WJEC (Wales)

If your child is studying WJEC Eduqas then we recommend they attend our OCR (A) course. Our course tutor Fariyo says: "WJEC Eduqas is more closely aligned to OCR than AQA. AQA has far less content than OCR and the Eduqas spec is much more detailed than AQA. "

Unit 1 : Basic Biochemistry and Cell Organisation

WJEC (Wales) Topic	Equivalent OCR (A) Topic	Covered by OCR (A)	*Not covered by OCR (A)*
1.1 Chemical elements are joined together to form biological compounds	2.1.2 Biological molecules	*- key elements present as inorganic ions in living organisms: Ca2+, PO43–* *- importance of water in terms of its polarity, ability to form hydrogen bonds, surface tension, as a solvent, thermal properties, as a metabolite* *- structure, properties and functions of carbohydrates: monosaccharides (triose, pentose, hexose sugars); disaccharides (sucrose, lactose, maltose); polysaccharides (starch, glycogen, cellulose)* *- alpha and beta structural isomerism in glucose and its polymerisation into storage and structural carbohydrates, illustrated by starch, cellulose* *- structures and properties of glucose, starch, glycogen and cellulose molecules* *- structures, properties and functions of lipids as illustrated by triglycerides and phospholipids* *- implications of saturated and unsaturated fat on human health* *- structure and role of amino acids and proteins* *- the primary, secondary, tertiary and quaternary structure of proteins* *- the relationship of the fibrous and globular structure of proteins to their function* *- formation and breakdown of bonds (peptide bonds, ester bonds)*	*- The structure and properties of chitin*

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1.2 Cell structure and organisation	2.1.1 Cell structure 2.1.6 Cell division, cell diversity and cellular organisation	*-the structure and function of the following: mitochondria; endoplasmic reticulum (rough and smooth); ribosomes; Golgi body; lysosomes; centrioles; chloroplasts; nucleus; nuclear envelope; nucleolus* *- the structure of prokaryotic cells* *- the similarities and differences in the structure and ultrastructure of prokaryotic and eukaryotic cells* *- The levels of organisation including aggregation of cells into tissues, tissues into organs and organs into organ systems*	*- The structure and function of plasmodesmata, and vacuoles* *- The structure of viruses* *- Similarities and differences in structure of viruses to prokaryotes/eukaryotes*
1.3 Cell membranes and transport	2.1.5 Biological membranes	*- the principal components of the plasma membrane and understand the fluid- mosaic model* *- factors affecting permeability of the plasma membrane* *- transport mechanisms: diffusion; osmosis; facilitated diffusion; endocytosis, secretion (exocytosis) and active transport*	*- Influence of cyanide to transport mechanisms*
1.4 Biological reactions are regulated by enzymes	2.1.4 Enzymes 6.1.2 Cloning and Biotechnology	*- metabolism as a series of enzyme controlled reactions* *- enzymes acting intracellularly or extracellularly* *- the theory of induced fit as illustrated by lysozyme* *- the meaning of catalysis; the lowering of the activation energy* *- the influence of temperature, pH, substrate and enzyme concentration on enzyme activity* *- the principles of competitive and non-competitive inhibition* *- the importance of immobilised enzymes and its use in industrial processes (covered in A2 level topics)*	*- The protein nature of enzyme* *- Active sites, interpreted in terms of three dimensional structure*

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1.5 Nucleic acids and their functions	2.1.3 Nucleotides and nucleic acids	*- the structure of nucleotides (pentose sugar, phosphate, organic base)* *- the structure and role of ATP in providing energy* *- complementary base pair rule; hydrogen bonding and the double helix; antiparallel strands* *- the differences in the structure of RNA and DNA* *- the two major functions of DNA; replication and protein synthesis* *- the semi-conservative replication of DNA including the roles of DNA polymerase and helicase* *- the term genetic code* *- the triplet code for amino acids* *- the transcription of DNA to produce messenger RNA* *- the translation of mRNA using ribosomes and the structure and function of transfer RNA, to synthesise proteins* *- Exons as regions of DNA that contain the code for proteins and that between the exons are regions of non-coding DNA called introns*	*- The importance of chemical energy in biological processes* *- The structure of DNA bases (purines and pyrimidines)* *- Meselson and Stahl experiments to prove semi-conservative DNA replication* *- The 'one gene - one polypeptide' hypothesis* *- The further modification and combination of some polypeptides*
1.6 Genetic information is copied and passed on to daughter cells	2.1.6 Cell division, cell diversity and cellular organisation	*- interphase and the main stages of mitosis* *- the significance of mitosis as a process in which daughter cells are provided with identical copies of genes and the process of cytokinesis* *- the significance of mitosis in terms of damage and disease: repeated cell renewal, damage repair and healing* *- the main stages of meiosis (names of subdivisions of prophase 1 not required) and cytokinesis* *- the differences between mitosis and meiosis, including that mitosis produces genetically identical daughter cells whereas meiosis produces non identical daughter cells*	*- Unrestricted mitosis division leads to cancerous growth*

Unit 2: Biodiversity and Physiology of Body Systems			
WJEC (Wales) Topic	**Equivalent OCR (A) Topic**	***Covered by OCR (A)***	***Not covered by OCR (A)***
2.1 All organisms are related through their evolutionary history	4.2.2 Classification and evolution 4.2.1 Biodiversity	*- the biological specification of species* *- the three domain classification system as compared with the five Kingdom classification system* *- the characteristic features of Kingdoms: Prokaryotae, Protoctista, Plantae, Fungi, Animalia* *- the concept of species* *-- the use of physical features and biochemical methods to assess the relatedness of organisms, including DNA sequences to show relatedness between organisms* *- the use of the binomial system in naming organisms* *- biodiversity as the number and variety of organisms found within a specified geographic region* *- biodiversity varying spatially and over time and affected by many factors* *- biodiversity can be assessed in a habitat e.g. Simpson's Diversity Index,* *- biodiversity can be assessed within a species at a genetic level by looking at the variety of alleles in the gene pool of a population, i.e. the proportion of polymorphic loci across the genome* *- biodiversity has been generated through natural selection* *- the different types of adaptations of organisms to their environment including anatomical, physiological and behavioural adaptations*	*- The need for classification and its tentative nature* *- Biodiversity can be assessed at a molecular level using DNA fingerprinting and sequencing*

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2.2 Adaptations for gas exchange	3.1.1 Exchange surfaces 3.1.2 Transport in animals	*- the adaptations for gas exchange which allow an increase in body size and metabolic rate* *- the common features of the specialised respiratory surfaces of larger animals and the adaptation of respiratory surfaces to environmental conditions* *- gas exchange in small animals across their general body surface* *- the need for large active animals with high metabolic rates to have ventilating mechanisms to maintain gradients across respiratory surfaces* *- ventilation in bony fish and comparison of counter current flow with parallel flow* *- the structure and function of the human breathing system* *- ventilation in humans and how gases are exchanged* *- the adaptations of the insect tracheal system to life in a terrestrial environment*	*- The comparison of gas exchange mechanisms in Amoeba, flatworm and earthworm* *- The structure of the angiosperm leaf* *- The role of leaf structures in allowing the plant to function and photosynthesise effectively* *- The role of the leaf as an organ of gaseous exchange, including stomatal opening and closing*

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2.3. Adaptations for transport	3.1.2 Transport in animals 3.1.3 Transport in plants	*- the similarities and differences in the vascular systems of animal groups: insects, mammals, fish* *- the heart and blood vessels and the names of the main blood vessels associated with the human heart* *- the function of red blood cells and plasma in relation to transport of respiratory gases* *- the cardiac cycle and the maintenance of circulation to include graphical analysis of pressure changes, the role of sino-atrial node and Purkyne/ Purkinje fibres and the analysis of electrocardiogram traces to show electrical activity* *- dissociation curves of haemoglobin of mammal (adult and foetus)* *- the Bohr effect and chloride shift* *- the formation of tissue fluid and its importance as a link between blood and cells* *- the structure of the dicotyledon root* *- the absorption of water by the root* *- the detailed structure of xylem as seen by the light and electron microscope* *- the structure and understand the role of the endodermis* *- the movement of water from root to leaf including the transpiration stream and cohesion-tension theory* *- the movement of water through the root: apoplast and symplast pathways* *- the effect of environmental factors affecting transpiration* *- the adaptations shown by some angiosperms: hydrophytes, xerophytes* *- the detailed structure of phloem as seen by the light*	*- The vascular system of earthworm* *- The dissociation curves of some animals adapted to low oxygen level habitats e.g. llama, lugworm* *- The transport of nutrients, hormones, excretory products and heat in the blood* *- The movement of water through vacuolar pathways* *- Cytoplasmic strands; mass flow models; experimental evidence that solutes e.g. sucrose, are carried in the phloem; use of aphids and autoradiographs*
2.4 Adaptations for nutrition	Not covered		