MARINA INTERNATIONAL SCHOOL

BIOLOGY SCHEME OF WORK

FORM 4 - TERM 1

WEEK	TOPIC	TOPIC DETAILS
1.1	Characteristics of living organisms	Define the terms: – movement as an action by an organism or part of an organism causing a change ofposition or place – respiration as the chemical reactions in cell that break down nutrient molecules and release energy for metabolism – sensitivity as the ability to detect or sense stimuli in the internal or external environment and to make appropriate responses
1.2	Characteristics of living organisms continue	– growth as a permanent increase in size and dry mass by an increase in cell number or cell size or both – excretion as removal from organisms of the waste products of metabolism (chemical reactions in cells including respiration), toxic materials, and substances in excess of requirements – nutrition as taking in of materials for energy, growth and development; plants require light, carbon dioxide, water and ions; animals need organic compounds and ions and usually need water
2.1	Concept and use of a classification system	•• Explain that classification systems aim to reflect evolutionary relationships •• Explain that classification is traditionally based on studies of morphology and anatomy •• Explain that the sequences of bases in DNA and of amino acids in proteins are used as a more accurate means of classification •• Explain that organisms which share a more recent ancestor (are more closely related) have base sequences in DNA that are more similar than those that share only a distant ancestor
3.1	Features of organisms	List the features in the cells of all living organisms, limited to ribosomes for protein synthesis and enzymes involved in respiration List the main features used to place all organisms into one of the five kingdoms: Animal, Plant, Fungus, Prokaryote, Protoctist List the main features used to place organisms into groups within the plant kingdom, limited to ferns and flowering plants (dicotyledons and monocotyledons) List the features of viruses, limited to protein coat and genetic material

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3.2	Dichotomous keys	Construct and use simple dichotomous keys based on easily identifiable features
4.1	Cell structure and organisation	•• Describe and compare the structure of a plant cell with an animal cell, as seen under a light microscope, limited to cell wall, nucleus, cytoplasm, chloroplasts, vacuoles and location of the cell membrane •• State the functions of the structures seen under the light microscope in the plant cell and in the animal cell
4.2	Cell structure and organisation	•• State that the cytoplasm of all cells contains structures, limited to ribosomes on rough endoplasmic reticulum and vesicles •• State that almost all cells, except prokaryotes, have mitochondria and rough endoplasmic reticulum •• Identify mitochondria and rough endoplasmic reticulum in diagrams and images of cells •• State that aerobic respiration occurs in mitochondria •• State that cells with high rates of metabolism require large numbers of mitochondria to provide sufficient energy
5.1	Levels of organization	•• Relate the structure of the following to their functions: – ciliated cells – movement of mucus in the trachea and bronchi – root hair cells – absorption – xylem vessels – conduction and support – palisade mesophyll cells – photosynthesis – nerve cells – conduction of impulses – red blood cells – transport of oxygen – sperm and egg cells – reproduction •• Define tissue as a group of cells with similar structures, working together to perform a shared function •• Define organ as a structure made up of a group of tissues, working together to perform specific functions •• Define organ system as a group of organs with related functions, working together to perform body functions •• State examples of tissues, organs and organ systems from sections 6 to 16 •• Identify the different levels of organisationin drawings, diagrams and images of familiar material
5.2	Size of specimens	Calculate magnification and size of biological specimens using millimetres and micrometres as units

WEEK	TOPIC	TOPIC DETAILS
6.1	Movement in and out of cells- Diffusion	•• Define diffusion as the net movement of particles from a region of their higher concentration to a region of their lower concentration down a concentration gradient, as a result of their random movement •• Describe the importance of diffusion of gases and solutes •• State that substances move into and out of cells by diffusion through the cell membrane •• State that the energy for diffusion comes from the kinetic energy of random movement of molecules and ions •• Investigate the factors that influence diffusion, limited to surface area, temperature, concentration gradients and distance
7.1	Osmosis & Active transport	•• Define osmosis as the net movement of water molecules from a region of higher water potential (dilute solution) to a region of lower water potential (concentrated solution), through a partially permeable membrane •• Explain the effects on plant tissues of immersing them in solutions of different concentrations by using the terms turgid, turgor pressure, plasmolysis and flaccid •• Explain the importance of water potential and osmosis in the uptake of water by plants •• Explain the importance of water potential and osmosis on animal cells and tissues •• Explain how plants are supported by the turgor pressure within cells, in terms of water pressure acting against an inelastic cell wall
7.2	Active transport	Define active transport as the movement of particles through a cell membrane from a region of lower concentration to a region of higher concentration using energy from respiration Discuss the importance of active transport as a process for movement across membranes: – e.g. ion uptake by root hairs and uptake of glucose by epithelial cells of villi and kidney tubules Explain how protein molecules move particles across a membrane during active transport
8.1	Biological molecules	•• List the chemical elements that make up: – carbohydrates – fats – proteins •• State that large molecules are made from smaller molecules, limited to: – starch and glycogen from glucose – cellulose from glucose – proteins from amino acids – fats and oils from fatty acids and glycerol •• Describe the use of: – iodine solution to test for starch – Benedict's solution to test for reducing sugars – biuret test for proteins – ethanol emulsion test for fats and oils – DCPIP test for vitamin C

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8.2	Biological molecules	•• Explain that different sequences of amino acids give different shapes to protein molecules •• Relate the shape and structure of protein molecules to their function, limited to the active site of enzymes and the binding site of antibodies •• Describe the structure of DNA as: – two strands coiled together to form a double helix – each strand contains chemicals called bases – cross-links between the strands are formed by pairs of bases – the bases always pair up in the same way: A with T, and C with G (full names are not required) •• Describe the roles of water as a solvent in organisms with respect to digestion, excretion and transport
9.1	Enzymes	•• Define the term catalyst as a substance that increases the rate of a chemical reaction and is not changed by the reaction •• Define enzymes as proteins that function as biological catalysts •• Describe why enzymes are important in all living organisms in terms of reaction speed necessary to sustain life •• Describe enzyme action with reference to the complementary shape of an enzyme and its substrate and the formation of a product (knowledge of the term active site is not required) •• Investigate and describe the effect of changes in temperature and pH on enzyme activity
9.2	Enzymes	•• Explain enzyme action with reference to the active site, enzyme-substrate complex, substrate and product •• Explain the specificity of enzymes in terms of the complementary shape and fit of the active site with the substrate •• Explain the effect of changes in temperature on enzyme activity in terms of kinetic energy, shape and fit, frequency of effective collisions and denaturation •• Explain the effect of changes in pH on enzyme activity in terms of shape and fit and denaturation
10.1	Plant nutrition-Photosynthesis	•• Define photosynthesis as the process by which plants manufacture carbohydrates from raw materials using energy from light •• State the word equation for photosynthesis: carbon dioxide + water → glucose + oxygen, in the presence of light and chlorophyll •• State the balanced chemical equation for photosynthesis $6CO_2 + 6H_2O$ ---- $C_6H_{12}O_6 + 6O_2$ light ,chlorophyll •• Explain that chlorophyll transfers light energy into chemical energy in molecules, for the synthesis of carbohydrates •• Outline the subsequent use and storage of the carbohydrates made in photosynthesis

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10.2	Plant nutrition-Photosynthesis	•• Define the term limiting factor as something present in the environment in such short supply that it restricts life processes •• Identify and explain the limiting factors of photosynthesis in different environmental conditions •• Describe the use of carbon dioxide enrichment, optimum light and optimum temperatures in glasshouses in temperate and tropical countries •• Use hydrogencarbonate indicator solution to investigate the effect of gas exchange of an aquatic plant kept in the light and in the dark
11.1	Leaf structure & Mineral requirements	•• Identify chloroplasts, cuticle, guard cells and stomata, upper and lower epidermis, palisade mesophyll, spongy mesophyll, vascular bundles, xylem and phloem in leaves of a dicotyledonous plant •• Explain how the internal structure of a leaf is adapted for photosynthesis •• Describe the importance of: – nitrate ions for making amino acids – magnesium ions for making chlorophyll •• Explain the effects of nitrate ion and magnesium ion deficiency on plant growth
12.1	Human nutrition & Diet	•• State what is meant by the term balanced diet for humans •• Explain how age, gender and activity affect the dietary needs of humans including during pregnancy and whilst breast-feeding •• Describe the effects of malnutrition in relation to starvation, constipation, coronary heart disease, obesity and scurvy •• List the principal sources of, and describe the dietary importance of: – carbohydrates – fats – proteins – vitamins, limited to C and D – mineral salts, limited to calcium and iron – fibre (roughage) – water •• Explain the causes and effects of vitamin D and iron deficiencies •• Explain the causes and effects of protein-energy malnutrition, e.g. kwashiorkor and marasmus
13.1	Alimentary canal	•• Define ingestion as the taking of substances, e.g. food and drink, into the body through the mouth •• Define mechanical digestion as the breakdown of food into smaller pieces without chemical change to the food molecules •• Define chemical digestion as the breakdown of large, insoluble molecules into small, soluble molecules •• Define absorption as the movement of small food molecules and ions through the wall of the intestine into the blood •• Define assimilation as the movement of digested food molecules into the cells of the body where they are used, becoming part of the cells

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13.2	Alimentary canal	•• Define egestion as the passing out of food thathas not been digested or absorbed, as faeces,through the anus •• Describe diarrhoea as the loss of watery faeces •• Outline the treatment of diarrhoea using oral rehydration therapy •• Describe cholera as a disease caused by a Bacterium •• Explain that the cholera bacterium produces a toxin that causes secretion of chloride ions into the small intestine, causing osmotic movement of water into the gut, causing diarrhoea, dehydration and loss of salts from blood

BIOLOGY SCHEME OF WORK

FORM 4 - TERM 2

WEEK	TOPIC	TOPIC DETAILS
1.1	Mechanical digestion	•• Identify the types of human teeth (incisors, canines, premolars and molars) •• Describe the structure of human teeth, limited to enamel, dentine, pulp, nerves and cement, as well as the gums •• Describe the functions of the types of human teeth in mechanical digestion of food •• State the causes of dental decay in terms of a coating of bacteria and food on teeth, the bacteria respiring sugars in the food, producing acid which dissolves the enamel and dentine •• Describe the proper care of teeth in terms of diet and regular brushing
1.2	chemical digestion	•• State the significance of chemical digestion in the alimentary canal in producing small, soluble molecules that can be absorbed •• State the functions of enzymes as follows: – amylase breaks down starch to simpler sugars – protease breaks down protein to amino acids – lipase breaks down fats to fatty acids and glycerol •• State where, in the alimentary canal, amylase, protease and lipase are secreted •• State the functions of the hydrochloric acid in gastric juice, limited to killing bacteria in food and giving an acid pH for enzymes •• Describe the digestion of starch in the alimentary canal: – amylase is secreted into the alimentary canal and breaks down starch to maltose – maltose is broken down by maltase to glucose on the membranes of the epithelium lining the small intestine

WEEK	TOPIC	TOPIC DETAILS
1.3	Chemical digestion	..Describe pepsin and trypsin as two protease enzymes that function in different parts of the alimentary canal: – pepsin in the stomach – trypsin in the small intestine ..Explain the functions of the hydrochloric acid in gastric juice, limited to the low pH: – denaturing enzymes in harmful microorganisms in food– giving the optimum pH for pepsin activity •• Outline the role of bile in neutralising the acidic mixture of food and gastric juices entering the duodenum from the stomach, to provide a suitable pH for enzyme action •• Outline the role of bile in emulsifying fats to increase the surface area for the chemical digestion of fat to fatty acids and glycerol by lipase
2.1	Absorption	•• Identify the small intestine as the region for the absorption of digested food •• Explain the significance of villi and microvilli in increasing the internal surface area of the small intestine •• Describe the structure of a villus •• Describe the roles of capillaries and lacteals in villi •• State that water is absorbed in both the small intestine and the colon, but that most absorption of water happens in the small intestine
3.1	Transport in plants & Water uptake	•• State the functions of xylem and phloem •• Identify the position of xylem and phloem as seen in sections of roots, stems and leaves, limited to non-woody dicotyledonous plants •• Identify root hair cells, as seen under the light microscope, and state their functions •• State the pathway taken by water through root, stem and leaf as root hair cells, root cortex cells, xylem and mesophyll cells •• Investigate, using a suitable stain, the pathway of water through the above-ground parts of a plant •• Explain that the large surface area of root hairs increases the rate of the absorption of water by osmosis and ions by active transport

WEEK	TOPIC	TOPIC DETAILS
4.1	Transpiration & Translocation	•• State that water is transported from the roots to leaves through the xylem vessels •• Define transpiration as loss of water vapour from plant leaves by evaporation of water at the surfaces of the mesophyll cells followed by diffusion of water vapour through the stomata •• Explain how water vapour loss is related to the large surface area of cell surfaces, interconnecting air spaces and stomata •• Explain the mechanism by which water moves upwards in the xylem in terms of a transpiration pull that draws up a column of water molecules, held together by cohesion •• Explain how and why wilting occurs•• Explain the effects of variation of temperature and humidity on transpiration rate •• Investigate and describe the effects of variation of temperature and humidity on transpiration rate
5.1	Transport in animals & Heart	•• Describe the circulatory system as a system of blood vessels with a pump and valves to ensure one-way flow of blood •• Describe the single circulation of a fish •• Describe the double circulation of a mammal •• Explain the advantages of a double circulation •• Name and identify the structures of the mammalian heart, limited to the muscular wall, the septum, the left and right ventricles and atria, one-way valves and coronary arteries •• State that blood is pumped away from the heart into arteries and returns to the heart in veins •• Name and identify the atrioventricular and semilunar valves in the mammalian heart •• Explain the relative thickness: – of the muscle wall of the left and right ventricles – of the muscle wall of the atria compared to that of the ventricles •• Explain the importance of the septum in separating oxygenated and deoxygenated blood
5.2	Transport in animals & Heart	•• Describe the functioning of the heart in terms of the contraction of muscles of the atria and ventricles and the action of the valves •• Explain the effect of physical activity on the heart rate •• Discuss the roles of diet and exercise in the prevention of coronary heart disease •• Describe ways in which coronary heart disease may be treated, limited to drug treatment with aspirin and surgery (stents, angioplasty and bypass •• State that the activity of the heart may be monitored by ECG, pulse rate and listening to sounds of valves closing •• Investigate and state the effect of physical activity on the pulse rate •• Describe coronary heart disease in terms of the blockage of coronary arteries and state the possible risk factors as diet, stress, smoking, genetic predisposition, age and gende

WEEK	TOPIC	TOPIC DETAILS
6.1	Blood and lymphatic vessels	•• Describe the structure and functions of arteries, veins and capillaries •• Name the main blood vessels to and from the: – heart, limited to vena cava, aorta, pulmonary artery and pulmonary vein – lungs, limited to the pulmonary artery and pulmonary vein – kidney, limited to the renal artery and renal Vein •• Explain how the structures of arteries, veins and capillaries are adapted for their functions •• State the function of arterioles, venules and shunt vessels •• Outline the lymphatic system in terms of lymphatic vessels and lymph nodes •• Describe the function of the lymphatic system in the circulation of body fluids and the protection of the body from infection
6.2	Blood	•• List the components of blood as red blood cells, white blood cells, platelets and plasma •• Identify red and white blood cells, as seen under the light microscope, on prepared slides and in diagrams and photomicrographs •• State the functions of the following components of blood: – red blood cells in transporting oxygen, including the role of haemoglobin – white blood cells in phagocytosis and antibody production – platelets in clotting (details are not required) – plasma in the transport of blood cells, ions, soluble nutrients, hormones and carbon dioxide •• Identify lymphocyte and phagocyte white blood cells, as seen under the light microscope, on prepared slides and in diagrams and photomicrographs •• State the functions of: – lymphocytes – antibody production – phagocytes – phagocytosis •• Describe the process of clotting as the conversion of fibrinogen to fibrin to form a mesh •• State the roles of blood clotting as preventing blood loss and preventing the entry of pathogens •• Describe the transfer of materials between capillaries and tissue fluid (details of the roles of water potential and hydrostatic pressure are not required)
7.1	Diseases and immunity	•• Define pathogen as a disease-causing organism •• Define transmissible disease as a disease in which the pathogen can be passed from one host to another •• State that the pathogen for a transmissible disease may be transmitted either through direct contact, e.g. through blood or other body fluids, or indirectly, e.g. from contaminated surfaces or food, from animals, or from the air •• State that the body has defences: – mechanical barriers, limited to skin and hairs in the nose – chemical barriers, limited to mucus and stomach acid – cells, limited to phagocytosis and antibody production by white blood cells – which can be enhanced by vaccination

WEEK	TOPIC	TOPIC DETAILS
7.2	Diseases and immunity	•• State that antibodies lock on to antigens leading to direct destruction of pathogens, or marking of pathogens for destruction by phagocytes •• Explain how each pathogen has its own antigens, which have specific shapes, so specific antibodies which fit the specific shapes of the antigens are needed •• Define active immunity as defence against a pathogen by antibody production in the body •• Explain that active immunity is gained after an infection by a pathogen, or by vaccination •• Explain the process of vaccination: – harmless pathogen given which has antigens – antigens trigger an immune response by lymphocytes which produce antibodies – memory cells are produced that give long-term immunity
8.1	Diseases and immunity continued	•• Explain the importance of hygienic food preparation, good personal hygiene, waste disposal and sewage treatment in controlling the spread of disease •• Explain the role of vaccination in controlling the spread of diseases •• Explain that passive immunity is short-term defence against a pathogen by antibodies acquired from another individual, e.g. mother tob infant •• State that memory cells are not produced in passive immunity •• Explain the importance of passive immunity for breast-fed infants •• State that some diseases are caused by the immune system targeting and destroying body cells, limited to type 1 diabetes
9.1	Gas exchange in humans	•• List the features of gas exchange surfaces in humans, limited to large surface area, thin surface, good blood supply and good ventilation with air •• Name and identify the lungs, diaphragm, ribs, intercostal muscles, larynx, trachea, bronchi, bronchioles, alveoli and associated capillaries •• Name and identify the internal and external intercostal muscles •• State the functions of the cartilage in the trachea •• Explain the role of the ribs, the internal and external intercostal muscles and the diaphragm in producing volume and pressure changes in the thorax leading to the ventilation of the lungs •• Explain the differences in composition between inspired and expired air •• Use limewater as a test for carbon dioxide to investigate the differences in composition between inspired and expired air •• Investigate and describe the effects of physical activity on rate and depth of breathing •• Explain the link between physical activity and rate and depth of breathing in terms of the increased carbon dioxide concentration in the blood, detected by the brain, causing an increased rate of breathing •• Explain the role of goblet cells, mucus and ciliated cells in protecting the gas exchange system from pathogens and particles

WEEK	TOPIC	TOPIC DETAILS
10.1	Respiration & Aerobic respiration	•• State the uses of energy in the body of humans: muscle contraction, protein synthesis, cell division, active transport, growth, the passage of nerve impulses and the maintenance of a constant body temperature •• State that respiration involves the action of enzymes in cells •• Define aerobic respiration as the chemical reactions in cells that use oxygen to break down nutrient molecules to release energy •• State the word equation for aerobic respiration as glucose + oxygen → carbon dioxide + water •• State the balanced chemical equation for aerobic respiration as $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$ •• Investigate the effect of temperature on the rate of respiration of germinating seeds •• Investigate the uptake of oxygen by respiring organisms, such as arthropods and germinating seeds
11.1	Anaerobic respiration	•• Define anaerobic respiration as the chemical reactions in cells that break down nutrient molecules to release energy without using oxygen •• State the word equations for anaerobic respiration in muscles during vigorous exercise (glucose → lactic acid) and in the microorganism yeast (glucose → alcohol + carbon dioxide) •• State that anaerobic respiration releases much less energy per glucose molecule than aerobic respiration •• State the balanced chemical equation for anaerobic respiration in the microorganism yeast as $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$ •• State that lactic acid builds up in muscles and blood during vigorous exercise causing an oxygen debt •• Outline how the oxygen debt is removed during recovery, limited to: – aerobic respiration of lactic acid in the liver – continuation, after exercise, of fast heart rate to transport lactic acid in blood from muscles to the liver – continuation, after exercise, of deeper breathing supplying oxygen for aerobic respiration of lactic acid

BIOLOGY SCHEME OF WORK

FORM 4 - TERM 3

WEEK	TOPIC	TOPIC DETAILS
1.1	Excretion in humans	•• State that urea is formed in the liver from excess amino acids •• State that carbon dioxide is excreted through the lungs •• State that the kidneys excrete urea and excess water and salts •• Explain that the volume and concentration of urine produced is affected by water intake, temperature and exercise •• Identify on drawings, diagrams and images, the ureters, bladder and urethra. •• Describe the role of the liver in the assimilation of amino acids by converting them to proteins, including plasma proteins, e.g. fibrinogen •• Define deamination as the removal of the nitrogen-containing part of amino acids to form urea
2.1	Excretion in humans	•• Explain the need for excretion, limited to toxicity of urea and carbon dioxide •• Outline the structure of the kidney, limited to the cortex, medulla and ureter •• Outline the structure and functioning of a kidney tubule, including: – the role of the glomerulus in the filtration from the blood of water, glucose, urea and salts – the role of the tubule in the reabsorption of all of the glucose, most of the water and some salts back into the blood, leading to the concentration of urea in the urine as well as loss of excess water and salts (details of these processes are not required) •• Explain dialysis in terms of salt balance, the maintenance of glucose concentration and the removal of urea •• Describe the use of dialysis in kidney machines •• Discuss the advantages and disadvantages of kidney transplants, compared with dialysis

WEEK	TOPIC	TOPIC DETAILS
3.1	1 Nervous control in humans	•• Describe a nerve impulse as an electrical signal that passes along nerve cells called neurones •• Describe the human nervous system in terms of: – the central nervous system consisting of brain and spinal cord – the peripheral nervous system – coordination and regulation of body functions •• Identify motor (effector), relay (connector) and sensory neurones from diagrams •• Describe a simple reflex arc in terms of receptor, sensory neurone, relay neurone, motor neurones and effector •• Describe a reflex action as a means of automatically and rapidly integrating and coordinating stimuli with the responses of effectors (muscles and glands) •• Define a synapse as a junction between two neurones
4.1	Nervous control in humans	•• Distinguish between voluntary and involuntary Actions •• Describe the structure of a synapse, including the presence of neurotransmitter containing vesicles, the synaptic cleft and neurotransmitter receptor molecules •• Describe how an impulse triggers the release of a neurotransmitter from vesicles into the synaptic gap and how the neurotransmitter diffuses across to bind with receptor molecules, in the membrane of the neurone after the synaptic gap, causing the impulse to continue •• State that in a reflex arc the synapses ensure that impulses travel in one direction only •• State that many drugs, e.g. heroin, act upon synapses
5.1	Sense organs	•• Define sense organs as groups of receptor cells responding to specific stimuli: light, sound, touch, temperature and chemicals •• Identify the structures of the eye, limited to cornea, iris, pupil, lens, retina, optic nerve and blind spot •• Describe the function of each part of the eye, limited to: – cornea – refracts light – iris – controls how much light enters pupil – lens – focuses light onto retina – retina – contains light receptors, some sensitive to light of different colours – optic nerve – carries impulses to the brain •• Explain the pupil reflex in terms of light intensity and pupil diameter only
5.2	Sense organs	•• Explain the pupil reflex in terms of light intensity and antagonistic action of circular and radial muscles in the iris •• Explain accommodation to view near and distant objects in terms of the contraction and relaxation of the ciliary muscles, tension in the suspensory ligaments, shape of the lens and refraction of light •• State the distribution of rods and cones in the retina of a human •• Outline the function of rods and cones, limited to greater sensitivity of rods for night vision and three different kinds of cones absorbing light of different colours for colour vision •• Identify the position of the fovea

WEEK	TOPIC	TOPIC DETAILS
6.1	Hormones in humans	•• Define a hormone as a chemical substance, produced by a gland and carried by the blood, which alters the activity of one or more specific target organs •• Identify specific endocrine glands and their secretions, limited to adrenal glands and adrenaline, pancreas and insulin, testes and testosterone and ovaries and oestrogen •• Describe adrenaline as the hormone secreted in 'fight or flight' situations and its effects, limited to increased breathing and pulse rate and widened pupils •• Give examples of situations in which adrenaline secretion increases •• State the functions of insulin, oestrogen and Testosterone •• Discuss the role of the hormone adrenaline in the chemical control of metabolic activity, including increasing the blood glucose concentration and pulse rate •• Compare nervous and hormonal control systems in terms of speed and longevity of action
7.1	Homeostasis	•• Define homeostasis as the maintenance of a constant internal environment •• Name and identify on a diagram of the skin: hairs, hair erector muscles, sweat glands, receptors, sensory neurones, blood vessels and fatty tissue •• Describe the maintenance of a constant internal body temperature in humans in terms of insulation, sweating, shivering and the role of the brain (limited to blood temperature receptors and coordination) •• Explain that homeostasis is the control of internal conditions within set limits •• Explain the concept of control by negative feedback •• Describe the control of the glucose concentration of the blood by the liver and the roles of insulin and glucagon from the pancreas •• Outline the symptoms and treatment of type 1 diabetes (detail of β cells is not required) •• Describe the maintenance of a constant internal body temperature in humans in terms of vasodilation and vasoconstriction of arterioles supplying skin surface capillaries
8.1	Tropic responses	•• Define gravitropism as a response in which parts of a plant grow towards or away from gravity •• Define phototropism as a response in which parts of a plant grow towards or away from the direction from which light is coming •• Investigate gravitropism and phototropism in shoots and roots •• Explain phototropism and gravitropism of a shoot as examples of the chemical control of plant growth •• Explain the role of auxin in controlling shoot growth, limited to: – auxin made in shoot tip (only) – auxin spreads through the plant from the shoot tip – auxin is unequally distributed in response to light and gravity – auxin stimulates cell elongation •• Describe the use in weedkillers of the synthetic plant hormone 2,4-D

WEEK	TOPIC	TOPIC DETAILS
9.1	Drugs & Medicinal drugs	•• Define a drug as any substance taken into the body that modifies or affects chemical reactions in the body •• Describe the use of antibiotics for the treatment of bacterial infection •• State that some bacteria are resistant to antibiotics which reduces the effectiveness of antibiotics •• State that antibiotics kill bacteria but do not affect viruses •• Explain how development of resistant bacteria such as MRSA can be minimised, limited to using antibiotics only when essential and ensuring treatment is completed •• Explain why antibiotics kill bacteria, but do not affect viruses
10.1	Misused drugs	•• Explain how development of resistant bacteria such as MRSA can be minimised, limited to using antibiotics only when essential and ensuring treatment is completed •• Explain why antibiotics kill bacteria, but do not affect viruses nicotine and tar •• State that the liver is the site of break down of alcohol and other toxins •• Explain how heroin affects the nervous system, limited to its effect on the function of synapses •• Discuss the evidence for the link between smoking and lung cancer •• Discuss the use of hormones to improve sporting performance, limited to testosterone and anabolic steroids