

# Biology Curriculum Map

## Year 12

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Introductory biological concepts about cells and biological molecules	Topic 1: Lifestyle, health and risk: Heart, circulation and cardiovascular diseases  Topic 4: Biodiversity and natural resources	Topic 1: Risk factors involved in CVD  Topic 4: Transport in plants, development of drugs and drug testing trials and conservation	Topic 2: Genes and Health: Structure and function of respiratory system, DNA replication, transcription and translation.  Topic 3: Cell cycle and cell division in full detail	Topic 2: inheritance, cystic fibrosis and testing for CF.  Topic 3: Epigenetics and regulation of gene expression	Topic 5: Ecology: Biotic and abiotic factors of an ecosystem and succession.  Energy transfer in an Ecosystem including photosynthesis.  Topic 6: Forensics
<b>Assessment:</b> Transition test assessing cells and biological molecules	<b>Assessment</b> <b>Progress test 1</b> on Heart and circulation. <b>Progress test 2</b> on Biodiversity	<b>Assessment:</b> PPE/End of topic tests on Topic 1 and Topic 4	<b>Assessment:</b> <b>Progress test 3</b> on Lungs structure and function, and DNA.  <b>Progress test 4</b> on cell division and cell cycle	<b>Assessment:</b> Transition test (entire first year content)	<b>Assessment:</b> Mini tests on adaptation of organisms and succession
<b>Builds upon:</b> GCSE content on cells and ultrastructure of the cell will be further extended. Use of Microscopes in studying cell ultrastructure and mathematical calculations to determine the size of a cell, determination of magnification based on	<b>Builds upon:</b> Structure and function of Heart and blood vessels. Double vs single and open vs. closed circulatory system. Cardiovascular diseases, the development of atherosclerosis in detail.	<b>Builds upon:</b> GCSE knowledge on reasons for developing CVD further explored. Correlation and causation of risk factors and data-based studies will be extended further.  Classification system and phylogeny.	<b>Builds upon:</b> Structure and function of lungs and the effective gas exchange in relation to Fick's law will be explored. DNA replication, transcription and translation will be discussed in full detail.  Detailed structure of gametes.	<b>Builds upon:</b> Mendelian Genetics and, monohybrid inheritance and analysis of pedigree charts.	<b>Build upon:</b> Ecosystem in the context of Biotic and abiotic factors, and adaptations shown by the organisms are further extended.  Energy transfer in an ecosystem is fully explored in this topic.

<p>micrographs will also be further extended.</p>	<p>GCSE content on environment and its influence on living organisms will be further discussed.</p>	<p>Discovering new medicinal products and drug testing protocols will be further extended.</p>	<p>Cell division stages – Mitosis in full detail. Meiosis – how this leads on to genetic variation in organisms.</p>		<p>Using DNA technology in forensics.</p>
<p><b>Introduces:</b> Carbohydrates, proteins, lipids and phospholipids. Focus will be on how polymers are made from monomers and also the structure and function of specific biological molecules.</p> <p>Use of stage micro meter and eyepiece graticules to determine the sizes of cells and cellular organelles</p>	<p><b>Introduces:</b> Cardiac cycle in full detail. Blood clotting cascade.</p> <p>Adaptations of the organisms to the environment with examples to show physiological, anatomical and behavioural adaptations. Evolution and Hardy-Weinberg principle to work out the changes in allele frequencies over time.</p>	<p><b>Introduces:</b> The process of large-scale cohort studies on perception and actual risk of CVD will be explored. The role of hereditary factors on the development of cardiovascular diseases.</p> <p>Phylogeny will be discussed further to analyse the ancestral relationships.</p> <p>Using Simpson Diversity index to quantify biodiversity.</p> <p>Importance of conservation.</p>	<p><b>Introduces:</b> The detailed explanation of the classic experiment that proved the semi conservative replication process.</p> <p>The Fluid Mosaic model to explain the structure and function of cell membrane.</p> <p>Stem cells and their uses and the ethical concerns.</p>	<p><b>Introduces:</b> Mutations and the effects including the development of Cystic fibrosis and the inheritance of this gene. Prenatal testing of CF. Making ethical decisions; Ethical framework.</p> <p>Process of gene expression and epigenetics (exploring the effect of environmental factors on gene expression).</p> <p>Development of Cancer and oncogenes.</p>	<p><b>Introduces:</b> Energy transfer in an ecosystem will be explored further in terms of net primary productivity and gross primary productivity.</p> <p>Biochemical details of both light dependent and light independent reactions of photophosphorylation.</p> <p>Forensic section is completely new for this curriculum and students will be introduced to how technological advances has been used in Forensics.</p>

Year 13

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2:
<p>Topic 5: Climate change and coping with it and global warming.</p> <p>Topic 6: Immunity, TB and AIDS; pathogen, infection and treatments</p>	<p>Topic 5: Speciation and carbon cycle.</p> <p>Topic 7: Musculoskeletal system.</p> <p>Topic 8: Nervous and sensory system</p>	<p>Topic 7: Respiration and peak performance and control of heart rate.</p> <p>Topic 8: Responding to the stimuli in plants. Structure and function of Brain and brain imaging.</p>	<p>Topic 7: Homeostasis, negative and positive feedback.</p> <p>Topic 8: Visual cortex development, learning and memory. Problem with synapses and genetic modification</p>	<p>Biostatistics and pre-release article</p> <p>Revision</p>	<p><b>Public Exams</b></p>
<p><b>Assessment:</b> Transition test: Ecosystem and photosynthesis, Forensics and Immunity.</p>	<p><b>Assessment:</b> <b>Progress test 5</b> on photosynthesis and climate change <b>Progress test 6</b> on Immunity</p>	<p><b>Assessment:</b> Mock exams/progress tests</p>	<p><b>Assessment:</b> End of topic tests/mock exams on entire contents</p>	<p><b>Assessment</b> A level exams</p>	<p><b>Assessment:</b> N/A</p>
<p><b>Builds upon:</b> Why does climate change occur and coping up with climate change (adapt or die).</p> <p>Structure of bacterial cells. Non-specific and specific immune response.</p> <p>Viral reproduction – Lytic and lysogenic cycles.</p>	<p><b>Builds upon:</b> Consolidation of carbon cycle.</p> <p>Structure of Joints.</p> <p>Structure and function of Motor, sensory and relay neurones. Nerve impulse transmission across the synapse. Structure and function of eye,</p>	<p><b>Builds upon:</b> Aerobic and anaerobic respiration.</p> <p>Regulation of cardiac cycle (heart rate) and breathing rate.</p> <p>Phototropism in plants.</p> <p>Structure of brain will be taught here in detail.</p>	<p><b>Builds upon</b> Thermoregulation and negative feedback mechanism.</p> <p>Genetic modification of bacterial cells, plants and animals.</p> <p>HGP and its uses.</p>	<p><b>Builds upon:</b></p>	<p><b>Builds upon:</b> N/A</p>

Use of antibiotics to treat bacterial infections.					
<p><b>Introduces:</b> Predicting future climate change and mathematical models.</p> <p>Evidence for climate change and related studies.</p> <p>Structure of bacterial cell and viral particles. Detail knowledge of HIV structure will be studied and this will be linked with viral reproduction.</p>	<p><b>Introduces:</b> Getting the balance right to tackle global warming and strategies to reduce carbon emission and the use of sustainable resources.</p> <p>Structure and function of joints and muscles in detail. Sliding filament theory to describe how muscles work?</p> <p>Detail explanation of nerve impulse transmission – resting and action potentials. Refractory period and the role of synapse in controlling impulse transmission. Detail knowledge of excitatory and inhibitory synapses (photoreceptor -Rod cells)</p>	<p><b>Introduces:</b> Biochemistry of aerobic and anaerobic respiration- full chemical reactions and this is also related to structure of Mitochondria. Respiration using other respiratory substrates and also the role of ATP.</p> <p>Coordination in plants – action of auxins in detail, photoperiods, flowering and phytochrome.</p> <p>Brain imaging techniques and how the function of the brain has been discovered.</p>	<p><b>Introduces:</b> Effect of excessive exercise and immune suppression. Damage to joints and treatment methods.</p> <p>Role of transcription factors on gene expression.</p> <p>Vision: How the visual cortex has been developed and cross-cultural studies.</p> <p>Learning and behaviour – Habituation.</p>	<p><b>Introduces:</b> Recap standard deviation calculation Simpson diversity index, t-test, chi square test</p>	<p><b>Introduces:</b> N/A</p>