

OCR (B)

If your child is studying OCR (B) then we recommend they attend our OCR (A) course. Our course tutor Fariyo says: "OCR (B) is more closely aligned to OCR (A) "

Module 1 – Development of practical skills in biology

OCR (B) Topic	Equivalent OCR (A) Topic	Covered by OCR (A)	Not covered by OCR (A)
1.1.1 Planning	1.1.1 Planning	<ul style="list-style-type: none"> - experimental design, including to solve problems set in a practical context - identification of variables that must be controlled, where appropriate - evaluation that an experimental method is appropriate to meet the expected outcomes. 	
1.1.2 Implementing	1.1.2 Implementing	<ul style="list-style-type: none"> - how to use a wide range of practical apparatus and techniques correctly - appropriate units for measurements - presenting observations and data in an appropriate format. 	
1.1.3 Analysis	1.1.3 Analysis	<ul style="list-style-type: none"> - processing, analysing and interpreting qualitative and quantitative experimental results - use of appropriate mathematical skills for analysis of quantitative data - appropriate use of significant figures - plotting and interpreting suitable graphs from experimental results, including selection and labelling of axes with appropriate scales, quantities and units and measurement of gradients and intercepts 	

OCR (B) Topic	Equivalent OCR (A) Topic	Covered by OCR (A)	Not covered by OCR (A)
1.1.4 Evaluation	1.1.4 Evaluation	<ul style="list-style-type: none"> - <i>how to evaluate results and draw conclusions</i> - <i>the identification of anomalies in experimental measurements</i> - <i>the limitations in experimental procedures</i> - <i>precision and accuracy of measurements and data, including margins of error, percentage errors and uncertainties in apparatus</i> - <i>the refining of experimental design by suggestion of improvements to the procedures and apparatus</i> 	

Module 2: Cells, chemicals for life, transport and gas exchange

OCR (B) Topic	Equivalent OCR (A) Topic	Covered by OCR (A)	Not covered by OCR (A)
2.1.1 Cells and microscopy	2.1.1 Cell structure 2.1.2 Biological molecules 2.1.5 Biological membranes	<ul style="list-style-type: none"> - the importance of microscopy in the development of the cell theory, as a unifying concept in biology, and the investigation of cell structure - the procedure for differential staining - the observation, drawing and annotation of cells in a blood smear as observed using the light microscope - the linear dimension of cells and the use and manipulation of the magnification formula - the ultrastructure of a typical eukaryotic animal cell, such as a leucocyte, as revealed by an electron microscope - the ultrastructure of a typical eukaryotic plant cell such as a palisade mesophyll cell and a prokaryotic cell, as revealed by an electron microscope - the similarities and differences between the structure of eukaryotic plant and animal cells, and between eukaryotic and prokaryotic cells - practical investigations using a graticule and stage micrometer to calculate and measure linear dimensions of cells - the fluid mosaic model of the typical plasma membrane - the movement of molecules across plasma membranes - practical investigation(s) into factors affecting diffusion rates in cells - the roles of membranes within and at the surface of cells - the interrelationship between the organelles involved in the production and secretion of proteins - how the plasma membrane is composed of modified lipids and how the structure of triglycerides and phospholipids is related to their functions 	<ul style="list-style-type: none"> - the preparation of blood smears (films) for use in light microscopy - the structure of animal cells as illustrated by a range of blood cells and components as revealed by the light microscope - practical investigations using a haemocytometer to determine cell counts - the principles and use of flow cytometry in blood analysis

OCR (B) Topic	Equivalent OCR (A) Topic	Covered by OCR (A)	Not covered by OCR (A)
2.1.2 Water and its importance in plants and animals	2.1.2 Biological molecules 2.1.5 Biological membranes	<ul style="list-style-type: none"> - the properties of water - the importance of water as a major constituent of cytoplasm, intracellular and extracellular fluids and as the essential transport medium in plants and animals - how sugar and protein molecules can be detected and measured in body fluids and plant extracts - the methodology and interpretation of the results of the Biuret test, Benedict's test and colorimetry - the importance of hydrolysis and condensation of biological molecules in cell metabolism - the structure of the ring form of α-glucose as an example of a simple monosaccharide, and lactose as a disaccharide - the formation of polysaccharides by condensation - a test for the identification and measurement of starch - osmosis, in terms of the movement of water down a water potential gradient - practical investigation(s) into factors affecting osmosis in plant and animal cells 	<ul style="list-style-type: none"> - analysis of secondary data on the composition of mammalian body fluids and plant extracts to illustrate the role of water as a solvent

OCR (B) Topic	Equivalent OCR (A) Topic	Covered by OCR (A)	Not covered by OCR (A)
2.1.3 Proteins and enzymes	2.1.2 Biological molecules 2.1.4 Enzymes	<ul style="list-style-type: none"> - the basic structure of an amino acid and the formation of peptide bonds - the use of chromatography in the separation and identification of amino acids - the molecular structure of globular proteins as illustrated by the structure of enzymes and haemoglobin - the factors affecting the rate of enzyme- catalysed reactions - practical investigations into the factors affecting the rate of enzyme-catalysed reactions - the use of enzyme inhibitors in medical treatment 	<ul style="list-style-type: none"> - how the structure of globular proteins enable enzyme molecules to catalyse specific metabolic reactions - the role of proteins in blood clotting, and blood clotting as an enzyme-controlled process - the first-aid procedure to assist the blood clotting process and prevent excessive blood loss - the use of diagnostic enzymes in medical diagnosis - the donation of blood, and the types and uses of stored blood products
2.1.4 Nucleic acids	2.1.3 Nucleotides and nucleic acids	<ul style="list-style-type: none"> - the structure of a nucleotide as the monomer from which nucleic acids are made - the structure of adenosine di-phosphate (ADP) and adenosine tri-phosphate (ATP) as phosphorylated nucleotides - the structure of the DNA molecule - practical investigation into the purification of DNA by precipitation - semi-conservative DNA replication - the nature of the genetic code - the structure of RNA (ribonucleic acid) and how it differs from that of DNA - transcription and translation of genes resulting in the synthesis of polypeptides. 	<ul style="list-style-type: none"> - a review of the evidence for complementary base pairing (Chargaff's rules)

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2.2.1 The heart and monitoring heart function	3.1.1 Exchange surfaces 3.1.2 Transport in animals	<ul style="list-style-type: none"> - the need for a mass transport system in mammals - the internal and external structure of the mammalian heart - the examination, dissection and drawing of the mammalian heart - the cardiac cycle - how heart action is initiated and co-ordinated - the effect of heart rate on cardiac output - the use and interpretation of an electrocardiogram (ECG) 	<ul style="list-style-type: none"> - practical investigation(s) into the factors affecting heart rate - the measurement and interpretation of pulse rate, to include the generation of primary data and the use of secondary data - the emergency treatment given to a person suffering a suspected heart attack or cardiac arrest
2.2.2 Transport systems in mammals	3.1.2 Transport in animals	<ul style="list-style-type: none"> - the importance of the closed double circulatory system - the structure and functions of arteries, arterioles, capillaries, venules and veins - the formation and importance of tissue fluid 	<ul style="list-style-type: none"> - transverse sections of arteries, veins and capillaries as observed using a light microscope - comparisons of blood pressure readings - the use of sphygmomanometer to measure systolic and diastolic blood pressure - the interpretation of systolic and diastolic blood pressure measurements
2.2.3 Gas exchange in mammals and plants	3.1.1 Exchange surfaces	<ul style="list-style-type: none"> - the relationships between cells, tissues and organs, in the mammalian gas exchange system - observations of tissues of the gas exchange system using microscopy - the parameters affecting pulmonary ventilation 	<ul style="list-style-type: none"> - the process of gas exchange in the alveoli - how expired air resuscitation can be carried out on adults, children and babies in cases of respiratory arrest - the process of gas exchange in terrestrial plants - the structure of stomata, their opening and closing - the microscopic appearance of stomata

2.2.4 Transport systems in plants	3.1.3 Transport in plants	<ul style="list-style-type: none"> - the need for transport systems in multicellular plants - the structure, function and location of vascular tissues in roots, stems and leaves - the observation, drawing and annotation of stained sections of plant tissues using a light microscope - the longitudinal and transverse dissection and examination of plant organs to demonstrate the position and structure of vascular tissue - the entry and transport of water in terrestrial plants - the process of transpiration and the environmental factors that affect the transpiration rate - practical investigations to estimate transpiration rates - the mechanism of translocation 	
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Module 3: Cell division, development and disease control

OCR (B) Topic	Equivalent OCR (A) Topic	Covered by OCR (A)	Not covered by OCR (A)
3.1.1 The developing cell: cell division and cell differentiation	2.1.6 Cell division, cell diversity and cellular organisation	<ul style="list-style-type: none"> - the cell cycle - the changes that take place in the nuclei and cells of animals during mitosis - the microscopic appearance of cells undergoing mitosis - the importance of mitosis in growth and repair - the differentiation of stem cells into specialised cells - current applications and uses of stem cells 	<ul style="list-style-type: none"> - the changes that take place in the nuclei and cells of plants during mitosis - the principal stages and features of apoptosis - the importance of apoptosis in cell deletion

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3.1.2 The developing individual: meiosis, growth and development	2.1.6 Cell division, cell diversity and cellular organisation	<ul style="list-style-type: none"> - the significance of meiosis in sexual reproduction and the production of haploid gametes in plants and animals - the main stages of meiosis - how meiosis produces daughter cells that are genetically different 	<ul style="list-style-type: none"> - the programme of antenatal care in the United Kingdom - the dietary changes recommended during pregnancy - the effects of alcohol consumption and smoking on fetal growth and development - the use of ultrasound for measuring fetal growth - the analysis of secondary data from fetal growth charts - the advantages and disadvantages of techniques for assessing fetal development and detecting disorders - the production and use of karyotypes.
3.1.3 The development of species: evolution and classification	4.2.1 Biodiversity 4.2.2 Classification and evolution	<ul style="list-style-type: none"> - the concepts of biological classification and species - the types of evidence used in biological classification and consideration of how theories change as new evidence is found - the relationship between classification and phylogeny - behavioural, physiological and anatomical adaptations to the environment - adaptation and selection as components of evolution - the definition and measurement of biodiversity - the calculations of genetic diversity within populations 	<ul style="list-style-type: none"> - the use of DNA barcoding in biological classification, examples of the genes used and consideration of the reasons for the choice of these genes - To include consideration of hominids, both extinct and extant, and hylobatids, including examples in which there is conflicting evidence - practical investigation into adaptations of plants to environmental factors - the evolution of language as an example of a scientific question with many competing theories

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3.2.1 Pathogenic microorganisms	4.1.1 Communicable diseases, disease prevention and the immune system	<ul style="list-style-type: none"> - how pathogens (including bacteria, viruses and fungi) cause communicable disease - the causes, means of transmission, symptoms and the principal treatment of tuberculosis (TB) and HIV/AIDS 	<ul style="list-style-type: none"> - the structure of the Human Immunodeficiency Virus (HIV) - the use of Gram stain, cell and colony morphology to identify bacteria - the culturing of bacteria and the identification of Gram-positive and Gram-negative bacteria using the Gram staining method on pure cultures - how the incidence and prevalence of a communicable disease can change over time - calculations of incidence rates, prevalence rates and mortality rates and their importance in epidemiology - the analysis, interpretation and use of epidemiological data - the importance of reporting notifiable diseases and the role of Public Health England, formerly known as the Health Protection Agency (HPA) - the social, ethical, economic and biological factors involved in the attempts to control and prevent diseases in the context of HIV/AIDS and TB

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3.2.2 The immune system	4.1.1 Communicable diseases, disease prevention and the immune system	<ul style="list-style-type: none"> - primary defences and non-specific defences against pathogens - the mode of action of phagocytes - the different roles and modes of action of B and T lymphocytes in the specific immune response - the secondary immune response and the role of memory cells in long term immunity - the structure and general function(s) of antibodies - the differences between active and passive immunity, and between natural and artificial immunity - how allergies can result from hypersensitivity of the immune system 	<ul style="list-style-type: none"> - how individuals can be tested for TB and HIV infection
3.2.3 Controlling communicable diseases	4.1.1 Communicable diseases, disease prevention and the immune system	<ul style="list-style-type: none"> - the principles of vaccination - the role of vaccination programmes in the prevention of epidemics - the use of antibiotics in the treatment of communicable disease - how the misuse of antibiotics can lead to the evolution of resistant strains of bacteria - to include bacteriostatic and bacteriocidal effects of antibiotics 	<ul style="list-style-type: none"> - the biological problems in the development of vaccines and the use of vaccination programmes - the ethical issues related to the development and use of vaccines - to include an outline of the modes of action of antibiotics e.g. inhibition of bacterial protein, DNA and cell wall synthesis - practical investigations on the effect of antibiotics on Gram-positive and Gram-negative bacteria
3.3.1 The cellular basis of cancer and treatment	Not covered		
3.3.2 Respiratory diseases and treatment	Not covered		