

**A level Biology Specification Comparison Document**

Exam Board	AQA	Edexcel		OCR		WJEC
Specification Title (Sept 2015)	<a href="#">A level Biology</a>	<a href="#">A level Biology A (Salters-Nuffield)</a>	<a href="#">A level Biology B</a>	<a href="#">A level Biology A</a>	<a href="#">A level Biology B (Advancing Biology)</a>	<a href="#">A level Biology (Eduqas)</a>
A Level Units	<b>Topic 1:</b> Biological molecules <b>Topic 2:</b> Cells <b>Topic 3:</b> Organisms exchange substances with their environment <b>Topic 4:</b> Genetic information, variation and relationships between organisms <b>Topic 5:</b> Energy transfers in and between organisms <b>Topic 6:</b> Organisms respond to changes in their internal and external environments <b>Topic 7:</b> Genetics, populations, evolution and ecosystems <b>Topic 8:</b> The control of gene expression	<b>Topic 1:</b> Lifestyle, Health and Risk <b>Topic 2:</b> Genes and Health <b>Topic 3:</b> Voice of the Genome <b>Topic 4:</b> Biodiversity and Natural Resources <b>Topic 5:</b> On the Wild Side <b>Topic 6:</b> Immunity, Infection and Forensics. <b>Topic 7:</b> Run for your Life <b>Topic 8:</b> Grey Matter	<b>Topic 1:</b> Biological Molecules <b>Topic 2:</b> Cells, Viruses and Reproduction of Living Things <b>Topic 3:</b> Classification and Biodiversity <b>Topic 4:</b> Exchange and Transport <b>Topic 5:</b> Energy for Biological Processes <b>Topic 6:</b> Microbiology and Pathogens <b>Topic 7:</b> Modern Genetics. <b>Topic 8:</b> Origins of Genetic Variation <b>Topic 9:</b> Control Systems <b>Topic 10:</b> Ecosystems.	<b>Module 1:</b> Development of practical skills in biology <b>Module 2:</b> Foundations in biology <b>Module 3:</b> Exchange and transport <b>Module 4:</b> Biodiversity, evolution and disease <b>Module 5:</b> Communication, homeostasis and energy <b>Module 6:</b> Genetics, evolution and ecosystems	<b>Module 1:</b> Development of practical skills in biology <b>Module 2:</b> Cells, chemicals for life, transport and gas exchange <b>Module 3:</b> Cell division, development and disease control <b>Module 4:</b> Energy, reproduction and populations <b>Module 5:</b> Genetics, control and homeostasis	<b>Core Concepts</b> <b>Component 1:</b> Energy for Life <b>Component 2:</b> Continuity of Life <b>Component 3:</b> Requirements for life with a choice of 1 option out of: A) Immunology and Disease B) Human Musculoskeletal Anatomy C) Neurobiology and Behaviour
A Level Exams (summer 2017)	<b>Paper 1: Topics 1-4 &amp; relevant practical skills</b> 35% of A level Written paper 2 hours 91 marks. (76 marks short and long answer questions, 15 marks extended response)	<b>Paper 1: The Natural Environment and Species Survival, Topics 1-6 &amp; practical skills</b> 33.3% of A level Written paper 2 hours 100 marks (multiple-choice, short open, open-response, calculations and extended writing questions)	<b>Paper 1: Advanced Biochemistry, Microbiology and Genetics, Topics 1-7</b> 30% of A level Written paper 1 hour 45 minutes. 90 marks. (multiple-choice, short open, open-response, calculations and extended writing questions)	<b>Paper 1: Biological processes, Modules 1, 2, 3 &amp; 5</b> (includes practical skills) 37% of A level Written paper 2 hours 15 minutes 100 marks (Section A multiple choice questions, 15 marks. Section B short structured questions, problem solving, calculations, practical and extended response questions, 85 marks)	<b>Paper 1: Fundamentals of Biology, Modules 1-5</b> (includes practical skills) 41% of A level Written paper 2 hours 15 minutes 110 marks (Section A multiple choice questions, 30 marks. Section B short structured questions, problem solving, calculations, practical and extended response questions, 80 marks)	<b>Paper 1: Component 1 Energy for Life &amp; Core Concepts</b> 33.3% of A level Written paper 2 hours 100 marks (A range of short and longer structured compulsory questions)
	<b>Paper 2: Topics 5-8 &amp; relevant practical skills</b> 35% of A level Written paper 2 hours 91 marks. (76 marks short and long answer questions, 15 marks comprehension)	<b>Paper 2: Energy, Exercise and Co-ordination, Topics 1-4, 7&amp;8, &amp; practical skills</b> 33.3% of A level Written paper 2 hours 100 marks. (multiple-choice, short open, open-response, calculations and extended writing questions)	<b>Paper 2: Advanced Physiology, Evolution and Ecology, Topics 1-4 &amp; 8-10</b> 30% of A level Written paper 1 hour 45 minutes. 90 marks. (multiple-choice, short open, open-response, calculations and extended writing questions)	<b>Paper 2: Biological diversity, Modules 1, 2, 4 &amp; 6</b> (includes practical skills) 37% of A level Written paper 2 hours 15 minutes 100 marks (Section A multiple choice questions, 15 marks. Section B short structured questions, problem solving, calculations, practical and extended response questions, 85 marks)	<b>Paper 2: Scientific Literacy in Biology, Modules 1-5</b> (includes practical skills) 37% of A level Written paper 2 hours 15 minutes 100 marks (The pre-released scientific article will underpin one section of the paper worth 20-25 marks, short structured questions, problem solving, calculations, practical and extended response questions)	<b>Paper 2: Component 2 Continuity of Life &amp; Core Concepts</b> 33.3% of A level Written paper 2 hours 100 marks (A range of short and longer structured compulsory questions)
	<b>Paper 3: Topics 1-8 &amp; relevant practical skills</b> 30% of A level Written paper 2 hours 78 marks (38 marks structured questions, 15 marks analysis of experimental data, 25 marks essay question from a choice of two)	<b>Paper 3: General and Practical Applications in Biology, Topics 1-8 &amp; practical skills</b> 33.3% of A level Written paper 2 hours 100 marks (The pre-released scientific article will underpin one section of the paper. The paper will include synoptic questions)	<b>Paper 3: General and Practical Principles in Biology, Topics 1-10 &amp; practical skills</b> 40% of A level Written paper 2 hours 30minutes. 120 marks. (multiple-choice, short open, open-response, calculations and extended writing questions. The paper will include synoptic questions.)	<b>Paper 3: Unified Biology, Modules 1-6</b> (includes practical skills) 26% of A level Written paper 1 hour 30 minutes 70 marks (short structured questions, problem solving, calculations, practical and extended response questions)	<b>Paper 3: Practical Skills in Biology, Modules 1-5</b> 22% of A level Written paper 1 hour 30 minutes 60 marks (short structured questions, problem solving, calculations, practical and extended response questions)	<b>Paper 3: Component 3 Requirements for life &amp; Core Concepts</b> 33.3% of A level Written paper 2 hours 100 marks Section A: 80 marks (A range of short and longer structured compulsory questions based on the compulsory content of the component. Section B: 20 marks Short and longer structured questions from a choice of 1 out of 3 options: Immunology and Disease; Human Musculoskeletal Anatomy or Neurobiology and

						Behaviour)
Practical Work A level (examined through written papers and the practical endorsement)	<p><b>1:</b> Investigation into the effect of a named variable on the rate of an enzyme-controlled reaction</p> <p><b>2:</b> Preparation of stained squashes of cells from plant root tips; set-up and use of an optical microscope to identify the stages of mitosis in these stained squashes and calculation of a mitotic index</p> <p><b>3:</b> Production of a dilution series of a solute to produce a calibration curve with which to identify the water potential of plant tissue</p> <p><b>4:</b> Investigation into the effect of a named variable on the permeability of cell-surface membranes</p> <p><b>5:</b> Dissection of animal or plant gas exchange or mass transport system or of organ within such a system</p> <p><b>6:</b> Use of aseptic techniques to investigate the effect of antimicrobial substances on microbial growth</p> <p><b>7:</b> Use of chromatography to investigate the pigments isolated from leaves of different plants, eg leaves from shade-tolerant and shade-intolerant plants or leaves of different colours</p> <p><b>8:</b> Investigation into the effect of a named factor on the rate of dehydrogenase activity in extracts of chloroplasts</p> <p><b>9:</b> Investigation into the effect of a named variable on the rate of respiration of cultures of single-celled organisms</p> <p><b>10:</b> Investigation into the effect of an environmental variable on the movement of an animal using either a choice chamber or a maze</p> <p><b>11:</b> Production of a dilution series of a glucose solution and use of colorimetric techniques to produce a calibration curve with which to identify the concentration of glucose in an unknown 'urine' sample</p> <p><b>12:</b> Investigation into the effect of a named environmental factor on the distribution of a given species</p>	<p><b>1: i)</b> Investigate the effect of caffeine on heart rate in daphnia.</p> <p><b>ii)</b> Discuss the potential ethical issues regarding the use of invertebrates in research.</p> <p><b>2:</b> Investigate the vitamin C content of food and drink.</p> <p><b>3:</b> Investigate membrane structure, including the effect of alcohol concentration or temperature on membrane permeability.</p> <p><b>4:</b> Investigate the effect of enzyme and substrate concentrations on the initial rates of reactions.</p> <p><b>5:</b> Prepare and stain a root tip squash to observe the stages of mitosis.</p> <p><b>6:</b> Identify sclerenchyma fibres, phloem sieve tubes and xylem vessels and their location within stems through a light microscope.</p> <p><b>7:</b> Investigate plant mineral deficiencies.</p> <p><b>8:</b> Determine the tensile strength of plant fibres.</p> <p><b>9:</b> Investigate the antimicrobial properties of plants, including aseptic techniques for the safe handling of bacteria.</p> <p><b>10:</b> Carry out a study on the ecology of a habitat, such as using quadrats and transects to determine distribution and abundance of organisms, and measuring abiotic factors appropriate to the habitat.</p> <p><b>11:</b> Investigate photosynthesis using isolated chloroplasts (the Hill reaction).</p> <p><b>12:</b> Investigate the effect of temperature on the rate of an enzyme-catalysed reaction, to include Q10.</p> <p><b>13:</b> Investigate the effects of temperature on the development of organisms (such as seedling growth rate, brine shrimp hatch rates).</p> <p><b>14:</b> Use gel electrophoresis to separate DNA fragments of different length.</p> <p><b>15:</b> Investigate the effect of different antibiotics on bacteria.</p> <p><b>16:</b> Investigate rate of respiration practically.</p> <p><b>17:</b> Investigate the effects of exercise on tidal volume, breathing rate, respiratory minute ventilation and oxygen</p>	<p><b>1:</b> Investigate a factor affecting the initial rate of an enzyme controlled reaction.</p> <p><b>2:</b> Use of the light microscope, including simple stage and eyepiece micrometers and drawing small numbers of cells from a specialised tissue.</p> <p><b>3:</b> Make a temporary squash preparation of a root tip to show stages of mitosis in the meristem under the light microscope.</p> <p><b>4:</b> Investigate the effect of sucrose concentrations on pollen tube growth.</p> <p><b>5:</b> Investigate the effect of temperature on beetroot membrane permeability.</p> <p><b>6:</b> Determine the water potential of a plant tissue.</p> <p><b>7:</b> Dissect an insect to show the structure of the gas exchange system.</p> <p><b>8:</b> Investigate factors affecting water uptake by plant shoots using a potometer.</p> <p><b>9:</b> Investigate factors affecting the rate of respiration using a respirometer.</p> <p><b>10:</b> Investigate the effects of different wavelengths of light on the rate of photosynthesis.</p> <p><b>11:</b> Investigate the presence of different chloroplast pigments using chromatography.</p> <p><b>12:</b> Investigate the rate of growth of bacteria in liquid culture.</p> <p><b>13:</b> Isolate individual species from a mixed culture of bacteria using streak plating.</p> <p><b>14:</b> Investigate the effect of gibberellin on the production of amylase in germinating cereals using a starch agar assay.</p> <p><b>15:</b> Investigate the effect of different sampling methods on estimates of the size of a population.</p> <p><b>16:</b> Investigate the effect of one abiotic factor on the distribution or morphology of one species.</p>	<p><b>1:</b> Microscopy (Using a light microscope to study mitosis)</p> <p><b>2:</b> Dissection (Dissection of the mammalian heart)</p> <p><b>3:</b> Sampling techniques (The calculation of species diversity)</p> <p><b>4:</b> Rates of enzyme controlled reactions (The effect of substrate concentration on the rate of an enzyme controlled reaction)</p> <p><b>5:</b> Colorimeter OR potometer (The effect of temperature on membrane permeability)</p> <p><b>6:</b> Chromatography OR Electrophoresis (Identification of the amino acids in a protein using paper chromatography)</p> <p><b>7:</b> Microbiological techniques (The effect of antibiotics on bacterial growth)</p> <p><b>8:</b> Transport in and out of cells (An investigation into the water potential of potato)</p> <p><b>9:</b> Qualitative testing (Qualitative testing for biological molecules – proteins)</p> <p><b>10:</b> Investigation using a data logger OR computer modelling (Investigating DNA structure using RasMol)</p> <p><b>11:</b> Investigation into the measurement of plant or animal responses (Investigation into the effect of exercise on pulse rate)</p> <p><b>12:</b> Research skills (Investigation into the respiration rate of <i>Saccharomyces cerevisiae</i>)</p> <p>*activities in brackets are suggestions from OCR but they do not have to be used as long as the appropriate skills are demonstrated.</p>	<p><b>1:</b> Microscopy (Using a light microscope to study mitosis)</p> <p><b>2:</b> Dissection (Dissection of the mammalian heart)</p> <p><b>3:</b> Sampling techniques (The 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using beetroot</p> <p><b>7:</b> Investigation into the effect of temperature or pH on enzyme activity</p> <p><b>8:</b> Investigation into the effect of enzyme or substrate concentration on enzyme activity</p> <p><b>9:</b> Simple extraction of DNA from living material</p> <p><b>10:</b> Investigation of dehydrogenase activity using artificial hydrogen acceptors, as illustrated by methylene blue or DCPIP or tetrazolium compounds</p> <p><b>11:</b> Investigation into the separation of chloroplast pigments by chromatography</p> <p><b>12:</b> Investigation into factors affecting the rate of photosynthesis</p> <p><b>13:</b> Investigation into the role of nitrogen and magnesium in plant growth</p> <p><b>14:</b> Investigation into factors affecting the rate of respiration in yeast</p> <p><b>15:</b> Investigation into the numbers of bacteria in fresh and stale milk, using techniques of serial dilution, plating and counting colonies</p> <p><b>16:</b> Investigation into the abundance and distribution of organisms in a habitat</p> <p><b>17:</b> Investigation into biodiversity</p>

		<p>consumption using data from spirometer traces.  <b>18.</b> Investigate habituation to a stimulus.</p>				<p>in a habitat  <b>18:</b> Scientific drawing of cells from slides of root tip to show stages of mitosis  <b>19:</b> Scientific drawing of cells from prepared slides of developing anthers to show stages of meiosis  <b>20:</b> Investigation of the digestion of starch agar using germinating seeds  <b>21:</b> Dissection of wind and insect-pollinated flowers  <b>22:</b> Scientific drawing of a low power plan of a prepared slide of an anther, including calculation of actual size and magnification of drawing  <b>23:</b> Experiment to illustrate gene segregation including the use of the chi squared test in testing the significance of genetic outcomes  <b>24:</b> Investigation of continuous variation in a species (including use of the Student's t-test)  <b>25:</b> Investigation into stomatal numbers in leaves  <b>26:</b> Dissection of fish head to show the gas exchange system  <b>27:</b> Scientific drawing of a low power plan of a prepared slide of dicotyledon leaf e.g. Ligustrum (privet), including calculation of actual size and magnification of drawing  <b>28:</b> Investigation into transpiration using a simple potometer  <b>29:</b> Scientific drawing of a low power plan of a prepared slide of T.S artery and vein, including calculation of actual size and magnification of drawing  <b>30:</b> Dissection of mammalian heart  <b>31:</b> Dissection of kidney</p>
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