



ASPIRE • BELIEVE • ACHIEVE



## Curriculum Overview: AS Biology

Year 12 Spring Term 1			
What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
Exchange Mass transport	<b>Knowledge &amp; understanding</b> <ul style="list-style-type: none"><li>Describe and explain the relationship between surface area to volume ratio and metabolic rate.</li><li>Calculate surface area to volume ratios when supplied with cell/organism dimensions.</li><li>Explain the adaptations that xerophytic plants have and how these balance the needs for gas exchange whilst minimising water loss.</li><li>Describe the structure of insect tracheal systems.</li><li>Explain how fish gills are adapted to maximise gas exchange, including counter current flow.</li><li>Explain the mechanism of breathing in terms of the action of the diaphragm muscle and the antagonistic action of the external and internal intercostal</li></ul>	<ul style="list-style-type: none"><li>Design and carry out an investigation into the effect of a named variable on human pulse rate</li><li>Confidently use of graph skills and plotting and interpreting graphs showing the effect of a named variable on pulse rate</li><li>Evaluate scientific evidence in supporting scientific ideas.</li><li>Research to develop method.</li><li>Calculate data to an appropriate number of significant figures.</li><li>Analyse, interpret and evaluate scientific information and evidence to make judgements, reach conclusions and develop/refine practical design and procedures.</li></ul>	<p><a href="https://www.aqa.org.uk/subjects/science/as-and-a-level/biology-7401-7402">https://www.aqa.org.uk/subjects/science/as-and-a-level/biology-7401-7402</a></p> <p><a href="https://www.physicsandmathstutor.com/biology-revision/">https://www.physicsandmathstutor.com/biology-revision/</a></p> <p><a href="https://www.khanacademy.org">https://www.khanacademy.org</a></p> <p><a href="https://www.s-cool.co.uk/a-level/biology">https://www.s-cool.co.uk/a-level/biology</a></p> <p><a href="https://studywise.co.uk/a-level-revision/biology/www">https://studywise.co.uk/a-level-revision/biology/www</a></p> <p><a href="http://www.senecalearning.com">http://www.senecalearning.com</a> login</p>

	<p>muscles and the pressure changes which they cause in the thoracic cavity.</p> <ul style="list-style-type: none"><li>• Explain the role of different enzymes in the digestive process and relate the specificity of enzymes back to protein structure.</li><li>• Explain how endopeptidases and exopeptidases increase protein digestion.</li><li>• Link the structure of the circulatory system to its role in exchanging and transporting materials.</li><li>• Explain differences between the oxyhaemoglobin dissociation curves of different species.</li><li>• Describe and label the structure of the heart.</li><li>• Explain the cardiac cycle.</li><li>• Explain the formation of tissue fluid in terms of hydrostatic pressure.</li><li>• Analyse and interpret data associated with specific risk factors and the incidence of cardiovascular disease.</li></ul> <p>Explain how water transport in the xylem is linked to transpiration in the leaves.</p> <p>Explain the cohesion-tension theory of water transport.</p>		
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	<ul style="list-style-type: none"> <li>• Explain the role of the phloem in plants.</li> <li>• Explain what is meant by translocation.</li> <li>•</li> </ul> <p><b>Skills</b></p> <ul style="list-style-type: none"> <li>• Dissect the gas exchange system of a bony fish and/or an insect</li> <li>• Use an optical microscope to examine and draw prepared mounts of the gas exchange surface of fish or insects, or temporary mounts of gills</li> <li>• Dissection of fish gills and locust to investigate filament and tracheal systems.</li> <li>• Development of knowledge of mechanism of breathing and associated measurements and the techniques associated with spirometers and respirometers</li> <li>• Interpret graphs showing spirometer traces.</li> <li>• Analyse, interpret and evaluate scientific information and evidence to assess the validity of conclusions and the strength of correlations.</li> <li>• Use an optical microscope to examine and draw prepared slides of sections through blood vessels</li> </ul>		
Year 12 Spring Term 2			

What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
DNA, genes and protein synthesis Genetic Diversity	<p><b>Knowledge &amp; understanding</b></p> <ul style="list-style-type: none"> <li>• Explain what is meant by the terms chromosome and gene.</li> <li>• Compare and contrast DNA in eukaryotes with that in prokaryotes, mitochondria and chloroplasts.</li> <li>• Explain the process of transcription and splicing in eukaryotes, linking this to knowledge of introns.</li> <li>• Interpret data from experimental work investigating the role of nucleic acids.</li> <li>• Explain what a gene mutation is and how it arises.</li> <li>• Explain what is meant by a deletion and substitution mutation and the potential consequences of each (linked to primary protein structure).</li> <li>• Explain the different outcome of mitosis and meiosis.</li> <li>• Explain what is meant by genetic diversity and allele frequency.</li> <li>• Explain the principles of natural selection and how selection and adaptation are major factors in evolution and contributing to species diversity.</li> </ul>	<ul style="list-style-type: none"> <li>• Carry out method to investigate the effect of antimicrobial substances</li> <li>• Measure zones of clearing/measure turbidity of broth</li> <li>• Interpret data and draw conclusions.</li> <li>• Introduce hierarchical system used for classification of organisms.</li> <li>• Develop mnemonics to remember hierarchical taxonomic ranks</li> <li>• Research and investigate comparative anatomy and embryology.</li> </ul>	<p><a href="https://www.aqa.org.uk/subjects/science/as-and-a-level/biology-7401-7402">https://www.aqa.org.uk/subjects/science/as-and-a-level/biology-7401-7402</a></p> <p><a href="https://www.physicsandmathstutor.com/biology-revision/">https://www.physicsandmathstutor.com/biology-revision/</a></p> <p><a href="https://www.khanacademy.org">https://www.khanacademy.org</a></p> <p><a href="https://www.s-cool.co.uk/a-level/biology">https://www.s-cool.co.uk/a-level/biology</a></p> <p><a href="https://studywise.co.uk/a-level-revision/biology/www">https://studywise.co.uk/a-level-revision/biology/www</a></p> <p><a href="http://www.senecalearning.com">http://www.senecalearning.com</a> login</p>

	<ul style="list-style-type: none"><li>• Explain what is meant by directional and stabilising selection.</li><li>• Identify types of selection from distribution curves.</li></ul> <p><b>Skills</b></p> <ul style="list-style-type: none"><li>• Students could calculate the percentage of human DNA which does code for polypeptides, when supplied with data about the number of coding bases and the total number of bases</li><li>• Students could work out the possible number of combinations that a triplet code can have.</li><li>• Apply knowledge of transcription and nucleic acids to explain experimental data from investigations into the role of nucleic acids.</li><li>• Application of knowledge to transcribe a DNA sequence into mRNA.</li><li>• Use the expression <math>2^n</math> to calculate the possible number of different combinations of chromosomes</li><li>• Derive a formula from this to calculate the possible number of different combinations of chromosomes following random fertilisation</li></ul>		
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	<ul style="list-style-type: none"><li>• Interpret data from graphs showing selection</li><li>• Application of knowledge to explain changes/lack of changes in the distribution curves/features of a population.</li><li>• Use laboratory glassware apparatus to perform serial dilutions of bacteria to perform a count</li><li>• Use microbiological aseptic techniques, including the use of agar plates or broth</li><li>• Use a logarithmic scale when dealing with data relating to large numbers of bacteria in a culture</li><li>• Present data in tables and graphs</li><li>• Could select and use an appropriate statistical test to find the significance of differences in the effect of different anti-microbial substances on microbial</li><li>• Make judgements and reach conclusions</li></ul>		
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