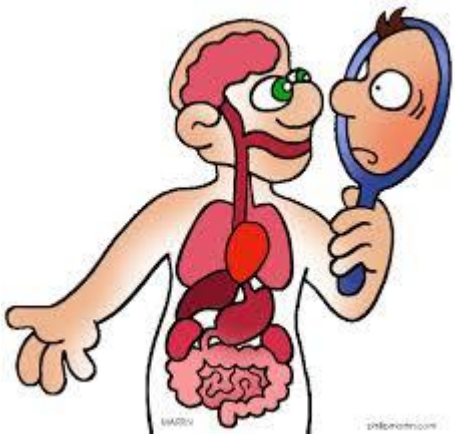
Year 10 AQA GCSE Biology Revision Checklist

Use this booklet to help you with your revision in preparation for your year 10 Biology examinations.

This is the work that you will have covered by the end of year 10 from the GCSE Syllabus Examination

How can you use this document to help you revise?

By looking at this document you can see the extent of the work that you need to fully cover and revise before you sit your GCSE examinations. This will then help you to track your progress through the year and also plan your revision for end of year examinations. Careful study and use of this document will ensure that you have sufficient time to cover all the work well before the exam. Remember to look back at the work you have done in year 9 as you will be expected to build upon this foundation. Exam questions may include some information from these topics.



BIOLOGY

Organisation in Plants	☺	😐	☹
Plant tissues, organs and systems			
Students should be able to explain how the structures of plant tissues are related to their functions. Plant tissues include: epidermal tissue, palisade mesophyll, spongy mesophyll, xylem and phloem, meristem tissue found at the growing tips of shoots and roots.			
The leaf is a plant organ. Knowledge limited to epidermis, palisade and spongy mesophyll, xylem and phloem, and guard cells surrounding stomata.			
Students should be able to explain how the structure of root hair cells, xylem and phloem are adapted to their functions.			
Students should be able to explain the effect of changing temperature, humidity, air movement and light intensity on the rate of transpiration.			
Students should be able to understand and use simple compound measures such as the rate of transpiration.			
The roots, stem and leaves form a plant organ system for transport of substances around the plant.			
Students should be able to describe the process of transpiration and translocation, including the structure and function of the stomata.			
Root hair cells are adapted for the efficient uptake of water by osmosis, and mineral ions by active transport.			
Xylem tissue transports water and mineral ions from the roots to the stems and leaves. It is composed of hollow tubes strengthened by lignin adapted for the transport of water in the transpiration stream.			
The role of stomata and guard cells are to control gas exchange and water loss.			
Phloem tissue transports dissolved sugars from the leaves to the rest of the plant for immediate use or storage. The movement of food molecules through phloem tissue is called translocation.			
Phloem is composed of tubes of elongated cells. Cell sap can move from one phloem cell to the next through pores in the end walls.			

Bioenergetics			
In this section we will explore how plants harness the Sun's energy in photosynthesis in order to make food. This process liberates oxygen which has built up over millions of years in the Earth's atmosphere. Both animals and plants use this oxygen to oxidise food in a process called aerobic respiration which transfers the energy that the organism needs to perform its functions. Conversely, anaerobic respiration does not require oxygen to transfer energy. During vigorous exercise the human body is unable to supply the cells with sufficient oxygen and it switches to anaerobic respiration. This process will supply energy but also causes the build-up of lactic acid in muscles which causes fatigue.			
Photosynthesis			
Photosynthetic reaction			
Photosynthesis is represented by the equation: carbon dioxide + water light glucose + oxygen Students should recognise the chemical symbols: CO_2, H_2O, O_2 and $C_6H_{12}O_6$.			
Students should be able to describe photosynthesis as an endothermic reaction in which energy is transferred from the environment to the chloroplasts by light.			
Rate of photosynthesis			
Students should be able to explain the effects of temperature, light intensity, carbon dioxide concentration, and the amount of chlorophyll on the rate of photosynthesis			
Students should be able to: • measure and calculate rates of photosynthesis • extract and interpret graphs of photosynthesis rate involving one limiting factor • plot and draw appropriate graphs selecting appropriate scale for axes • translate information between graphical and numeric form.			
These factors interact and any one of them may be the factor that limits photosynthesis. (HT only) Students should be able to explain graphs of photosynthesis rate involving two or three factors and decide which is the limiting factor.			
Students should understand and use inverse proportion – the inverse square law and light intensity in the context of photosynthesis. Limiting factors are important in the economics of enhancing the conditions in greenhouses to gain the maximum rate of photosynthesis while still maintaining profit			
investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed			
Uses of glucose from photosynthesis			
The glucose produced in photosynthesis may be: • used for respiration • converted into insoluble starch for storage • used to produce fat or oil for storage			

• used to produce cellulose, which strengthens the cell wall • used to produce amino acids for protein synthesis. To produce proteins, plants also use nitrate ions that are absorbed from the soil.			
Plant disease			
Plant diseases can be detected by: • stunted growth • spots on leaves • areas of decay (rot) • growths • malformed stems or leaves • discolouration • the presence of pests.			
Identification can be made by: • reference to a gardening manual or website • taking infected plants to a laboratory to identify the pathogen • using testing kits that contain monoclonal antibodies.			
Plants can be infected by a range of viral, bacterial and fungal pathogens as well as by insects.			
Knowledge of plant diseases is restricted to tobacco mosaic virus as a viral disease, black spot as a fungal disease and aphids as insects.			
Plants can be damaged by a range of ion deficiency conditions: • stunted growth caused by nitrate deficiency • chlorosis caused by magnesium deficiency. Knowledge of ions is limited to nitrate ions needed for protein synthesis and therefore growth, and magnesium ions needed to make chlorophyll.			
Plant defence responses			
Students should be able to describe physical and chemical plant defence responses.			
Physical defence responses to resist invasion of microorganisms. • Cellulose cell walls. • Tough waxy cuticle on leaves. • Layers of dead cells around stems (bark on trees) which fall off.			
Chemical plant defence responses. • Antibacterial chemicals. • Poisons to deter herbivores.			
Mechanical adaptations. • Thorns and hairs deter animals. • Leaves which droop or curl when touched. • Mimicry to trick animals.			
Respiration			
Aerobic and anaerobic respiration			
Students should be able to describe cellular respiration as an exothermic reaction which is continuously occurring in living cells. The energy transferred supplies all the energy needed for living processes. Respiration in cells can take place aerobically (using oxygen) or anaerobically (without oxygen), to transfer energy. Students should be able to compare the processes of aerobic and anaerobic			

respiration with regard to the need for oxygen, the differing products and the relative amounts of energy transferred. Organisms need energy for: • chemical reactions to build larger molecules • movement • keeping warm. Aerobic respiration is represented by the equation: glucose + oxygen carbon dioxide + water Students should recognise the chemical symbols: C6H12O6, O2, CO2 and H2O. Anaerobic respiration in muscles is represented by the equation: glucose ⟶ lactic acid As the oxidation of glucose is incomplete in anaerobic respiration much less energy is transferred than in aerobic respiration. Anaerobic respiration in plant and yeast cells is represented by the equation: glucose ethanol + carbon dioxide Anaerobic respiration in yeast cells is called fermentation and has economic importance in the manufacture of bread and alcoholic drinks.			
Response to exercise			
During exercise the human body reacts to the increased demand for energy. The heart rate, breathing rate and breath volume increase during exercise to supply the muscles with more oxygenated blood. If insufficient oxygen is supplied anaerobic respiration takes place in muscles. The incomplete oxidation of glucose causes a build up of lactic acid and creates an oxygen debt. During long periods of vigorous activity muscles become fatigued and stop contracting efficiently.			
Blood flowing through the muscles transports the lactic acid to the liver where it is converted back into glucose. Oxygen debt is the amount of extra oxygen the body needs after exercise to react with the accumulated			
The heart and blood vessels			
Students should know the structure and functioning of the human heart and lungs, including how lungs are adapted for gaseous exchange. The heart is an organ that pumps blood around the body in a double circulatory system. The right ventricle pumps blood to the lungs where gas exchange takes place. The left ventricle pumps blood around the rest of the body. Knowledge of the blood vessels associated with the heart is limited to the aorta, vena cava, pulmonary artery, pulmonary vein and coronary arteries. Knowledge of the names of the heart valves is not required. Knowledge of the lungs is restricted to the trachea, bronchi, alveoli and the capillary network surrounding the alveoli.			
The natural resting heart rate is controlled by a group of cells located in the right atrium that act as a pacemaker. Artificial pacemakers are electrical devices used to correct irregularities in the heart rate.			
The body contains three different types of blood vessel: • arteries			

• veins • capillaries. Students should be able to explain how the structure of these vessels relates to their functions.			
Students should be able to use simple compound measures such as rate and carry out rate calculations for blood flow.			
Blood			
Blood is a tissue consisting of plasma, in which the red blood cells, white blood cells and platelets are suspended. Students should know the functions of each of these blood components			
Students should be able to recognise different types of blood cells in a photograph or diagram, and explain how they are adapted to their functions.			
Coronary heart disease: a non-communicable disease			
Students should be able to evaluate the advantages and disadvantages of treating cardiovascular diseases by drugs, mechanical devices or transplant.			
In coronary heart disease layers of fatty material build up inside the coronary arteries, narrowing them. This reduces the flow of blood through the coronary arteries, resulting in a lack of oxygen for the heart muscle.			
Stents are used to keep the coronary arteries open. Statins are widely used to reduce blood cholesterol levels, which slows down the rate of fatty material deposit.			
In some people heart valves may become faulty, preventing the valve from opening fully, or the heart valve might develop a leak. Students should understand the consequences of faulty valves.			
Faulty heart valves can be replaced using biological or mechanical valves.			
In the case of heart failure a donor heart, or heart and lungs can be transplanted.			
Artificial hearts are occasionally used to keep patients alive whilst waiting for a heart transplant, or to allow the heart to rest as an aid to recovery.			
Health issues			
Students should be able to describe the relationship between health and disease and the interactions between different types of disease.			
Health is the state of physical and mental well-being.			
Diseases, both communicable and non-communicable, are major causes of ill health. Other factors including diet, stress and life situations may have a profound effect on both physical and mental health.			
Different types of disease may interact. • Defects in the immune system mean that an individual is more likely to suffer from infectious diseases. • Viruses living in cells can be the trigger for cancers. • Immune reactions initially caused by a pathogen can trigger allergies such as skin rashes and asthma. • Severe physical ill health can lead to depression and other mental illness.			
Students should be able to translate disease incidence information between graphical and numerical forms, construct and interpret frequency tables and diagrams, bar charts and histograms, and use			

a scatter diagram to identify a correlation between two variable			
Students should understand the principles of sampling as applied to scientific data, including epidemiological data.			
The effect of lifestyle on some non-communicable diseases			
Students should be able to: • discuss the human and financial cost of these non-communicable diseases to an individual, a local community, a nation or globally • explain the effect of lifestyle factors including diet, alcohol and smoking on the incidence of non-communicable diseases at local, national and global levels.			
Risk factors are linked to an increased rate of a disease. They can be: • aspects of a person's lifestyle • substances in the person's body or environment. A causal mechanism has been proven for some risk factors, but not in others. • The effects of diet, smoking and exercise on cardiovascular disease. • Obesity as a risk factor for Type 2 diabetes. • The effect of alcohol on the liver and brain function. • The effect of smoking on lung disease and lung cancer. • The effects of smoking and alcohol on unborn babies. • Carcinogens, including ionising radiation, as risk factors in cancer. Many diseases are caused by the interaction of a number of factors			
Students should be able to understand the principles of sampling as applied to scientific data in terms of risk factors			
Students should be able to translate information between graphical and numerical forms; and extract and interpret information from charts, graphs and tables in terms of risk factors.			
Students should be able to use a scatter diagram to identify a correlation between two variables in terms of risk factors.			
Cancer			
Students should be able to describe cancer as the result of changes in cells that lead to uncontrolled growth and division.			
Benign tumours are growths of abnormal cells which are contained in one area, usually within a membrane. They do not invade other parts of the body.			
Malignant tumour cells are cancers. They invade neighbouring tissues and spread to different parts of the body in the blood where they form secondary tumours. Scientists have identified lifestyle risk factors for various types of cancer.			
There are also genetic risk factors for some cancers.			
Communicable diseases			
Students should be able to explain how diseases caused by viruses, bacteria, protists and fungi are spread in animals and plants. Students should be able to explain how the spread of diseases can be reduced or prevented.			
Pathogens are microorganisms that cause infectious disease. Pathogens may be viruses, bacteria, protists or fungi. They may infect plants or animals and can be spread by direct contact, by water or by air. Bacteria and viruses may reproduce rapidly inside the body. Bacteria may produce poisons (toxins) that damage tissues and make us feel			

ill. Viruses live and reproduce inside cells, causing cell damage.			
Viral diseases			
Measles is a viral disease showing symptoms of fever and a red skin rash. Measles is a serious illness that can be fatal if complications arise. For this reason most young children are vaccinated against measles. The measles virus is spread by inhalation of droplets from sneezes and coughs.			
HIV initially causes a flu-like illness. Unless successfully controlled with antiretroviral drugs the virus attacks the body's immune cells. Late stage HIV infection, or AIDS, occurs when the body's immune system becomes so badly damaged it can no longer deal with other infections or cancers. HIV is spread by sexual contact or exchange of body fluids such as blood which occurs when drug users share needles.			
Tobacco mosaic virus (TMV) is a widespread plant pathogen affecting many species of plants including tomatoes. It gives a distinctive 'mosaic' pattern of discolouration on the leaves which affects the growth of the plant due to lack of photosynthesis.			
Bacterial diseases			
Salmonella food poisoning is spread by bacteria ingested in food, or on food prepared in unhygienic conditions. In the UK, poultry are vaccinated against Salmonella to control the spread. Fever, abdominal cramps, vomiting and diarrhoea are caused by the bacteria and the toxins they secrete.			
Gonorrhoea is a sexually transmitted disease (STD) with symptoms of a thick yellow or green discharge from the vagina or penis and pain on urinating. It is caused by a bacterium and was easily treated with the antibiotic penicillin until many resistant strains appeared. Gonorrhoea is spread by sexual contact. The spread can be controlled by treatment with antibiotics or the use of a barrier method of contraception such as a condom.			
Fungal diseases			
Rose black spot is a fungal disease where purple or black spots develop on leaves, which often turn yellow and drop early. It affects the growth of the plant as photosynthesis is reduced. It is spread in the environment by water or wind. Rose black spot can be treated by using fungicides and/or removing and destroying the affected leaves			
Protist disease			
The pathogens that cause malaria are protists. The malarial protist has a life cycle that includes the mosquito. Malaria causes recurrent episodes of fever and can be fatal. The spread of malaria is controlled by preventing the vectors, mosquitos, from breeding and by using mosquito nets to avoid being bitten.			
Human defence system			
Students should be able to describe the non-specific defence systems of the human body against pathogens, including the: • skin • nose • trachea and bronchi			

• stomach			
Students should be able to explain the role of the immune system in the defence against disease. If a pathogen enters the body the immune system tries to destroy the pathogen. White blood cells help to defend against pathogens by: • phagocytosis • antibody production • antitoxin production.			
Vaccination			
Students should be able to explain how vaccination will prevent illness in an individual, and how the spread of pathogens can be reduced by immunising a large proportion of the population.			
Vaccination involves introducing small quantities of dead or inactive forms of a pathogen into the body to stimulate the white blood cells to produce antibodies. If the same pathogen re-enters the body the white blood cells respond quickly to produce the correct antibodies, preventing infection			
Students do not need to know details of vaccination schedules and side effects associated with specific vaccines.			
Antibiotics and painkillers			
Students should be able to explain the use of antibiotics and other medicines in treating disease			
Antibiotics, such as penicillin, are medicines that help to cure bacterial disease by killing infective bacteria inside the body. It is important that specific bacteria should be treated by specific antibiotics			
The use of antibiotics has greatly reduced deaths from infectious bacterial diseases. However, the emergence of strains resistant to antibiotics is of great concern.			
Antibiotics cannot kill viral pathogens.			
Painkillers and other medicines are used to treat the symptoms of disease but do not kill pathogens.			
It is difficult to develop drugs that kill viruses without also damaging the body's tissues			
Discovery and development of drug			
Students should be able to describe the process of discovery and development of potential new medicines, including preclinical and clinical testing.			
Traditionally drugs were extracted from plants and microorganisms. • The heart drug digitalis originates from foxgloves. • The painkiller aspirin originates from willow. • Penicillin was discovered by Alexander Fleming from the Penicillium mould.			
Most new drugs are synthesised by chemists in the pharmaceutical industry. However, the starting point may still be a chemical extracted from a plant			
New medical drugs have to be tested and trialled before being used to check that they are safe and effective. New drugs are extensively tested for toxicity, efficacy and dose.			

Preclinical testing is done in a laboratory using cells, tissues and live animals.			
Clinical trials use healthy volunteers and patients. • Very low doses of the drug are given at the start of the clinical trial. • If the drug is found to be safe, further clinical trials are carried out to find the optimum dose for the drug. • In double blind trials, some patients are given a placebo.			
Monoclonal antibodies			
Producing monoclonal antibodies			
Students should be able to describe how monoclonal antibodies are produced. Monoclonal antibodies are produced from a single clone of cells. The antibodies are specific to one binding site on one protein antigen and so are able to target a specific chemical or specific cells in the body.			
They are produced by stimulating mouse lymphocytes to make a particular antibody. The lymphocytes are combined with a particular kind of tumour cell to make a cell called a hybridoma cell. The hybridoma cell can both divide and make the antibody. Single hybridoma cells are cloned to produce many identical cells that all produce the same antibody. A large amount of the antibody can be collected and purified			
Uses of monoclonal antibodies			
Students should be able to describe some of the ways in which monoclonal antibodies can be used. Some examples include: • For diagnosis such as in pregnancy tests. • In laboratories to measure the levels of hormones and other chemicals in blood, or to detect pathogens. • In research to locate or identify specific molecules in a cell or tissue by binding to them with a fluorescent dye. • To treat some diseases: for cancer the monoclonal antibody can be bound to a radioactive substance, a toxic drug or a chemical which stops cells growing and dividing. It delivers the substance to the cancer cells without harming other cells in the body. Students are not expected to recall any specific tests or treatments but given appropriate information they should be able to explain how they work			
Monoclonal antibodies create more side effects than expected. They are not yet as widely used as everyone hoped when they were first developed.			
Homeostasis and response			
Cells in the body can only survive within narrow physical and chemical limits. They require a constant temperature and pH as well as a constant supply of dissolved food and water. In order to do this the body requires control systems that constantly monitor and adjust the composition of the blood and tissues. These control systems include receptors which sense changes and effectors that bring about changes. In this section we will explore the structure and function of the nervous system and how it can bring about fast responses. We will also explore the hormonal system which usually brings about much slower changes. Hormonal coordination is particularly important in reproduction since it controls the menstrual cycle. An understanding of the role of hormones in reproduction has allowed scientists to develop not only			

contraceptive drugs but also drugs which can increase fertility.			
Homeostasis			
Students should be able to explain that homeostasis is the regulation of the internal conditions of a cell or organism to maintain optimum conditions for function in response to internal and external changes.			
Homeostasis maintains optimal conditions for enzyme action and all cell functions.			
In the human body, these include control of: • blood glucose concentration • body temperature • water levels.			
These automatic control systems may involve nervous responses or chemical responses.			
All control systems include: • cells called receptors, which detect stimuli (changes in the environment) • coordination centres (such as the brain, spinal cord and pancreas) that receive and process information from receptors • effectors, muscles or glands, which bring about responses which restore optimum levels.			
The human nervous system			
Structure and function			
Students should be able to explain how the structure of the nervous system is adapted to its functions. The nervous system enables humans to react to their surroundings and to coordinate their behaviour. Information from receptors passes along cells (neurones) as electrical impulses to the central nervous system (CNS). The CNS is the brain and spinal cord. The CNS coordinates the response of effectors which may be muscles contracting or glands secreting hormones. stimulus receptor coordinator effector response Students should be able to explain how the various structures in a reflex arc – including the sensory neurone, synapse, relay neurone and motor neurone – relate to their function. Students should understand why reflex actions are important. Reflex actions are automatic and rapid; they do not involve the conscious part of the brain.			
Students should be able to extract and interpret data from graphs, charts and tables, about the functioning of the nervous system			
Students should be able to translate information about reaction times between numerical and graphical forms.			
The brain			
The brain controls complex behaviour. It is made of billions of interconnected neurones and has different regions that carry out different functions. Students should be able to identify the cerebral cortex, cerebellum and medulla on a diagram of the brain, and describe their functions.			
Students should be able to explain some of the difficulties of investigating brain function and treating brain damage and disease.			
Neuroscientists have been able to map the regions of the brain to particular functions by studying patients with brain damage, electrically stimulating different parts of the brain and using MRI scanning techniques. The complexity and delicacy of the brain makes investigating and treating brain			

disorders very difficult.			
The eye			
Students should be able to relate the structures of the eye to their functions. This includes: • accommodation to focus on near or distant objects • adaptation to dim light. The eye is a sense organ containing receptors sensitive to light intensity and colour.			
Students should be able to identify the following structures on a diagram of the eye and explain how their structure is related to their function: • retina • optic nerve • sclera • cornea • iris • ciliary muscles • suspensory ligaments.			
Accommodation is the process of changing the shape of the lens to focus on near or distant objects.			
To focus on a near object: • the ciliary muscles contract • the suspensory ligaments loosen • the lens is then thicker and refracts light rays strongly.			
To focus on a distant object: • the ciliary muscles relax • the suspensory ligaments are pulled tight • the lens is then pulled thin and only slightly refracts light rays.			
Two common defects of the eyes are myopia (short sightedness) and hyperopia (long sightedness) in which rays of light do not focus on the retina.			
Generally these defects are treated with spectacle lenses which refract the light rays so that they do focus on the retina.			
New technologies now include hard and soft contact lenses, laser surgery to change the shape of the cornea and a replacement lens in the eye.			
Students should be able to interpret ray diagrams, showing these two common defects of the eye and demonstrate how spectacle lenses correct them.			
Control of body temperature			
Body temperature is monitored and controlled by the thermoregulatory centre in the brain. The thermoregulatory centre contains receptors sensitive to the temperature of the blood. The skin contains temperature receptors and sends nervous impulses to the thermoregulatory centre. If the body temperature is too high, blood vessels dilate (vasodilation) and sweat is produced from the sweat glands. Both these mechanisms cause a transfer of energy from the skin to the environment. If the body temperature is too low, blood vessels constrict (vasoconstriction), sweating stops and skeletal muscles contract (shiver).			
Students should be able to explain how these mechanisms lower or raise body temperature in a given context			
Plant hormones			
Control and coordination			
Plants produce hormones to coordinate and control growth and responses to light (phototropism) and gravity (gravitropism or geotropism).			
Unequal distributions of auxin cause unequal growth rates in plant roots and shoots.			
Gibberellins are important in initiating seed germination.			
Ethene controls cell division and ripening of fruits			
The mechanisms of how gibberellins and ethene work are not required.			

Use of plant hormones			
Students should be able to describe the effects of some plant hormones and the different ways people use them to control plant growth. Plant growth hormones are used in agriculture and horticulture.			
Auxins are used: • as weed killers • as rooting powders • for promoting growth in tissue culture.			
Ethene is used in the food industry to control ripening of fruit during storage and transport.			
Gibberellins can be used to: • end seed dormancy • promote flowering • increase fruit size.			
Hormonal coordination in humans			
Human endocrine system			
Students should be able to describe the principles of hormonal coordination and control by the human endocrine system. The endocrine system is composed of glands which secrete chemicals called hormones directly into the bloodstream. The blood carries the hormone to a target organ where it produces an effect. Compared to the nervous system the effects are slower but act for longer. The pituitary gland in the brain is a 'master gland' which secretes several hormones into the blood in response to body conditions. These hormones in turn act on other glands to stimulate other hormones to be released to bring about effects. Students should be able to identify the position of the following on a diagram of the human body: • pituitary gland • pancreas • thyroid • adrenal gland • ovary • testes.			
Control of blood glucose concentration			
Blood glucose concentration is monitored and controlled by the pancreas. If the blood glucose concentration is too high, the pancreas produces the hormone insulin that causes glucose to move from the blood into the cells.			
In liver and muscle cells excess glucose is converted to glycogen for storage.			
Students should be able to explain how insulin controls blood glucose (sugar) levels in the body.			
Type 1 diabetes is a disorder in which the pancreas fails to produce sufficient insulin. It is characterised by uncontrolled high blood glucose levels and is normally treated with insulin injections.			
In Type 2 diabetes the body cells no longer respond to insulin produced by the pancreas. A carbohydrate controlled diet and an exercise regime are common treatments.			
Obesity is a risk factor for Type 2 diabetes. Students should be able to compare Type 1 and Type 2 diabetes and explain how they can be treated.			
Students should be able to extract information and interpret data from graphs that show the effect of insulin in blood glucose levels in both people with diabetes and people without diabetes			
If the blood glucose concentration is too low, the pancreas produces the hormone glucagon that causes glycogen to be converted into glucose and released into the blood.			
Students should be able to explain how glucagon interacts with insulin in a negative feedback cycle to control blood glucose (sugar) levels in the body.			

Maintaining water and nitrogen balance in the body			
Students should be able to explain the effect on cells of osmotic changes in body fluids.			
Water leaves the body via the lungs during exhalation.			
Water, ions and urea are lost from the skin in sweat.			
There is no control over water, ion or urea loss by the lungs or skin.			
Excess water, ions and urea are removed via the kidneys in the urine. If body cells lose or gain too much water by osmosis they do not function efficiently			
The digestion of proteins from the diet results in excess amino acids which need to be excreted safely.			
In the liver these amino acids are deaminated to form ammonia. Ammonia is toxic and so it is immediately converted to urea for safe excretion.			
Students should be able to describe the function of kidneys in maintaining the water balance of the body. The kidneys produce urine by filtration of the blood and selective reabsorption of useful substances such as glucose, some ions and water. Knowledge of other parts of the urinary system, the structure of the kidney and the structure of a nephron is not required.			
Students should be able to translate tables and bar charts of glucose, ions and urea before and after filtration.			
Students should be able to describe the effect of ADH on the permeability of the kidney tubules.			
The water level in the body is controlled by the hormone ADH which acts on the kidney tubules.			
ADH is released by the pituitary gland when the blood is too concentrated and it causes more water to be reabsorbed back into the blood from the kidney tubules.			
This is controlled by negative feedback.			
People who suffer from kidney failure may be treated by organ transplant or by using kidney dialysis. Students should know the basic principles of dialysis.			