

Food Technology Knowledge Organiser- Year 11

STUDENT NAME _____

CLASS CODE _____

TEACHER _____

**SCIENTIA
POTENTIA EST**



LEADING STUDENTS TO A BRIGHT FUTURE

KNIFE HOLDS

Claw grip

1. Shape your hand into a claw shape, tucking the thumb inside the fingers.

2. The knuckle to fingertips part of the hand acts as a barrier against the knife blade.

3. Place the item you are cutting flat side down on a chopping board and rest the claw on the item to be sliced.



Bridge hold

1. First place the flat surface of the item on to a chopping board.

2. Form a bridge with the thumb and index finger of one hand and hold the item on the chopping board.

3. Hold a knife in the other hand and position the blade under the bridge formed with your hand. Firmly cut downwards.



THE EATWELL GUIDE

- The Eatwell Guide was developed to promote a healthy, balanced diet.
- The Eatwell Guide shows how much of what we eat overall should come from each food group to achieve a healthy, balanced diet.
- The balance of foods does not need to be eaten for every meal but for foods eaten over the course of a day or two.
- Macronutrients are fats, protein and carbohydrates and are needed in large amounts in the diet.

DIFFERENT VEGETABLE CUTS

	<u>Brunoise</u> Small dice		<u>Macedoine</u> Medium dice
	<u>Jardinière</u> Baton-shaped lengths		<u>Julienne</u> Matchstick-sized strips
	<u>Chiffonade</u> Fine shreds of leafy green vegetables		<u>Slice</u>

HEALTHY EATING TIPS

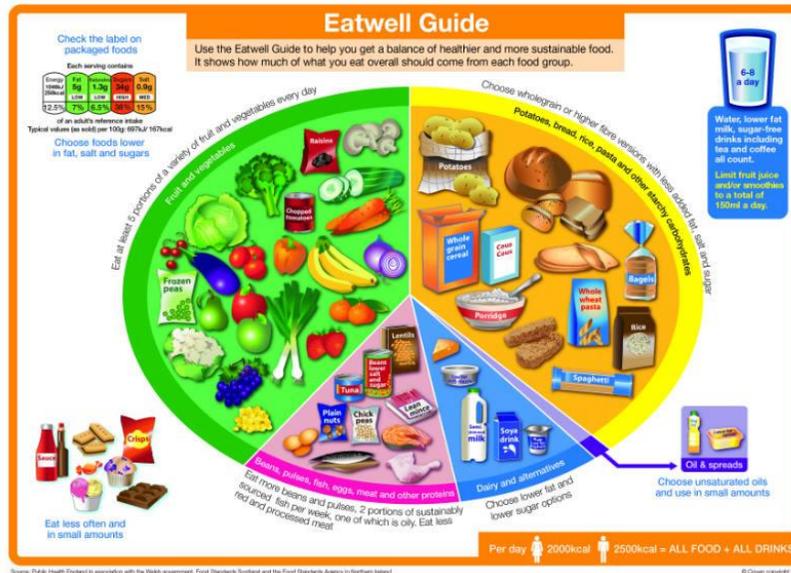
The Department of Health has produced the following practical tips to help you make healthier choices. They are:

1) **Base your meals on starchy foods**

Most of us should eat more starchy foods - try to include at least one starchy food with each of your main meals. So you could start the day with a wholegrain breakfast cereal, have a sandwich for lunch, and potatoes, pasta or rice with your evening meal.



- Micronutrients are vitamins and minerals and are needed in small amounts.



- Carbohydrates are needed for energy. 50% of the recommended energy per day should come from carbohydrates.
- Starchy carbohydrates should make up 1/3 of our daily diet (38%).
- Fibre is needed for a healthy digestive system which prevents constipation. Foods which are wholegrain contain more fibre. 30g of fibre is recommended per day.
- Protein is needed for growth and repair of muscles and 12% of the Eatwell Guide is protein.
- Main sources of protein are meat, poultry, beans, peas, and lentils.
- Calcium is needed for strong bones and teeth.
- 8% of the Eatwell Guide comes from calcium.
- Vitamins and minerals are needed to keep the body healthy and to boost the immune system.

2) Eat lots of fruit and vegetables

Try to eat at least 5 portions of a variety of fruit and vegetables every day. It might be easier than you think.

3) Eat more fish, including oily fish

Aim for at least two portions of fish a week, including a portion of oily fish (herring, salmon, mackerel and sardines).



4) Cut down on saturated fat and sugar

5) Eat less salt- no more than 6g a day

Adults - and children over 11 - should have no more than 6g salt a day.

6) Get active and be a healthy weight

7) Don't get thirsty

We should be drinking about 6 to 8 glasses (1.2 litres) of water, or other fluids, every day to stop getting dehydrated.



8) Don't skip breakfast

Breakfast can help give us the energy we need to face the day, as well as some of the vitamins and minerals we need for good health.

- Vitamins and minerals come from fruit and vegetables and make up over a third of the food we eat (40%). Eat at least 5 portions of fruit and vegetables each day. They have to be a variety of fruit and vegetables and a portion in 80g.
- Fat is needed to help protect organs and for warmth of the body.

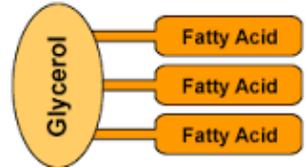
CARBOHYDRATES

- Carbohydrates provide the body with energy. Most of the bodies energy should come from starchy carbohydrates.
- Carbohydrates are split into 3 groups, sugary, starchy and fibre.
- Carbohydrates are classified according to their structure:
 Monosaccharides- they include glucose and galactose
 Disaccharides- formed when two monosaccharides are joined together. They include: sucrose, Maltose and lactose.
 Polysaccharides- made up of many monosaccharide units joining together. They include: starch, glycogen, dextrin, cellulose and pectin

Dietary Fibre

- The function of dietary fibre is to help make food matter pass through the intestines soft and bulky.
- Dietary fibre is found in wholemeal products, the skin of fruit and vegetables, dried fruits, nuts and seeds.
- Dietary fibre deficiency can lead to constipation and diverticular disease. A low-fibre diet can be linked to bowel cancer.
- There are two sources of dietary fibre which are:
 Insoluble fibre which passes through the body mostly unchanged as it is undigested. It absorbs water and

FATS

- Fats are needed in the body to provide us with energy, keep the body warm and protect vital organs.
 - The sources of fat are visible fats, these are fats that can be clearly seen on food such as lamb or pork and butter on a slice of bread. Invisible fat are fat that is not clearly seen on food such as crisps, biscuits and cakes, mayonnaise and milk.
 - The chemical name for a fat is triglyceride and is made up of three fatty acids parts attached to one glycerol part.
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- The diagram shows a central oval labeled 'Glycerol' on the left. Three horizontal lines extend from the right side of the glycerol oval to three separate rounded rectangular boxes, each labeled 'Fatty Acid'.
- Saturated fats contain saturated fatty acids, are usually from animal sources and can be harmful to health.
 - Unsaturated fats contain unsaturated fatty acids and are thought to be better for health. They are found in oily fish such as salmon and nuts and seeds and sunflower and olive oils.
 - Essential fatty acids are required for development and cannot be made by the body. Examples of these are omega 3 which is found in oily fish, seeds, grains and green leafy vegetables. Omega 6 which is found in vegetables, grains, seeds and chicken.
 - Cholesterol is a fatty substance which is needed for the normal functioning of the body, is helps with the digestion of fats.
 - Cholesterol is made by the body but is also found in fatty foods.
 - Too much bad cholesterol and saturated fats in the body can build up in arteries and cause heart disease.
 - Excess fat can cause bad cholesterol and risk of heart disease, make people put on weight and type 2 diabetes.
 - A lack of fat in the diet over time will result in weight loss.

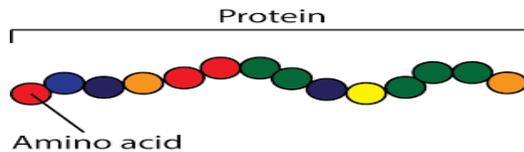
swells. Examples are oats, nuts, bananas, apples, carrots and potatoes.
Soluble fibre slows down the digestion and absorption of carbohydrates. Examples of this are wholegrain foods, brown rice, wheat bran, nuts and seeds.

- Sources of starch in the diet are root vegetables (potatoes and carrots) and cereals and cereal products.
- 50% of the daily energy in our diet should come from carbohydrates.

- Hydrogenation is the chemical process when vegetable oils are hardened to make them solid at room temperature.

PROTEIN

- Protein is needed in the body for growth and repair of muscles and providing an energy source.
- Proteins are made up from building blocks called amino acids.
- There are 20 different amino acids.
- When protein is eaten, amino acids are broken down and rearranged in to new proteins that the body need.
- Non-essential amino acids are amino acids that can be made by the body and are always available.
- Essential amino acids are amino acids that cannot be made by the body and must come from food. There are 8.
- High biological protein (HBV) is foods that contains all essential amino acids. They come from animal sources



DIFFERENT TYPES OF KNIVES

Knife	Description	Uses
 Cook's knife	Comes in different sizes. Strong, ridged blade is suitable for a range of tasks.	Dicing, chopping and trimming vegetables, meat, poultry and fresh herbs.
 Paring knife	A small knife with a thin and slightly flexible blade.	Fruit and vegetable preparation.
 Boning knife	A very strong blade that will not bend or break easily. May have a straight or curved blade.	Removing bones from meat joints and poultry.

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such as meat, fish, poultry and eggs. The only plant based are soya products and quinoa.

- Low biological protein (LBV) are proteins that lacks one or more of the essential amino acids. For example, beans, pulses, nuts, seeds and cereals.
- Protein complementation is when LBV proteins are combined together to make a HBV protein.
- Examples of protein complementation are beans on toast, peas and rice, houmous with pitta bread.
- There are three main protein alternatives: soya, mycoprotein and quinoa.
- Kwashiorkor is a deficiency of protein which usually occurs in children in the developing countries where there is famine or an unstable food supply.
- Too much protein in the diet can be harmful to the kidneys and liver because they have to break down protein.

<p>Filleting knife</p> 	<p>Thin-bladed, flexible, very sharp knife.</p>	<p>Filleting fish.</p>
<p>Carving knife</p> 	<p>Long blade with a serrated or plain edge. Can be rounded or pointed.</p>	<p>Carving meat joints or cooked hams.</p>
<p>Bread knife</p> 	<p>Long serrated edge.</p>	<p>Slicing loaves and other bread products.</p>
<p>Palette knife</p> 	<p>Flexible blade, which is rounded at the top.</p>	<p>Icing cakes; turning food during cooking, moulding and smoothing food.</p>

FAT-SOLUBLE VITAMINS

- **Micronutrients** are vitamins and minerals. They are required in the body in very small amounts and do not provide energy.
- **Fat-soluble vitamins** can be stored in the body for months, even years and they dissolve in fat.
- Fat-soluble vitamins are vitamins A, D, E and K.
- **Vitamin A's (Retinol and Beta carotene)** function in the body is for the maintenance of normal vision, maintenance of skin and the mucus membrane and is essential for maintaining a healthy immune system.
 - Vitamin A is found in liver, milk, green leafy vegetables, carrots and oranges.
 - Vitamin A deficiency can cause night blindness.
 - Excess vitamin A can cause liver and bone damages.
- **Vitamin D (cholecalciferol)** is needed in the body for the absorption and use of calcium and maintenance and strength of bones and teeth.
 - Vitamin D is found in oily fish, meat, eggs, fortified breakfast cereals and sunlight on the skin.
 - Vitamin D is known as the sunlight vitamin.
 - The deficiency of vitamin D is rickets in children and osteoporosis in adults.
 - Rickets is a condition that affects bone development in children. It causes bone pain, poor growth and soft, weak bones that can lead to bone deformities.
 - Osteoporosis is a health condition that weakens bones, making them fragile and more likely to break. It develops slowly over several years and is often only diagnosed when a fall or sudden impact causes a bone to break (fracture).
- **Vitamin E (tocopherol)** is needed in the body to maintain healthy skin and eyes and is an antioxidant.
 - Vitamin E is found in sunflower oils, nuts, seeds and wheat germ.
 - A deficiency is very rare for vitamin E.
- **Vitamin K (phytomenadione)** is needed in the body for normal clotting of blood.
 - Vitamin K is found in green leafy vegetables, cheese, bacon and liver.
 - A deficiency in vitamin K is very rare.



WATER-SOLUBLE VITAMINS

- **Water-soluble vitamins** cannot be stored in the body and need to be eaten regularly. They dissolve in water.
- Water-soluble vitamins are B vitamins and vitamin C.

- **Vitamin B1 (Thiamin)** function is working with other B group vitamins to release energy from food and helps the nervous system work.
- Vitamin B1 is found in liver, milk, cheese, bread and dried fruits.
- Vitamin B1 deficiency is beri beri and an excess is very rare.
- Beri beri is a deficiency disease caused by a severe shortage of vitamin B1. It is a muscle wasting disease which is only seen in countries where there are food shortages.

- **Vitamin B2 (Riboflavin)** function is to help the body to release energy from the food we eat and keeps the skin, eyes, the nervous system and mucous membranes healthy.
- Vitamin B2 is found in chicken, eggs, milk, fish and yoghurt.
- Vitamin B2 deficiency is very rare.

- **Vitamin B12** function is to maintain nerve cells and make red blood cells and processes folic acid.
- Vitamin B12 is found in meat, eggs, milk, salmon and fortified breakfast cereals.
- Vitamin B12 deficiency is known as pernicious anaemia.
- Pernicious anaemia is one of the vitamin B-12 deficiency anaemias. It's caused by an inability to absorb the vitamin B12 needed for your body to make enough healthy red blood cells.
- Pernicious anaemia is most likely in vegans.

- **Folic acids** function is to help reduce the risk of nervous system defects in unborn babies and works with vitamin B12 to form healthy red blood cells.
- Folic acid is found in fortified breakfast cereal, broccoli, liver, chickpeas and spinach.
- Folic acid can reduce the risk of having baby with a nervous system defect called spina bifida.
- Spina bifida means split spine and is a defect in the backbone that can occur in unborn babies if not enough folic acid was eaten by the mother during pregnancy.

- **Vitamin C (Ascorbic acid)** function is to make and maintain healthy connective tissue, helps wounds heal and repairs body tissues and helps the absorption of iron from the intestines.
- Vitamin C is found in oranges and orange juice, blackcurrants, broccoli and red and green peppers.
- Vitamin C deficiency is called scurvy.

- Scurvy is a very rare but the symptoms include swollen gums, severe joint pain and new wounds may fail to heal.
- Taking large amounts of vitamin C can cause stomach pain and diarrhoea.

ANTIOXIDANTS

- **Antioxidants**- All bodily functions and lifestyle habits produce substances called free radicals that can attack healthy cells.
- Free radicals are substances that are found inside the body and will attack healthy cells, which can cause heart disease or cancer.
- When free radicals are found in large amounts in the body the healthy cells are weakened, and are more vulnerable to heart disease and certain types of cancer.
- Antioxidants help to protect healthy cells from the damage caused by free radicals.
- Vitamins A, C and E are all antioxidants.

REDUCING THE LOSS OF VITAMINS WHILE COOKING

- The preparation and cooking of foods can affect its nutritional value.
- **Water-soluble vitamins** in the B group and vitamin C are affected by food preparation and cooking. They are very unstable.
- The water-soluble vitamins dissolve in water, can be destroyed by contact with sunlight, air and heat and are affected by enzymes.
- The following ways you can reduce the loss of water soluble vitamins:
 - Buy fruit and vegetables in good conditions
 - Choose ripe fruit and vegetables
 - Store in cool, dark places
 - Use shortly after buying
 - Minimise the preparation
 - Blanch vegetables
 - Avoid soaking in water
 - Eat fruit and vegetables raw
 - Cook and eat fruit and vegetables in their skins
 - Use a small amount of water when cooking fruit and vegetables
 - Place vegetables in boiling water and cook quickly
 - Use the cooking water

Minerals

- **Calcium** is needed to help build strong bones and teeth, controlling muscle contractions including the heartbeat and ensuring the blood clots normally.
- Calcium is found in cheese, tofu, milk and soya beans.
- A lack of calcium could lead to a condition called rickets in children and osteoporosis in adults.
- Too much calcium could lead to stomach pain and diarrhoea.

- **Iron** is needed in the body for making red blood cells, which carry oxygen around the body.
- Iron is found in meat, liver, eggs, beans, nuts and dried fruits.
- A shortage of iron in the diet is a very common nutritional problem. A lack of iron is called iron deficiency anaemia.
- The symptoms of anaemia are tiredness, dizziness, and shortness of breath during exercise, a pale appearance and brittle nails and cracked lips.
- Large quantities of iron can be harmful. The side effects of too much iron are constipation, feeling sick and stomach pains.

- **Sodium** is needed in the body to keep the level of water in the body balanced.
- Sources of sodium are salt, cheese, ready meals, savoury snacks, salted nuts, smoked fish, bacon and bread.
- Too much salt in the diet is linked to an increase in blood pressure, which raises your risk of a stroke and heart attack.
- Low intakes of sodium can result in muscle cramps.

- **Fluoride** is needed in the body to help prevent tooth decay by strengthening the tooth enamel and supporting bone health.
- Sources of fluoride are drinking water, fish where the bones are eaten, seafood and tea.
- Very large amounts of fluoride can cause staining and pits to develop on teeth.
- A deficiency of fluoride is tooth decay.

- **Iodine** is needed in the body for making the hormone thyroxine which maintains a healthy metabolic rate.
- Sources of iodine are red meat, sea fish, shellfish, cereals and grains.
- Taking high doses of iodine for long periods of time can affect the thyroid gland. This can lead to weight gain.
- Iodine deficiency used to be the main cause of goitre. A goitre is a swelling of the thyroid gland. This is now very rare to have an iodine deficiency in the UK.

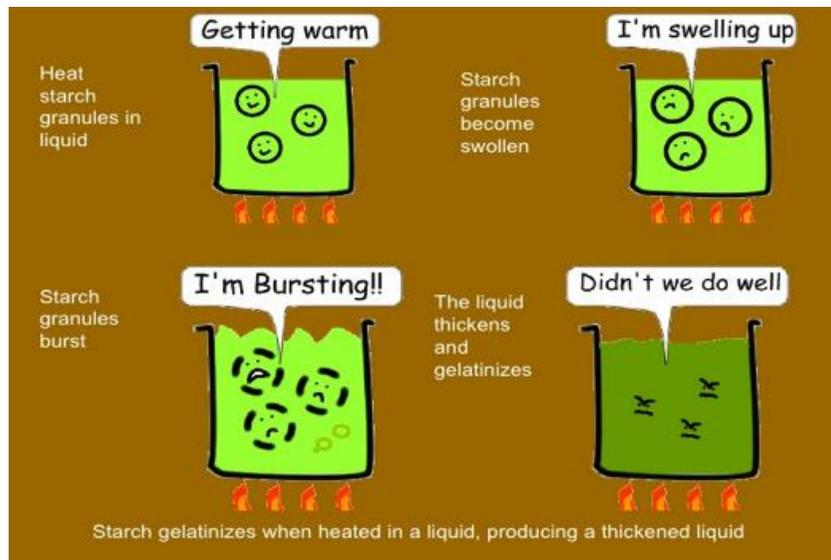
- **Phosphorus** is needed in the body to maintain the bones and teeth and to release energy from food.
- Sources of phosphorous are red meat, dairy foods, fish, poultry, bread, brown rice, oats, beans and lentils.

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- Consuming very large amounts of phosphorous over time can reduce the amount of calcium in the body, which means that bones are more likely to fracture.
- Phosphorus is in so many foods that it is unlikely to be deficient in the diet.
- **Water:**
- The human body can only survive a few days without water.
- Hydration is the supply of water required to maintain the correct amount of fluid in the body.
- To stay healthy, it is important to replace the water you lose when you breathe, sweat and urinate.
- The function of water is cooling the body, removing waste from the body and helping the body to use the food you eat.
- Most people need about 2 litres of water a day, which is about 8 average size glasses.
- Sources; water, low-sugar soft drinks, milk, fruit juices, tea and coffee.
- When your body does not have enough water it becomes dehydrated.
- Signs of dehydration are feeling thirsty, dark urine, headaches, lack of energy and feeling light-headed.
- Drinking too much water can be harmful. The condition is called water intoxication. It can only occur if many litres of water are consumed over a very short period of time.

Gelatinisation

- Some carbohydrates are starches.
- Gelatinisation is the process in which moist heat is applied to starch grains, which swell, increase in size and then burst open, releasing amylose, which thickens the mixture around boiling point.
- Gelatinisation happens between 75C and 87C.
- At 0C nothing happens
- At 60C the starch granules start to absorb the liquid and swell.
- At 80C the starch granules begin to break open and release amylose which causes sauces to thicken.
- At 100C gelatinisation is complete.
- When the thick liquid cools it forms a gel that will set called amylopectin.
- Stirring the sauce at all times will prevent lumps.



What can affect gelatinisation?

- Amount of liquid, types of starch, temperature, stirring, sugar and acids.

Caramelisation

- Caramelisation causes changes to a food's colour and also to its flavour.
- It leads to a desirable golden brown colour and an attractive flavour in baked goods and drinks.
- Caramelisation can give a buttery, toasty or even a nutty flavour to food.

How does Caramelisation occur?

- It occurs when food products containing sugar come in contact with heat. It is the process of sugar turning brown through heat being applied.
- The process begins when sugar breaks down, as sugar is heated to a high temperature (about 180C) it darkens and turns from clear to dark amber.
- It happens because water is released from the sugar as it is heated. The water is released as steam.
- If the sugar is over heated it will burn and produce a bitter taste.

Examples:

- Fudge, toffee, jam and honeycomb.
- The surface of biscuits, breads and pastries.
- Some vegetables such as onion. They contain natural sugars that caramelize when cooked.

<p><u>Dextrinisation</u></p> <ul style="list-style-type: none"> - Dextrinisation occurs when starch is broken down into dextrin by dry heat. - Dextrin is formed during the baking and toasting of starchy foods and adds a sweet taste to baked products. - Dextrinisation contributes to the colour and flavour of many foods such as toast, bread and croissants. 	<p><u>Gluten formation</u></p> <ul style="list-style-type: none"> - Gluten is the general name for the proteins found in flour. - Two proteins called gliadin and glutenin are important in bread products. - Glutenin gives the dough strength and elasticity. - Gliadin binds the dough together into a sticky mass. <p>Gluten formation in bread making</p> <ul style="list-style-type: none"> - Water is added to break-making flour. - Water activates gliadin and glutenin in the flour, which absorb the water to form gluten. - As the dough is kneaded gluten continues to form, creating a framework in the bread dough. - Yeast in the mixture produces carbon dioxide gas, which is trapped in the framework and causes the dough to rise. - When gluten is heated in the oven it sets or coagulates, giving the bread a springy, light texture.
<p><u>Foam formation</u></p> <ul style="list-style-type: none"> - Eggs are excellent at foam formation. You can whisk egg whites, egg yolk or whole eggs into a foam. A foam is when a gas is spread throughout a liquid and whisking eggs to produce a gas-in-liquid foam. - Whisking makes the protein in the egg white unravel and denature. This allows tiny air bubbles of air to be incorporated into the egg white making an egg white foam. - This denaturation is reversible as if the foam is left to stand it will collapse back into liquid egg white. - Eventually the egg white will stand in soft peaks. When you heat the foam, tiny air bubbles expand and the egg protein coagulates around them. This gives firmness to the foam. - Examples of foods that rely on this property are meringues and soufflés. 	<p><u>Protein denaturation</u></p> <ul style="list-style-type: none"> - Denaturation is a change in the structure of protein. The long chains of amino acids that make up the proteins unfold from their coiled state, <div data-bbox="1339 1058 1928 1305" data-label="Image"> <p>Broken chemical bonds</p> </div> <ul style="list-style-type: none"> - Protein is denatured by heat, acids and mechanical action. - Heating and acids change the shape and structure of proteins permanently. However mechanical action such as whisking egg white can be reversible if the egg foam is left to stand, the foam returns to its liquid state. - Marinating will tenderise the tougher cuts of meat. The acids causes the meat fibres to break down and this allows

Critical points to remember when whisking egg whites to make a foam:

- Use fresh eggs
- Tiny amounts of fat and egg yolk will stop the foaming of egg whites
- Use only a metal or glass bowls
- The whisk should be a fine wire or have thin blades
- Avoid over whisking
- Adding vinegar makes the mixture slightly acidic

more moisture to be absorbed into the meat, making the meat juicy and tender.

Mechanical action

- The physical action of whisking will cause protein to denature. The eggs will stretch when whisked. The protein stretches into strands and forms a structure which allows air to be captured.
- Kneading in bread making can cause proteins to denature.
- The pounding, cutting up and mincing of meat helps to break up long muscle fibres.

Coagulation

- Coagulation is when the protein in food sets. This occurs when the protein is heated. If protein is heated too much, it will become hard, tough and difficult to digest.
- Heated protein will coagulate in different ways:
Meat and poultry- meat proteins shrink as they coagulate.
Fish- fish proteins shrink as they coagulate.
Eggs- egg whites become solid and coagulate at 60C. Egg yolk become solid and dry as it coagulated at 70C.
Wheat- the protein is called gluten. Gluten will set and give cakes, breads and biscuits their firm structure.
Milk- milk proteins will coagulate and form skin on heated milk.
Cheese- the fat in cheese melts. The proteins in the cheese denature and then coagulate, if overheated it will become rubbery.

Shortening

- Fat gives foods such as biscuits, shortbread and pastries a crumbly texture. The ability of fat to do this is called shortening.
- Shortening is when fat coats the flour particles preventing the absorption of water, which results in a crumbly mixture.

The fat:

- Gives the flour particles a waterproof coating
- Prevents the flour from absorbing water
- Reduces the development of gluten

Aeration

- Aeration is when air is trapped in a mixture.
- Air needs to be added to a cake mixture in order to give a springy and well-risen texture to the baked cakes. When baking a cake, fat and sugar are creamed together using an electric whisk or wooden spoon. When fat and sugar are creamed, they enclose tiny bubbles of air. The tiny bubbles of air make a stable foam, which can be baked to give a springy texture.

Plasticity

- Fats do not melt at a fixed temperature, but over a range of temperatures. The plasticity of fat is linked to their different melting points. Plasticity gives fats their unique character.
- Plasticity is very important when choosing which fat to use in food preparation. There are many different types of fats. Solid fats do not melt immediately but soften over a range of temperature.

	<ul style="list-style-type: none"> - Plasticity affects the spreading, creaming and shortening ability of fat. - The fat chosen for shortening must have good plasticity. This is because it needs to spread over a large area of flour and coat it with a film of oil. If the fat is too hard, it will have poor spreading power. If the fat chosen is liquid, it will clump rather than make a coating over the flour.
<p><u>Emulsification</u></p>	<p><u>Raising agents</u></p>
<ul style="list-style-type: none"> - Fats and oils do not mix with water. This means they are immiscible and they cannot be mixed. - When two unmixable liquids are forced together, tiny droplets of one will spread throughout the second liquid. This forms an emulsion. <p>Emulsifiers</p> <ul style="list-style-type: none"> - The formation of an emulsion will depend on the presence of an emulsifier. An emulsifier is a substance that will allow two immiscible liquids to be held together. <p>How do emulsifiers work?</p> <ul style="list-style-type: none"> - An emulsifier has two parts; <ol style="list-style-type: none"> 1. A water-loving part, which we describe as 'hydrophilic' 2. A water-hating part, which we describe as 'hydrophobic' - One part of the emulsifier attracts the water and one part attracts the oil. This combination holds the oil and water together. The emulsifier lowers the surface tension between the two liquids so that they can combine to form a stable emulsion. - Products such as ice cream, mayonnaise and salad dressing all require an emulsifier. 	<ul style="list-style-type: none"> - Raising agents are used to make mixtures rise. Raising agents work by introducing gas into a mixture. When you heat a mixture, which contains a raising agent, the gas expands and makes the mixture rise. Some gas escapes and some is trapped in the mixture as it cools and sets. This makes the baked item have a light, open texture. - The gases that are used as raising agents are air, steam and carbon dioxide. <p><u>Chemical raising agents</u></p> <ul style="list-style-type: none"> - Chemical raising agents produce carbon dioxide when they are heated with a liquid. The two most common are baking powder and bicarbonate of soda. <p><u>Mechanical raising agents</u></p> <ul style="list-style-type: none"> - Mechanical raising agents use air and steam. - Air can be introduced into a mixture mechanically by whisking, beating, folding, sieving, creaming and rubbing in. - Some dishes that depend on air are whisked sponges, soufflés and roulades. - Steam is used in make Yorkshire puddings, choux, puff and flaky pastry.

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Biological raising agents

- Yeast is a biological raising agent. Yeast is a living plant. It produces the gas carbon dioxide by fermentation.
- Yeast needs warmth, food, moisture and time to ferment.

Personal hygiene

-Personal hygiene is important for anyone preparing and cooking food. If high standards of personal hygiene are met, food poisoning is less likely to occur. Hands are the most likely way that you spread bacteria on to food.

When should you wash your hands?

- Before you start any food preparation.
- After touching your hair or face.
- After using the toilet.
- After using a handkerchief or tissue to cough or blow your nose.
- After cleaning or putting rubbish into the bin.
- After handling raw meat, poultry, seafood, vegetables or eggs.
- After eating or drinking.

Personal hygiene rules for the kitchen:

- Don't cough or sneeze near food.
- Don't touch your head, especially your mouth, nose or ears.
- Don't brush your hair in the food room or with your apron on.
- Long hair should be tied back or covered.
- Wounds, such as cuts and scratches, should be covered with a coloured waterproof plaster/dressing.
- Wear a clean apron to protect the food from bacteria on your clothes.
- Don't prepare food if you are unwell with a tummy bug, or cough as you could spread bacteria onto food.

Food safety principles when working with food:

- Clean work surfaces: They need to be kept clean so they are free from bacteria. They can be cleaned before, during and at the end of any food preparation.
- Separate raw and cooked foods: any food that is cooked and ready to eat should be protected from raw foods.
- Cooking food for the correct time: many foods need to be cooked to kill any pathogenic bacteria that may cause food poisoning.
- Use a temperature probe: The probe should be inserted into the thickest part of the food, food should reach a temperature of 75C and above.
- Defrosting food: Once food has been defrosted it should be treated as fresh and be used as soon as possible. Never re-freeze defrosted frozen food. Chicken should be thoroughly defrosted, bacteria will be alive in the centre of food. Unless the heat penetrates through to the centre of the chicken, bacteria may survive the cooking process. If the chicken is cooked without being fully defrosted, it may take much longer for the heat of the oven to penetrate the centre of the chicken.
- Reheat food: when reheating food it should reach a temperature of 75C, which will destroy most of the bacteria in the food.
- High-risk foods are the most likely foods to cause food poisoning. They are ready to eat moist foods, usually high in protein.

Chopping boards



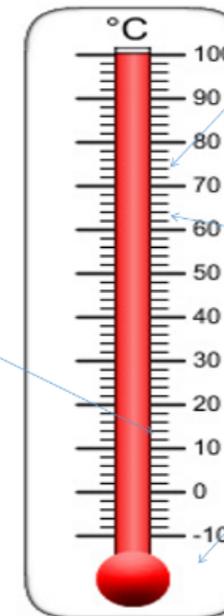
Buying and storing food

- Many outbreaks of food poisoning are caused by high-risk food being kept for too long within the temperature danger zone.
- Danger zone- is the range of temperatures from 5C to 63C, where most bacteria can easily multiply.
- Bacteria grow very slowly, or do not grow at all at temperatures below 5C.
- No bacteria grows at temperatures above 63C.
- Bacteria will multiply the fastest at around body temperature of 37C.
- The danger zone does not apply to non-perishable foods around 17C-20C.

Danger zone=5C-63C
Food should spend **no more than 90 minutes** in the danger zone.

Chilling= 5C or lower

Fridge temperature should be 0C-5C



Cooked= 75C
Temperatures this high kill **most** bacteria

Hot Holding= 63C
Hot-holding is when food is kept hot until it's served

No bacteria grow at temperatures above 63C.

Freezing= -18C or lower
Here it is **too cold** for bacteria to multiply.

Activate Windows

- **Perishable foods** are foods with a fairly short shelf life, which usually need to be stored in the fridge or freezer.
- Examples of perishable foods are raw and cooked meats, poultry and fish, milk and eggs, butter, low fat spread and yoghurts, cheeses and vegetables, fruits and salads.

- **Non-perishable foods** are foods that have been processed in some way to prevent the growth of micro-organisms and to prolong their shelf-life.
- Non-perishable foods include canned foods, dried pasta and rice, breakfast cereals, flour, coffee powder and sugar.

Where food should be stored in the fridge:

- Top shelf- ready to eat foods such as dairy products, yoghurts and cream.
- Middle shelf- cream cakes, butter/margarine, cooked meats and packaged foods.
- Bottom shelf- raw meat, poultry and fish- always sealed and covered.
- Bottom/drawers- salad vegetables, fruit and vegetables.

Dates on food:

- Best before date means that food is at its best quality before this date, although with the exception of eggs, it may safely be eaten after this date. Usually non-perishable foods.
- Use by date means that food must be consumed by this date to prevent food poisoning.

Bacterial contamination

- Food may become contaminated with bacteria from many different places.
- **Raw food contamination-** Many types of bacteria live in the intestines of animals. When the animal is slaughtered the bacteria can get onto the meat and poultry. These bacteria could multiply to cause food poisoning if the meat and its juices are allowed to come into contact with other foods and equipment. Other raw foods that carry bacteria are raw eggs, which may have bacteria on the inside and outside of their shell, as well as shellfish. Vegetables can be contaminated with bacteria from the soil.
- **Work surface and equipment contamination-** They may become contaminated from raw foods and unwashed hands. Any work surface that comes in to contact with raw meat and poultry should be thoroughly cleaned with hot soapy water before they are re-used for other preparation. Colour coding of equipment.
- **Food handler contamination-** You can contaminate the food with bacteria that are naturally present on you. To avoid this, you should: use tongs to pick up food. When you taste food during preparation, don't double-dip. Don't lick fingers. Avoid touching parts of utensils that come into contact with food.
- **Pest contamination-** Pests such as flies, insects, mice and even rats contaminate food. They carry bacteria on their bodies and in their urine and droppings.
- **Waste food and rubbish contamination-** Bacteria can multiply in waste food and rubbish bins. To avoid contamination onto foods: Only use bins with lids. Use thick bin bags. Empty bins as soon as possible. A foot-operated bin is better. Bins should be washed regularly.
- **At risk groups-** Food poisoning is very unpleasant for anyone but for some groups of the population, the outcome can be more serious. These groups are babies and very young children, pregnant women, elderly people and those with reduced immunity.
- The outcomes of food poisoning can be serious and death is more frequent in these at risk groups.

Food poisoning

- Food poisoning happens when a food is contaminated.
- Food poisoning may be caused by: eating or drinking contaminated water. Eating undercooked food. Not storing food correctly. Not storing cooked foods in the fridge, or in the wrong place. Eating food that has been touched by someone who has a septic cut or who is ill. Cross-contamination.
- Symptoms of food poisoning are: vomiting, diarrhoea, nausea, stomach pains, vomiting and diarrhoea may lead to dehydration.
- The symptoms may start within 2 hours of eating the food, but they can also begin after many days depending on the pathogenic bacteria that has caused the food poisoning.

Types of food poisoning:

- **Campylobacter** is the most common type of food poisoning in the UK. Most cases are from contaminated poultry. Most likely way of getting it is from undercooked chicken or when the bacteria from raw chicken spreads onto other foods. Do not wash meat and poultry before cooking.
- **E.Coli** is normally found in the intestines of people and animals. It is also found anywhere faecal contamination occurs. Is a type of food poisoning bacteria often associated with undercooked meat. It can have serious outcomes and may lead to death if not treated. Only a small number of toxins are needed to cause illness. The bacteria can survive both refrigeration and freezer temperatures. Bacteria is killed whilst cooking.
- **Salmonella** is a type of food poisoning bacteria, sometimes on undercooked meat, eggs, and chicken, pork and dairy products. It can be spread by not washing hands after going to the toilet. It is destroyed by cooking and reaching a core temperature of 75C.
- **Listeria** is a type of food poisoning bacteria that can multiply at fridge temperatures below 5C. Bacteria is found in many places in the environment, including soil, decaying vegetation and water. Sources: unpasteurised milk and cheeses. It is destroyed by cooking.
- **Staphylococcus aureus** is mainly transmitted by human handlers. It is found on human skin and the mucus lining of the body. The bacteria produces toxins which cause the symptoms of food poisoning.

Micro-organisms

- Food spoilage happens when food is contaminated by yeast, moulds or bacteria which make food unsafe or undesirable to eat. Food spoilage may also be caused by enzyme activity.
- Micro-organisms- The yeasts, moulds and bacteria that contaminate food and cause food spoilage are called micro-organisms. They are tiny living things that can only be seen with a microscope.
- Yeasts, moulds and bacteria need the following four conditions to grow- food, moisture, warmth and time.
- **Yeasts**- They are tiny, single-celled fungi which reproduce by budding.
- Ideal conditions for growth- Most grow in the presence of oxygen but they can grow without as well. They prefer acid foods and can grow in high concentrations of sugar and salt. Grown in warm conditions around 25-29C. They are destroyed at temperatures above 100C.
- Yeasts can spoil jam, honey, fruit, yoghurts and fruit juices.

- **Moulds** are tiny fungi that produce thread-like filaments. These filaments help the mould to spread around the food, extracting nutrients from it.
- Ideal growth conditions for moulds- They may grow on many foods, including acid and alkaline foods as well as those with high sugar and salt concentrations. They grow best between 20-30C. Growth can be slowed down or prevented by: storing food in a cool, dry place, storing food in a fridge, cooking food and storing in acid conditions. Moulds often grow on and spoil bread and bakery products.
- **Bacteria** are single-celled micro-organisms. They are divided into harmless bacteria, pathogenic bacteria and food spoilage bacteria.
- Ideal growth conditions for bacteria- They need food, warmth, moisture and time to grow. They do not like acidic conditions, they grow best in neutral conditions. Bacterial growth can be slowed down by storing perishable foods in the fridge, cooling cooked perishable foods to room temperature within 90 minutes. Reheat leftovers once and use high concentrations of salt, sugar and acid.
- Bacteria prefer foods that are high in protein and that are moist.
- Oxidation is the loss of water-soluble vitamins on exposure to heat/air. Enzymes can cause foods to spoil by the process of oxidation.
- Yeast is widely used in food production as a raising agent for bread and other yeasted doughs such as crumpets, doughnuts and currant buns. As well as baked products, yeast is used in the brewery industry to ferment grapes into wine and beer.
- Some cheeses are made with mould to improve their colour and flavour. For example, Brie, Camembert and Stilton.
- Moulds are also used to ripen the surface of some sausages. The mould improves the aroma and texture of sausages and also extends their shelf-life.
- Harmless bacteria are used to make cheese and yoghurt.

The process of cheese making:

- The milk used for cheese-making is usually pasteurised, this means the milk has been held at a minimum temperature of 72C for 15 seconds to kill any harmful bacteria.
- The pasteurised milk is warmed to between 25-35C.
- The starter culture, Rennet, is added to the warmed milk and this sours the milk. The starter culture converts the milk sugar, lactose into lactic acid and this begins the cheese making process.
- To increase the rate of curdling, rennet is also added. This contains an enzyme called rennin. The rennet causes the milk to separate into curds and whey.
- The curds and whey are then cut to release the whey which is drained off. The curd is heated and stirred and becomes very firm. The blocks of curd are milled to form smaller pieces of curd. Salt is added to the curd at this stage to add flavour and to help preserve the cheese.
- These curds are then pressed into moulds and pressed again to make blocks of cheese which are firm and solid. They then go into storage.

Diet, Nutrition and Health

If you do not have a healthy diet, you can become ill. This may be caused by:

- **Over-nutrition** which is eating too much food, or too much of a certain nutrient.
- **Under-nutrition** which is eating too little food or too little of a particular nutrient to meet dietary needs.
- **Obesity** means being very overweight.
- You can use body mass index (BMI) to see if your weight falls into the normal range.
- To calculate BMI you need your weight and height:

BMI= Weight(Kg) divided by height (m²)

- 18.5 to 24.9 = healthy weight
- 25 to 29.9 = overweight
- 30 to 39.9 = obese
- 40 or above = severely obese

- Health problems linked to obesity are type 2 diabetes, coronary heart disease, stroke, some cancers, arthritis and depression.
- Treating obesity means losing weight and reaching a healthy BMI if they have a healthy diet and follow the Eatwell Guide, reduce the calories in their diet and exercise regularly.
- **Cardiovascular disease** covers a group of diseases of the heart and blood vessels.
- Two main types of cardiovascular disease are coronary heart disease (CHD) and stroke.
- **Coronary heart disease** occurs when blood vessels to the heart become blocked with fatty deposits. This can cause angina if the blood flow is restricted or a heart attack if the blood supply is cut off completely.
- **Strokes** occur when the blood supply to the brain is cut off. The brain needs oxygen and nutrients to work properly. A stroke may lead to physical disability, brain injury or even death.
- Risk factors for cardiovascular disease are high blood pressure, smoking, high blood cholesterol, diabetes, not exercising enough being obese or overweight, having a blood relative with cardiovascular disease and ethnic background.
- Reducing the risk of cardiovascular disease by following the Eatwell Guide and not over-eating, not drinking too much alcohol, exercising regularly and not smoking.
- Preventing cardiovascular disease by watching the fat in the diet, reducing the salt and sugar in the diet.
- **Type 2 diabetes** is a condition when the sugar in a person's blood gets too high. Once someone has diabetes they have it for the rest of their life.
- You are more likely to get type 2 diabetes if you are overweight or obese, over 4 years old, eat fatty, salty and sugary foods often, have high blood pressure or you do not exercise regularly.
- The main symptoms of diabetes are feeling tired all the time, feeling thirsty and passing more urine than normal.

Factors affecting food choices and religion

- Factors that may influence food choice are cost of food, PAL, enjoyment, food availability, healthy eating, income, lifestyles, seasonality, time available to prepare/cook and celebration/occasion.
- PAL- stands for physical activity level.
- PAL is a way of showing your daily physical activity in a number. PAL will vary depending on how you spend your time during the day. If you are sedentary you will have a lower PAL than someone who moves around a lot in their job.
- Our food choices can be influenced by our culture.
- Culture includes our laws, morals, customs and habits- all of these have an influence on what we choose to eat and why.
- Many religions have specific rules relating to food, and have celebrations and festivals where specific foods are eaten at specific times.
- **Jews (Judaism)**
 - They do not eat shellfish or pork. They do not eat dairy and meat in the same meal. They only eat meat that has been slaughtered in a specific way in order to be called Kosher. Jewish festivals where specific food is eaten: Passover, Rosh Hashanah, Yom Kippur, Hanukkah
- **Hindus**
 - Do not eat beef or any beef products- this is because they consider the cow to be a sacred animal. They will use milk because no animal is killed during the process. Many are vegetarians. Most do not drink alcohol. Celebrate Diwali- the festival of lights.
- **Sikhs**
 - Do not eat beef or any beef products because they believe the cow is a sacred animal. Many are vegetarians. Many will not eat Halal or Kosher meats as they believe the animals were not killed humanely. Devout Sikhs do not drink alcohol.
- **Muslims (Islam)**
 - Do not eat pork. Only eat Halal meat. Won't eat seafood without fins or scales such as crabs and prawns. Many do not drink alcohol. Muslims have a month long fast called Ramadan. They have a three-day festival called Eid.
- **Buddhists**
 - Most try to avoid intentionally killing animals and are vegetarians. Some monks fast in the afternoon
- **Rastafarians**
 - They eat food which is natural, pure, clean or from the earth. They try to avoid foods which has been chemically modified or contains artificial additives.
 - Do not eat pork. Will eat fish but not fish that is twelve inches long. Food is prepared without salt. They do not drink alcohol. They do not drink milk or coffee.
- **Christians**
 - Before Easter they will observe lent, where they give up certain foods for 40 days and 40 nights. Some Catholics fast on Fridays during the run-up to lent. Celebrate Christmas and Easter.

Special Diets

- Some people cannot eat certain foods without becoming ill.
- Food intolerances is when people have a sensitivity to certain foods, which can give them symptoms such as nausea, abdominal pain, joint aches and pains, tiredness and weakness.
- **Lactose intolerance** means the body is unable to digest the sugar in milk. The sugar in milk and dairy products is called lactose. An enzyme in the digestive system called lactase is needed to break down lactose. People with lactose intolerance don't produce enough lactase and so the milk sugar lactose stays in the digestive system, where it ferments and produces gases.
- People with lactose intolerance need to avoid all dairy products such as: milk, cheese, yoghurt, butter and cream, processed foods that may contain milk, pizza and lasagne, ice cream and cheesecake and chocolate, chocolate mousse, cakes and biscuits.
- The alternatives to dairy include: soya milk and soya products, dark chocolate and lactose-free products.
- **Gluten sensitivity** is also known as coeliac disease.
- Coeliac disease is a bowel disease, people with this have a sensitivity of gluten. Gluten is a protein present in a number of cereals including wheat, rye, oats and barley.
- Symptoms of coeliac disease include: weight loss, diarrhoea, lack of energy, loss of appetite and vomiting, children may not gain weight or grow properly and general malnutrition as coeliac's cannot absorb enough nutrients.
- **Food allergies**- A person has a food allergy when they experience an allergic reaction to a specific food.
- If the reaction is a bad one, it could give the following symptoms: a skin rash, itchiness of skin, eyes and mouth, swollen lips, face and eyes and difficulties breathing. A severe case can cause an anaphylactic shock. Anaphylactic shock is a serious condition which the person develops swelling in their throat and mouth, making it difficult to breathe or speak. This can lead to death if appropriate treatment such as an epi pen is not used quickly.
- There are 14 allergens which need to be emphasised on a food label, which are: eggs, milk, fish, crustaceans, molluscs, peanuts, tree nuts, sesame seeds, cereals containing gluten, soya, celery, mustard, lupin and sulphur dioxide and sulphates.
- There are many reasons such as: personal choice, essential to health, part of your religion or culture or due to an allergy or intolerance.
- There are three different types of vegetarians depending on which animal foods are included in the diet.
- Reasons people follow a vegetarian diet are: they do not like the thought of eating a dead animal, they think it is cruel to kill animals for food, their religion does not allow them to eat meat, fish or poultry, they think it is healthier to eat a vegetarian diet and they think it is wasteful to raise animals for food when the same land space could be used more economically to grow crops.
- **Lacto-vegetarians** will not eat animal foods such as meat, poultry and fish, nor products made from animals such as lard or gelatine. They will also not eat eggs but they will eat dairy products such as milk, butter, cream and yoghurt.
- **Lacto-ovo-vegetarians** will not eat animal foods such as meat, poultry and fish nor products made from animals such as lard or gelatine but will eat eggs and dairy products.
- **Vegans**, their diet does not contain any animal foods. They will not eat meat, fish, poultry, eggs, dairy products or any meat products. All foods are plant based.
- A vegan diet should be supplemented with vitamin B12 from fortified food products, such as soya milk, almond milk and some breakfast cereals.

Food and the environment

- The environment includes air, water and land on which people, animals and plants live.
- To sustain our environment we need to maintain and look after it by: using less energy, reducing the consumption of water, avoiding waste and recycling and reusing as much as possible.
- Sustain means to maintain and look after something, for example the environment.

The 6 R's-

- **Rethink**- how much of the ingredient do we need to buy? Think about the most energy efficient cooking methods, and think about reducing air miles.
- **Refuse**- don't use a material or buy a product if you don't need it or if it's bad for people or the environment.
- **Reduce**- cut down the amount of packaging material on food, and conserve energy and water when you cook.
- **Reuse**- use leftover food to create another dish. Reuse packaging such as jars.
- **Recycle**- always recycle packaging.
- **Repair**- fix equipment used in preparation and cooking when it breaks down or does not work properly, rather than buy new equipment.

Seasonal food

- Seasonal foods means foods that are only available at certain times in the year.
- Advantages of seasonal foods are it is more likely to be local or grown in the UK, so the food miles will be low and it will support local farms. It is often healthier because it is fresher, it has not travelled across the world spending time in transport and storage. Foods in season are often plentiful and therefore cheaper.

The Red Tractor food assurance scheme

- The Red Tractor food assurance scheme is a scheme which covers production standards such as safety, hygiene, animal welfare and the environment.
- By having the logo people will know the food that they are buying is safe, they will know where the raw ingredients come from and the standards to which the food has been produced, and they will know that the animals reared will have been raised according to high welfare standards.



Sustainability and sustainable methods of farming.

- Many farmers now work in a sustainable way: this means that they grow crops, or rear animals in a way that maintains and improves the environment.

- Fish- fish products with a marine stewardship council label means they come from a sustainable fishery, ensuring appropriate fishing methods are used and that the supply is maintained and supported.

Food miles

- Food miles are the distance that food is transported as it travels from producer to consumer. In the UK food travels by boat, air, Lorries and cars.
- Food transport is responsible for the UK adding carbon dioxide to the atmosphere each year.

Organic food

- Organic food means that at least 95% of the ingredients come from organically produced plants and animals.
- To be organic food must meet the following standards:
- The food must not have any artificial colourings and sweeteners, nor use artificial fertilisers. For farmers rearing animals and they must be free range. The use of many drugs and antibiotics are banned. Animals raised as organic must have a 100% organic diet and GM crops and ingredients are banned.



Production methods

- Free-range egg production is a method of farming where animals have access to outdoor spaces, rather than being restricted to an enclosure for 24 hours each day.

Advantages of free-range production:

- Animals can graze and look for food meaning they are more likely to eat a varied diet.
- Animals have a better life and consumers prefer to buy these products.
- Some consumers believe they taste better.
- Animals can roam around and are less likely to spread disease between each other.

Disadvantages of free-range production:

- Animals are at risk of being attacked by predators.
- Animals can catch disease from wild animals.
- Animals can suffer discomfort during extreme weather.
- More land is needed in free-range production and it needs to be carefully managed.
- Free-range foods can be more expensive to buy.

Free range egg production need to follow the minimum conditions:

- Hens have continuous daytime access to open-air runs and perches, the open-air runs must be mainly covered with vegetation and each hen has 4m² of outside space at all times.

Genetically modified foods

- Genetically modified foods (GM foods) are foods produced from plants or animals that have had their genetic information changed by scientists.
- GM foods could have better resistance to insect, pests or disease, increased storage life when harvested, resistance to low rainfall and faster growth.
- GM foods- The genetic information controls the features that are passed on from one generation to the next. Scientists can change a plant or animal by adding genetic information from another plant or animal to it.
- Currently the production of genetically modified food in Europe is restricted. Only maize used for animal feed is produced.
- Pesticides are chemicals that destroy pests or creatures that are harmful to crops.
- Fertilisers are chemicals that enhance the soil by adding nutrients.

Benefits of GM foods

- Can be produced in large amounts.
- They are cheaper in the long run. They need less pesticides and herbicides and less people to grow them successfully.
- Storage life of a food can be improved.
- Can be produced to survive poor weather.

Problems with GM foods

- GM technology could affect animal habitat.
- Pests could become resistant to the new crop.
- New diseases could develop.
- The labelling of GM foods can cause confusion.

Sustainability of food

- **Food security** is when all people, at all times, have access to enough safe and nutritious food for them to lead an active healthy life.
- There are four features: availability of food, access to food, use of food and stability of the supply. Food security requires all four features to be met at the same time.
- **The physical availability of food**- food availability is about the supply side of food security. The amount of food available in a country depends upon how much food they produce, store and trade. Some people will suffer food shortages if they are affected.

- **Access to food-** the access to food is affected by cost of food. High food prices can mean that people on low incomes will be unable to buy enough food. Issues like access to land to grow food and poor transport systems can also limit the access to food for some people.
- **The use of food-** the use of food is about how they body uses the nutrients in the food. People need to know how to use food and eat a balanced diet.
- **The stability of the food supply-** food stability is about the supply of food over time. Poor weather and economic factors can have a harmful effect on long-term food supply.
- **Imported food** is food that is brought into the UK from other countries for sale. Fruit and vegetables are the biggest group of foods imported in the UK.
- **Challenges to providing food security:**
 - Increases diseases in farm and animals and crops because of the spread on insects.
 - Reduces animal habitats by clearing land and forests for food production and overgrazing.
 - Decreases natural food reserves through excess fishing to meet population demands.
 - Reduces the number of bees as some pesticides destroy all insects.
 - Damages the soil by the overuse of chemical fertilisers and removal of vegetation.
 - Contributes to climate change because farming releases gases which cause global warming.
 - Reduces availability of fossil fuels because energy from fossil fuels is used to produce food.
 - Harms water supplies by using fertilisers.
 - Contributes to the growth of deserts as global temperatures increase and rainfall is reduced.
 - Reduces water supplies because agriculture accounts for 70% of global water use.
 - The factors that affect the distribution of food and increase in food prices are changes to the environment, the world population and global trade.

Food production

- Most food undergoes some processing before it appears at the table. This process is called field to fork.
- **The two stages of food production are primary and secondary food processing.**
- **Primary processing** is changing raw food materials into food that can be eaten immediately or be processed further into other food products. Primary processing includes transporting, sorting, cleaning, blending, cooking, preserving, packing and storage of the raw food.
- **Secondary processing** is when primary products are changed into other types of food products. Examples: wheat flour into breads, pasta, pastries and cakes, milk into cheese and yoghurt, fruit into jams, jellies and marmalades, vegetables can be shredded or sliced, fish into frozen meals.

Milk- primary processing

- Milk is processed to produce a variety of different types:

- Pasteurised- this extends shelf-life by using heat to destroy harmful bacteria.
- Skimmed- this is pasteurised but has had all or most of the fat removed.
- Semi-skimmed- this is pasteurised.
- Ultra-heat treated (UHT)- also known as long life. This has a shelf life of up to 6 months.
- Sterilised- this has a longer shelf life, is homogenised and has a slightly caramel flavour.
- Dried- does not need refrigeration until reconstituted. It is made by evaporating the water from the milk, which leaves a fine powder.
- Canned:
- Evaporated- milk that has had water evaporated off, it is sweet and concentrated, homogenised and is sealed in cans and sterilised.
- Condensed- evaporated milk that hasn't been sterilised, it has sugar added and is very thick.

Milk- secondary processing

- Cream- the fat removed from milk is used.
- Butter- cream is churned to make butter.
- Cheese- this is milk in its solid form.
- The process of cheese making: pasteurise the milk, add the started culture and ripen, add the rennet, cut the curd and heat, drain whey, texture curd, salt, form the cheese into blocks, store and age and package.
- Yoghurt- milk has a bacteria culture added to it to make yoghurt
- The process: pasteurise the milk, warm the milk, add the starter cultures, hold, cool, add fruit and flavour and package.

Wheat – primary processing

- Wheat is made into flour by a process called milling.

Wheat- secondary processing

- Flour can be further processed in to products such as pasta and bread.
- Pasta is made from strong wheat called durum wheat.

Milling process

The milling of wheat into flour for the production of bread, cakes and biscuits is a huge industry. Cereal grains consist of three distinct parts. The purpose of milling is to separate the different parts of the grain.

Step 1: Breaking

The grain is broken between steel rollers, with grooved surfaces, working at different speeds. This is the first 'break' and the wheat grains are torn open.

Step 2: Sieving and reduction

The broken grain is sieved. Three main separations are made:

- Flour called the 'first break flour' is removed.
- Rough white flour called semolina is collected. Semolina is a coarse-ground flour produced from wheat.
- Large pieces of the wheat grain are collected.

After the 'first break flour' has been removed, the coarse semolina and large pieces of wheat grain are fed into a second reduction roll. The flour is sieved out after each reduction roll.

The semolina is repeatedly rolled between break

Food processing

- Processing foods has advantages because it makes them safer to eat and offers more food choices
- **Blanching**- before food is canned or frozen, it is usually blanched. Water-soluble vitamins are reduced by blanching.
- Blanching is boiling fruit or vegetables for a short period of time to destroy enzymes, before plunging into iced water to stop the cooking process.
- **Canning**- in this process food and a small amount of water are heated inside a sealed can to a very high temperature. This kills any dangerous micro-organisms and extends the shelf-life of the food.
- Pasteurisation involves heating liquid foods such as milk and fruit juices to 72°C for 15 seconds to destroy micro-organisms.

Fortified foods and enriched foods.

- Fortified foods are foods that have one or more micronutrients added to them. These nutrients are often ones that were never present in the original food.
- Enriched foods are foods that have one or more micronutrients added to them. These nutrients are added to replace those lost during processing.
- **Food additives**- they are added for the following reasons:
 - To make food last longer
 - To improve the flavour
 - To meet expectations about the colour
 - To replace nutrients lost during processing
 - To maintain the texture of a product

- **Preservatives** are a food additive which keeps food for longer. They extend shelf life by preventing the growth of bacteria as well as yeasts and moulds.
- Negative aspects of preservatives are they can contain nitrates which are linked to a higher risk of developing cancer.
- **Colourings** positive aspects: Colourings are added to foods to improve their appearance.
- Negative aspects- They can have a negative effect on children's behaviour and can cause hyperactivity.
- **Flavourings** positive aspects: Flavourings are added to foods to enhance, improve or strengthen the flavour of foods. They can restore the flavours of food after processing or be used in baking to add new flavours.
- Negative aspects- Some flavour enhancers such as monosodium glutamate are reported to cause symptoms similar to an allergic reaction. They may show itching, sweating and numbness as well as headaches.
- **Emulsifier's** positive aspects- they are used to mix together ingredients which would not normally mix. Lecithin is an example of a natural emulsifier found in egg yolk.
- Negative aspects- there are few problems from emulsifiers, but flatulence and bloating have been experienced by some people.
- **Stabilisers** positive aspects- they are used to prevent oil and watery mixtures from separating once an emulsifier has allowed them to mix together.
- Negative aspects- there are few reported problems from consuming stabilisers, although flatulence and bloating have been noted by some people.