Protein

Low Biological Value **(LBV)** protein: Food that is deficient in one or more of the amino acids are said to have LBV.
Sources:
- Seeds and Nuts
- Beans and Legumes
- Plant based products e.g.: Oats and cereals

High Biological Value **(HBV)** protein: Food that contains **ALL** the essential amino acids is said to have HBV.
Sources:
- Animal products (meat, fish, eggs)
- Dairy products

Complimentary Proteins: mix HBV's and LBV's or combine LBV's to contain all essential amino acids the body needs.

Carbohydrate

Is a macronutrient- The three main types of carbohydrate are **starch, sugar and fibre.**

They are needed in the body for energy, aiding digestion, bulking your diet and helping to lower blood cholesterol levels

Sugars:
Sugars within carbohydrates come in two different forms, intrinsic sugars (found in the cells of vegetables and fruit extrinsic sugars (processed sugars)

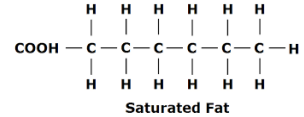
Fibre:
(NSP) is the cellulose found in the outer skins of the flesh of fruits and vegetables. This can be split into two further groups. Soluble and Insoluble

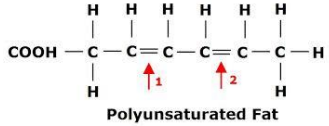
Starch:
Starch is found in cereal, they are filling and provide you with slow release energy.

Fats

Essential fatty acids (EFA): *cannot be made in the body*, but are vital for our health and the function of our bodies.
Examples include:
Omega 3- protects the heart, found in oily fish and green leafy vegetables
Omega 6- helps to lower cholesterol, found in vegetables, grains, seeds and poultry.

Functions of fats:
- ✓ Energy
- ✓ Insulation
- ✓ Protects organs
- ✓ Texture and flavour to food
- ✓ Source of some fat soluble vitamins.

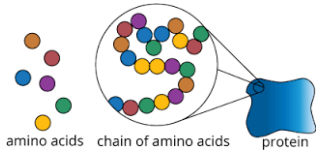




Protein

Essential macronutrient made up of complex amino acids- we obtain these through eating food.

Protein is needed for:
- Growth
- Repair of body tissues
- To promote enzyme manufacture
- As a secondary source of energy



A lack of protein causes:
- Slow physical development in children
- Digestive problems
- Malfunction of liver
- Weakening of muscles
- Kwashikor

Protein Value: Based on the biological value of protein (HBV or LBV).

Essential amino acids: Adults need 10, children need 8.

Vitamins

Vitamin	Sources	Function	Deficiency
A	Eggs, cheese, green vegetables	Keeps skin healthy, vision, growth	Night blindness, stunted growth,
E	Plant foods	antioxidant	Rare
D	Sunlight, oily fish	Absorption of calcium, strengthen bones and teeth	Rickets, weakening of bones.
K	Green vegetables	Blood clotting	Rare
B	Milk, Meat, green vegetables	Enables energy to be released	Rare
C	Fruits eg oranges	Aids the absorption of iron, immune system	Anaemia, longer healing wounds

Vitamins and Minerals

Vitamins: These are micronutrients. You can obtain all of the vitamins you need to be healthy by eating a wide varied diet.

Vitamins are split in to **fat-soluble** (vitamins A and D for example *can* dissolve in fat and can be stored) and **water-soluble** (vitamins such as B and C as well as folate/ folic acid. These are dissolved in water and *cannot* be stored in the body.)

Minerals: these are micronutrients needed to maintain good health they are used in the building the body and controlling how it works.

Mineral	Source	Function	Deficiency
Calcium	Milk, vegetables	Bones and teeth	Rickets
Iron	Meat, egg	Blood and oxygen transportation	Anaemia
Sodium	Salt, cheese	Maintains water	Cramp, CHD
Fluoride	Fish, water, tea	Strengthens teeth	Tooth decay

Fats

A macronutrient. They are made up of chemical elements, carbon, hydrogen and oxygen combined these form fatty acids and glycerol.
Fatty acids can be saturated, or unsaturated (this depends on the arrangement of the carbon and hydrogen atoms)

Saturated Fats:

- Solid at room temperature
- Found in foods that originate from animals
- Contain high levels of cholesterol
- Cause a build up of fatty deposits. Causing CHD in some people.

Unsaturated Fats:

-Found in plants and oily fish
-Polyunsaturated fats are liquid or soft at room temp. They contain two or more pairs of carbon atoms and are therefore capable of holding two more hydrogen atoms.

Eatwell guide

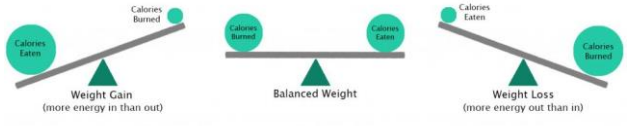
1. Base your meals on starchy carbohydrates.
2. Eat lots of fruit and veg.
3. Eat more fish – including a portion of oily fish.
4. Cut down on saturated fat and sugar.
5. Eat less salt – no more than 6g a day for adults.
6. Get active and be a healthy weight.
7. Don't get thirsty.
8. Don't skip breakfast.

Energy Needs

BMR= **Basal Metabolic Rate** is the number of calories required to keep your body functioning at rest.

PAL= **Physical Activity Level**, this is the amount of energy we use for movement and physical activity every day.

Energy Balance= The amount of energy we get from food each day is the same amount that we use.

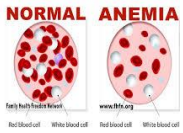


Anaemia

Anaemia is a condition where a lack of iron in the body leads to a reduction in the number of red blood cells. Iron is used to produce red blood cells, which help store and carry oxygen in the blood.

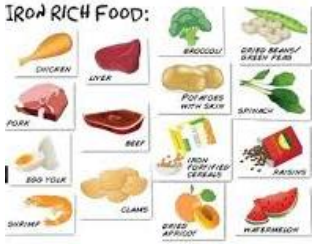
What causes it?

- Heavy periods
- Pregnancy
- Stomach ulser
- Lack of iron in diet



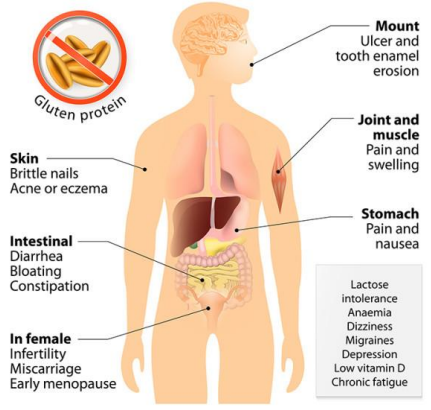
Symptoms include:

- Fatigue
- Weakness
- Dizziness
- Headaches
- Pale
- Rapid heartbeat
- Shortness of breath



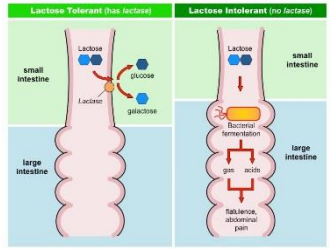
Making informed choices: Coeliac

A COELIAC is a person who has a sensitivity to GLUTEN. A COELIAC suffers from a medical condition called Coeliac Disease.



Making informed choices: Lactose

Lactose intolerance is a common digestive problem where the body is unable to digest lactose, a type of sugar mainly found in milk and dairy products.



Symptoms of lactose intolerance usually develop within a few hours of consuming food or drink that contains lactose. They may include:

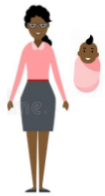
- flatulence (wind)
- diarrhoea
- bloated stomach
- stomach cramps and pains
- stomach rumbling
- feeling sick

Life stages- Babies

Babies require breast milk, this provides all the nutrients a baby needs for growing. They will be breast fed for the first 6 months.

Pregnancy and breast feeding

During pregnancy the mother will need to have a varied diet with enough energy and nutrients. They should consume more Folic Acid, Iron and Calcium.



When the baby is born the mother needs to continue to eat a healthy balanced and varied diet. She will need to have foods rich in the nutrients, calcium, phosperous and also the vitamins A and C

Life stages- Children

What happens at this stage:
Growth continues in 'spurt's
Children should aim to be physically active most of the time

Important nutrients:
- Protein
- Carbohydrate
- Fat
- All minerals
- All vitamins
- Fibre
- Water

Encourage them to:
Regular well balanced meals
Try new foods
Learn about how they can prepare and get involved with meals.

Discourage them from eating:
Grazing on snacks in between meals
Drinking and eating too many sugary snacks

Life stages- Teenagers

What happens at this stage:
Body grows rapidly
Minerals are taken into the bones and teeth
Girls start periods
Pressures from school

Important nutrients:
- Protein
- Carbohydrate
- Fat
- All minerals
- All vitamins
- Fibre
- Water

Encourage them to:
Follow the Eatwell guide and eat regular meals
Include plenty of iron rich foods in the diet
Spend time outdoors
Eat breakfast.

Discourage them from:
Drinking and eating too much sugar and salt
Skipping meals
Eating lots of energy dense foods.

Life stages- Toddlers

What happens at this stage:
Growth and development rapidly
Lots of energy used

Important nutrients:
- Protein
- Carbohydrate
- Fat
- All minerals
- All vitamins
- Fibre
- Water

Encourage them to eat:
Small but regular meals or drinks.
Try new foods but do not force them
Eat until there are full
Sit at a table

Discourage them from eating:
Eating snacks between meals
Avoid sugary sweets and drinks

Life stages- Adults

What happens at this stage:
The body doesn't grow anymore.
Maintain the body to keep it strong, disease free and active
Weight gain can occur if energy intake is unbalanced.

Important nutrients:
- Protein
- Carbohydrate
- Fat
- Vitamins A, B, C, D, E
- Fats (especially omega 3 and fatty acids)
- Minerals

Encourage them to:
Follow the Eatwell guide and eat regular balanced meals
Eat plenty of calcium rich foods
Spend time outdoors exercising

Discourage them from:
Eating lots of energy dense fats
Adding lots of sugar and salt to food

Life stages- Elderly

What happens at this stage:
Body systems start to slow
Blood pressure may increase
Appetite gets smaller
Sense of smell and taste diminishes
Skeleton starts to loose minerals

Important nutrients:
- Protein
- Carbohydrate
- Fat
- Vitamins A, B, C, D, E
- Fats (especially omega 3 and fatty acids)
- Minerals
- Calcium and vitamin D
- Iron

Encourage them to eat:
Follow the Eatwell guide
Eat plenty of fresh foods
Get regular exercise and drink lots of water
Eat enough fibre

Discourage them from eating:
Too many sugar and salty foods

Skeletal Disease

Rickets is a condition that affects bone development in children. It causes bone pain, poor growth and soft, weak bones that can lead to bone deformities.

What causes it?

A lack of vitamin D or calcium is the most common cause of rickets. Vitamin D largely comes from exposing the skin to sunlight, but it's also found in some foods, such as oily fish and eggs. Vitamin D is essential for the formation of strong and healthy bones in children.

Rickets can easily be prevented by:

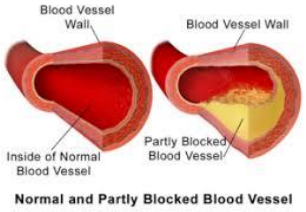
- Eating a diet that includes vitamin D
- Eating a diet that includes calcium
- Spending some time in sunlight
- If necessary, taking vitamin D supplements.

Cardiovascular Disease

Coronary heart disease is the term that describes what happens when your heart's blood supply is blocked or interrupted by a build-up of fatty substances in the coronary arteries.

1. Fatty cholesterol plaques develop over time
2. Hard outer layer of plaque can crack
3. Platelets form blood clots around the cracks
4. Artery narrows even more
5. Blood flow blocked – oxygen doesn't reach the heart muscle, so the muscle dies

Over time, the walls of your arteries can become furred up with fatty deposits.



Normal and Partly Blocked Blood Vessel

Obesity

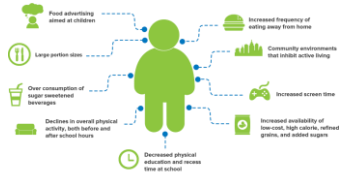
Obesity is a diet related disease in which the body contains too much stored fat.

It is caused by not being in energy balance

Obesity has become a very serious problem all over the world and is linked to the over consumption of processed foods such as: ready meals, fast food, and some hot and cold drinks.

The body stores the excess fat and can cause a number of health related problems such as:

- Breathing issues
- Type 2 diabetes
- CHD
- Cancers

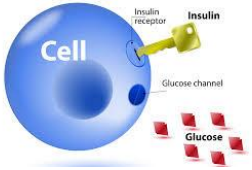


Diabetes type 2

Diabetes is a serious condition where your blood glucose level is too high.

Diabetes causes people to have too much glucose (sugar) in their blood. Glucose gives us energy. We get glucose when our bodies break down the carbohydrates that we eat or drink. And that glucose is released into our blood.

We also need a hormone called insulin- made by our pancreas, insulin allows the glucose in our blood to enter our cells and fuel our bodies.



Symptoms of Type 2 diabetes

- Feeling tired
- Needing the toilet a lot
- Thirst
- Slow healing wounds
- Yeast infections

Managing Type 2 diabetes

- Healthy eating
- Becoming more active
- Loosing weight
- Using medication to bring down glucose levels. Either through tablets or insulin injections.

Food Intolerance & Allergy

Intolerance

- Usually reactions are delayed and symptoms may take several hours, or even several days to appear
- Multiple symptoms can occur and be many and varied, from migraine to bloating, diarrhoea, lethargy, joint pain and a general feeling of poor health
- Reactions can occur after ingesting small amounts of a culprit food but are usually triggered by larger amounts

Allergy

- Food allergy is a reaction caused by the immune system's reaction to a food. The immune system usually makes specific antibodies to 'fight off' the allergens found in these foods. This results in the release of histamine and other naturally occurring chemicals in the body, which subsequently cause inflammation.
- Symptoms can be mild or severe and can involve the skin, gut, breathing or the whole body's circulation system

Vegetarian

Lacto-ovo-vegetarians eat both dairy products and eggs; this is the most common type of vegetarian diet.

Lacto-vegetarians eat dairy products but avoid eggs.

Ovo-vegetarian. Eats eggs but not dairy products.

Vegans do not eat dairy products, eggs, or any other products which are derived from animals.

Moral issues

Factory Farming- animals kept in disturbing living conditions where intensive factory farming restricts the movement of animals. The red tractor sign marks quality and guarantees food has come from companies that follow high standards.

Fair Trade- About trade that offers better prices, better working conditions, local sustainability and fairer terms of trade for farmers and workers in the developing world.

Organic farming- low carbon production systems that works with nature sustaining the health of the soil, ecosystem and people. It relies on ecological process and biodiversity. It can be more expensive but the taste, seasonality, nutrition is generally thought to be better.

Religious diets

Islam: *Prohibited animal flesh: pork.*
The Koran outlines the foods which can be eaten (halal) and those forbidden (haram).
Beef, lamb and chicken can only be eaten if the animal has been slaughtered by the halal method. This means that the animal must be killed by slitting its throat. The animal will then have all the blood drained from its body.

Judaism: *Prohibited animal flesh: pork and non-kosher beef, lamb and chicken.*

Kosher animals have a completely split hoof and chew cud, e.g. cows, goat and sheep. Horses and pigs are not Kosher animals. Kosher fish must have fins and scales, therefore shellfish and eels are excluded.

Hindu: *Prohibited animal flesh: all, except lamb, chicken and fish.*

Strict Hindus are vegetarian. The cow is held in high regard and a symbol of abundance, therefore Hindus do not eat beef.

Religious diets

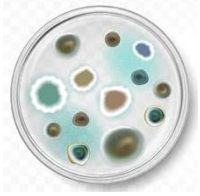
Sikhism: *Prohibited animal flesh: pork, beef, halal and kosher.*
Sikhs do not eat halal or kosher meat because they are not meant to take part in religious rituals apart from the Sikh Rehat Maryada (Code of Conduct). They should also refrain from food and drinks which may harm their body, e.g. alcohol.

Buddhism: *Prohibited animal flesh: all.*
Buddhists believe they should not be responsible for the death of any other living organism. Therefore, most Buddhists follow a strict vegetarian, if not vegan diet. They also avoid the consumption of alcohol.

Seventh-Day Adventist Church: *Prohibited animal flesh: pork, beef and lamb.*
Many Adventists are ovo-lacto vegetarians, which means they do not consume animal flesh of any kind, but will consume dairy and egg products.Some Adventists avoid food and drinks which contain caffeine, therefore they do not consume tea and coffee. They also avoid alcohol.

Microorganisms

Yeast – found in soil, in the air and on some fruits. They are one celled organisms and apart of a group of organisms called fungi. They reproduce by budding: this means they multiply and the one cell divides into two



Moulds – they are also a type of fungi. They can be blue, green, black or white in colour. They reproduce by producing spores which will travel in the air and land on foods, they will then grow in the correct conditions.

Bacteria – Extremely small single cell organisms. Bacteria can be found everywhere, in air, water, food, on animals and humans. Bacteria produce very quickly by dividing into two every 20 minutes if the conditions are correct.

Enzymes

Enzymes are natural substances (mostly Proteins) that are found in foods and all living things.
They are called biological catalysts, which means they have the ability to speed up reactions.

Enzymic browning is a chemical process which occurs in some fruits and vegetables. It causes the them to discolour, usually turning a brown colour.

Once the fruit or vegetable is cut, some of the cells are opened up to the air.
The enzyme polyphenol oxidase then reacts with the **oxygen** in the air and as a result the fruit & vegetables will turn brown.

Food spoilage

Fresh foods can spoil quickly during storage. You may notice a change in the texture, flavour or colour of the food. These changes are generally caused by bacteria, moulds and yeasts. Enzymes will also cause food to spoil as well as the natural decay of foods. Foods that have spoiled are often said to have 'gone off'

Signs of food spoilage:

- A sour smell or taste
- Areas of mould on food
- A slimy feel to the surface of food
- A loss of moisture leading to wrinkled food that can be discoloured
- Foods looking or feeling over dry or wet

Micro organisums in food production

There are many types of micro-organism that are non-pathogenic and do not cause food poisoning and are used in the production of many familiar food products.

Moulds are added to blue cheese- the mould gives the cheese texture, and a distinctive sharp, tangy taste.

Yeasts make bread rise, with the correct conditions the yeast ferments with the sugar and produces CO^2 which makes the bread rise.

Bacteria are used to make yoghurt. Milk is pasteurised to kill the bad bacteria, then non-pathogenic bacteria are added these ferment and produce lactic acid. This then makes the milk thicken and gives it a sour and tangy taste.

Buying and storing food

Storing food at the right temperature ensures that it remains at its best for as long as possible and prolongs the contamination from pathogenic bacteria.

Storing food in the fridge:
Fridges should be between **0°-5°C**
Keep foods covered
Always store raw meats, poultry, fish etc at the bottom of the fridge.

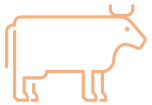
Storing food in the freezer:
Freezers should be -18°C
Clearly label foods
Defrost foods thoroughly before cooking in the fridge

Storing food in the cupboard:
Keep in a sealed container
Keep in a cool dry place

Food Provenance

Foods that are grown:
Crops such as wheat and barley are grown in the UK. To get the best crops farmers- prepare the soil, keep crops free from weeds and pests and then harvest them.

Food that is reared:



Animals that are reared are cattle, for meat and milk, Chickens for meat and eggs, sheep and lamb.

Foods that are caught:
This can be done through trawling, line caching, or through the use of pots like lobster pots

Food that is gathered:

Plant foods are gathered from the wild for eating eg herbs, edible fungi, berries and seaweed)

Seasonal Produce

Seasonal foods (mostly plants) are ready to be harvested at the stage of their life cycle when they are at their best for flavour, colour and texture

Seasonal foods often have a better nutritional value, are cheaper, and have less environmental impact on the planet.

Environmental impact and food waste

Food production contributes to global warming during:
Growing and rearing / farming
Processing and manufacturing
Packaging
Transportation
Storage
Cooking
Waste

All of these things link to the increase in the carbon footprint. Meat and dairy production has the highest carbon footprint.

Food waste

7 million tonnes (approx.) is wasted a year, this means it goes to landfill and isn't consumed.
The main reasons for people wasting food are:

- Poor meal planning
- Serving portions are too large
- Not storing food properly
- Misunderstanding use by dates

Food security

Food security is about ensuring that all people, at all times have access to enough safe and nutritious food.

1. AVAILABILITY OF FOOD – the physical availability of food, this is about the supply of food. The amount of food available in a country depends on the production, storage and trade.

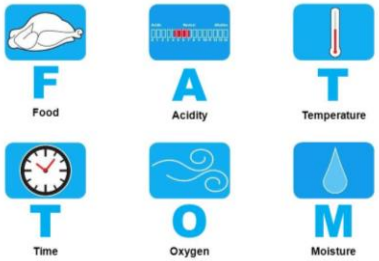
2. ACCESS TO FOOD – The access to food is affected by the cost of food, if the food prices are high it can impact those who are on low incomes. Issues like land to grow the food on and poor transport systems can also impact peoples access to food.

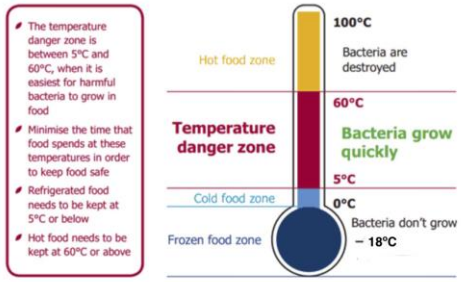
3. USE OF FOOD – This refers to how the body uses the nutrients. People need to understand how to eat food correctly to get a balanced diet.

4. STABILITY OF THE SUPPLY – this is about the supply of food over time. Poor weather and economic factors can have effects on the long term supply of food supplies.

Bacteria

Bacteria need the following conditions to grow:





These are temperature zones that relate to bacteria growth.

Technological Development

- **Man made:**
  - Smart food materials: raw ingredients that have one or more properties that can be significantly changed.
  - Modified Starch: Synthetic man made additive that can be used as a thickener or stabiliser.
- **Novel functions:**
  - Sweeteners: added to change the working characteristics of a food substance.
  - Stabilisers: Prevents the separation of foods and improve consistency.
  - Gelling agents: help improve consistency.
- **Functional:**
  - Nutraceuticals: health promoting or disease fighting properties. They have to be labelled.
  - Prebiotics: healthy non digestible food ingredients that contain NSP
  - Probiotics: bio cultures containing living helpful bacteria.
- **Specially Developed:**
  - Meat analogues: Quorn, tofu.
- **Nanotechnology:**
  - Innovation in food science and technology that involves the use of materials and structures at a tiny scale.

Exam Question tips: understand the language.

- Give/ state/ name: quick one mark questions
- Describe/ Outline: straightforward questions describe something in detail some questions may ask for some drawings.
- Explain/ Justify: asking you to respond in detail to the question. DO NOT USE SHORT PHRASES. Make sure that you make a valid point and justify it.
- Evaluate/ Discus/Compare: These appear towards the end of the paper and are designed to challenge you. Make sure your arguments are well balanced and include advantages and disadvantages

Milk Production

Primary and secondary processing of milk
The processing of milk starts on the farm. The farmer milks the cows two to three times daily.
Milk is then transported from the farm to the factory to be processed.

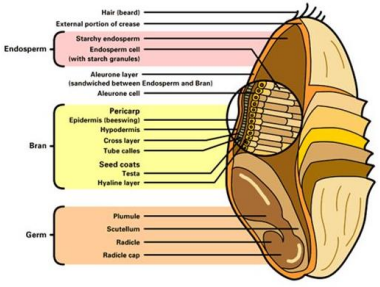
The milk is then **pasteurised**. This means that it is heated to a high temperature to kill bacteria, it is then cooled again.

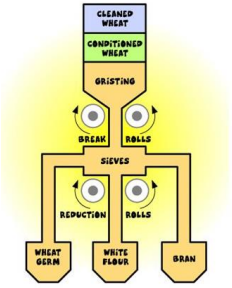
The cream is then separated from the milk. It is added back into the milk depending on what type of milk is required – skimmed, semi-skimmed or full fat.

The final step is **homogenisation**. This ensures the cream (or fat) is evenly distributed through the milk which will now have a smooth consistency and is ready to be sold.

Wheat Production

Primary processing is the conversion of raw materials into food commodities – for example, milling wheat into flour.





Secondary processing is when the primary product is changed to another product – for example, turning wheat flour into bread.

Exam Question tips:

- ✓ Use these revision cards to help you.
- ✓ Read, cover, write over and over.
- ✓ Get someone to test you.
- ✓ Keep hydrated.
- ✓ Remember to bring a pencil to the exam.
- ✓ Structure your tine well, the design question is worth lots of marks so make sure you attempt that.

Good Luck!