

A level Biology Content Comparison Document

Exam Board	AQA	Edexcel		OCR		WJEC
Specification Title (Sept 2015)	A level Biology	A level Biology A (Salters-Nuffield)	A level Biology B	A level Biology A	A level Biology B (Advancing Biology)	A level Biology (Eduqas)
A Level Units	<p>Topic 1: Biological molecules monomers and polymers; carbohydrates; lipids; proteins; enzymes, nucleic acids; DNA; RNA; ATP; water; inorganic ions</p>	<p>Topic 1: Lifestyle, Health and Risk Heart; circulation; mass transport; water as a solvent; cardiac cycle; veins; capillaries; arteries; atherosclerosis; blood clotting; cardiovascular disease; risk factors; energy; diet; monosaccharides; disaccharides; polysaccharides; triglycerides; lipids; HDLs, LDLs, cholesterol; treatments CVD</p>	<p>Topic 1: Biological Molecules Carbohydrates; lipids; proteins; DNA; DNA replication; protein synthesis; genetic code; enzymes; inorganic ions; water</p>	<p>Module 1: Development of practical skills in biology Planning; implementing; analysis; evaluation; independent thinking; use and application of scientific methods and practices; research and referencing; instruments and equipment; Practical Endorsement biological techniques</p>	<p>Module 1: Development of practical skills in biology Planning; implementing; analysis; evaluation; independent thinking; use and application of scientific methods and practices; research and referencing; instruments and equipment; Practical Endorsement biological techniques</p>	<p>Core Concepts Inorganic ions; water; carbohydrates; lipids; proteins; amino acids; cells; structure and function of ultrastructure cells; eukaryotes; prokaryotes; microscopy; plasma membrane; transport across membranes; osmosis; water potential; enzymes; metabolism; nucleotides; ATP; DNA; RNA; replication of DNA; transcription; translation</p>
	<p>Topic 2: Cells Cell structure: eukaryotes; prokaryotes; viruses; studying cells (microscopy); cell cycle; mitosis; transport across membranes; cell surface proteins; immune system</p>	<p>Topic 2: Genes and Health Gas exchange surfaces; surface area to volume ratio; Ficks law; cell membranes; osmosis; transport across membranes; ; DNA; protein synthesis; DNA replication; ATP; gene; allele; phenotype; genotype; heterozygous; dominant mutations; enzymes; amino acids; cystic fibrosis; inheritance; screening</p>	<p>Topic 2: Cells, Viruses and Reproduction of Living Things Cell structure; eukaryotes; prokaryotes; microscopy; viruses; treating viruses; cell cycle; mitosis; meiosis; genetic variation; mutations; sexual reproduction in mammals; gametes; sexual reproduction in plants</p>	<p>Module 2: Foundations in biology Cell structure; microscopy; prokaryotes; eukaryotes; biological molecules; polymers; monomers; carbohydrates; lipids; proteins; amino acids; inorganic ions; colorimetry; chromatography; nucleotides; DNA; RNA; ATP; DNA replication; protein synthesis; enzymes; cell membranes; transport across membranes; cell cycle; mitosis; meiosis; differentiation; stem cells</p>	<p>Module 2: Cells, chemicals for life, transport and gas exchange Microscopy; cell structure; eukaryotes; prokaryotes; plant and animal cells; cell membranes; transport across membranes; water; carbohydrates; osmosis; proteins; ; enzymes; blood: cells, clotting and donation; nucleic acids; ADP; ATP; DNA replication; protein synthesis ; mass transport; heart structure; cardiac cycle; ECG; cardiac output; circulatory systems; blood vessels; blood pressure; gas exchange; ventilation; vascular tissue in plants; transpiration; translocation</p>	<p>Component 1: Energy for Life ATP; mitochondria; chloroplasts; electron transport chain; photosynthesis; cyclic and non-cyclic photophosphorylation; limiting factors; plant metabolism; light dependent and light independent reactions; respiration; glycolysis; Krebs cycle; anaerobic respiration; classification of bacteria; culturing microorganisms; population growth; aseptic technique; biomass; sampling techniques; abundance; density; ; succession; carbon cycle; nitrogen cycle; nutrient cycles; habitat; community; eutrophication; extinction; conservation; sustainability</p>
	<p>Topic 3: Organisms exchange substances with their environment Surface area to volume ratio; gas exchange; digestion and absorption; mass transport in animals; mass transport in plants</p>	<p>Topic 3: Voice of the Genome Cell structure; eukaryotes; prokaryotes; electron micrographs; gametes; fertilisation; chromosomes and sex linkage; meiosis; mitosis; cell cycle; variation; stem cell; totipotent; pluripotent; medical therapies; gene expression; cell specialisation; polygenic inheritance; epigenetics</p>	<p>Topic 3: Classification and Biodiversity Classification; species; DNA sequencing; bioinformatics; 3 domain model vs 5 domain model; natural selection; evolution; adaptation; niche; speciation; biodiversity; index of diversity; conservation</p>	<p>Module 3: Exchange and transport Exchange surfaces; gaseous exchange and ventilation (mammals, bony fish, insects); mass transport; circulatory systems; arteries; veins; capillaries; heart; cardiac cycle; transport in plants; transpiration; vessels; translocation; dissection</p>	<p>Module 3: Cell division, development and disease control Cell cycle; mitosis; apoptosis; stem cells; meiosis; antenatal care, fetal development and diagnostics; classification; phylogenetic trees; adaptations; biodiversity; genetic diversity; pathogens; transmission; epidemiology; HIV; TB; non-specific immune response; specific immune response; vaccinations; antibiotics; cellular basis of cancer; detecting and treating cancer; respiratory diseases and treatments; clinical trials</p>	<p>Component 2: Continuity of Life Classification; species; biodiversity; natural selection; DNA fingerprinting; adaptations; genetic diversity; mitosis; meiosis; cell cycle; reproductive system; formation of gametes; hormonal control of reproductive systems; sexual reproduction in plants; pollination; double fertilisation; germination; gibberellin; inheritance; genes; alleles; monohybrid and dihybrid crosses; gene mutations; sex linkage; autosomal linkage; gene expression; epigenetics; variation; gene pools; competition; allele frequency; population genetics; speciation; evolution; human genome project; genetic disorders; model organisms; PCR; electrophoresis; recombinant DNA; gene</p>

						technology; gene therapy; stem cells
	Topic 4: Genetic information, variation and relationships between organisms DNA; genes; chromosomes; protein synthesis; mRNA; tRNA; genetic diversity; meiosis; mutations; adaptation; species; taxonomy; biodiversity in communities; investigating biodiversity	Topic 4: Biodiversity and Natural Resources Biodiversity; species richness; niche; adaptation; evolution; speciation; taxonomy; classification; plant cell structure; polysaccharides; starch; cellulose; sclerenchyma; xylem; phloem; water and inorganic ions; plant mineral deficiencies; drug development; bacterial growth; antimicrobial properties; conservation	Topic 4: Exchange and Transport Surface area to volume ratio; mass transport; cell transport; ATP; cell membrane structure and models; gas exchange; circulation; structure of heart; capillaries; veins; arteries; cardiac cycle; ECGs; blood clotting; atherosclerosis; blood; transport of gases in blood; transport into cells; transport in plants; xylem; phloem; transpiration	Module 4: Biodiversity, evolution and disease Pathogens; transmission of pathogens; plant defences; non-specific immune response; blood cells; specific immune response; immunity; autoimmune diseases; vaccinations; sources of medicines; antibiotics; biodiversity; sampling; maintaining biodiversity; classification phylogeny; evolution; natural selection; variation; adaptation	Module 4: Energy, reproduction and populations Respiration; glycolysis; link reaction; Krebs cycle; respirometers; heart rate; breathing rate; metabolism and exercise; skeletal muscles; gametes; male and female reproductive systems and fertility; chloroplasts; photosynthesis; nitrogen cycle; food production; food chains; biomass; agriculture and conservation; succession; sampling; biodiversity; sustainability; human populations; plant reproduction; cereals as staple foods	Component 3: Requirements for life Gas exchange; plants, animals and insects; surface area to volume ratio; exchange surfaces; ventilation; circulatory systems; heart and blood vessels structure; cardiac cycle; plant vascular system; transport of nutrients in blood; transport of nutrients in plants; transpiration; xylem; phloem; nutrition in unicellular organisms; autotrophs; heterotrophs; adaptations of digestive systems; enzymes; parasites; homeostasis; negative feedback; hormones; osmoregulation; kidneys; nervous system; neurons; reflex arc; action potentials; synapse; drugs impact on nervous system
	Topic 5: Energy transfers in and between organisms Photosynthesis; light dependent and light independent reactions; respiration; energy and ecosystems; nutrient cycles; phosphorus cycle; nitrogen cycle	Topic 5: On the Wild Side Ecosystem; community; habitat; population; biotic and abiotic factors; niche; distribution of species; measure species distribution; succession; light dependent reactions; light independent reactions; photosynthesis; energy transfers; climate change; enzyme activity; evolution; speciation; carbon cycle	Topic 5: Energy for Biological Processes aerobic respiration; glycolysis; Krebs cycle; ATP; oxidative phosphorylation; anaerobic respiration; photosynthetic pigments; photosynthesis; light dependent reaction; light independent reaction	Module 5: Communication, homeostasis and energy Homeostasis; cell signalling; thermal regulation; excretion; liver; kidney; water potential in the blood; neurons; action potentials; synapses; hormones; pancreas; blood glucose regulation; diabetes; plant responses; plant hormones; mammalian nervous system; brain; reflex actions; heart rate; muscle structure; photosynthesis; chloroplasts; light dependent and light independent reaction; respiration; mitochondria; glycolysis; linking reaction; Krebs cycle; oxidative phosphorylation; anaerobic respiration; respiratory quotient	Module 5: Genetics, control and homeostasis Genetics; inheritance; mutations; alleles; sex linkage; autosomal linkage; model organisms; genetic counselling; population genetics; natural selection; allele frequency; genetic biodiversity; epigenetics; gene expression; species formation; gene technologies; nervous system structure and function; action potentials; synapses; reflexes; visual function; ageing and the nervous system; homeostasis; blood glucose control and diabetes; kidney function	Component 3 option: Immunology and Disease Infections; pathogens; transmission; antibiotics; vaccines; antibiotic resistance; immune response; non-specific immune response; white blood cells; specific immune response; active and passive immune response
	Topic 6: Organisms respond to changes in their internal and external environments Stimuli; survival response; receptors; control of heart rate; nerve impulses; synaptic transmission; skeletal muscles; homeostasis; negative feedback; blood glucose; blood water potential	Topic 6: Immunity, Infection and Forensics. Decomposition; forensic entomology; DNA profiling; PCR; bacteria; viruses; TB; HIV; non-specific immune response; specific immune response; infection; antibiotics; development of immunity; evolutionary race	Topic 6: Microbiology and Pathogens Microbial techniques; aseptic techniques; culturing; bacterial growth; pathogens; endotoxins; exotoxins; antibiotics; antibiotic resistance; fungi; viruses; parasites; controlling disease; immune response; immunity	Module 6: Genetics, evolution and ecosystems Gene mutations; gene expression; development; phenotypic and genetic variation; allele frequency; evolution; artificial selection; DNA sequencing; genome comparisons; DNA profiling; PCR; electrophoresis; genetic engineering; gene therapy; artificial and natural clones; microorganisms in biotechnology; aseptic techniques; immobilised enzymes; ecosystems; biotic and abiotic factors; decomposition; carbon cycle; succession; distribution and abundance of		Component 3 option: Human Musculoskeletal Anatomy Skeletal tissues; cartilage; bone; osteoblasts and osteoclasts; calcium and vitamin D deficiency; fast twitch and slow twitch muscles; filaments; anaerobic respiration; structure and function of the skeleton; fractures; vertebra; types of joints; osteoarthritis; rheumatoid arthritis; antagonistic muscle action; synovial joints

				organisms; populations; sustainability		
	Topic 7: Genetics, populations, evolution and ecosystems Inheritance; phenotype; genotype; alleles; homozygous; heterozygous; allele frequency; populations; evolution; speciation; populations in ecosystems; competition; predation; abiotic and biotic factors	Topic 7: Run for your Life Muscles; tendons; skeleton; ligaments; aerobic and anaerobic respiration; ATP; cardiac muscle; ECGs; cardiac output; electrical control of the heart; negative feedback; positive feedback; homeostasis; transcription factors; medical technology	Topic 7: Modern Genetics. Gene sequencing; PCR; transcription factors; gene expression; epigenetics; stem cells; pluripotent; totipotent; multipotent; recombinant DNA; genetic modification; gene technology			Component 3 option: Neurobiology and Behaviour Structure of human brain; functions of areas of the brain; sympathetic and parasympathetic nervous system; homunculus; language comprehension and speech; studying the brain EET; PET; CT; expression of genes; brain development; neuroplasticity; innate behaviours; learned behaviours; habituation; imprinting; conditioning; sexual selection; social structures
	Topic 8: The control of gene expression Genes; mutations; structure of proteins; totipotent; pluripotent; multipotent; unipotent; stem cells; control of transcription and translation; epigenetics; gene expression and cancer; using genome projects; recombinant DNA technology; identifying and diagnosing conditions; genetic fingerprinting	Topic 8: Grey Matter Neurones; nervous system; detection of stimuli; action potentials; synapses; plant responses; nervous and hormonal control; brain structure; MRI; fMR; PET; CT; animal models; habituation; effects of drugs on the nervous system; genetically modified organisms to produce drugs; genome sequencing; nature and nurture	Topic 8: Origins of Genetic Variation Genetic variation; mutations; genotype; phenotype; homozygous; heterozygous; unlinked genes; linked genes; sex linked genes; gene pools; genetic drift; allele frequency			
			Topic 9: Control Systems Homeostasis; negative feedback; positive feedback; hormones; chemical control in plants; plant growth; auxins; cytokines; gibberellins; nervous system; brain structure; action potentials; synapse; drugs impacting on nervous system; detecting light in mammals; control of heart rate in mammals; water and temperature regulation; kidney			
			Topic 10: Ecosystems. Ecosystems; trophic levels; distribution of organisms; sampling; energy transfer through ecosystems; nutrient cycles; abiotic and biotic factors; climax communities; succession; human impacts; climate change; sustainability			