Personalised Learning Checklists Edexcel Single: Biology Paper 1

Edexcel Single Biology (1BI0) from 2016 Topics B2&3				
Topic	**Student Checklist**	**R**	**A**	**G**
Topic 2 – Cells and control	Describe mitosis as part of the cell cycle, including the stages interphase, prophase, metaphase, anaphase and telophase and cytokinesis			
	Describe the importance of mitosis in growth, repair and asexual reproduction			
	Describe the division of a cell by mitosis in terms of cells formed and chromosome numbers			
	Describe cancer as the result of changes in cells that lead to uncontrolled cell division			
	Describe growth in plants and animals including: cell division, differentiation and elongation (plants only)			
	Explain the importance of cell differentiation in the development of specialised cell			
	Demonstrate an understanding of the use of percentiles charts to monitor growth			
	Describe the function of embryonic stem cells in animals and meristems in plants			
	Discuss the potential benefits and risks associated with the use of stem cells in medicine			
	Bio ONLY: Describe the structures and functions of the brain including the cerebellum, cerebral hemispheres and medulla oblongata			
	Bio & HT ONLY: Explain how the difficulties of accessing brain tissue inside the skull can be overcome by using CT scanning and PET scanning			
	Bio & HT ONLY: Explain some of the limitations in treating damage and disease in the brain and other parts of the nervous system			
	Explain the structure and function of the nervous system including neurones, synapses and neurotransmitters			
	Explain the structure and function of a reflex arc including sensory, relay and motor neurones			
	Bio ONLY: Explain the structure and function of the eye as a sensory receptor including the role of: cornea, lens, iris, rod and cone cells			
	Bio ONLY: Describe defects of the eye including cataracts, long-sightedness, short-sightedness and colour blindness			

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Topic 3 – Genetics	Bio ONLY: Explain how cataracts, long-sightedness and short-sightedness can be corrected			
	Bio ONLY: Explain some of the advantages and disadvantages of asexual reproduction			
	Bio ONLY: Explain some of the advantages and disadvantages of sexual reproduction			
	Explain the role of meiotic cell division in terms of cells formed and chromosome numbers			
	Describe the structure of DNA in terms of bases and bonding			
	Describe what a genome and gene are and describe the role of a gene			
	Explain how DNA can be extracted from fruit			
	Bio & HT ONLY: Explain how the order of bases in a section of DNA decides the order of amino acids and how this determines the shape of the protein			
	Bio & HT ONLY: Describe the stages of protein synthesis, including transcription and translation:			
	Bio & HT ONLY: Describe how genetic variants in the non-coding DNA of a gene can affect phenotype			
	Bio & HT ONLY: Describe how genetic variants in the coding DNA of a gene can affect phenotype			
	Bio ONLY: Describe the work of Mendel in discovering the basis of genetics and recognise the difficulties of understanding inheritance before this discovery			
	Explain why there are differences in the inherited characteristics as a result of alleles			
	Explain the terms: chromosome, gene, allele, dominant, recessive, homozygous, heterozygous, genotype, phenotype, gamete and zygote			
	Explain monohybrid inheritance using genetic diagrams, Punnett squares and family pedigrees			
	Describe how the sex of offspring is determined at fertilisation, using genetic diagrams			
	Calculate and analyse outcomes (using probabilities, ratios and percentages) from monohybrid crosses and pedigree analysis for dominant and recessive traits			
	Bio ONLY: Describe the inheritance of the ABO blood groups with reference to codominance and multiple alleles			
	Bio & HT ONLY: Explain how sex-linked genetic disorders are inherited			
	State that most phenotypic features are the result of multiple genes rather than single gene inheritance			
	Describe the causes of variation that influence phenotype: genetic/environmental variation and mutations			
	Discuss the outcomes of the Human Genome Project and its potential applications within medicine			
	State that there is usually extensive genetic variation within a population of a species and that these arise through mutations			

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Edexcel Single Biology (1BI0) from 2016 Topic B4&5				
Topic	**Student Checklist**	**R**	**A**	**G**
Topic 4 – Natural selection and genetic modification	Describe the differences in severity of a genetic mutation on the phenotype			
	Bio ONLY: Describe the work of Darwin and Wallace in the development of the theory of evolution by natural selection and explain the impact of these ideas on modern biology			
	Explain Darwin's theory of evolution by natural selection			
	Explain how the emergence of resistant organisms supports Darwin's theory of evolution including antibiotic resistance in bacteria			
	Describe the evidence for human evolution, based on fossils, including: Ardi, Lucy and Leakey's discovery of fossils			
	Describe the evidence for human evolution based on stone tools, including: a) the development of stone tools over time b) how these can be dated from their environment			
	Bio ONLY: Describe how the anatomy of the pentadactyl limb provides scientists with evidence for evolution			
	Describe how genetic analysis has led to the suggestion of the three domains rather than the five kingdoms classification method			
	Explain selective breeding and its impact on food plants and domesticated animals			
	Bio ONLY: Describe the process of tissue culture and its advantages in medical research and plant breeding programmes			
	Describe genetic engineering as a process which involves modifying the genome of an organism to introduce desirable characteristics			
	HT ONLY: Describe the main stages of genetic engineering including the use of: restriction enzymes, ligase, sticky ends and vectors			
	Bio ONLY: Explain the advantages and disadvantages of genetic engineering to produce GM organisms including the modification of crop plants			
	Bio ONLY: Explain the advantages and disadvantages of agricultural solutions to the demands of a growing human population, including use of fertilisers and biological control			

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Topic 5 – Health, disease and the development of medicines	Evaluate the benefits and risks of genetic engineering and selective breeding in modern agriculture and medicine, including practical and ethical implications			
	Describe health as defined by the World Health Organization (WHO)			
	Describe the difference between communicable and non-communicable diseases			
	Explain why the presence of one disease can lead to a higher susceptibility to other diseases			
	Describe a pathogen as a disease-causing organism, including viruses, bacteria, fungi and protists			
	Describe some common infections, including: cholera, tuberculosis, Chalara ash dieback, malaria, HIV, stomach ulcers, Ebola and state the pathogen type and details of the symptoms			
	Explain how pathogens are spread and how this spread can be reduced or prevented, including: cholera, tuberculosis, Chalara ash dieback, malaria, HIV, stomach ulcers, Ebola			
	Bio ONLY: Describe the lifecycle of a virus, including lysogenic and lytic pathways			
	Explain how sexually transmitted infections (STIs) are spread and how this spread can be reduced or prevented, including: Chlamydia and HIV			
	Bio ONLY: Describe how some plants defend themselves against attack from pests and pathogens by physical barriers			
	Bio ONLY: Describe how plants defend themselves against attack from pests and pathogens by producing chemicals and how some can be used to treat humans			
	Bio & HT ONLY: Describe different ways plant diseases can be detected and identified			
	Describe how the physical barriers and chemical defences of the human body provide protection from pathogens			
	Explain the role of the specific immune system of the human body in defence against disease, including ideas on antigens and lymphocytes			
	Explain the body's response to immunisation using an inactive form of a pathogen			
	Bio ONLY: Discuss the advantages and disadvantages of immunisation, including the concept of herd immunity			
	Explain why antibiotics can only be used to treat bacterial infections			
	Bio ONLY: Explain the aseptic techniques used in culturing microorganisms in the laboratory			
	Bio ONLY: Core Practical: Investigate the effects of antiseptics, antibiotics or plant extracts on microbial cultures			
	Bio ONLY: Calculate cross-sectional areas of bacterial cultures and clear agar jelly using πr^2			
	Describe that the process of developing new medicines, including antibiotics, has many stages, including discovery, development, preclinical and clinical testing			
	Bio & HT ONLY: Describe the production of monoclonal antibodies			
	Bio & HT ONLY: Explain the use of monoclonal antibodies			
	Describe that many non-communicable human diseases are caused by the interaction of a number of factors			
	Explain the effect of lifestyle factors on non-communicable diseases at local, national and global levels including BMI, alcohol and smoking			
	Evaluate some different treatments for cardiovascular disease, including: life-long medication, surgical procedures and lifestyle changes			