

# OCR Course Guide

Candidates taking the OCR AS biology course are required to complete the units F211, F212 and F213. Candidates taking the

OCR A2 course will need to complete the requirements for the AS course, as well as units F214, F215, and F216.

AS Content	Topics in AS Workbook	A2 Content	Topics in A2 Workbook
<b>Unit F211: Cells, Exchange and Transport</b>		<b>Unit F214: Communication, Homeostasis and Energy</b>	
<b>Module 1: Cells</b> 1.1.1 Microscopy techniques & stains, organelle structure and function, protein secretion, eukaryote and prokaryote cells characteristics. 1.1.2 Membrane structure and function. Membrane transport systems. Cell signalling and receptors. Osmosis and water potential. 1.1.3 Mitosis, homologous chromosomes. Stem cells, cell differentiation, and tissue organisation.	Cell Structure  Cell Membranes  Cell Division & Organisation	<b>Module 1: Communication and Homeostasis</b> 4.1.1 Communication systems in multicellular organisms: nervous and hormonal coordination, feedback, thermoregulation. 4.1.2 Sensory receptors, neurones, action potentials, myelination, cholinergic synapses. 4.1.3 Endocrine glands and chemical messengers, adrenal glands and pancreas, regulation of blood glucose, diabetes, control of heart rate.	Communication & Homeostasis  Nerves  Hormones
<b>Module 2: Exchange and Transport</b> 1.2.1 Surface area to volume ratio, diffusion. Mammalian lung & gas exchange system. Breathing in humans, measuring breathing. 1.2.2 Animal transport systems, mammalian heart & the cardiac cycle. Structure and function of arteries, veins and capillaries, tissue fluid and lymph. Haemoglobin and oxygen binding. 1.2.3 Plant transport systems. Structure and function of transport tissues. Transpiration, translocation. Water potential, water movement.	Exchange Surfaces & Breathing  Transport In Animals  Transport in Plants	<b>Module 2: Excretion</b> 4.2.1 Structure and roles of the liver and role of the kidneys. Control of urine output and composition, urinalysis, renal failure.	Excretion
<b>Unit F212: Molecules, Biodiversity, Food and Health</b>		<b>Unit F215: Control, Genomes and Environment</b>	
<b>Module 1: Biological Molecule</b> 2.1.1 Water. Amino acids, peptide bonds. Structure and function of proteins, carbohydrates & lipids. Hydrolysis and condensation. Food testing methods. 2.1.2 Nucleic acids, structure of DNA, DNA replication, the basis of protein synthesis. 2.1.3 Enzyme structure and function, mode of action, enzyme activity, inhibitors, cofactors.	Biological Molecules  Nucleic Acids  Enzymes	<b>Module 1: Cellular Control and Variation</b> 5.1.1 Genes and the genetic code, transcription, translation, mutation, Lac operon, apoptosis and genetic control of development. 5.1.2 Meiosis and variation, genetic crosses, chi squared, sex linkage, codominance, epistasis. Continuous and discontinuous variation, genotype and environment. Variation and selection, Hardy-Weinberg principle, calculation of allele frequencies, natural selection, genetic drift, isolation and speciation, species concept, artificial selection.	Cellular Control  Meiosis & Variation  Variation & Evolution
<b>Module 2: Food and Health</b> 2.2.1 Diet & nutrition, malnutrition & obesity, CHD. Importance of plants. Selective breeding, microbes & food production, increasing food production, food preservation. 2.2.2 Health and disease, pathogens. Malaria, HIV, TB. Health effects of smoking. Immune system and the body's defences. Immunity and vaccination. New medicines.	Diet & Food Production  Infectious Disease, Smoking: A Choice Against Health Defence & the Immune System	<b>Module 2: Biotechnology &amp; Gene Technologies</b> 5.2.1 Reproductive and non-reproductive cloning, natural clones in plants, cloning in animals. 5.2.2 Biotechnology, microorganisms in biotechnology, enzyme immobilisation, continuous and batch cultures, metabolites. 5.2.3 Genome sequencing, genetic engineering DNA probes, transgenic organisms, gene therapy, GE xenotransplants, ethical issues.	Cloning in Plants and Animals  Biotechnology  Genomes & Gene Technologies
<b>Module 3: Biodiversity and Evolution</b> 2.3.1 Species, habitat and biodiversity. Sampling and measuring biodiversity. 2.3.2 Classification systems. Features of the five kingdoms, identification keys. 2.3.3 Darwin's theory of natural selection, speciation, variation. Mechanisms and evidence for evolution. Pesticide resistance. Antibiotic and other drug resistance. 2.3.4 Conservation. Maintaining biodiversity, global climate change and biodiversity.	Biodiversity & Classification  Biodiversity & Classification  Evolution  Maintaining Biodiversity	<b>Module 3: Ecosystems and Sustainability</b> 5.3.1 Ecosystems: trophic structure, energy transfers, primary succession, measuring distribution and abundance, microbes recycling, and nitrogen cycle. 5.3.2 Population growth, species interactions, conservation, preservation, and sustainable management. Human impact (Galapagos).	Ecosystems  Populations & Sustainability
<b>Unit F213: Practical Skills in Biology 1</b>		<b>Module 4: Responding to the Environment</b> 5.4.1 Tropisms, phytohormones, gibberellins and auxins, commercial uses of plant hormones. 5.4.2 Animal responses: brain and nervous system, autonomic nervous system and reflexes, muscle activity and movement, fight or flight responses. 5.4.3 Innate behaviour, types of learning, sociality in primates, dopamine and behaviour.	
<b>1. Qualitative Task</b> Use of appropriate qualitative skills to perform a practical task. Safe techniques, accurate observation and recording.	Practical Skills in Biology 1 Cell Structure	<b>Unit F216: Practical Skills in Biology 2</b>	
<b>2. Quantitative Task</b> Use of appropriate quantitative skills to perform a practical task safely. Accurate measurements and use of the correct degree of precision.	Practical Skills in Biology 1	<b>1 Qualitative task</b>	Practical Skills in Biology 2  Ecosystems
<b>3. Evaluative Task</b> Processing and recording results, evaluating trends and drawing conclusions. Identifying limitations. Reliability and validity of data.	Practical Skills in Biology 1	<b>2 Quantitative task</b>	
		<b>3 Evaluative task</b>	