

FOOD, NUTRITION AND HEALTH

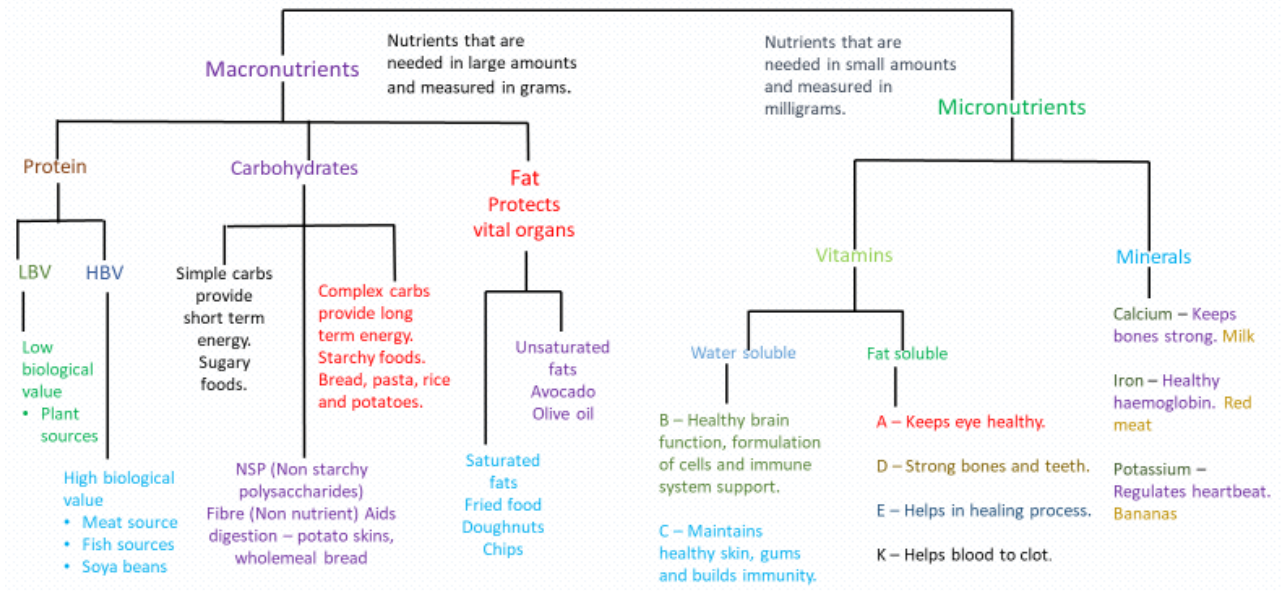
The 5 main nutrients are:  
**Carbohydrate** (Sugar, Starch, Fibre)  
**Fat**  
**Protein**  
**Vitamins** (A, B, C, D, E, K)  
**Minerals** (Iron, Sodium, Flouride, Calcium)

Macro Nutrients: **Carbohydrate, Fat, Protein**  
 Micro Nutrients: **Vitamins and Minerals**

Non Nutrients:  
**FIBRE** – Vegetables, wholemeal flours/ pasta – aids digestion  
**WATER** - Water, juice, fruit, vegetables - hydration of all cells



Nutrients



Nutrients

Protein

Is a **macronutrient**. It is formed from chains of **amino acids**. 8 amino acids need to be provided by the diet in adults and are called **essential amino acids**. Children require 2 more (10). Protein is used for specific functions in the body: **growth, repair, maintenance and is a secondary energy source.**



BIOLOGICAL VALUE

The biological value of protein means the amount of essential amino acids present. **Animal protein sources** contain **all the essential amino acids** required by the body (**HBV high biological value**). Soya is a plant and is the only exception being HBV too. **Proteins from plant sources** are of **low biological value LBV** and lack some essential amino acids (except soya). Vegetarians can combine LBV proteins to ensure they get all the essential ones (**protein complementation**)

PROTEIN EXCESS AND DEFICIENCIES

Protein is a third source of energy. In developing countries KWASHIORKOR (malnutrition) occurs. More protein is required in -babies and children for growth - adolescents for growth spurts -pregnant women (baby) -nursing mothers (lactation).

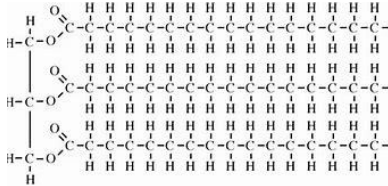
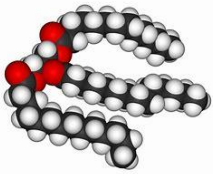
Symptoms of kwashiorkor can include:

- Odema – fluid build up and swelling
- loss of muscle mass
- an enlarged tummy ("pot belly")
- regular infections, or more serious or long-lasting infections
- red, inflamed patches of skin that darken and peel or split open
- dry, brittle hair that falls out easily and may lose its colour
- failure to grow in height
- tiredness or irritability
- ridged or cracked nails



# Fat

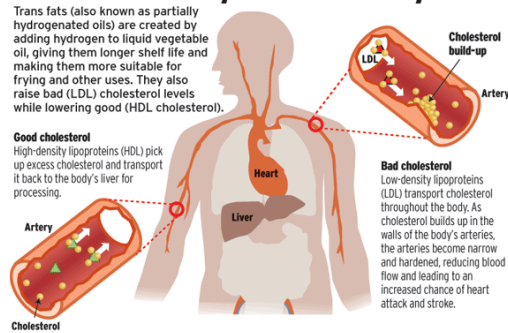
Is a **macronutrient** made up of **fatty acids and glycerol**. The structure of fatty acids influences their effect on health and cooking choice. **Fat soluble vitamins A,D,E and K** are found in foods high in fat. Fat provides energy, it protects the bodies major organs, insulates the body and provides the fat soluble vitamins.



## TYPES OF FAT

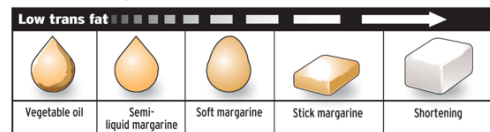
Saturated Fat	Unsaturated Fat
meats, butter, dairy products	vegetable oils
solid at room temperature	liquid at room temperature
Increase levels of "bad" cholesterol (low-density lipoprotein)	Increase levels of "good" cholesterol (high-density lipoprotein)
low-density lipoprotein clogs arteries	high-density lipoprotein, or HDL, "grabs" LDL and escorts it to the liver where LDL is broken down and eventually removed from the body

## What they do to the body



## Where it comes from

Trans fats are created by hydrogenation, a chemical process that hardens vegetable oil. The more solid the fat, the more trans fat it contains.



Sources: The Mayo Clinic; American Heart Association; U.S. Food and Drug Administration; McClatchy-Tribune The Register

## FAT EXCESS AND DEFICIENCIES

Fat provides the body with energy – 9kcal per gram. Foods that contain fat are therefore energy dense. If the energy is not burned off through good physical exercise it is stored under the skin. Too much fat can lead to **Obesity – BMI of over 30**. Too much saturated fat can also lead to **coronary heart disease**.

A deficiency of fat in the diet is rare but if carbohydrate is also decreased fat will be lost, the body will chill quickly, the body will bruise easily due to no protection and the body will lack vitamins A,D,E and

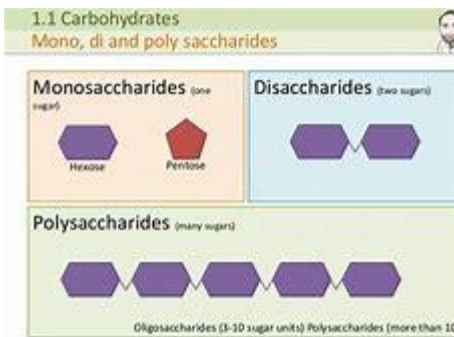
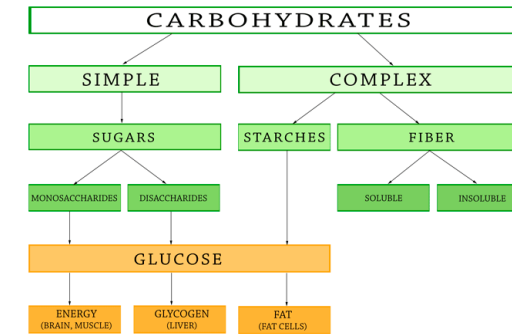
# Carbohydrate

Is a **macronutrient**. Carbohydrate is needed by all mammals. It is made by green plants during photosynthesis. **Dietary fibre** is a form of carbohydrate (it is a non-nutrient).

## TYPES OF CARBOHYDRATE

**Monosaccharides and disaccharides** – these are sugars that provide quick release energy. Free sugars –sugars added to food. Processed sugars.

**Polysaccharides** are complex carbohydrates – these are know as starch that provide slow release energy.



## Types of Carbohydrates

- Starches**  
 Usually found in:  
 - most common type of carb in human diet  
 - consisting of a large number of glucose  
 bread, crackers, corn, peas, potatoes
- Sugars**  
 - also referred to as simple or fast-acting carbohydrate  
 - can be naturally-occurring or added  
 fruits, processed foods with added sugar
- Fibre**  
 - also referred to as simple or fast-acting carbohydrate  
 - can be naturally-occurring or added  
 whole grain products, nuts

## CARBOHYDRATE EXCESS AND DEFICIENCIES

If the diet contains more carbohydrate than the body needs it will converted into fat and stored in the body. Again the storing of this over time could lead to **obesity**. Too much sugar can put stress on the pancreas and **type 2 diabetes** can be the result. Sugar can also lead to **tooth decay**



# Vitamins and Minerals

Are **Micronutrients**. They are **chemical substances** that are found naturally occurring in foods. Vitamins and minerals **promote health and help prevent disease**. Each vitamin is given a chemical name and a letter. **Vitamins A, C and E are antioxidants** these prevent chemicals from air, water etc reacting with the oxygen in our bodies and creating free radicals which can be damaging to our bodies.

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## Eat your vitamins and minerals!

Vitamin/mineral	Other name	Good for	Deficiency causes	Daily intake	Get it from
A	Retinol	Eyesight, bone growth, reproduction, appetite and taste, regulating the immune system	Night-blindness	Men: 900 mcg (one millionth of a gram) Women: 700 mcg	Liver, cod liver oil, carrots, green leafy vegetables, egg yolks, enriched margarine, milk products, yellow fruits
B <sub>1</sub>	Thiamine	Nervous system, digestion, muscles, heart, alcohol-damaged nerve tissues	Tingling in fingers and toes, confusion, difficulties in maintaining balance, loss of appetite, exhaustion and weakened powers of concentration	Men: 1.2 mg Women: 1.1 mg	Liver, yeast, egg yolk, cereal, red meat, nuts, wheat germ
B <sub>2</sub>	Riboflavin	Growth, skin, nails, hair, eyesight, breakdown of protein, fat and carbohydrates	Itchy irritated eyes, itchy mucous membranes (nose, mouth, throat) and cracked corners of lips	Men: 1.3 mg Women: 1.1 mg	Milk, liver, yeast, cheese, green leafy vegetables, fish
B <sub>6</sub>	Pyridoxine	Preventing skin conditions, nerve problems, helping the body absorb protein and carbohydrates	Skin inflammation	1.3 mg (seniors and pregnant women should aim higher)	Fish, bananas, chicken, pork, whole grains, dried beans
B <sub>9</sub>	Folic Acid	Production of red blood cells, essential in first three months of pregnancy to prevent spina bifida, cleft palate or cleft lip	Tiredness due to anemia and red tongue	400 mcg (pregnant women should aim for 600 mcg)	Carrots, yeast, liver, egg, yolks, melon, apricots, pumpkin, avocado, beans, rye and whole wheat, green leafy vegetables
B <sub>12</sub>	Cobalamin	Making red blood and the formation of the nerves	Tiredness and fatigue, tingling and numbness in hands/feet, memory problems and anemia	2.4 mcg	Eggs, shellfish, poultry, meat, liver, milk, cheese, fortified cereal
C	Ascorbic acid	Immune defence system, protection from viruses and bacteria, healing wounds, reducing cholesterol, cell lifespan and preventing scurvy	Tiredness, bleeding gums and slow-healing wounds	Men: 90 mg Women: 75 mg	Citrus fruits, kiwi fruit, berries, tomatoes, cauliflower, potatoes, green leafy vegetables, peppers
D	None	Strong bones and teeth	Unhealthy teeth, weakening of bones, rickets in children	600 IU (international units)	Sunlight (our bodies manufacture vitamin D when sun contacts skin), cod liver oil, sardines, herring, salmon, tuna, milk, milk products
E	Tocopherol	Fighting toxins, protecting cells from damage, supporting immune function, DNA repair and metabolic processes	Weak muscles and fertility problems	15 mg	Nuts, soya beans, vegetable oil, broccoli, sprouts, spinach, whole meal products, eggs
Ca	Calcium	Strong bones and teeth, nerve function, muscle contraction, blood clotting	Poor teeth and brittle bones	1,000 mg	Milk, cheese, butter, yogurt, green leafy vegetables
Fe	Iron	Red blood cells and muscle function, white blood cells and the immune system	Tiredness, irritability, difficulties concentrating	Men: 8 mg Women: 18 mg (Vegetarians need double)	Lean red meat, oily fish, egg yolks, green leafy vegetables, nuts, whole grains, whole wheat
Mg	Magnesium	Converting energy from food, cell repair, building strong bones, teeth and muscles and regulating body temperature	Muscle spasms, and has been associated with heart disease, diabetes, high blood pressure and weak bones	Men 19-30: 400 mg; 31+: 420 mg Women 19-30: 310 mg; 31+: 320 mg	Green leafy vegetables, whole grains, nuts
Zn	Zinc	Immune system, the breakdown of protein, fat and carbohydrates	Lesions on skin, eyes and in throat, loss of taste and smell, hair loss, diarrhea, slow healing of wounds and growth problems in children	Men: 11 mg Women: 8 mg	Meat, shellfish, milk, brown rice, whole grains

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## Nutritional needs and health

As we age our nutritional needs change due to a number of reasons.

**YOUNG CHILDREN** – growth spurt – require more protein, calcium and vitamin D. Teething – calcium, fluoride and Vit D, developing immune system, fewer sugary sweets and drinks to prevent overweight and tooth decay.

**TEENAGERS** – Calcium and vitamin D for growth spurts and bones, iron to prevent anaemia, eat regularly for energy, fewer sweets and sugary drinks to prevent obesity.

**ADULTS AND THE ELDERLY** – more dietary fibre to prevent obesity, diabetes and cancers, more vitamin D and calcium for bones, fewer sugars snacks and drinks, elderly need less energy and energy dense foods, more iron to prevent anaemia and maintain healthy red blood cells, less salt add more water to reduce hypertension.

**When we plan a meal there are a large number of points to consider:**

**Portion size and costing when planning a meal.**

Eating the correct portion size ensures that individuals nutritional ad energy needs are met. Must stay within the family budget.

1. Physical Activity Level – the amount of energy needed to perform daily tasks.
2. Healthy eating – a balanced and varied diet.
3. Lifestyle – the way people live.
4. Food availability – the amount and variety of food available.
5. Seasonality – availability of foods.
6. Cost of food – the price of food products.
7. Income – disposable income is the amount of money a family can spend on rent and food.
8. Preferences – some prefer sweet or savoury.
9. Enjoyment – eat certain foods for enjoyment.
10. Time available to prepare food – busy
11. Time of day – breakfast, lunch and dinner.
12. Celebration – plays an important part for special

## FURTHER CONSIDERATIONS

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## Diet concerns

1. **Hypertension**— condition in which blood pressure is too high. Due to obesity, smoking .
2. **Iron deficiency anaemia** —condition caused by a lack of iron in the diet.
3. **Obesity** —Condition in which fat is stored by the body in large amounts.
4. **Coronary heart disease** — condition in which blood vessels in the heart are narrowed by cholesterol plaque build —up.
5. **Type 2 diabetes** — chronic condition in which blood sugar levels are abnormally high.
6. **Skeletal disorders** — group of diseases of the skeletal system caused by a deficiency of micronutrients.
7. **Energy** —is the number of calories you need to consumer every day to maintain function and body mass.
8. **Energy needs** —depend on sex, age, height, weight, occupation, lifestyle, body composition.

BMR —basal metabolic rate.

PAL —physical activity level

BMR x PAL = total energy expenditure (TEE)

BMI —body mass index.

## Religion

1. Rastafarians —eat i-tal (clean, natural and pure), coconut oil, herbal tea, fruit and veg. Don't eat pork, salt, milk coffee, alcohol.
2. Buddhists — eat a vegetarian diet, don't eat meat and alcohol.
3. Muslims —eat halal food only, don't eat pork, alcohol, fish and shellfish, without scales.
4. Jews —eat kosher food, don't eat shellfish, pork, meat with diary.
5. Hindus —eat milk, main vegetarian, don't eat beef and alcohol.
6. Sikhs —eat a vegetarian diet,, don't eat alcohol, kosher, halal, beef.
7. Christians —eat generally everything, don't eat meat on a Friday.

## Ethical beliefs

May be based on – animals suffering, how food is made or how food production affects the environment.

1. Fair-trade – global movement focused on ensuring fair working conditions, prices and wages to farmers and workers in developing countries.
2. Animal welfare – Movement focused on ensuring the well-being of animals and humane conditions for rearing animals.
3. Organic foods - Plants and animals are grown and reared in the most natural way possible.
4. GM foods – Plants or animals in which DNA has been altered.
5. Local produce —local food fresher, tastier, cheaper, fewer food miles and lower carbon emissions.
6. Food miles —Distance from a farm to the plate.
7. Carbon footprint – amount of carbon dioxide and other greenhouse gases emitted during the production of the food.
8. Greenhouse gases - carbon dioxide, water vapour, nitrous oxide, ozone .

## Medical Conditions

1. Food intolerances —reaction of the digestive tract to a food ingredient.
2. Most common intolerances – lactose, gluten (in wheat, barley, rye and oats)
3. Symptoms and diet —cause bloating, stomach cramps or diarrhoea.
4. Food allergy —reaction of the immune system to a food ingredient.
5. Most common allergens —nuts, eggs, milk, wheat, fish and shellfish.
6. Symptoms and diet —can cause a severe, life threatening reaction.
7. Anaphylactic shock – must avoid the food.



## Why do we cook food?

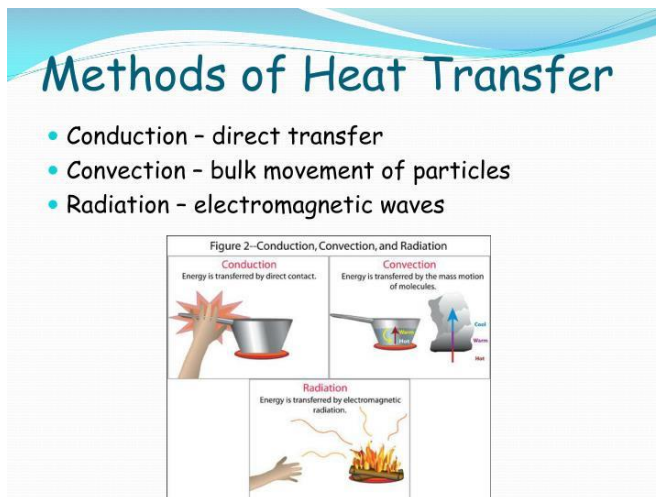
1. **Making it safe** – heat kills bacteria, inactivates harmful enzymes and toxins.
2. **To develop flavours** – water evaporation, adding sugar – caramelisation and other reactions add flavour.
3. **To improve texture** – makes food easier to eat.
4. **To improve shelf life** – cooking kills microorganisms which could spoil the food.
5. **To increase variety** – one product may be cooked in many different ways.

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## How does cooking affect food?

1. Appearance – meats shrink, cakes rise, eggs become solid, sauces thicken, rice and pasta increase in size.
2. Colour- Foods become golden or brown, red and green vegetable may lose colour.
3. Flavour– ay become sweeter, more pronounced, rich.
4. Texture– eggs set, vegetables and meats soften, chips become crunchy, bread becomes crispy, custard becomes creamy, sauces thicken.
5. Smell –is more pronounced because essential oils fill the air and are more easily detected by the olfactory system.
6. Maillard reaction –high temperatures, sugar and protein react with each other producing brown compounds what affect the colour, taste and smell of food. E.g.. Browning of onions

## Heat transfer



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## Cooking Methods

### Oil based cooking methods

1. Deep fat frying –foods become golden and crunchy, but their nutritional value is poor. (loss of vitamins, high fat content)
2. Shallow frying –seals the surface of food and helps to obtain crunchy top and juicy interior.
3. Stir frying –low fat. Helps to preserve nutritional value of food.

### Water based cooking methods

1. Steaming – Helps preserve nutritional value of food. Low in fat.
2. Boiling – May cause vitamin loss. Low in fat.
3. Simmering- long time required. Causes vitamin loss.
4. Blanching –prevents enzymic browning and oxidation, preserves nutritional value.
5. Poaching –ideal for preparing delicate ingredients.
6. Braising – long time required. Causes vitamin loss.

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### Dry cooking methods

1. Baking –long time required. Causes vitamin loss. Palatability is improved (cakes and other baked goods become sponge like and often have crispy top).
2. Roasting -Helps to reduce amount of fat in food. Long time required. Decreases vitamin content. Helps to obtain a crispy skin or surface.
3. Grilling –may create harmful substances. Usually low in fat. 4. Dry-frying –Reduces amount of fat n food. Nutritional value is preserved.

## Sensory evaluation

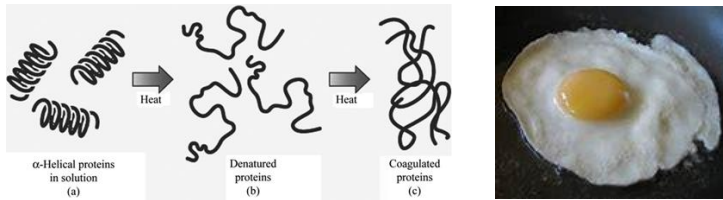
1. Smell –Olfactory system responds to aroma stimuli and sends information to the brain.
2. Touch –helpful in judging the texture, consistency and mouthfeel of the food.
3. Eyesight –important when presenting food, more appetising, colourful, neat and decorated.
4. Hearing –crunchiness and crispiness indicates its freshness.
5. Taste –taste buds located on the tongue. 5 tastes –sweet, sour, salty, bitter and umami

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## Protein

- Denaturation** –damage of the protein’s structure caused by:
  - Heat – during cooking, proteins vibrate resulting in hydrogen bonds being broken.
  - Acid –hydrogen atoms from the acid bind with nitrogen from the protein, preventing it from forming hydrogen bonds within protein molecules, and so it cannot form a 3D structure.
  - Mechanical action – during whisking, protein uncoils and exposes hydrophobic areas, which stick together and form a foam.

**2. Coagulation** –aggregation (heating) of protein particles into larger lumps, causing it to set. Eg setting of egg.



**3. Syneresis** –leakage of water from overcooked (over-coagulated) proteins. Usually associated with eggs.

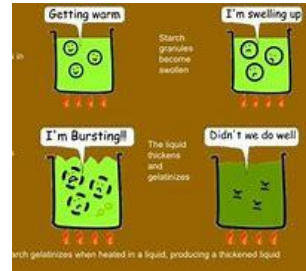
**4. Gluten formation** –complex, net-like protein built of glutenin and gliadin. Proteins from wheat, rye, barley and oats. Net traps and hold air bubbles during proving and baking. Glutenin+gliadin+water= gluten net, soft springy texture.

**5. Foam formation** –air bubbles trapped in a liquid (e.g. egg white). Whisking makes proteins unravel and denature.



## Carbohydrate

- Gelatinisation** –happens when starch granules absorb water, swell and break during heating, causing mixture to thicken and form a gel when cooled. Starch+water+heat= gelatinisation



- Dextrinisation** –happens when starch chains break down into shorter chains of dextrin's, during the process, molecules of water evaporate and carbon is left to give brown colour, occurs during baking and tasting bread and other baked goods. Starch+heat=dextrinisation

- Caramelisation** –happens when sugar is heated to a very high temp, causing it to liquidise and form a thick, brown syrup, during the process, water evaporates and carbon is left to create a brown or black colour, occurs during roasting of vegetables, making caramel and fudge etc. Sugar+heat=caramelisation

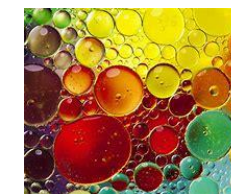
**ENZYMIC BROWNING** –discolouration of fruits and vegetables as a result of oxygen reacting with enzymes and plant cell substances.

Slow down –lower temp, adding heat and acid, removing the oxygen.

Oxidation –substances react with oxygen changing the appearance, smell and nutritional value of food.

## Fats and Oils

- Shortening** –when fat particles surround starch to produce a waterproof layer. Prevents gluten formation.
- Aeration** –trapping air bubbles in a fat mixture, e.g. cream or butter, to improve its texture.
- Plasticity** –ability of fat to be easily spreadable and melt at various temperatures. Depends on the length of the fatty acid chain.
- Melting point** - temp when fat turns to oil.
- Emulsion** –stable mixture of oil and water. Water-in-oil emulsion –butter Oil-in-water emulsion -milk. Emulsifiers-used bind together molecules into a stable emulsion. E.g. lecithin from egg yolk used to make mayonnaise.



## Raising Agents

- MECHANICAL** –methods of trapping air bubbles to mixtures or between layers. Whisking, beating, folding, rubbing-in, sieving, creaming.
- BIOLOGICAL** –yeast is a single-celled fungus used in the production of baked goods, cheese, wine and beer. YEAST+SUGAR+WARMTH+LIQUID- CARBON DIOXIDE+ALCOHOL/ACID.
- CHEMICAL** –bicarbonate of soda and baking powder. CO<sub>2</sub> bubbles form and cause the batter to rise, while proteins set and structure becomes stable.

## FOOD SAFETY

### Food spoilage and contamination

Food spoilage may be caused by many various microorganisms – bacteria, yeast and moulds – as well as by enzymes naturally present in the food products.

## Microorganisms

Tiny organisms visible only under a microscope e.g. bacteria, yeast and mould. To grow and multiply they need:

1. Warmth – ideally a temperature between 5°C and 63°C.
2. Water – microorganisms grow better in moist conditions.
3. Food – ideally protein, but sometimes also sugar.
4. Time – the longer the time, the more time microorganisms have to multiply.

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**DANGER ZONE – 5°C – 63°C.** Bacteria growth above and below these temperatures is slower.

Growth controlled – by storing food in proper conditions, freezing and refrigerating food, cooking food before eating, not refreezing food once it has been defrosted.

## Enzymes

Enzymes - Biologically active protein-based molecules. Catalysts – speed up the rate of chemical reactions. Enzymes are necessary for fruit to ripen. Enzymic browning – darkening of fruit and vegetables caused by enzymes and should be avoided to preserve nutritional value of food.

Browning can be stopped by:

- a) Blanching – food put into boiling water then immediately plunged into cold water or ice.
- b) Use of acids – use of lemon juice or vinegar. Acid denatures and deactivates enzymes, because they are built of protein

## Key Terms

1. **Shelf life** – period of time during which food can be safely stored and eaten.
2. **Food poisoning** – illness caused by eating contaminated food or drinking contaminated water.
3. **First in, first out** – Rule which says that the oldest foods should be eaten first.
4. **Vacuum packing** – Packaging food in airtight foil bags to remove oxygen and prevent spoilage.
5. **Food covering** – prevents from light, air, oxygen and dust, protects from pests and rodents, tainting.
6. **Perishable foods** – have a fairly short shelf life and need to be stored in the fridge. Raw and cooked meat, especially minced, raw and cooked poultry, raw and cooked fish and shellfish, milk and dairy, eggs, vegetables and fruit.
7. **Insulated cold bag** – used to transport high-risk foods and maintain their low temperature.
8. **Best before** – applied to food quality (look, flavour and colour) and it's relatively safe to eat the food after that date: it is used on dry, frozen or tinned foods and eggs.
9. **Use by** – applies to food safety so it might be harmful to eat a food after that date: used on fresh foods such as milk and dairy.
10. **Ambient storage** – storing at room temperature usually around 20°C.
11. **British Lion Scheme** – food safety mark which guarantees that eggs are produced in the UK and that all the hens have been vaccinated against salmonella

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## Cross-contamination

**Is when bacteria, toxins or food particles are transferred to a food product.**

Caused by: • Waste food and rubbish • Pests and rodents • The cooks hand • Work surfaces and equipment • Other contaminated foods, including high-risk foods.

## Food Allergies

Anaphylactic shock – is a life-threatening reaction of the immune system to an allergen. Most common allergens – nuts, fish and seafood, milk and eggs.

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## Food Poisoning

**Food poisoning – is a disease caused by eating spoiled or contaminated food. Such food may contain certain microorganisms, toxins or enzymes.**

**Pathogenic bacteria** – microorganisms which cause disease.

**Carrier** – a person who carries a pathogen but shows no symptoms of a disease.

TYPES

**Campylobacter** – raw poultry and unpasteurised milk.

**E. Coli** – undercooked beef, unwashed vegetables, dirty hands.

**Salmonella** – raw eggs, meat and poultry, unpasteurised milk.

**Listeria** – ready-to-eat foods, unpasteurised milk, dirty hands.

**Staphylococcus aureus** – salads, ham, eggs, tuna, poultry, cream, hands of an infected person

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## Use in food production

### BACTERIA

1. **FOOD SPOILAGE** –Clostridium botulinum produces a toxin which causes meat bulge. Most bacteria do not cause visible signs of spoilage.
2. **USE IN FOOD MANUFACTURING** – cheese used a starter culture LACTOBACILLUS to give a balanced aroma taste and texture. Yoghurts – starter culture, probiotics – health benefits.
3. **WHY DOES THIS WORK?** Bacteria ferment lactose from milk into lactic acid, giving food a sour taste and coagulates the protein. Causes yoghurt to become thicker.

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### YEAST

1. **FOOD SPOILAGE** ferments sugar in juices and beverages, making them sour, fizzy and foamy.
2. **USE IN FOOD MANUFACTURING** Bread, doughnuts and other baked goods use yeast to help them rise.
3. **WHY DOES THIS WORK?** Yeast ferments sugar in foods and produces carbon dioxide to help it rise. It also creates fizz in some alcoholic drinks.

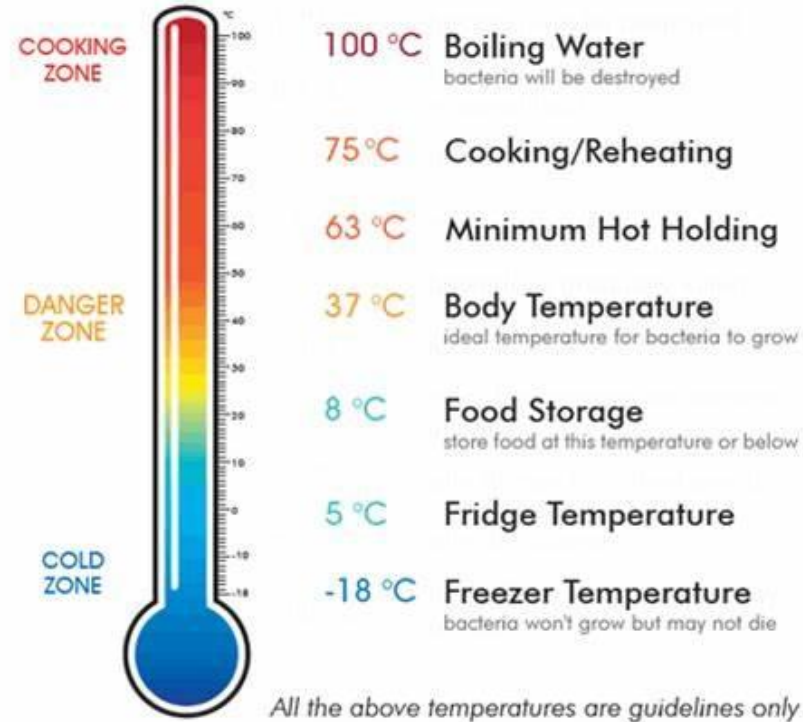
### MOULD

1. **FOOD SPOILAGE** Creates a green, white or black coating on food products such as bread, grapes, tomatoes and jams.
2. **USE IN FOOD MANUFACTURING** Blue cheeses, such as Stilton, have a mould called Penicillium added to give them a distinctive texture, taste and aroma.
3. **WHY DOES THIS WORK?** Mould breaks down polysaccharides into shorter chains, which changes the taste of the food.

### ENZYMES

1. **FOOD SPOILAGE** Turn bananas, apples, potatoes and other foods brown.
2. **USE IN FOOD MANUFACTURING** Rennet is an enzyme used in cheese production to coagulate milk.
3. **WHY DOES THIS WORK?** Enzymes react with oxygen and turn yellow pigments in food into brown melanin

## Principles of food safety



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## Be safe

### PERSONAL HYGIENE

- Always wash hands before and after cooking and dry with disposable paper towels.
- Avoid touching your face or hair
- Tie your hair back and cover with a hairnet.
- Avoid cooking when your ill.
- Change clothes and use an apron.
- Cover any wounds with a waterproof plaster.
- Do not wear rings or other jewellery when cooking.

### SEPARATE FOODS

- Separate raw and cooked foods both when preparing and storing food.
- Cover prepared food and store in closed containers.
- Use dedicated, colour-coded utensils.
- Wash dishes straightway in hot water to avoid pests and cross-contamination.

### WORK SURFACES

- Clean thoroughly after dealing with high-risk foods.
- Use soapy hot water or antibacterial spray to clean any spills.
- Use a clean kitchen towel or disposable paper towels.

### TEMPERATURE CONTROL

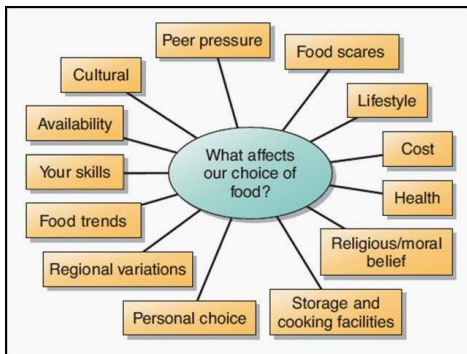
- Make sure the temperature inside food reaches 75°C both when cooking and reheating.
- Make sure the temperature of served food is above 63°C.
- Do not put hot food straight into the fridge – let it cool for 90 minutes.
- Ensure correct cooking time to avoid cold spots.
- Defrost thoroughly to avoid cold spots

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## FOOD CHOICE

### Factors affecting food choice



### Target Market

**A target market is a set of consumers a product is aimed at** e.g. teenager, OAP, vegetarian, luxury

Food labels give consumers a wide range of information. Some is mandatory (required by law) some is not.

Slogans, adverts, colour, phrases are all carefully chosen to influence our food choice

Nutrition should be a key consideration when choosing food

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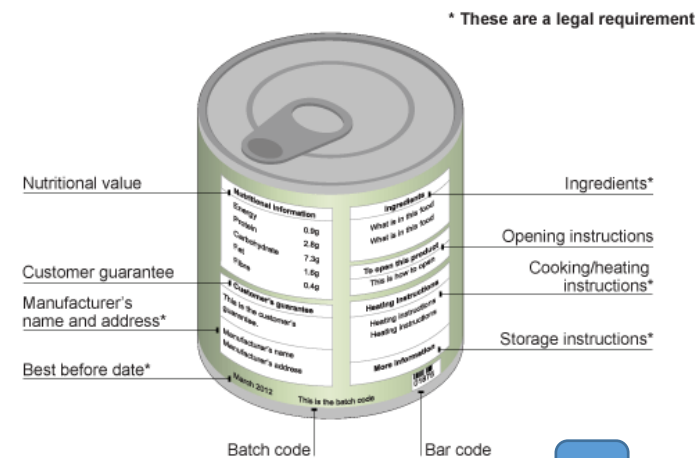
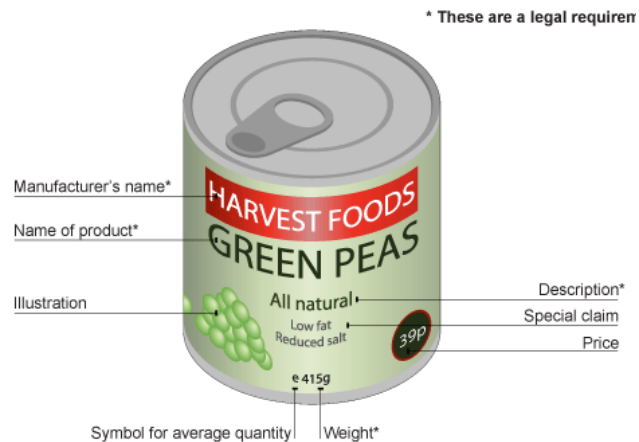
Each grilled burger (94g) contains

Energy	Fat	Saturates	Sugars	Salt
924kJ 220 kcal	13g	5.9g	0.8g	0.7g
11%	19%	30%	<1%	12%

of an adult's reference intake

Typical values (as sold) per 100g: Energy 966kJ / 230kca

## Food Labelling



Y

## British and international cuisines

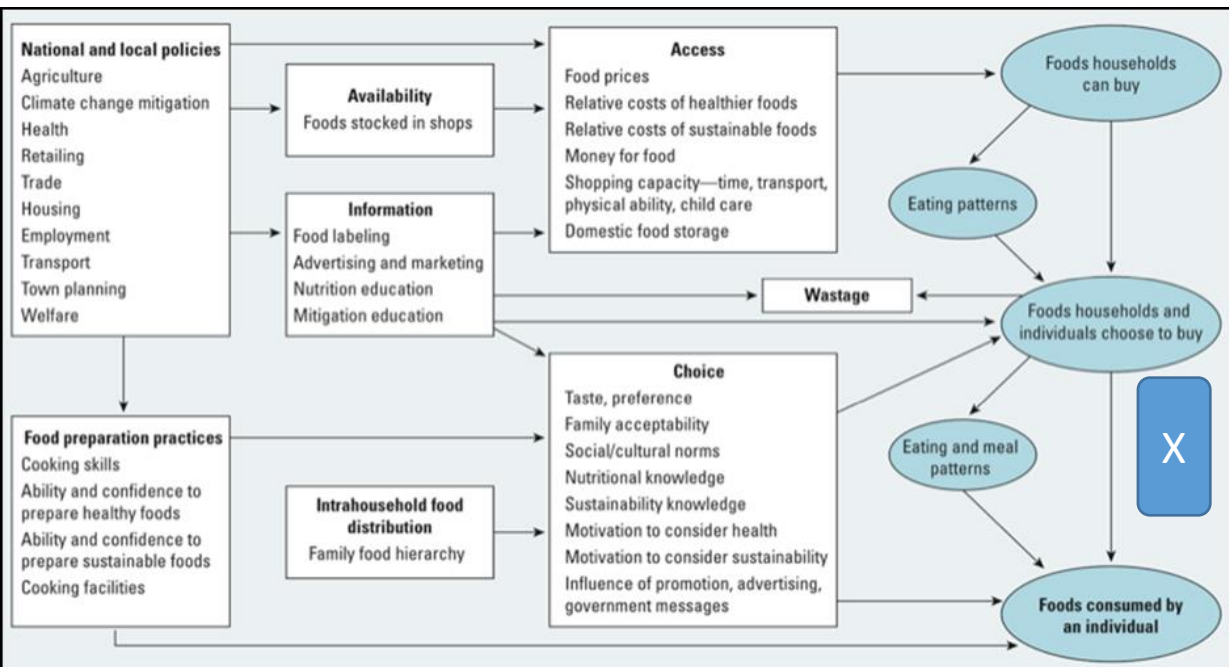
### British Foods

1. England - Cornish pasty, Yorkshire pudding, fish and chips, English breakfast, sandwiches, roast dinner, beer and cider.
2. Wales – Cawl/ broth, welsh rarebit, Glamorgan sausage, welsh cakes, bara brith, laver bread.
3. Northern Ireland – colcannon, soda bread, black pudding, Irish stew, oatmeal, Irish cream, whiskey and beer.
4. Scotland – porridge, scotch broth, Dunlop cheese, kippers, haggis, scotch pie, oat cakes

### International Cuisine

1. Mediterranean cuisine –olives and olive oil, grapes, wine, fish, seafood, tomatoes, aubergines, courgettes.
2. Chinese – noodle, rice, pork, duck, chicken, Chinese cabbage, water chestnuts, bamboo shoots, mushrooms, bean sprouts, soy sauce
3. Japanese – rice, soya, fish, seafood, noodles, seaweed, eggs, seasonal foods, green tea, wasabi.
4. India –rice, lentils, chickpeas, beans, coconut milk, ghee butter, paneer cheese.

Z



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## FOOD PROVENANCE

### Environmental impact and sustainability

## Food sources

Where and how food is made depends on climate, soil quality, availability of water, resources, availability of land, size of population. Religion, ethical beliefs. Food can be:

1. Grown— orchards, fields, polytunnels.
2. Reared— sheds, barns, fish farms
3. Gathered— in forests, near the roads
4. Caught — open spaces and forests oceans and seas.

a

## Farming Types

1. **Organic farming** – • No chemicals • Little or no use of pesticides • No artificial fertilisers • No herbicides • No GM feed or seeds • Antibiotics are only used when necessary • Crop rotation may be applied to preserve soil quality • Animal welfare standards are kept.
2. **Intensive farming** – • Chemicals such as pesticides, herbicides and artificial fertilisers are used to prevent crop failure. • Antibiotics are used to prevent diseases in livestock, not to cure them. • GM feed and seeds are used to obtain high – yield crops. • Animal welfare standards are often violated

b

## Genetic Modification

Plant cells contain DNA. DNA built of tiny genes which encode all information about an organism. Cell-nucleus-chromosome-DNA-gene. Modern technologies – allow people to manipulate the DNA code. • cut out unwanted genes to avoid disease. • Modify the sequence of genes. • Paste new genes to add new features  
Genetically modified – when the DNA has been changed.

c

## Fishing Types

1. Sustainable fishing –fishing in natural fisheries limited to certain period of time. Giving the shoal time to reproduce and restore itself. Policy set by the Marine Stewardship Council.
2. Fish farms  
Advantages –protect the natural ecosystems, prevent overexploitation of fisheries, keep animal welfare standards, protect wild species diversity. Prevent by catch.  
By catch –accidental catch of a sea organism which wasn't the primary goal of the fishing.

d

Disadvantages –fish tanks often overcrowded, fed low-quality feed affecting their flavour and nutritional value, might be fed antibiotics, increasing risk of antibiotic resistance.

### Methods of fishing

Purse seining –use large nets to trap fish.  
Longlining– use longline, fish attach to a hook on the line  
Bottom trawling – pulling a large net along the sea bottom.



## Points to consider - food production

1. Danger of carbon dioxide –production creates carbon dioxide. This creates a layer around the earth which reflects warmth back onto the earth. Average temp rises.
2. Carbon footprint – amount of CO2 and greenhouse gases emitted into the environment. By input, processing and output.
3. Global warming – rise in average temperature on earth due to extravagant release of greenhouse gases. CO2 layer –heat cannot escape –rise in temp –glaciers melt-fierce hurricanes, rainfall-crop failure –food shortage.
4. Greenhouse gases – vapour, CO2, nitrous oxide, methane, ozone, CFC's, absorb infrared radiation and trap heat.
5. Food miles –distance from the field to the plate.
6. Food production –direct and indirect effect on the environment by creating various pollutants and by causing deforestation.
7. Packaging –using fossil fuels to produce, tonnes thrown away, unrecycled creates pollution, animals, birds and fish swallow debris and die, some never decompose.
8. Fairtrade– foundation and ethical movement focused on supporting farmers and sustainability of food. Fair wages and prices, improved working condition, empowers local communities, education for all.
9. Food availability – climate change affects food availability. Droughts, flood causes crop failure. Therefore no plants to eat and no food for animals.
10. Food security – when all people, at any time, have access to nutritious, healthy food in sufficient amount.
11. Seasonal foods – foods which are characteristic of a given season when they ripen and are harvested.

e

Spring – sprouts, kale, lettuce, spring onion, radish

Summer – peas, berries, courgettes, cucumbers, apricots, cherries

Autumn – apples, pears, plums, aubergine, pumpkin, celery

Winter – potatoes, carrots, parsnips, beetroots, Brussel sprouts, onion.

Advantages –reduce food miles and carbon footprint, cheaper, higher in nutrients and tastier.

12. Food waste – due to buying or cooking too much, not eating before it goes off. Effect – waste of money, pollution, carbon footprint increased. Prevention – planning, only cook what's needed, store leftovers, prevent spoilage, make compost from left overs.

## Processing and Production

### Primary Processing

Primary source – foods in their natural, raw state e.g. milk, wheat grains, apples.

f

**Primary processing of food – doesn't significantly affect the natural values of food products.** Sorting, trimming, discarding, washing, wrapping, draining, trussing, cutting, heat treatment, milling, deboning, skinning, deseeding.

#### FOR EXAMPLE

Making of flour – harvesting and transport to mill, separating from dirt etc, washing and drying, milling, sieving. Removal of bran. Bran – the outer layer of a grain.  
Heat treatment of milk. • Pasteurisation – 72°C for 15 sec to kill pathogenic bacteria. • Ultra-heat-treatment – heated 135°C for 1-2 seconds, kill bacteria. • Microfiltration – milk pushed through very fine membranes. • Sterilisation – heated to 110°C for 30 mins. Nutrients + flavour affected. • Drying – condensed, then dried, fall in B vitamin levels.

### Secondary Processing

Secondary source – goods that have been changed e.g. yoghurt, flour, jam

g

**Secondary processing of food – affects natural features to obtain new food products. Smoking, irradiation, adding additives, fermentation, cooking/heating, drying and freeze-drying.**

#### FOR EXAMPLE

The making of pasta – harvesting, milling, mixing, kneading, add flavourings and colourings, rolling, pasteurisation, cut into shapes, drying, packaging  
Jam – harvesting, washing, crushing, adding water and sugar, simmering, pouring into jars.  
The making of yoghurt – milk cows, transporting, pasteurisation and homogenisation, warming to 42°C, add starter culture, fermentation (ripening), cooling, add flavourings, packaging. Starter cultures – probiotic bacteria begin the fermentation process. Fermentation – changing lactose into lactic acid by adding bacteria. Change in PH leads to coagulation and thickens mix.  
Making of cheese – milking, transportation, pasteurisation, homogenisation, add starter culture, fermentation, add rennet, cutting curd, pressing, add salt, pressing, ageing. Rennet – enzyme which coagulates milk and increases curdling. Whey: liquid by-product of cheese production.

### Fortification

During processing many food products lose their nutritional value.

The main function of food fortification is to:

- Restore the nutritional value of foods
- Improve the nutritional value of foods
- Make food more suitable for certain groups of consumers
- Prevent diseases caused by malnutrition.

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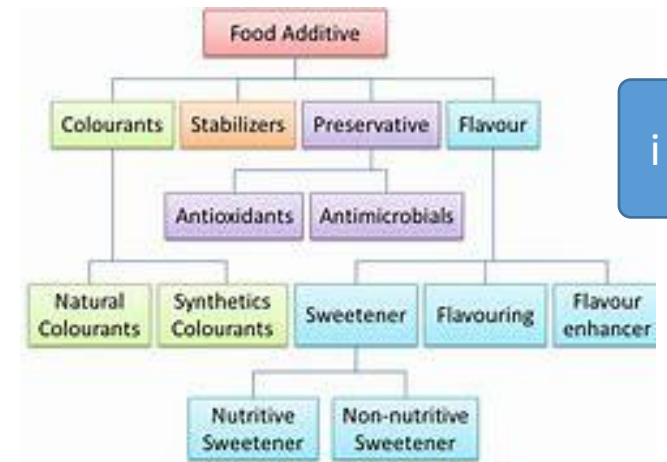
Fortification required by law:

Wheat flour and bread – Thiamine – prevent beri beri, help release energy from food. Niacin to prevent pellagra, calcium to prevent rickets and osteoporosis, iron to prevent iron deficiency and anaemia.

Vegetable fat spreads. VitA – prevent growth and eyesight issues e.g. Night blindness, VitD – prevent rickets and osteoporosis. Semi-skimmed and skimmed milk. VitA – prevent growth and eyesight issues e.g. night blindness.

### Additives

**These are natural or synthetic (man made) chemical substitutes added to food during manufacturing**



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Food additives

Additive	Examples	Food	Benefit	Health hazard
Antioxidants	Ascorbic acid (vitamin C)	Fruit, meat	Stop food reacting with O <sub>2</sub> (which spoil taste, change color)	
Colourings			Improve appearance of food	
	Sunset yellow	Drinks, sweets	Give yellow/orange colour	-cause hyperactivity in children -trigger asthma
	Caramel	Sweet, drinks, soups	Give brown color	
Flavouring	Monosodium glutamate	Processed food, Chinese food	Enhance taste of food	
	vanillin	Desert, chocolate	Give vanilla taste	
Preservatives			Give food longer life	
	Sulfur dioxide	Fruit juice, dried fruit	-Kill bacteria -Preserve vitamin C	Destroy vitamin B <sub>1</sub>
	Sodium nitrate	Meat products (sausages)	Stops growth of harmful bacteria	May cause cancer
Emulsifier	Lecithin	Powdered milk	Stop oil and H <sub>2</sub> O separating out into different layers	