

KPI 8BD 1: Describe and explain the components that make up a balanced diet, describing the consequences of an imbalanced diet

Deficiency diseases

When the body does not have enough of a certain nutrient deficiency diseases can develop.

Deficiency diseases are most common in more deprived areas of the world such as Africa and in people who have difficulty maintaining a healthy diet such as the elderly.

Disease	Nutrient	Symptoms
Kwashiorkor	Essential nutrients, cause unknown	Inflamed skin, tiredness, poor growth, enlarged stomach, persistent infection
Ricketts	Vitamin D and Calcium	Bone pain, poor growth, deformation of the skeleton
Scurvy	Vitamin C	Muscle and joint pain, bleeding and swelling of the gums
Anaemia	Iron	Tiredness, lack of breath, heart palpitations (noticeable heartbeats), pale complexion

Food groups

There are 7 major food groups, a balanced diet will contain the correct amounts of all of these for the person's needs, e.g. someone who does a lot of exercise will need a lot more carbohydrate than someone who does not. The seven food groups are summarised below:

Food Group	Example	Function
Protein	Fish, meat, dairy	For growth and repair.
Fat	Butter, oils, nuts	To provide energy. Fat provides a long term store of energy. It also provides insulation for the body.
Carbohydrate	Bread, pasta, sugar	To provide energy.
Fibre	Vegetables, Bran	To help food move through the gut.
Minerals	Dairy (calcium)	Required in small amounts to remain healthy, for example calcium is crucial for healthy teeth and bones.
Vitamins	Oranges (vitamin C), Carrots (vitamin A)	Required in small amounts to remain healthy, for example vitamin D is needed to keep teeth and bones healthy.
Water	Water, fruit juice, milk	Needed to form the cytoplasm of the cells and other fluids.

Food Tests

Starch test: Add iodine liquid, if starch is present substance will change to a blue/black colour.

Sugar/Glucose test: Add benedict's solution to the substance. Warm in a water bath. If substance changes green/orange/red sugar is present.

Protein test: Add Biuret reagent. If substance changes to a purple colour protein is present.

Fat test: Wipe substance on filter paper. If paper becomes translucent fat is present. Alternatively add ethanol and water. Milky white emulsion appears in presence of fats.

KPI sBD 2: Evaluate how different lifestyles have different energy needs

Food labelling

Food labels give you information about which food groups and how much energy each food contains. They give guidance to tell you what percentage of nutrients each food contains.

We measure the energy stored in food in calories.

MED Calories 353 18%	LOW Sugar 0.9g 1%	MED Fat 20.3g 29%	HIGH Sat Fat 10.8g 54%	MED Salt 1.1g 18%
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Food labelling

Different people require different amounts of energy depending upon their energy needs. For example an accountant who sits at his desk all day may only require 2,500kcal of energy whereas a builder may require 4,500kcal.

Eating too much can cause obesity which can lead to heart disease and diabetes. Eating too little can lead to malnutrition and can be caused by diseases such as anorexia or bulimia.



Energy in Food

The energy in food is often measured in kJ, the amount of energy you need depends on your lifestyle. If there is an imbalance you will put on or loose weight.

energy in = energy out
 weight stays the same

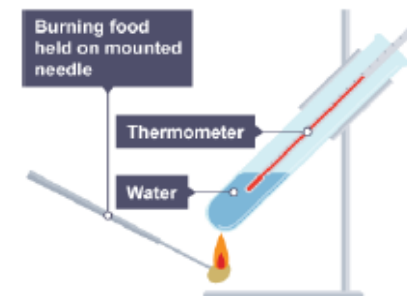
energy in > energy out
 weight increases

energy in < energy out
 weight decreases

Key:
 = equal to
 > greater than
 < less than

Measuring Energy in Food

The energy in different foods can be measured using a simple experiment. If the food is set on fire, it can be used to heat up water and by measuring the temperature change, you should be able to see which foods cause the greatest rise in temperature and have given out the most energy.



Balanced and healthy diets

Eating food from only one group can be very harmful. In order for a diet to be healthy the food that is consumed must come from a variety of food groups and contain enough calories.

People who have unhealthy diets are more likely to develop diseases either as a result of deficiency of food groups or from consuming too few or too many calories.

KPI 8BD 3: Describe the symbiotic relationship between bacteria and the human digestive system

Bacteria in the digestive system

The digestive system contains many bacteria. About half of the dry weight of faeces is bacteria. Bacteria have several uses in the digestive system including:

- Digesting some substances that humans cannot, eg. Some carbohydrates like cellulose
- Reducing the chances of harmful bacteria multiplying.
- Producing vitamins that humans need eg. Vitamin B12 and K

Symbiotic relationship

Symbiosis is a relationship between organisms of a different species that show a natural (innate) relationship with each other.

Symbiotic relationships provide at least one of the species with an advantage.

For humans and bacteria the bacteria help to keep humans healthy by defending against harmful bacteria, digesting indigestible substances and produces certain vitamins. The bacteria are given an environment in which they are able to survive and reproduce.

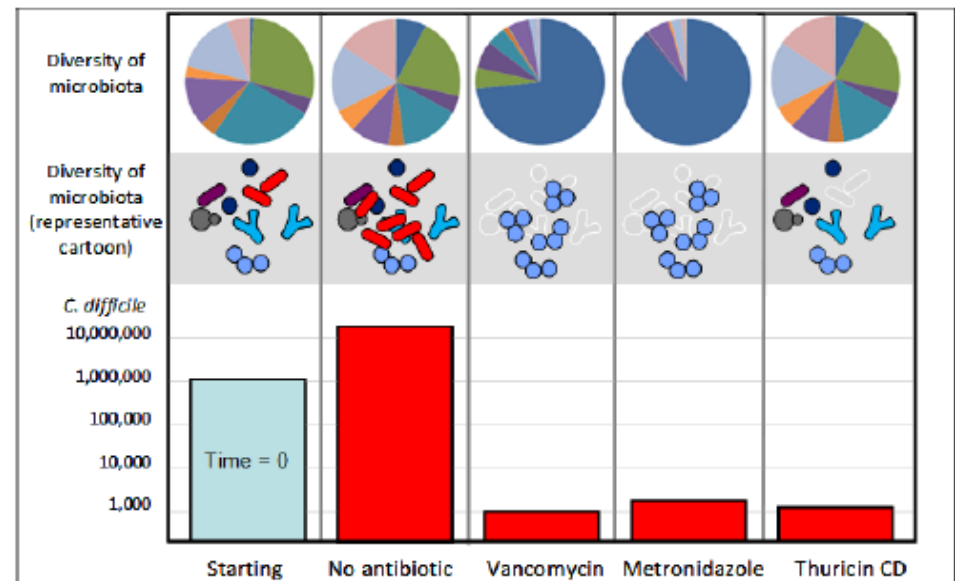
Probiotics and Antibiotics

Two types medications can affect the bacteria in our digestive system.

Probiotics – These promote the growth of bacteria in our bodies.

Antibiotics – These kill nearly all bacteria in our bodies.

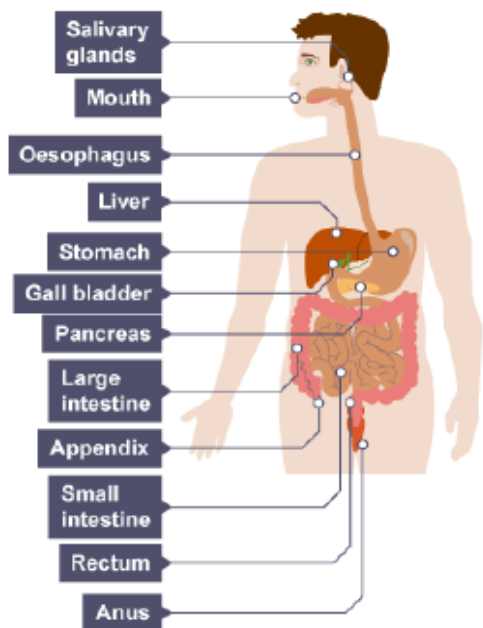
When foreign bacteria invade our bodies they reproduce rapidly (much faster than our native bacteria) and produce toxins which are harmful to our bodies. The most common treatment for a bacterial infection is antibiotics which kill all bacteria including the useful ones. When taking courses of antibiotics it is important to promote the growth of 'good' bacteria in our digestive system through taking a probiotic also.



KPI 8BD 4: Describe how and explain why foods are broken down in the digestive system, in terms of enzymes

The Digestive System

Food is digested in the digestive system, this is an organ system. You should be able to name all parts of diagram below:

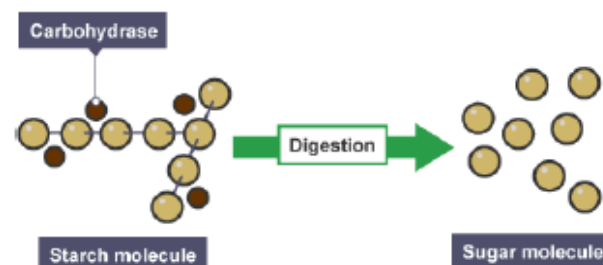


- The mouth has teeth that mechanically digest the food, it also has a salivary gland that releases enzymes to break the food down.
- The oesophagus is a muscular tube that pushes the food into the stomach
- The stomach churns the food up, while also adding acid and enzymes to break the food down.
- In the small intestine, food is broken down further and is absorbed through the walls of the intestine into the blood stream.
- The large intestine absorbs any remaining water
- Finally the food passes through the anus as faeces

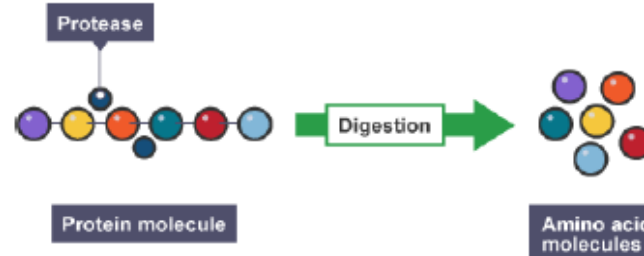
Enzymes

Enzymes are chemicals that help break down food molecules into smaller molecules. This enables the food to be absorbed by the body through the walls of the small intestine.

Breaking down starch (carbohydrates) – Enzyme = Carbohydrase



Breaking down proteins – Enzyme = Protease



Breaking down fats – Enzyme = Lipase (helped by bile to break fat into droplets)

