Edexcel (combined) Biology Topics (1SC0) from 2016 - Paper 1 (Topic 1)				
Topic	**Student Checklist**	**R**	**A**	**G**
Topic 1 – Key concepts in biology	Explain how the sub-cellular structures of eukaryotic and prokaryotic cells are related to their functions, including: animal, plant & bacteria			
	Explain how specialised cells are adapted to their functions, including: sperm, egg and ciliated epithelial cells			
	Explain how changes in microscope technology, including electron microscopy, have enabled us to see cell structures with more clarity and detail than in the past			
	Demonstrate an understanding of number, size and scale, including the use of estimations and explain when they should be used			
	Demonstrate an understanding of the relationship between quantitative units in relation to cells, including: milli, micro, nano & pico			
	HT ONLY: Complete calculations with numbers written in standard form			
	Core Practical: Investigate biological specimens using microscopes, including magnification calculations and labelled scientific drawings from observations			
	Explain the mechanism of enzyme action including the active site and enzyme specificity			
	Explain how enzymes can be denatured due to changes in the shape of the active site			
	Explain the effects of temperature, substrate concentration and pH on enzyme activity			
	Core Practical: Investigate the effect of pH on enzyme activity			
	Demonstrate an understanding of rate calculations for enzyme activity			
	Demonstrate an understanding of rate calculations for enzyme activity			
	Explain the importance of enzymes as biological catalysts in the synthesis and breakdown of carbohydrates, fats and proteins			
	Explain how substances are transported into and out of cells, including by diffusion, osmosis and active transport			
	Core Practical: Investigate osmosis in potatoes			
	Calculate percentage gain and loss of mass in osmosis			

Edexcel (combined) Biology Topics (1SC0) from 2016 Paper 1 (Topics 2&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			
	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			
Topic 3 – Genetics	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			
	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			
	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			

Edexcel (combined) Biology Topics (1SC0) from 2016 - Paper 1 (Topics 4&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			
	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			
	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			
	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			
	Evaluate the benefits and risks of genetic engineering and selective breeding in modern agriculture and medicine, including practical and ethical implications			
Topic 5 – Health, disease and the development of medicines	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			
	Explain how sexually transmitted infections (STIs) are spread and how this spread can be reduced or prevented, including: Chlamydia and HIV			
	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			
	Explain why antibiotics can only be used to treat bacterial infections			
	Describe that the process of developing new medicines, including antibiotics, has many stages, including discovery, development, preclinical and clinical testing			
	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			