Learners Cloud

Education, Anywhere, Anytime

OCR 21ST CENTURY GCSE BIOLOGY EXAMINATION BOARD COVERAGE

TOPIC	HEADING	OCR 21ST CENTURY KEYWORDS	OCR 21ST CENTURY CORE	OCR 21ST CENTURY ADDITIONAL	OCR 21ST CENTURY EXTENSION
Adaptation, classification and evolution	Classification	Species, classification, similarities, differences (physical features, DNA), levels of classification (Kingdom, species), role of classification	Y		
Adaptation, classification and evolution	Adaptations to the environment	Adaptation, survival and reproduction	Y		
Adaptation, classification and evolution	Evolution by natural selection	Simple life began 3.5 billion years ago, genetic variation, inheritance, genes, natural selection, selective breeding, interpret data, new species, evidence (fossils, DNA), Darwin's theory, Lamarck	Y		
Adaptation, classification and evolution	Speciation	Combined effects of mutation, environmental change and isolation	Y		
Behaviour	Rhythms in plants and animals	N/A			
Behaviour	Behaviour and conditioning	Stimulus, simple involuntary reflex, survival, examples. Conditioning, Pavlov's dogs, response, secondary stimulus, learning, survival, modify reflex.		Y	
Behaviour	Communication and plant and animal interactions	N/A			
Behaviour	Human evolution	Evidence for evolution through fossils and DNA	Y		
Biotechnology	Introduction to working with microbes	N/A			
Biotechnology	Making use of microbes	Advantages of using microbes, large-scale production of medicines, single cell protein, enzymes			Y
Biotechnology	Using enzymes in industry	Large-scale production of enzymes			Y

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Biotechnology	Genetic engineering	Transfer of genes - isolate gene, place in vector, insert and select. Examples (insulin production, herbicide resistance).			Y
Biotechnology	Biofuels	Biogas and alcohol production, anaerobic respiration. Crude oil, sunlight as sustainable source of energy			Y
Biotechnology	New technologies in biology	Overview of microbes and genetic modification, genetic testing. Nanotechnology, definition, applications in food industry, stem cell technology, biomedical engineering (pacemakers, heart valves)			Y
Cell processes	Aerobic and anaerobic respiration	Role of respiration (movement, synthesis, active transport). Anaerobic respiration in plant cells and yeast (applications). Word and symbol equations.		Y	
Cell processes	Diffusion, osmosis and active transport	Diffusion, passive, concentration, leaf, osmosis, definition, partially permeable membrane, active transport, absorption of nitrates by roots		Y	
Cells and cell division	Cells	Plant cell (chloroplast, membrane, nucleus, cytoplasm, mitochondria, vacuole, cell wall) and functions. Animal and microbial cells, function of cell components in respiration		Y	
Cells and cell division	The microscope	N/A			
Cells and cell division	Cell division - mitosis	Mitosis, genetically identical, cell cycle, chromosomes copied, increase in number of organelles		Y	
Cells and cell division	Cell division - meiosis	Meiosis, gametes, half chromosome number, zygote		Y	
Cells and cell division	Cloning	Asexual reproduction, natural clones (bulbs, runners), identical twins, nuclear transfer. Plant cuttings, meristems, rooting hormone, mammalian cloning, reactivation of genes	Y	Y	

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Cells and cell division	Stem cells	Adult, embryonic stem cells, unspecialised, potential for treatments, specialisation, 8-cell stage, meristems and specialisation into plant tissues. Genes switched off, ethical issues and government regulation. Treatment of leukaemia and spinal cord injuries	Y	Y	
Cells and cell division	Growth and development	N/A			
DNA and genes	DNA, genes and the genetic code	DNA, double helix, base pairs AT CG, code for proteins		Y	
DNA and genes	Genetic modification	Transferring genes, main steps, applications - insulin production, herbicide resistance			
Drugs	Developing new drugs	Testing new drugs and vaccines for safety and effectiveness, using animals, using animal cells, human trials, open label blind and double blind, long term trials, ethical issues of placebos	Y		
Drugs	Alcohol, cigarettes and health	Effects of misuse of nicotine and alcohol on heart rate, blood pressure, heart attack	Y		
Drugs	Drugs and their misuse	Misuse of drugs (ecstasy, cannabis, nicotine, alcohol) on heart rate, blood pressure, heart attack	Y		
Ecosystems, cycles and energy flow	Energy and biomass in food chains	Interdependence, competition for resources, food web, environmental changes, sun's energy, photosynthesis, transfer of energy and losses, detritivores, efficiency calculations	Y		
Ecosystems, cycles and energy flow	Parasitism and mutualistic feeding relationships	N/A			
Ecosystems, cycles and energy flow	Decay and the carbon cycle	Carbon recycling, combustion, respiration, photosynthesis, decomposition, role of microorganisms	Y		
Ecosystems, cycles and energy flow	The nitrogen cycle	Nitrogen cycling, fixation, nitrates, proteins, food chains, release and uptake of nitrates, denitrification, role of microorganisms, interpret diagrams	Y		

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Farming and food security	Food security	Human activity can unbalance natural ecosystems. Sustainable harvesting, quotas, restocking, tensions between conservation and communities			Y
Farming and food security	Farming	N/A			
Fieldwork	Fieldwork techniques in biology	Techniques (light meter, quadrat, key, transect) investigating effect of light on plants		Y	
Fieldwork	Fossil evidence for evolution	Evidence for evolution		Y	
Fieldwork	Soil	N/A			
Homeostasis	Homeostasis - balancing the internal environment	Homeostasis, nervous and hormonal control, steady levels for proper cell functions, receptor, processing centre, effector, negative feedback	Y		
Homeostasis	Thermoregulation - balancing heat gain and loss	Balancing heat gain and loss, skin receptors, brain receptor (hypothalamus), effectors (sweat glands, muscles). Sweating, vasodilation, dehydration. Shivering, vasoconstriction, antagonistic effectors			Y
Homeostasis	Controlling blood sugar level and diabetes	Blood sugar level, processed foods, type 1 diabetes - pancreas, insulin, injections, type 2 - late onset, diet and exercise, interpret data - unhealthy lifestyles			Y
Human impact on the environment	Pollution and environmental change	Environmental change, non-living indicators (nitrates, temp, CO_2 levels), living indicators (phytoplankton, lichens, river organisms), interpret data. Bioaccumulation, eutrophication.	Y		
Human impact on the environment	Human impact on biodiversity	Biodiversity (different species, range of organisms, genetic variation), importance for food crops and medicines, rate of extinction, maintaining biodiversity and sustainability, silting, desertification	Y		Y

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Human impact on the environment	Sustainability	Sustainability, future generations, monoculture, improving sustainability, decreasing use of materials. Closed loop systems, ecosystems, interpret closed loop diagrams and data, role of vegetation in stable ecosystems, ecosystem services. Waste and emissions. Unsustainable practice	Y		Y
Inheritance	Variation and inherited characteristics	Genes, nucleus, instructions for proteins (structural, functional), DNA, chromosomes, genetic and environmental factors, several genes working together	Y		
Inheritance	Genetic disorders and genetic diagrams - OCR	Genetic disorders, faulty alleles, Huntington's disease, cystic fibrosis, carrier, interpret genetic diagrams, genetic testing, testing embryos (pre-implantation genetic diagnosis) predictive testing, implications of testing, use of testing by others, use of DNA technology in genetic testing (isolation of DNA from WBCs, labelled gene probe)	Y		
Inheritance	Genes and inheritance	Paired/single chromosomes, genes, alleles, homozygous, heterozygous, sexual reproduction and variation, dominant, recessive, interpret Punnett squares, genotype, phenotype	Y		
Inheritance	Sex determination and sex-linked genetic disorders	XY and XX, sex-determining gene on Y chromosome and testes, inheritance of sex chromosome	Y		
Keeping healthy	Organ transplants	N/A			
Keeping healthy	Pathogens and the body's defences against disease	N/A			
Keeping healthy	Antimicrobial agents and microbial resistance	Antimicrobial chemicals kill/inhibit bacteria, fungi, viruses, antibiotics, resistance, mutation and resistance, correct use of antibiotics	Y		

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Keeping healthy	Harmful microbes, vaccination and immunity	Symptoms, toxins, rapid reproduction of bacteria and viruses, calculating population growth, white blood cells, immune system, antibodies, antigens, memory cells, immunity, vaccination, need for vaccinating large numbers, side effects and risk	Y		
Keeping healthy	Diet	N/A			
Keeping healthy	Heart disease	Fatty deposits, heart attack, lifestyle (diet, stress, smoking, drugs) and genetic factors, exercise, comparing incidence in different countries, epidemiology, assessing levels of risk, blood pressure and heart disease	Y		
Nerves and hormones	Hormones in our bodies	Chemicals produced in glands, e.g. insulin, oestrogen		Y	
Nerves and hormones	Tropisms - hormone control of plant growth	Influence of environment, phototropism, increasing survival, explain phototropism (auxin distribution)		Y	
Nerves and hormones	Uses of plant hormones	N/A			
Nerves and hormones	The nervous system	Nervous coordination, receptor, processing centre, effector (gland, muscle), impulses		Y	
Nerves and hormones	The reflex arc	Neurons (axon, membrane, fatty sheath), receptors, effectors, CNS - brain, spinal cord, PNS - sensory/motor neurons, spinal reflex arc pathway, relay neuron, automatic response		Y	
Nerves and hormones	The synapse	Synapse, neurotransmitters, receptor molecule, effect of toxins and drugs (ecstasy, beta blockers, Prozac)		Y	
Nerves and hormones	The brain and mind	Cerebral cortex, intelligence, memory, language, consciousness, brain mapping (brain damage, electrical stimulation, MRI)		Y	
Nerves and hormones	Hormone control of the menstrual cycle	N/A			
Nerves and hormones	Controlling fertility	N/A			

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Photosynthesis	The leaf and photosynthesis	Role of photosynthesis, word, symbol equation, stages, fate of glucose, diffusion of gases, limiting factors (temp, CO_2, light), interpret data		Y	
Photosynthesis	Transpiration and plant transport	Uptake of minerals by roots		Y	
Proteins and enzymes	Proteins	Proteins as chains of amino acids with specific shape (no explicit ref).		Y	
Proteins and enzymes	How proteins are made	Explain how bases in gene is code for amino acids, protein production in cytoplasm, messenger RNA		Y	
Proteins and enzymes	Enzymes	Enzymes, protein, reaction rate, instructions in genes, shape, active site, lock and key model, influence of temp and pH, changes to shape of active site, denature		Y	
Tissues, organs and organ systems	Effect of exercise on the body	Heart rate, pulse, blood pressure as two numbers, normal range of measurements, medical and lifestyle history and exercise regime, interpret data (heart rate, blood pressure, recovery period), Body Mass Index formula, accuracy and repeatability of data		Y	Y
Tissues, organs and organ systems	Cells, tissues, organs and organ systems	Plant tissues (xylem, phloem), organs (flower, leaf, stem, root). Multicellular organisms' need for nervous and hormonal communication		Y	
Tissues, organs and organ systems	Blood and circulatory system	Circulatory system, heart as double pump, heart muscle and own blood supply, structure and function of arteries, veins and capillaries. Blood (red, white cells, platelets, plasma). Adaptation of RBC to function (haemoglobin, no nucleus, biconcave). Heart - named structures and vessels, valves. Formation of tissue fluid, diffusion and exchange		Y	
Tissues, organs and organ systems	Gas exchange and the lungs	N/A			

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Tissues, organs and organ systems	Digestive system and digestive enzymes	N/A			
Tissues, organs and organ systems	The kidney and water balance	Balanced water level, water gains and losses, kidneys, waste, urine concentration, ADH, pituitary gland, negative feedback, alcohol and ecstasy = effect on urine production and ADH	Y		
Tissues, organs and organ systems	The skeleton and joints	Internal skeleton, vertebrates, support, movement, antagonistic muscles, joint (cartilage, synovial fluid, ligament, tendon, bone), injuries (sprains, dislocations, torn ligaments or tendons), symptoms and treatment of sprains, physiotherapist			Y