

GCSE Food Preparation & Nutrition *Wheat- Bread*

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

Food Science

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

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

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

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

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

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

Functions of Bread ingredients



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



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



Salt: Structure: helps with gluten formation
Taste: a small amount improves the flavour of the bread.

Too much: will prevent the yeast from fermenting



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

Nutritional Value of Bread:

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

Other ingredients in bread making

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

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

Taste: Enhances the flavour.

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

Other ingredients in bread making

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

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

Taste: Sugar adds sweetness to the bread.

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

Additional learning and challenge activities

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

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Cereals - Wheat



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

Food Science

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

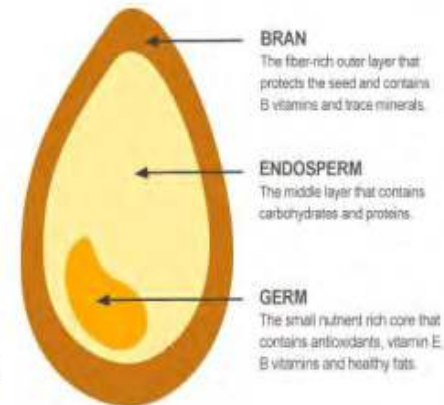
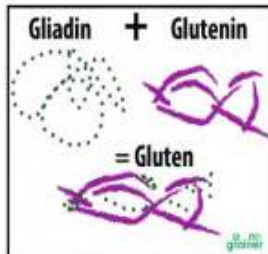
Some food products require more gluten development for **strength and structure** such as in the making of bread, also in puff, flaky and choux pastry. Softer flour should be used in cakes, batters and muffins where gluten development is to be avoided, as strong flours will result in an undesirable tougher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

Effect of heat:

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

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

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



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

Types of flour produced from wheat:

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

Nutritional Value of Wheat:

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

Processed wheat grain products:

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

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

Semolina: Mainly used for making pasta.

Couscous: made from semolina grains

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

Additional learning and challenge activities

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

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Pasta

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

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

Key terms

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

Durum wheat – high protein wheat used to make pasta.

Laminating – rolling out pasta into thin sheets.

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

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

Food Science

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

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

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

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

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

Colouring Pasta:

Spinach: Verdi – Green

Tomato puree: Pomodori - Red

Beetroot: Barbabietola rossa – Purple

Squid ink: Nero - Black

Why is some pasta unsuitable for coeliacs?



Nutritional Value of Pasta:

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



Storage

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

Additional learning and challenge activities

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

Cereals

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



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

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



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



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



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

Other grains:

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

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

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

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

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



Key words

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

Additional learning and challenge activities

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

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Milk, Cheese and Yoghurt

MILK

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

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

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

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

Protein - HBV
 Fat - Saturated
 Carbohydrate - simple - lactose - sugar in milk
 Minerals - calcium, phosphorus, potassium and iron
 Vitamins - A, D and B some C
 Water - high volume content.

Storage
 Perishable - refrigerated and away from strong smelling foods.

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

CHEESE

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

Protein - HBV
 Fat - Saturated. High content depending on milk used
 Minerals - calcium, phosphorus, sodium
 Vitamins - A, D and B some C

Uses: flavour, colour, texture and increased nutritional value

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

YOGHURT

Protein - HBV
 Fat - Saturated.
 High content depending on milk used
 Minerals - calcium, phosphorus, sodium
 Vitamins - A, D and B some C

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

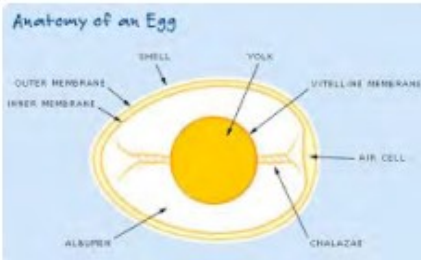
Yoghurt is made from different types of milk. Some yoghurts contain other ingredienmts to flavour them sich as sugar and fruit.
 Set yogjhurt - firm texture - set in pot it is served in
 Love yoghurt - fermented with live culture bacteria - still living
 Jgreek (strained) yoghurt - cows or ewes milk- thick and high in fayt.

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

EGGS

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

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



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

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

Egg Nutrition



Cooked by:
boiling,
frying,
poaching,
scrambling

Yolk

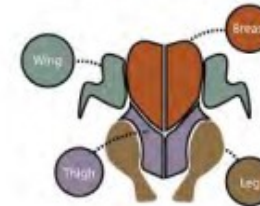
Fat 4.5 g
Sat. Fat 1.6 g
Cholesterol 184 mg
Carbohydrates 0.5 g
Protein 2.5 g

White

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

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

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



POULTRY

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

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

Poultry = muscle + connective tissue.

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

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

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

GCSE Food Preparation & Nutrition
Butters, Oils, Sugars and Syrup

Butters

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

Uses:

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

Nutrients:

High in fat
Vitamins A and D
Sodium - salt

Storage:

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

Oils

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

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

Margarine

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

Uses:

Block margarine is used for baking. Soft margarine is used for baking and frying and for spreading when making sandwiches. Some soft margarines have a very low fat content so no suitable for making cakes, pastries and biscuits. High in fat. Provide vitamins A and D, water and minerals such as sodium (salt).

Sugars

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

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

Syrups

Golden syrup is the most familiar
Bought in various forms - jar - can- squeezey bottle. Very sweet.
Black treacle is also a syrup, much darker in colour and thicker with a stronger flavour
Black treacle is used for making christmas cake, gingerbread and some curry sauces.
Best stored in cool, dry places and used within three months of opening



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

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

Macronutrients

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

Protein:

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

Source

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

Function

Growth
Repair
maintenance



Not enough

Kwashiorkor
Oedema
Anaemia
Slow growth in children

Too much

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

Dietary Reference Values

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

Complementary actions

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

Fats, oils and lipids:

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

Source

Saturated Fats

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



Unsaturated Fats

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



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



Function

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

Dietary Reference Values

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

Too much

Obesity
Heart disease
Type 2 diabetes
Stroke
Cancer

Not enough

Vitamin deficiency (fat soluble)
Unprotected organs

Carbohydrates

There are 2 kinds, simple or complex.



Source

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

Function

Simple

Quick burst of energy

Complex

Longer lasting energy

Free sugars

These give you no nutritional benefit other than energy.



Not enough

Can make blood sugar level drop

- hunger,
- dizziness,
- Tiredness
- Lack of energy

Our body will use protein for energy (leads to loss of muscle)

Too much

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

Dietary advice

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

Micronutrients

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

Vitamins

They all have different functions, but generally

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

Fat soluble vitamins: vitamin A, and vitamin D

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

Water soluble vitamins: vitamin C

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

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

Minerals

Minerals help chemical reactions in our body.

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

Water

Keeps us hydrated.

Source

Drinks, fruit and vegetables, soup.

Function

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

Deficiency

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

Trace Elements

Trace elements help chemical reactions in our body.

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

Fibre

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

Insoluble fibre

Source

Wholegrain, whole wheat and wholemeal cereals

Function

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

Deficiency

Constipation, bowel cancer

Soluble Fibre

Source

Peas, beans, lentils, apples and citrus fruit

Function

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

RDA

30g per day

GCSE FOOD PREPARATION AND NUTRITION: The Eatwell guide and healthy eating guidelines

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



4. Eat less saturated fat and sugar

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

How?

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

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

How?

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

5. Eat less salt

Eat no more than 5g a day.

Too much salt causes high blood pressure, strokes and dehydration

It is highly addictive!

How?

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

2. Eat lots of fruit and veg

We should eat at least five a day.

How?

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

Add vegetables to meals

Add vegetables or fruit to cakes and desserts

3. Eat more fish

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

How?

Aim for at least two portions of fish a week

1. Base your meals on starchy food

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

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

Whole grain and whole wheat versions are best

How?

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

We also follow the 8 government healthy eating guidelines:

6. Get active

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

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

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

How?

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

8. Eat breakfast

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

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

7. Drink plenty of water

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

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

How?

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

GCSE FOOD PREPARATION AND NUTRITION: Food science

Why food is cooked:

1. To make it safe to eat
2. To improve the shelf life
3. To develop flavour
4. To improve texture
5. To give variety

Methods of heat transfer

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

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

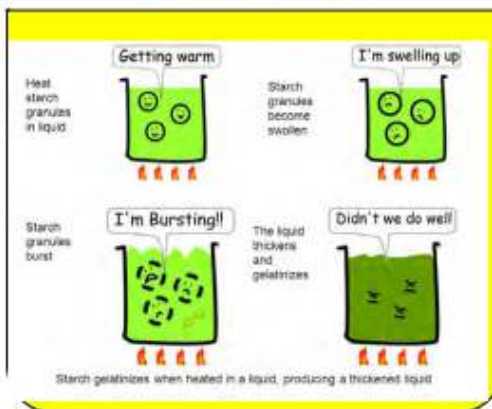
Conduction - when heat is transferred directly.

- e.g. - frying an egg

Radiation - when heat radiates

- e.g. - toast

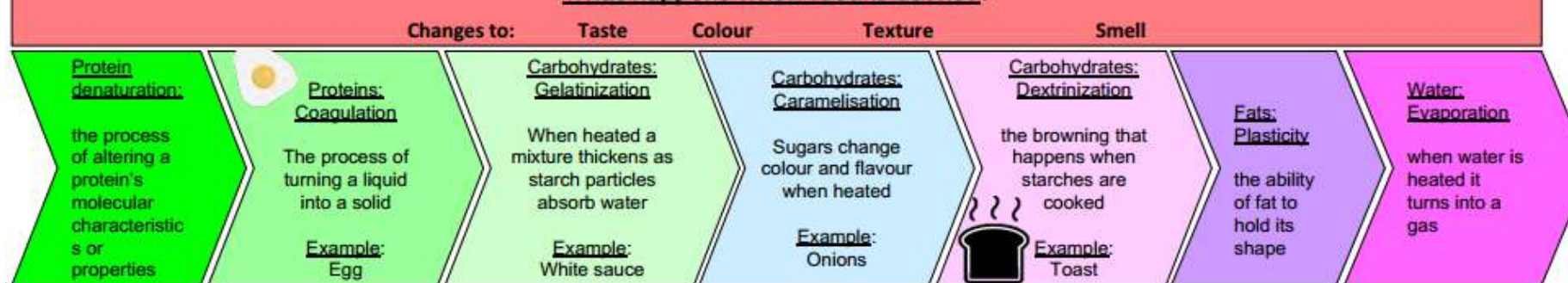
Gelatinization



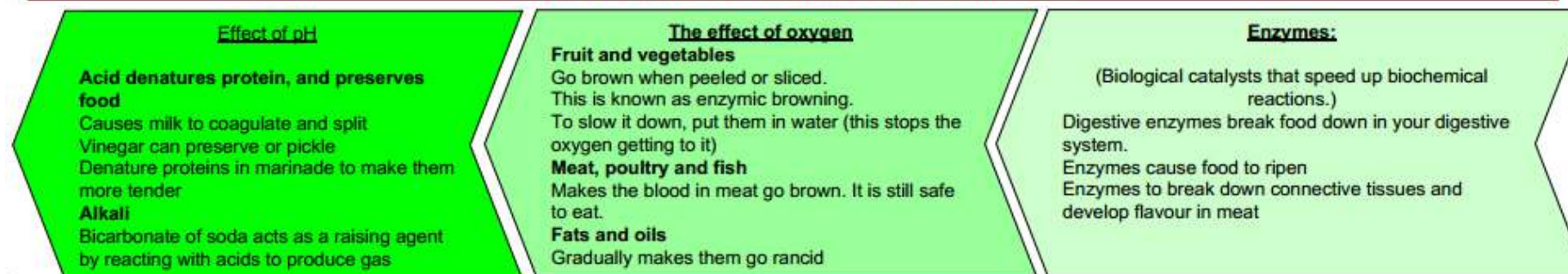
Why do things go wrong?

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

What happens when food is cooked:

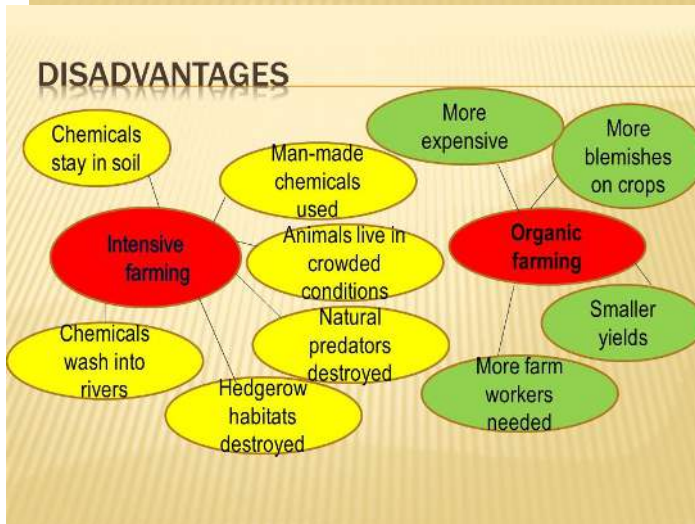
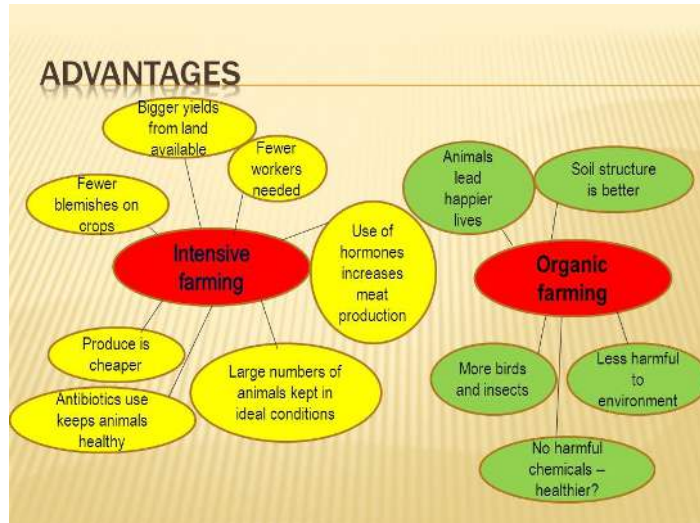


Effect of pH, Oxygen and Enzymes of Food:



GCSE FOOD PREPARATION AND NUTRITION: Farming methods:

Intensive farming VS Organic



What is organic farming?

NO CROP SPRAYING **NO GROWTH HORMONES**

Natural Pest Control
Crop Rotation
Animal Welfare
Natural Fertilizers

NATURAL FOOD

Cultivating plants and rearing animals in natural ways



Intensive farming provides high crop yield at a low cost, but is susceptible to poor hygiene and diseases.

GM is a technology that involves inserting DNA into the genome of an organism. To produce a GM plant, new DNA is transferred into plant cells. Usually, the cells are then grown in tissue culture where they develop into plants. The seeds produced by these plants will inherit the new DNA.



PROS:

- Less Pesticides used
- More Nutritious Foods
- Increased Food Supply
- Drought Tolerance
- Longer Shelf Life
- Disease Fighting Foods

CONS:

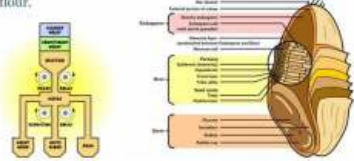
- More Pesticide Resistance
- Decreased Antibiotic Efficacy
- GENE Transfer Into The Wild
- No Studies on Long Term Effects
- Bio-Tech's Poor Track Record
- Increased Herbicide Use

WHEAT GRAIN into FLOUR

Wheat grains are harvested in late summer, and then are processed into flour.

Flour milling

During milling, different parts of the wheat are used or removed at different stages to make different varieties of flour.



White flour has only 75% of the grain in; almost all of the bran and germ removed, it is mostly the starchy endosperm. Brown flour has about 85% of the grain left - some of the bran and endosperm are added back in. Wholemeal has 100% of the grain, so all of the bran and germ - this is the best type of flour fibre-wise & health-wise.

Stoneground flour is milled traditionally using large grinding stones, rather than the large metal rollers favoured by commercial millers.

STRUCTURE OF WHEAT GRAIN

The bran is the outer part of the grain & contains all the fibre.

The wheatgerm is the seed part of the grain and contains Vitamin E & some unsaturated oils. The endosperm is the white starchy part in the middle of the grain - this gives the energy for the seed to germinate.



FLOUR into BREAD

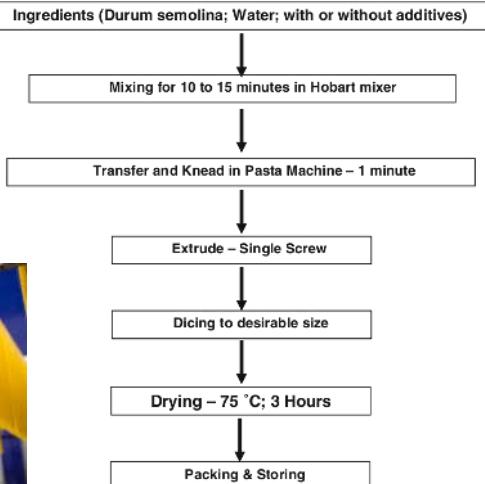
Basic bread contains only 4 ingredients: flour 100g, water 60-70g, salt 1g & yeast 2g. The basic process for making is:

1. Weigh & combine ingredients in correct proportions.
2. Mix to form a dough & then knead for 10 mins until smooth & elastic
3. Prove/Rise - leave to rise, covered, in a warm place until doubled in size
4. Knock back - knock any large air pockets out of the dough
5. Shape & 2nd Prove/Rise - once shaped leave to prove/rise for a 2nd time
6. Bake in a hot oven until crisp & hollow sounding

ORGANIC vs NON-ORGANIC

Organic means grown without chemicals (no chemical fertilisers, pesticides or weed killers are used).

Flour to pasta



Milk

Most milk we consume is pasteurised. This is a process where milk is heated to 75°C for 25 seconds then rapidly cooled to 5°C. This destroys most of the pathogenic bacteria. There are many different types of processed milks such as homogenised, sterilised, ultra heat treated, evaporated, condensed and dried. Each have different properties.

Many consumers choose plant based milks as an alternative to animal milks. This could be due to health benefits (reduced saturated fat content), vegetarian diets, ethical choices, intolerances or personal preferences.



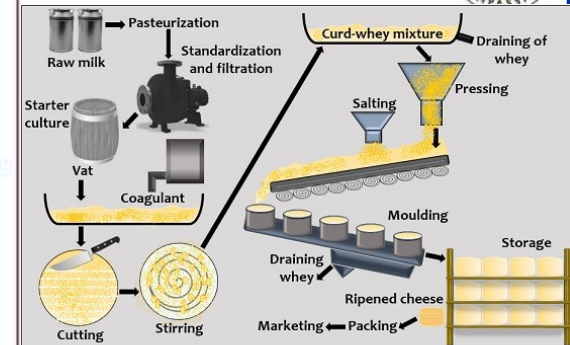
Cheese

Making cheese - A starter culture is added to fresh milk which ripens the milk allowing the lactose to be fermented into lactic acid. Rennet is then added which splits the milk into curds and whey. The curds are then pressed into moulds to remove any remaining whey where it is then left to mature for up to 24 months to turn into cheese. The longer it's left the stronger the cheese.

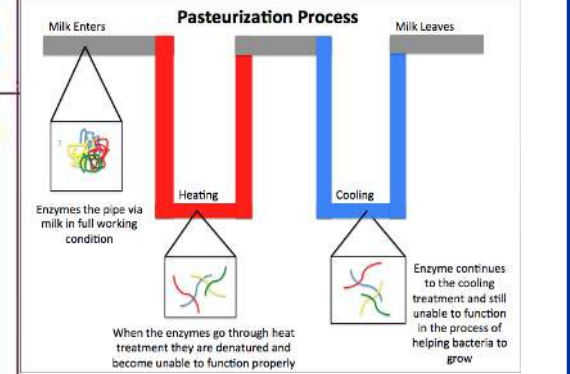
There are many different uses of cheese such as being eaten in its natural state on crackers, in sandwiches or salads. Added to a dish to add flavour and texture e.g. parmesan on spaghetti, mozzarella on pizza, stilton in soup.

Yoghurt

Yoghurt has similar nutritional values to milk and is an excellent source of HBV protein, calcium and Vitamins A, B and D. It is also contains good bacteria which aids digestion. Yoghurts can come in a range of textures, fat content and flavours. Yoghurt, like other dairy products should be stored in the fridge at 5°C. Yoghurt can be used as an ingredient in dishes to give a creamy texture, a healthy alternative to cream, an alternative to mayonnaise or simply consumed as a snack.



FLOWCHART FOR THE PRODUCTION OF CHEESE



Key vocabulary

Pathogenic bacteria	Bacteria that causes disease such as salmonella.
Pasteurisation	a process where milk is heated to 75°C for 25 seconds then rapidly cooled to 5°C. This destroys most of the pathogenic bacteria.
Rennet	An enzyme used to separate the milk into curds and whey.
Curds	A soft white substance formed when milk sours, used as the basis for cheese.
Whey	The watery part of milk that remains after the formation of curds.
Primary processing	The conversion of raw materials into food commodities e.g. milling of wheat into flour.
Secondary Processing	Converting primary processed foods into other food products, e.g. flour to bread.
Lactose intolerant	When a person is unable to digest lactose, a sugar found in milk and some other dairy products.
Food provenance	Food provenance means where your food comes from, i.e. where it is grown, raised or reared.
Emulsion	A fine dispersion of minute droplets of one liquid into another.

GCSE FOOD PREPARATION AND NUTRITION: Sensory panels

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

Sensory Testing

Humans taste with their tongue and nose.

Tongues have thousands of taste buds that detect 5 things

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



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

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

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

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

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



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

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

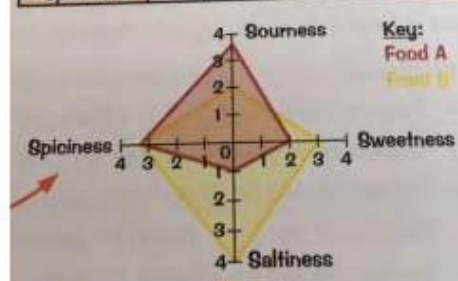
Profiling Test
Tasters rate certain characteristics of food and the average rating of each is worked out to create a profile of the food. This can be displayed visually on a star diagram Star diagrams can be overlapped to compare two different foods.

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

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

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

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



GCSE FOOD PREPARATION AND NUTRITION: Labelling foods

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

Compulsory Information

Food Labelling Regulations

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

Sucrose-Free Plain Milk Chocolate

Nutrition Facts
Serving Size: 1 Chocolate Bar (50g)

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

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

Each nutrient must be given per 100g of the food

Energy is given in kilojoules, and the rest in grams

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

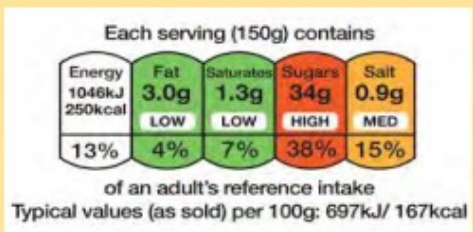


Any genetically modified ingredient need to also be shown.

Non - Compulsory Information



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



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



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

Knife Skills



Meat, fish and alternatives

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

fruits and vegetables

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

Prepare fruits and Vegetables



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

Tenderise and Marinate



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

Prepare combine and shape



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

Select and adjust a cooking Process



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

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

Making Sauces

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

Water based methods using the hob

Demonstrate the following techniques:

- steaming
- boiling and simmering
- blanching
- poaching

Weigh and Measure

Demonstrate accurate measurement of liquids and solids

Dry heat and fat based methods using the hob

Demonstrate the following techniques:

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

Preparation of ingredients and equipment

Demonstrate the following techniques:

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

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

Using Raising agents

Demonstrate the following techniques:

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

Set a mixture - removal of heat (gelation)

Demonstrate the following techniques:

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

Set a mixture - heating (coagulation)

Demonstrate the following techniques:

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

Using the oven

Demonstrate the following techniques:

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

Use of Equipment

Demonstrate the following techniques:

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

Using the grill

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

- char
- grill or toast

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

Shaping and finishing dough



Demonstrate the following techniques:

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

Test for Readiness



Demonstrate the following techniques:

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

Judge and manipulate sensory Properties



Demonstrate the following techniques:

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