

Cells and levels of organisation

List the levels of organisation from smallest to largest.

Cells and levels of organisation

What is a tissue?

Cells and levels of organisation

Why is the stomach an organ?

Cells and levels of organisation

Function of the nucleus?

Cells and levels of organisation

Function of mitochondria?

Cells and levels of organisation

Function of ribosomes?

Cells and levels of organisation

Function of the cell membrane?

Cells and levels of organisation

Which structures do plant cells have that animal cells do not?

A group of cells with a similar structure and function.

Organelles, cells, tissues, organs, organ systems (then the organism).

Contains the genetic material (DNA) and controls the activities of the cell.

It is made of several different tissues that work together to do a specific job.

Where proteins are made (protein synthesis).

Where aerobic respiration takes place, releasing energy for the cell.

Cell wall, chloroplasts and a large permanent vacuole.

Controls the movement of substances into and out of the cell.

Cells and levels of organisation

Function of the cell wall and the vacuole in a plant cell?

Cells and levels of organisation **Biology only**

What is cell differentiation?

Cells and levels of organisation **Biology only**

Why is differentiation important in a multicellular organism?

Cells and levels of organisation **Biology only**

Give two advantages of using stem cells in medicine.

Cells and levels of organisation **Biology only**

Give two disadvantages of using stem cells in medicine.

Biological molecules and enzymes

Which elements are in carbohydrates and lipids?

Biological molecules and enzymes

Which elements are in proteins?

Biological molecules and enzymes

What are starch and glycogen made from?

The process by which a cell becomes specialised for a particular job.

The cell wall (cellulose) strengthens and supports the cell. The vacuole contains cell sap and keeps the cell firm.

They could replace damaged or diseased cells, and treat conditions such as diabetes or paralysis.

It produces specialised cells that form tissues and organs, each doing a different job efficiently.

Carbon, hydrogen and oxygen.

They may form tumours, viruses may be passed on, the immune system may reject them, and there are ethical objections.

Many simple sugars (glucose) joined together.

Carbon, hydrogen, oxygen and nitrogen, and sometimes sulfur.

Biological molecules and enzymes

What are proteins and lipids made from?

Biological molecules and enzymes

Food test for glucose?

Biological molecules and enzymes

Food test for starch?

Biological molecules and enzymes

Food test for protein?

Biological molecules and enzymes

Food test for fat?

Biological molecules and enzymes

What is an enzyme?

Biological molecules and enzymes

What is the active site?

Biological molecules and enzymes

Why are enzymes specific?

Add Benedict's solution and heat in a water bath. Blue turns green, yellow, orange or brick-red.

Proteins: amino acids. Lipids: fatty acids and glycerol (three fatty acids to one glycerol).

Add biuret reagent. Blue turns purple (lilac).

Add iodine solution. Orange-brown turns blue-black.

A protein that acts as a biological catalyst, speeding up metabolic reactions without being used up.

Shake the sample with ethanol, then pour into water. A cloudy white emulsion shows fat is present.

Only a substrate with a shape complementary to the active site can fit, so each enzyme catalyses one type of reaction.

The region of an enzyme with a shape complementary to its substrate, where the reaction takes place.

Biological molecules and enzymes

Why does the rate rise with temperature up to the optimum?

Biological molecules and enzymes

What happens to an enzyme above its optimum temperature?

Biological molecules and enzymes

How does pH affect an enzyme?

Biological molecules and enzymes

Practical: how do you show when amylase has digested all the starch?

Biological molecules and enzymes **Biology only**

Practical: how is pH varied and temperature kept constant in the amylase investigation?

Movement of substances into and out of cells

Define diffusion.

Movement of substances into and out of cells

Define osmosis.

Movement of substances into and out of cells

Define active transport.

The shape of the active site changes, the substrate no longer fits and the enzyme is denatured.

Particles have more kinetic energy, so enzyme and substrate collide more often.

Test samples with iodine solution. When it stays orange-brown and does not turn blue-black, the starch has gone.

Away from the optimum pH the shape of the active site is altered, so the rate falls. At extreme pH the enzyme is denatured.

The net movement of particles from an area of higher concentration to an area of lower concentration.

Use buffer solutions of different pH and keep all tubes in a water bath at one temperature.

Movement of substances against a concentration gradient (low to high), using energy from respiration.

The diffusion of water from a dilute solution to a more concentrated solution through a partially permeable membrane.

Movement of substances into and out of cells

Which of diffusion, osmosis and active transport are passive?

Movement of substances into and out of cells

Give an example of active transport in plants.

Movement of substances into and out of cells

Name four factors affecting rate of movement into and out of cells.

Movement of substances into and out of cells

How do you calculate surface area : volume ratio?

Movement of substances into and out of cells

How do distance and concentration gradient affect the rate of diffusion?

Movement of substances into and out of cells

Equation for percentage change in mass?

Movement of substances into and out of cells

In the potato practical, what does a mass increase show?

Movement of substances into and out of cells

Why can glucose but not starch pass through Visking tubing?

Root hair cells take in mineral ions from the soil against the concentration gradient.

Diffusion and osmosis. They do not need energy from respiration.

Surface area $\div$ volume. For a cube, surface area is $6 \times \text{side}^2$, volume is side^3 .

Surface area to volume ratio, distance, temperature and concentration gradient.

$(\text{final mass} - \text{initial mass}) \div \text{initial mass} \times 100$.

A shorter distance and a steeper concentration gradient both make diffusion faster.

Visking tubing is partially permeable. Glucose molecules are small enough to pass through its pores, starch molecules are too large.

The solution was more dilute than the cell contents, so water moved in by osmosis.

Movement of substances into and out of cells

How do agar cubes show surface area : volume ratio?

Nutrition in flowering plants

What is photosynthesis?

Nutrition in flowering plants

What energy conversion happens in photosynthesis?

Nutrition in flowering plants

Word equation for photosynthesis?

Nutrition in flowering plants

Balanced symbol equation for photosynthesis?

Nutrition in flowering plants

What is a limiting factor?

Nutrition in flowering plants

Which three factors affect the rate of photosynthesis?

Nutrition in flowering plants

Why does the rate fall at high temperature?

The process by which plants make glucose from carbon dioxide and water, using light energy absorbed by chlorophyll.

Small cubes, with a larger ratio and shorter distance to the centre, turn completely colourless sooner when placed in acid.

Carbon dioxide + water → glucose + oxygen
(in the presence of light and chlorophyll).

Light energy is converted to chemical energy, stored in glucose.

A factor in short supply that stops the rate of a process from increasing.

$6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$ (light, chlorophyll).

The enzymes controlling photosynthesis are denatured above their optimum temperature.

Carbon dioxide concentration, light intensity and temperature.

Nutrition in flowering plants

Which leaf cells do most photosynthesis, and why?

Nutrition in flowering plants

Why does the spongy mesophyll have air spaces?

Nutrition in flowering plants

How is the upper epidermis adapted for photosynthesis?

Nutrition in flowering plants **Biology only**

How is a leaf adapted for gas exchange?

Nutrition in flowering plants **Biology only**

Why are moist cell surfaces important for gas exchange in a leaf?

Nutrition in flowering plants

Why do plants need magnesium ions?

Nutrition in flowering plants

Why do plants need nitrate ions?

Nutrition in flowering plants

How can you measure the rate of photosynthesis in pondweed?

So carbon dioxide can diffuse through the leaf to the cells and oxygen can diffuse out.

Palisade mesophyll cells: packed with chloroplasts and close to the light at the top of the leaf.

Broad and flat (large surface area), thin (short diffusion distance), many stomata, air spaces in the spongy mesophyll, moist cell surfaces.

It is thin and transparent, so light passes through to the palisade cells.

To make chlorophyll. A shortage makes the leaves yellow.

Gases dissolve in the film of water on the mesophyll cells, then diffuse into or out of the cells.

Count the oxygen bubbles released per minute, or measure the volume of gas collected.

To make amino acids for proteins. A shortage causes stunted growth.

Nutrition in flowering plants

How is light intensity changed in the pondweed practical?

Nutrition in flowering plants

Why is a plant destarched before a starch test?

Nutrition in flowering plants

Why is a leaf boiled in ethanol before the iodine test?

Nutrition in flowering plants

What does a variegated leaf show in the starch test?

Nutrition in flowering plants

How do you show that carbon dioxide is needed for photosynthesis?

Human nutrition

What are the seven components of a balanced diet?

Human nutrition

How do energy requirements vary?

Human nutrition

Sources and function of carbohydrate?

So any starch found was made during the investigation. It is kept in the dark for 24 to 48 hours.

By changing the distance between the lamp and the plant.

Only the green areas turn blue-black, so chlorophyll is needed for photosynthesis.

Ethanol removes chlorophyll so the colour change can be seen. Turn off the Bunsen burner first.

Carbohydrate, protein, lipid, vitamins, minerals, water and dietary fibre.

Compare a leaf in a flask with soda lime, which absorbs carbon dioxide, with a control leaf. Test both for starch.

Bread, pasta, rice and potatoes. Provides energy.

They are higher with greater activity, are higher in teenagers than in older adults, and are higher in pregnancy.

Human nutrition

Sources and function of protein?

Human nutrition

Sources and function of lipids?

Human nutrition

Function of vitamin A, and a source?

Human nutrition

Function of vitamin C, and a source?

Human nutrition

Function of vitamin D, and a source?

Human nutrition

Function of calcium, and a source?

Human nutrition

Function of iron, and a source?

Human nutrition

Why is dietary fibre needed?

Butter, oils and nuts. Energy store, insulation and cell membranes.

Meat, fish, eggs and beans. Growth and repair.

Healthy skin and gums. Citrus fruits.

Healthy eyes and vision in dim light. Liver, carrots.

Strong bones and teeth. Milk and cheese.

Helps absorb calcium for strong bones. Oily fish, eggs, sunlight on skin.

It adds bulk, which helps peristalsis move food through the gut.

Makes haemoglobin in red blood cells. Red meat, spinach.

Human nutrition

Name the parts of the alimentary canal in order.

Human nutrition

What does the pancreas do in digestion?

Human nutrition

What happens in the ileum and in the colon?

Human nutrition

What is peristalsis?

Human nutrition

What do amylase and maltase do?

Human nutrition

What do proteases digest, and to what?

Human nutrition

What do lipases digest, and to what?

Human nutrition

Where is bile made and stored?

Makes amylase, protease and lipase and releases them into the duodenum.

Mouth, oesophagus, stomach, small intestine (duodenum, ileum), large intestine (colon, rectum), anus.

Waves of contraction of circular and longitudinal muscles that squeeze food along the gut.

Ileum: digestion is finished and products are absorbed. Colon: water is absorbed.

Proteins to amino acids.

Amylase digests starch to maltose. Maltase digests maltose to glucose.

Made in the liver. Stored in the gall bladder.

Lipids to fatty acids and glycerol.

Human nutrition

What are the two roles of bile?

Human nutrition

Why does emulsifying lipids speed up digestion?

Human nutrition

How does a villus increase absorption?

Human nutrition

What does the lacteal do?

Human nutrition **Biology only**

Equation for energy released when food burns under water?

Human nutrition **Biology only**

Why is the energy measured in the food practical too low?

Respiration

What is respiration?

Respiration

How is ATP made in respiration?

Small droplets have a larger surface area, so lipase can work faster.

It neutralises stomach acid and emulsifies lipids.

It absorbs fatty acids and glycerol into the lymph system.

Large surface area (villi, microvilli), wall one cell thick, and a capillary network that keeps the concentration gradient steep.

Heat is lost to the surroundings, and the food may not burn completely.

Energy (J) = mass of water (g) $\times$ 4.2 $\times$ temperature change ($^{\circ}\text{C}$).

Energy released from the breakdown of glucose is used to join a phosphate group to ADP, making ATP.

The chemical process in cells that releases energy from food, such as glucose, and uses it to make ATP.

Respiration

What does ATP do?

Respiration

Word equation for aerobic respiration

Respiration

Balanced symbol equation for aerobic respiration

Respiration

Word equation for anaerobic respiration in animals

Respiration

Word equation for anaerobic respiration in plants

Respiration

Why does aerobic respiration release more energy than anaerobic?

Respiration

Does anaerobic respiration need oxygen?

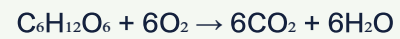
Respiration

Why are boiled seeds used in the respiring seeds practical?

glucose + oxygen → carbon dioxide + water

ATP provides energy for cells, for example for muscle contraction, active transport and making large molecules.

glucose → lactic acid



Glucose is completely broken down in aerobic respiration, but only partly broken down in anaerobic respiration.

glucose → ethanol + carbon dioxide

They are dead, so they act as a control and show that the changes are caused by living seeds.

No. Aerobic respiration needs oxygen; anaerobic respiration happens without it.

Respiration

What happens to hydrogen-carbonate indicator when seeds respire?

Gas exchange in flowering plants

Which two gases are waste products of metabolism in a leaf?

Gas exchange in flowering plants **Biology only**

What is the role of diffusion in gas exchange in a leaf?

Gas exchange in flowering plants **Biology only**

When do plants respire and when do they photosynthesise?

Gas exchange in flowering plants **Biology only**

What is the role of stomata and guard cells?

Gas exchange in flowering plants **Biology only**

What is the compensation point?

Gas exchange in flowering plants **Biology only**

Net gas exchange of a leaf in darkness?

Gas exchange in flowering plants **Biology only**

Hydrogen-carbonate indicator colours: red/orange, yellow and purple?

Carbon dioxide (from respiration) and oxygen (from photosynthesis). Both leave by diffusion through the stomata.

It changes from red/orange to yellow, because the seeds release carbon dioxide.

Plants respire all the time, but photosynthesise only when there is light.

Carbon dioxide and oxygen move into and out of the leaf down a concentration gradient.

The light intensity at which photosynthesis equals respiration, so there is no net gas exchange.

Stomata are pores for gas exchange. Guard cells open and close them.

Red/orange: normal air. Yellow: more carbon dioxide. Purple: less carbon dioxide.

Only respiration happens, so there is a net release of carbon dioxide and net uptake of oxygen.

Gas exchange in flowering plants **Biology only**

What colour is the indicator with a leaf in bright light?

Gas exchange in humans

Name the path of air from the trachea to the gas exchange surface.

Gas exchange in humans

What do the pleural membranes do?

Gas exchange in humans

What keeps the trachea open?

Gas exchange in humans

What happens when you breathe in?

Gas exchange in humans

What happens when you breathe out?

Gas exchange in humans

How are alveoli adapted for gas exchange?

Gas exchange in humans

Which direction do oxygen and carbon dioxide diffuse at the alveoli?

Trachea, bronchi, bronchioles, alveoli.

Purple, because photosynthesis is faster than respiration and the leaf takes in carbon dioxide.

Rings of cartilage.

They surround the lungs, and the fluid between them reduces friction when the lungs move.

Intercostal muscles and diaphragm relax, ribs move down and in, volume decreases, pressure rises and air moves out.

Intercostal muscles and diaphragm contract, ribs move up and out, volume of thorax increases, pressure falls and air moves in.

Oxygen diffuses from the alveoli into the blood. Carbon dioxide diffuses from the blood into the alveoli.

Large surface area, walls one cell thick, good blood supply, moist lining, and ventilation to keep a steep concentration gradient.

Gas exchange in humans

What does tar do in the lungs?

Gas exchange in humans

How does carbon monoxide harm the body?

Gas exchange in humans

How does smoking increase the risk of coronary heart disease?

Gas exchange in humans

What is emphysema?

Gas exchange in humans

How does limewater show that exhaled air contains carbon dioxide?

Gas exchange in humans

What is the effect of exercise on breathing?

The need for transport and transport in plants

Why can a unicellular organism rely on diffusion?

The need for transport and transport in plants

Why do multicellular organisms need a transport system?

It combines with haemoglobin, so red blood cells carry less oxygen and the heart works harder.

It destroys cilia, so mucus is not removed. It also contains carcinogens that cause lung cancer.

A lung disease in which alveoli walls break down, reducing the surface area for gas exchange.

Smoke damages artery linings so fatty deposits build up in the coronary arteries. Nicotine raises heart rate and blood pressure; carbon monoxide reduces oxygen carried.

Breathing rate and depth increase, because muscles respire faster and make more carbon dioxide.

It turns cloudy (milky) when carbon dioxide is bubbled through it.

Small surface area : volume ratio and long diffusion distances, so diffusion alone is too slow.

It has a large surface area compared with its volume, so substances only have a short distance to diffuse.

The need for transport and transport in plants

**What is the formula for surface area :
volume ratio?**

The need for transport and transport in plants

What does the xylem transport?

The need for transport and transport in plants

What does the phloem transport?

The need for transport and transport in plants

How is xylem adapted for its function?

The need for transport and transport in plants

Biology only

**How is water absorbed by root hair
cells?**

The need for transport and transport in plants

Biology only

**How does the root hair shape help
absorption?**

The need for transport and transport in plants

Biology only

Define transpiration.

The need for transport and transport in plants

Biology only

What is the transpiration stream?

Water and mineral ions from the roots to other parts of the plant.

Surface area $\div$ volume. A cube with 3 cm sides has $54 \text{ cm}^2 \div 27 \text{ cm}^3 = 2 : 1$.

Dead cells with no end walls form hollow tubes; lignin strengthens the walls.

Sucrose and amino acids between the leaves and other parts of the plant.

The long, thin projection gives a large surface area for absorbing water and mineral ions.

By osmosis: from the dilute soil water into the more concentrated cell sap, through the partially permeable membrane.

The continuous flow of water up the xylem to replace water lost from the leaves.

The evaporation of water from the surface of a plant.

The need for transport and transport in plants

Biology only

Which four factors affect the rate of transpiration?

The need for transport and transport in plants

Biology only

Why does high humidity reduce the rate of transpiration?

The need for transport and transport in plants

Biology only

What does a potometer measure?

The need for transport and transport in plants

Biology only

How do you calculate rate of water uptake from a potometer?

Blood and the immune system

Name the four components of blood.

Blood and the immune system

What does plasma transport?

Blood and the immune system

Where is urea transported from and to?

Blood and the immune system

How is the shape of a red blood cell adapted?

There is less of a concentration gradient of water vapour between the leaf and the air, so diffusion is slower.

Humidity, wind speed, temperature and light intensity.

Distance moved by the air bubble $\div$ time.
Multiply distance by tube cross-sectional area for volume.

The uptake of water by a cut leafy shoot, used to measure the rate of transpiration.

Carbon dioxide, digested food, urea, hormones and heat energy.

Red blood cells, white blood cells, platelets and plasma.

Biconcave disc: a large surface area for absorbing and releasing oxygen.

From the liver, where it is made, to the kidneys, to be removed in urine.

Blood and the immune system

Why do red blood cells have no nucleus?

Blood and the immune system

What is the role of haemoglobin?

Blood and the immune system

How do phagocytes defend the body?

Blood and the immune system

How do lymphocytes defend the body?

Blood and the immune system

Why are antibodies specific?

Blood and the immune system **Biology only**

What are memory cells?

Blood and the immune system **Biology only**

How does vaccination protect against future infection?

Blood and the immune system **Biology only**

What is the role of platelets?

It combines with oxygen to form oxyhaemoglobin, so red blood cells can carry oxygen.

It leaves more room for haemoglobin, so they can carry more oxygen.

They release antibodies that are specific to the antigens on a pathogen.

They ingest pathogens and destroy them.

Lymphocytes that stay in the body after exposure to an antigen and respond quickly if the pathogen returns.

Each antibody has a shape that fits the antigens of one pathogen only.

They are involved in blood clotting, which prevents blood loss and the entry of micro-organisms.

It makes memory cells, so antibodies are made sooner, faster and in greater quantity.

Blood and the immune system **Biology only**

What changes in blood clotting?

The heart and circulation

Name the four chambers of the heart.

The heart and circulation

What is the function of the septum?

The heart and circulation

What do heart valves do?

The heart and circulation

Which vessel takes blood from the left ventricle to the body?

The heart and circulation

Why is the left ventricle wall thicker than the right?

The heart and circulation

Why does heart rate increase during exercise?

The heart and circulation

What is the effect of adrenaline on the heart?

Right atrium, left atrium, right ventricle and left ventricle.

Soluble fibrinogen becomes insoluble fibrin, forming a mesh that traps red blood cells.

They open to let blood flow forwards and close to prevent backflow.

It separates the two sides of the heart so oxygenated and deoxygenated blood do not mix.

It pumps blood around the whole body, which needs higher pressure.

The aorta.

It increases the heart rate, so blood reaches the muscles faster.

Muscles respire faster, so more oxygen and glucose are needed and more carbon dioxide must be removed.

The heart and circulation

What happens in coronary heart disease?

The heart and circulation

List risk factors for coronary heart disease.

The heart and circulation

How is an artery adapted for its function?

The heart and circulation

How is a vein adapted for its function?

The heart and circulation

How is a capillary adapted for its function?

The heart and circulation

What is a double circulatory system?

The heart and circulation

Name the blood vessels to and from the liver.

The heart and circulation

Name the blood vessels to and from the kidneys.

Saturated fat and cholesterol, smoking, lack of exercise, high blood pressure, obesity, stress, genetics and age.

Fatty material builds up in the coronary arteries, narrowing them and reducing blood flow to the heart muscle.

Wide lumen and valves, to let blood flow at low pressure and stop backflow.

Thick muscular wall with elastic fibres to withstand high pressure; narrow lumen.

Blood passes through the heart twice on each circuit: heart to lungs and back, then heart to body and back.

Wall one cell thick for a short diffusion distance; a huge network gives a large surface area.

Renal artery to the kidneys and renal vein from the kidneys.

Hepatic artery and hepatic portal vein carry blood in; hepatic vein carries blood out.

Excretion

Define excretion.

Excretion

What is the excretory product of the lungs?

Excretion

What does the skin excrete in sweat?

Excretion

What do the kidneys excrete?

Excretion **Biology only**

What are the two roles of the kidney?

Excretion **Biology only**

Name the parts of the urinary system in order, from kidney to outside the body.

Excretion **Biology only**

What is the function of the bladder?

Excretion **Biology only**

Name the parts of a nephron in order.

Carbon dioxide (with water vapour).

The removal from the body of the waste products of metabolism.

Urea, with excess water and ions, in urine.

Water, salts (ions) and urea.

Kidney, ureter, bladder, urethra.

Excretion (removing urea) and osmoregulation (controlling the water and ion content of the blood).

Bowman's capsule with glomerulus, proximal convoluted tubule, loop of Henle, distal convoluted tubule, collecting duct.

It stores urine.

Excretion **Biology only**

What is ultrafiltration?

Excretion **Biology only**

What is in the glomerular filtrate, and what is not?

Excretion **Biology only**

Where is glucose reabsorbed, and why?

Excretion **Biology only**

Where is water reabsorbed into the blood from?

Excretion **Biology only**

What does urine contain?

Excretion **Biology only**

What does ADH do?

Excretion **Biology only**

What happens to ADH release and urine when the blood water content is too high?

Coordination, homeostasis and plant responses

What three parts make a co-ordinated response?

In: water, glucose, urea, ions. Not: proteins and blood cells, which are too large.

High pressure in the glomerulus forces small molecules out of the blood into the Bowman's capsule.

The collecting duct, by osmosis.

At the proximal convoluted tubule, by active transport, because glucose is needed for respiration.

It makes the collecting duct more permeable to water, so more water is reabsorbed into the blood.

Water, urea and ions.

A stimulus, a receptor and an effector.

Less ADH is released, so a large volume of dilute urine is made.

Coordination, homeostasis and plant responses

What is an effector?

Coordination, homeostasis and plant responses

How do animals and plants respond to changes in their environment?

Coordination, homeostasis and plant responses

Define homeostasis.

Coordination, homeostasis and plant responses

Give two examples of homeostasis.

Coordination, homeostasis and plant responses

How do shoots respond to light and to gravity?

Coordination, homeostasis and plant responses

How do roots respond to light and to gravity?

Coordination, homeostasis and plant responses

Where is auxin made in a shoot?

Coordination, homeostasis and plant responses

How does auxin make a shoot bend towards light?

Animals use the nervous system and hormones. Plants respond by changing how they grow.

A muscle or gland that carries out the response.

Control of body water content and control of body temperature.

The maintenance of a constant internal environment.

Negative phototropism (away from light) and positive geotropism (downwards).

Positive phototropism (towards light) and negative geotropism (upwards).

Auxin moves to the shaded side and makes those cells elongate more, so the shoot bends towards the light.

In the tip of the shoot.

The nervous system and the eye

What is the central nervous system (CNS)?

The nervous system and the eye

How are the sense organs linked to the CNS?

The nervous system and the eye

What happens when a receptor is stimulated?

The nervous system and the eye

What is a synapse?

The nervous system and the eye

How does a signal cross a synapse?

The nervous system and the eye

Put the reflex arc in order.

The nervous system and the eye

Why is a reflex fast?

The nervous system and the eye

What does the cornea do?

By nerves.

The brain and spinal cord.

A gap between two neurones.

Electrical impulses are sent along nerves into the CNS, giving a rapid response.

Stimulus, receptor, sensory neurone, relay neurone, motor neurone, effector, response.

A neurotransmitter is released, diffuses across the gap and binds to receptors on the next neurone, starting a new impulse.

Refracts (bends) light as it enters the eye.

It is automatic and impulses do not have to reach the conscious part of the brain first.

The nervous system and the eye

What does the retina contain?

The nervous system and the eye

What does the optic nerve do?

The nervous system and the eye

**Near object: ciliary muscles,
ligaments, lens?**

The nervous system and the eye

**Distant object: ciliary muscles,
ligaments, lens?**

The nervous system and the eye

**Bright light: what do the iris muscles
do?**

The nervous system and the eye

Dim light: what do the iris muscles do?

Hormones and temperature control

**Give three differences between
nervous and hormonal
communication.**

Hormones and temperature control

What is a hormone?

Carries impulses from the retina to the brain.

Light receptor cells: rods (dim light) and cones (colour, bright light).

Ciliary muscles relax, suspensory ligaments are pulled tight, lens is pulled thin.

Ciliary muscles contract, suspensory ligaments loosen, lens becomes thicker.

Radial muscles contract and circular muscles relax, so the pupil gets larger.

Circular muscles contract and radial muscles relax, so the pupil gets smaller.

A chemical messenger secreted by a gland into the blood, which affects a target organ.

Nervous: electrical impulses, fast, short-lived. Hormonal: chemicals in the blood, slower, longer-lasting.

Hormones and temperature control Source and role of adrenaline?	Hormones and temperature control Source and role of insulin?
Hormones and temperature control Source and role of testosterone?	Hormones and temperature control Source and role of oestrogen?
Hormones and temperature control Source and role of progesterone?	Hormones and temperature control Biology only What does ADH do?
Hormones and temperature control Biology only What do FSH and LH do?	Hormones and temperature control Name two skin responses when the body is too hot.

Pancreas. Lowers blood glucose: cells take up glucose and the liver stores it as glycogen.

Adrenal glands. Prepares the body for fight or flight: raises heart rate and blood glucose.

Ovaries. Female secondary sexual characteristics; builds up the uterus lining.

Testes. Male secondary sexual characteristics and sperm production.

Released by the pituitary gland. Makes collecting ducts more permeable to water, so more water is reabsorbed.

Ovaries. Maintains the lining of the uterus.

Sweating, and vasodilation (blood vessels near the surface widen).

Both from the pituitary. FSH makes an egg mature and stimulates oestrogen; LH stimulates ovulation.

Hormones and temperature control

What is vasoconstriction?

Hormones and temperature control

How does sweating cool the body?

Sweat evaporates from the skin and takes heat with it.

Blood vessels supplying the skin narrow, so less blood flows near the surface and less heat is lost.