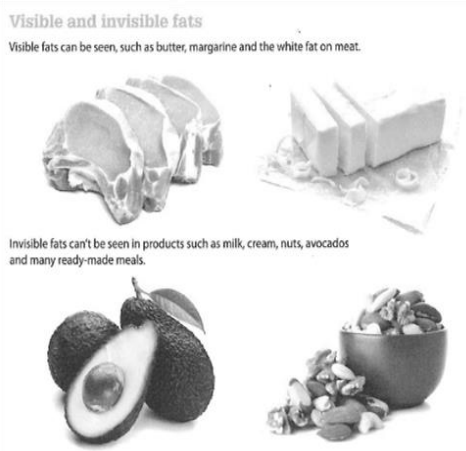
Reducing fat in the diet
- ✓ Choose leaner cuts of meat and check for the fat content of minced beef
- ✓ Grill, bake and steam rather than frying foods
- ✓ Trim excess fat from meat
- ✓ Choose low-fat versions of spreads and dairy foods.
- ✓ Reduce the amount of butter or margarine you spread on bread
- ✓ Use alternatives to high fat mayonnaise for salad dressings
- ✓ Buy canned fish, like tuna and salmon, in brine rather than oil

Composition of fats
All fat molecules contain carbon, hydrogen and oxygen, but how the molecules are arranged will determine what type of fat it is.

Saturated fat
Saturated fats have all the carbon atoms in each molecule joined (saturated) with hydrogen atoms. These are found mainly in animal fats and are linked with raised low density lipoproteins (LDL) cholesterol levels associated with coronary heart disease. Examples are butter, ghee, cram, cheese and meat fat.

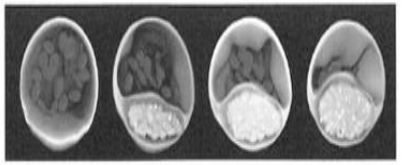
Monounsaturated fat
This has one carbon atom in each molecule joined to one other carbon atom, forming a double bond.. The double bond blocks any hydrogen molecule form joining the two carbon atoms. This fat helps to reduce LDL blood cholesterol and increase high density lipoprotein (HDL) cholesterol. Examples include avocado and olive oil.

Polyunsaturated fat
This is where several carbon atoms form double bonds, thus reducing the hydrogen atoms available in the molecule. This provides HDL cholesterol and is a good source of omega 3 and omega 6 fatty acids. Examples are sunflower, soya beans, and oily fish.

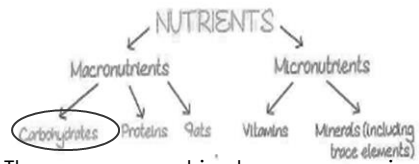


Fat and health problems

Eating too many fats and fatty foods causes a range of health problems, including weight gain, obesity, type 2 diabetes, blocked arteries leading to coronary heart disease, stroke and some cancers. Accepted advice is to reduce total fat intake, and eat mainly unsaturated fats.



Nutrients 3 - Carbohydrates



These macronutrients are our main source of energy at 3.75kcal/16kj per gram. During digestion, carbohydrates are broken down into glucose, which is then absorbed into the blood. The pancreas produces insulin, allowing glucose to enter body cells to produce energy. Some carbohydrates help rid the body of waste material (in the form of faeces).

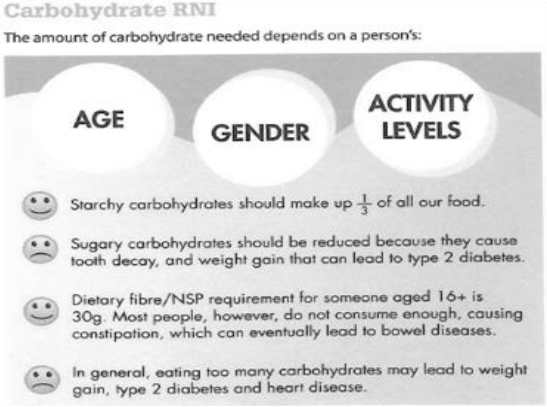
Types of carbohydrates

Starch (complex carbohydrate) gives slow-release energy, keeping us feeling fuller for longer.

Sugar (simple sugars) release glucose very quickly, giving us a short burst of energy. Lots of factory-made foods are high in "hidden" sugars.

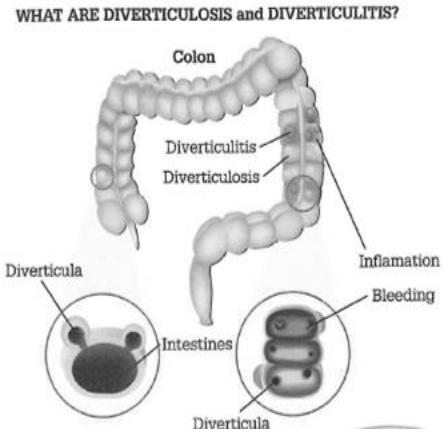
Functions/Uses of Carbohydrates in the diet

- Provide the body with energy for physical activity.
- Provide the body with energy for maintaining body functions.
- Provide the body with fibre (NSP) to help digestion.
- Sweeten and flavour foods.



What happens if we eat too much or too little carbohydrate?

Too Much	Too Little
The excess will be converted into fat and stored in the body. This leads to a gain in weight	The body will use up the energy stores it has, so a person may lose weight
The consumption of too much sugar can result in tooth decay	The body will also use some of the protein eaten as a secondary energy source



Dietary fibre/NSP

The non-starch polysaccharide (NSP) type of carbohydrate comes from all plant cells, skins and seeds. Insoluble fibre, found in wholegrains, nuts, and many fruit and vegetables, travels through the digestive system, without being digested. It is needed to absorb water and bulk out the faeces (poo), making it softer and easier to pass. It keeps the colon and bowel healthy, preventing piles, diverticulosis, diverticulitis and some cancers.

Soluble fibre, found in oats, peas, beans, carrots and apples, is digested, helping lower blood sugar cholesterol.

A diet high in fibre keeps us feeling fuller for longer and should stop people from snacking and help to maintain a healthy weight, fibre also helps to control our blood sugar levels, which is very important for diabetics.

Fibre/NSP

- This is the non-digestible part of plant cell walls called cellulose.
- It cannot be digested by our bodies, so passes straight though the digestive system, providing bulk in the diet and helping to move the waste food through the system, preventing constipation and cleaning the walls of the digestive system to remove bacteria.

Functions of NSP:

- Holds water and keeps faeces soft and bulky.
- Helps prevent bowel disorders including constipation, bowel cancer, diverticular disease and haemorrhoids (piles).
- Can help with weight control as high fibre foods are filling, but as the fibre is not digested. It is not broken down to provide energy or calories.
- High fibre diets have been shown to help lower blood cholesterol.

Nutrients 4 – vitamins and minerals

Why do we need vitamins?
These micronutrients are essential in very small quantities. They are measured in units of milligrams (mg) or even smaller micrograms (µg). The body needs a wide range of vitamins to function properly and for good health. Each vitamin has specific jobs, but in general, they:

- release energy
- Prevent some diseases
- Assist in cell function and repair.

Fat soluble vitamins
Vitamins A, D, E and K are found in fats and foods naturally containing fats and oils. These vitamins can be stored in the liver and fat reserves for later use. Eating too much of these causes the body harm.

Water soluble vitamins

- The B group of vitamins and vitamin C cannot be stored in the body so must be eaten every day. Any excess of these vitamins is flushed out in urine.
- They are easily destroyed by heat, water and exposure to air during storage, preparation and cooking, so don't prepare them until you need them. Cook them in the smallest amount of water possible for the shortest amount of time.
- Steaming rather than boiling vegetables will preserve water soluble vitamins and any cooking liquid could be used in sauces and gravy.
- The best way to get these vitamins is to eat fruit and vegetables raw.

Vitamin	Fat-soluble / Water-soluble	Food sources	Why is it needed?	Not enough of it?	Too much of it?
A (Retinol)	Fat-soluble	Liver, fish liver oils, eggs, milk, butter, cheese Leafy green vegetables, orange and yellow vegetables, tomatoes, fruits (these contain beta-carotene, a precursor of vitamin A)	• Healthy immune system • Helps us to see in dim light	• Rare, but can cause night blindness and stunted growth in children.	• Fractures in old age • Pregnant women eating too much can cause birth defects.
B1 (Thiamin)	Water-soluble	Liver, pork, wholegrains, legumes, nuts, sunflower seeds, fruits, vegetables	• Releasing energy from food • Nervous system • Growth in children	• Muscle wastage; dry and sore skin • Some anaemias	• Unlikely as flushed out in urine
B2 (Riboflavin)	Water-soluble	Liver, kidney, eggs, milk, rice, legumes, wholegrains, green vegetables			
B3 (Niacin)	Water-soluble	Fish, poultry, meat, milk, wholegrains			
B5 (Pantothenic acid)	Water-soluble	Liver, kidney, eggs, wholegrains, fortified breakfast cereals			
B6 (Pyridoxine)	Water-soluble	Meat, fish, wholegrains, vegetables			
B9 (Folic Acid)	Water-soluble	Liver, legumes, leafy green vegetables, wholegrains, yeast extract			
B12 (Cobalamin)	Water-soluble	Meat, poultry, liver, kidney, fish, eggs, dairy products			
C (Ascorbic Acid)	Water-soluble	Citrus fruits, bell peppers, strawberries, broccoli	• Collagen formation • Wound healing • Helps absorption of iron	• Bleeding gums; wounds not healing • Anaemia if not enough iron is absorbed	• Excess is flushed out in urine
D (Calciferol)	Fat-soluble	Oily fish, fish liver oils, egg yolk, dairy products	• Formation of bones and teeth • Controls calcium absorption	• Rickets (in children) and osteomalacia (in adults) • Heart failure	• Kidney damage
E (Alpha-Tocopherol)	Fat-soluble	Nuts, seeds, vegetable oils, wheat germ	• Antioxidant to prevent disease • Healthy skin and eyes	• Deficiency is unlikely	• Affects blood coagulation
K	Fat-soluble	Leafy green vegetables, rapeseed and soya bean oil, natto, wholegrain cereals	• Blood clotting; wound healing • Good bone health	• Deficiency is unlikely	• Stored in the liver

Nutrients 4 – vitamins and minerals

Why do we need minerals?
These micronutrients are essential in very small quantities. They are measured in units of milligrams (mg) or even smaller micrograms (µg). They are found in most foods. The three minerals you need to really know and understand are:
- Calcium
- Iron
- Sodium

Mineral	Food sources	Why is it needed?	Not enough of it?	Too much of it?
Calcium	Milk and milk products; canned fish with bones (salmon, sardines); fortified tofu and fortified soy beverage; greens (broccoli, mustard greens); legumes	Important for healthy bones and teeth; helps muscles relax and contract; important in nerve functioning, blood clotting, blood pressure regulation, immune system health	• Rickets in children • Osteomalacia in adults • Osteoporosis	• A build-up in the kidneys can be fatal
Iron	Organ meats; red meats; fish; poultry; shellfish (especially clams); egg yolks; legumes; dried fruits; dark, leafy greens; iron-enriched breads and cereals; and fortified cereals	Part of a molecule (hemoglobin) found in red blood cells that carries oxygen in the body; needed for energy metabolism	• Anaemia – tired lethargic and very pale eye margins	• Constipation and nausea
Sodium	Table salt, soy sauce; large amounts in processed foods; small amounts in milk, breads, vegetables, and unprocessed meats	Needed for proper fluid balance, nerve transmission, and muscle contraction	• Rare	• High blood pressure and strokes

Other minerals:

Potassium is needed for healthy blood pressure, to balance body fluids and to prevent cramps. It is found in fruit, vegetables, beans, nuts and seeds.
Phosphorous works with calcium to form strong bones and teeth. It is found in red meat, dairy foods and bread.
Magnesium helps bone development and the nervous system. It is found in meat fish and dairy foods.

RNI

The RNI of each mineral depends on a person's age, sex and general health. A deficiency always causes serious problems. Sodium (salt) causes a major health issue in the UK because people regularly eat more than the recommended 6g of salt a day, resulting in high blood pressure and leading to strokes.

Water
Water is not a nutrient but it is essential for life because it:
- regulates body temperature
- Transports nutrients in the blood
- Removes waste from cells
- Aids digestion

We obtain water from all drinks and foods we eat. A lack of water causes dehydration, resulting in headaches, thirst, dizziness and poor concentration.

How nutrients work together
Some nutrients rely on each other to improve absorption.
Vitamin C+Iron: when you eat iron-rich plant sources, add a vitamin C-rich food to the dish to increase the iron absorption; for example, blueberries with breakfast cereal or tomatoes in a bean salad.
Vitamin D+Calcium: you may eat lots of calcium-rich foods but if vitamin D is missing, the calcium can't be absorbed and you may suffer with calcium deficiency. To improve this, eat a yoghurt while sitting outside in the sun, or a tuna sandwich with a glass of milk.
Trace elements: a healthy, balanced diet ensure that iodine, zinc, fluoride and selenium trace elements are easily accessed.