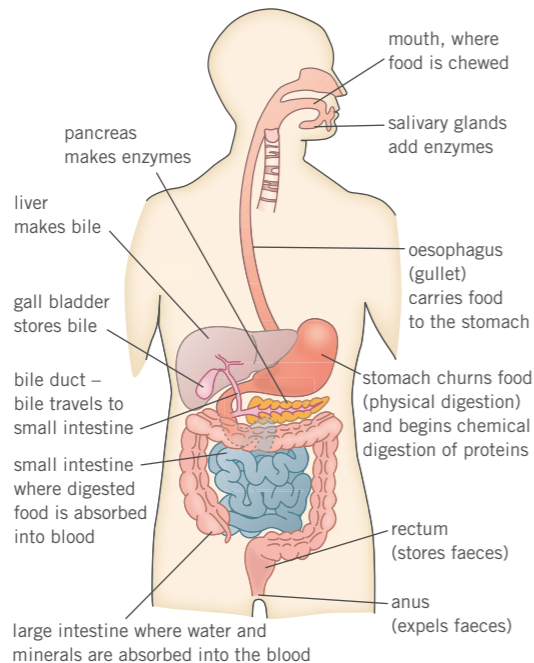


### Diet

#### The digestive system

Digestion is the breaking down of large insoluble food molecules to small soluble ones. These small molecules are absorbed into the blood for your body to use.



**Bacteria** live on fibre in your diet in the large intestine and make important vitamins (e.g., vitamin K).

#### Enzymes

**Enzymes** are special proteins that can break large molecules of nutrients down into small molecules.

Enzymes are known as biological **catalysts** – they speed up **digestion** without being used up.

There are three main types of enzyme involved in digestion:

	Type of enzyme		
	carbohydrase	protease	lipase
speeds up digestion of	carbohydrates (e.g., starch)	protein	lipids
	↓	↓	↓
	sugars	amino acids	fatty acids and glycerol

#### Nutrients

Nutrient	Role in your body
carbohydrates	main source of energy
lipids	fats and oils provide energy
proteins	growth and repair of cells and tissues
vitamins and minerals	essential in small amounts to keep you healthy
water	needed in all cells and body fluids
fibre	provides bulk to food to keep it moving through the gut (not actually a nutrient)

#### Food tests

##### Starch

Add a few drops of iodine solution to the food solution.  
Result: If the solution turns blue-black, the food contains starch.

##### Lipids

Add a few drops of ethanol to the food solution, shake it, and leave for one minute. Then pour the ethanol into a test tube of water.  
Result: If the solution turns cloudy, the food contains lipids.

##### Sugar

Add a few drops of Benedict's solution and heat the solution in a water bath.  
Result: If the solution turns orange-red, the food contains sugar.

##### Protein

Add a few drops of copper sulfate solution and sodium hydroxide solution.  
Result: If the solution turns purple, the food contains protein.

#### Effects of an unhealthy diet

A **balanced diet** is when you have the right proportions of the food groups to keep you healthy.

Eating an unbalanced diet can lead you to be:

##### underweight

Increased risk of:

- poor immune system
- lack of energy
- lack of vitamins and minerals.

##### overweight

Increased risk of:

- heart disease
- stroke
- diabetes
- some cancers.

##### vitamin and mineral deficient

Vitamin A deficiency can lead to night blindness.  
Vitamin D deficiency can lead to rickets.

### Effects of lifestyle on health

#### Drugs

Drugs are any chemicals that affect the way your brain and body work.

Medicinal drugs	Recreational drugs
<ul style="list-style-type: none"> <li>used in medicine</li> <li>benefit your health if used correctly</li> <li>used to treat symptoms or cure illness</li> <li>some have side effects</li> </ul> examples include: painkillers, antibiotics, and cough mixture	<ul style="list-style-type: none"> <li>taken for enjoyment/to relax/stay awake</li> <li>normally have no health benefits</li> <li>many can be harmful</li> <li>many are illegal</li> </ul> examples include: alcohol, caffeine, heroine, cocaine, tobacco

#### Alcohol

Alcohol is a depressant because it slows down your body's reactions.

Drinking large amounts of alcohol over a long time can cause:

- stomach ulcers
- heart disease
- reduced fertility
- brain damage
- liver damage (cirrhosis)

Drinking during pregnancy increases the risk of:

- miscarriage
- stillbirth
- premature birth
- low birth weight babies
- Foetal Alcohol Syndrome (FAS)

#### Smoking

Cigarette smoke is full of harmful chemicals including:

**tar** – clogs the lining of the lungs and alveoli, contains cancer-causing chemicals

**nicotine** – an addictive stimulant

**carbon monoxide** – stops blood from carrying oxygen.

Smoking can cause many different diseases, including:

- heart disease
- emphysema
- respiratory infections
- strokes
- lung cancer

Smoking during pregnancy increases the risk of miscarriage and low birth weight babies, and can also affect the foetus' development.

**Addiction** – When your body becomes used to the chemical changes caused by a drug and you need to take the drug to feel normal.

When a person who is addicted to a drug tries to stop taking it, they may suffer from sickness, nausea, stomach cramps, headaches, anxiety, and sweating. These are called **withdrawal symptoms**.

#### Key words

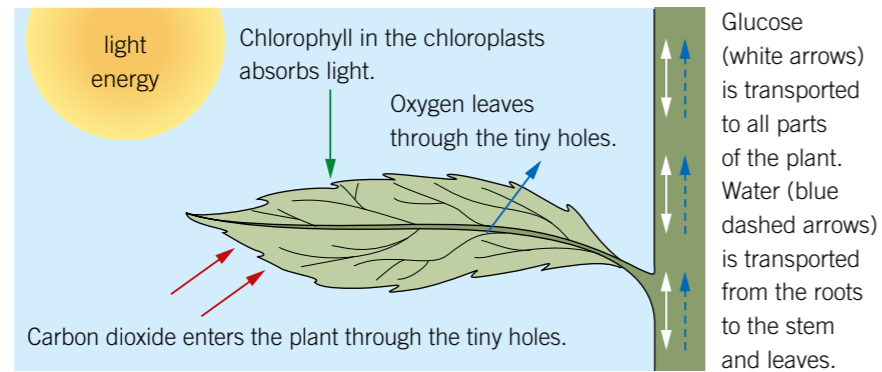
Make sure you can write definitions for these key terms.

addiction anus balanced diet carbohydrase carbohydrate carbon monoxide catalyst deficiency digestion digestive system drug enzyme fibre food test large intestine lipid lipase mineral nicotine nutrient obese oesophagus protease protein rectum small intestine starvation stimulant stomach tar vitamin withdrawal symptom



### Photosynthesis

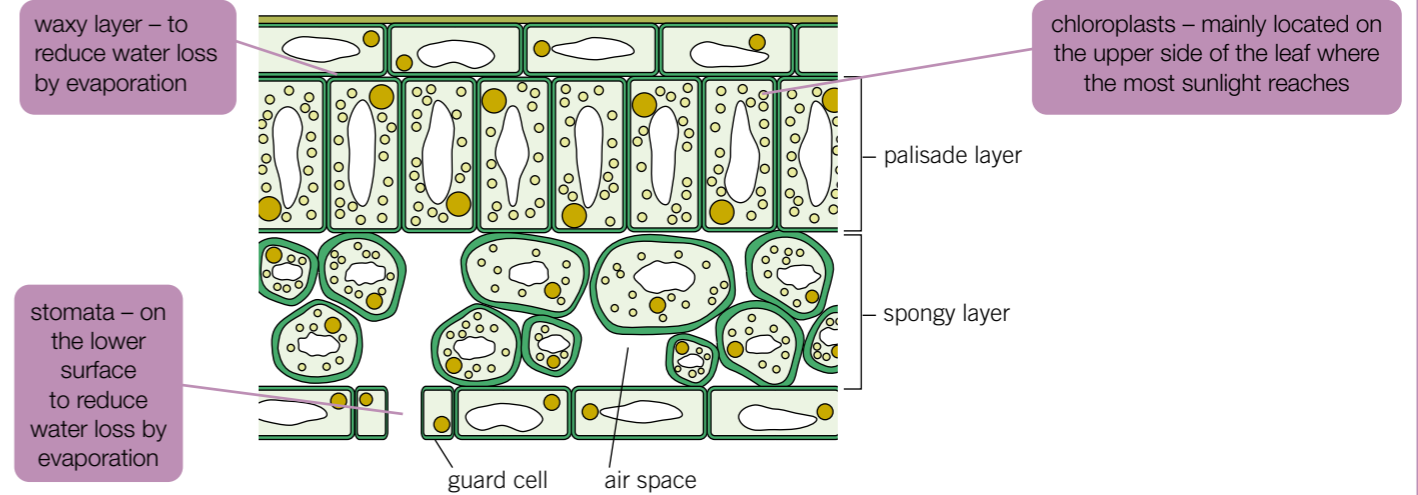
**Photosynthesis** is a chemical reaction that takes place in the **chloroplasts** to produce **glucose**.



The minerals plants need are:

- 1 **nitrates** for growth
- 2 **phosphates** for healthy roots
- 3 potassium for healthy leaves and flowers
- 4 magnesium for making chlorophyll

If a plant does not have enough of a mineral, it may suffer from a mineral **deficiency**. Farmers can use **fertilisers** to add missing minerals to the soil.



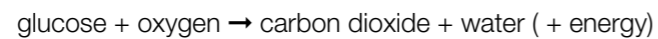
Leaves are specially adapted for photosynthesis:

- have lots of green **chlorophyll** – absorb sunlight for photosynthesis
- are thin – allow gases to diffuse in and out of the leaf
- have a large surface area – absorb as much light as possible
- have veins – xylem transports water and phloem transports glucose

### Respiration

with oxygen

#### Aerobic respiration



- Respiration occurs in the **mitochondria** of cells to produce energy.
- Glucose is absorbed from the small intestine into the blood **plasma**. It is transported to the cells where it diffuses in.
- Oxygen is breathed in and diffuses into the bloodstream. Oxygen is then carried by haemoglobin to the cells where it diffuses in.
- Carbon dioxide diffuses out of the cells into the blood plasma. It is transported to the lungs where it diffuses into the air sacs and is exhaled.

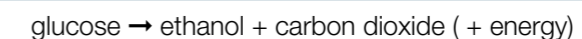
without oxygen

#### Anaerobic respiration (in animals)



- This occurs when there is not enough oxygen for aerobic respiration, such as during strenuous exercise.
- It transfers less energy than aerobic respiration.
- The lactic acid produced can cause muscle cramps. This causes increased inhalation to break down lactic acid – the oxygen needed is called the **oxygen debt**.

#### Fermentation (in microorganisms)



- Yeast respire anaerobically – this fermentation is important in food production (e.g., bread, beer, and wine).

### Key words

Make sure you can write definitions for these key terms.

aerobic   anaerobic   chlorophyll   community   consumer   deficiency   fermentation   fertiliser   producer   mitochondria   nitrate   oxygen debt   plasma  
 phosphate   photosynthesis   stomata



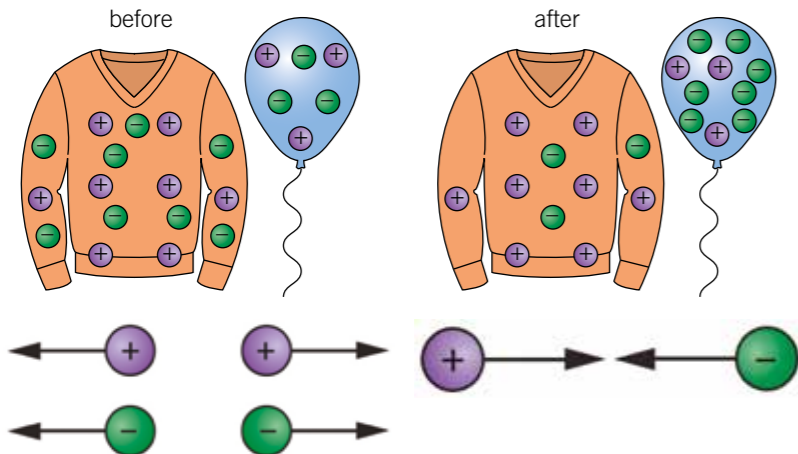


# P2 Chapter 1: Electricity and magnetism

## Knowledge organiser

### Charging up

**Static electricity:** by rubbing **insulators** together **electrons** are transferred, which gives the objects electric charges.



Charged objects have **electric fields** around them. If you put a charged object in an electric field, a force acts on the object.

### Potential difference

- Potential difference is the amount of energy transferred by the charges in the circuit.
- It is measured with a **voltmeter** (connected in parallel). The unit is the **volt (V)**.

### Circuits and currents

- Current is the amount of charge flowing per second.
- It is measured with an **ammeter** (connected in series).
- The unit for current is the **amp (A)**.

### Resistance

The **resistance** is a measure of how easy it is for current to pass through a component.

**conductors** – low resistance

**insulators** – high resistance

Resistance is calculated by measuring the potential difference and the current.

The unit for resistance is the **ohm ( $\Omega$ )**.

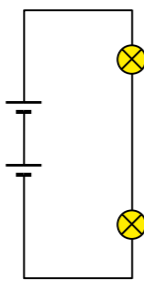
$$\text{resistance } (\Omega) = \frac{\text{potential difference (V)}}{\text{current (A)}}$$

### Series and parallel circuits

In a series circuit all of the components are connected in one loop. If one component or wire breaks, **current** stops flowing everywhere.

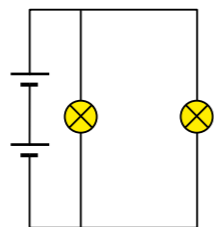
#### Series circuits

- contain only one loop
- the current is the same everywhere
- the **potential difference** across each component adds up to the potential difference across the battery



#### Parallel circuits

- contain multiple branches
- currents in all the branches add up to make the total current
- the potential difference across each component is the same as the potential difference across the battery

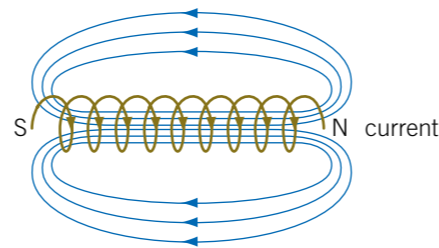


### Electromagnets

- **Electromagnets** are only magnetic when they have a flow of current, so they can be turned off.
- They are made by running a current through a coil of wire.
- They usually have an iron core in the middle of the coil, which makes them stronger.

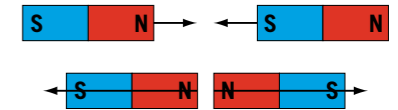
You can make an electromagnet stronger by:

- adding more turns of wire on the coil
- using more current.



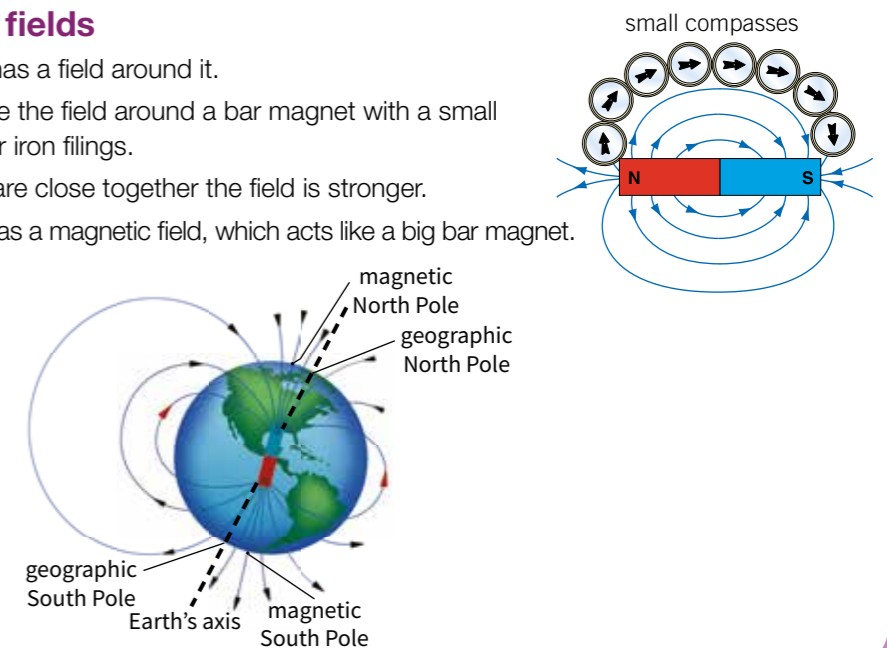
### Magnets

- **Magnets** have north and south poles.
- Opposite poles attract, and the same poles repel:



#### Magnetic fields

- A magnet has a field around it.
- You can see the field around a bar magnet with a small compass or iron filings.
- If the lines are close together the field is stronger.
- The Earth has a magnetic field, which acts like a big bar magnet.



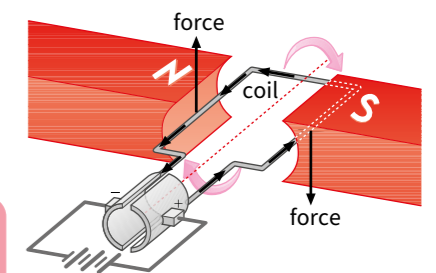
### Uses of electromagnets

- moving cars or other metal objects
- sorting iron and steel from aluminium
- making motors and speakers
- making levitating trains, which travel much faster as there is no friction

#### How motors work

Applying a current to a coil of wire makes it electromagnetic.

This causes a force between the coil of wire and the permanent magnet nearby, which makes the wire spin. This is a motor.



### Key words

Make sure you can write definitions for these key terms.

ammeter attract conductor current electron electric field electromagnet insulator repel magnet magnetic field line motor north pole ohm parallel potential difference resistance series static electricity south pole volt voltmeter