



## KS5 Curriculum Map – Biology:

Topic	Knowledge	Skills	Assessment Opportunities
Cell Structure	<p><i>Substantive knowledge:</i> This is the specific, factual content for the topic, which should be connected into a careful sequence of learning.</p> <ul style="list-style-type: none"><li>• Methods of studying cells.</li><li>• The electron microscope.</li><li>• Microscope measurements and calculations.</li><li>• Eukaryotic cell structure.</li><li>• Cell specialisation and organisation.</li><li>• Prokaryotic cells and viruses.</li></ul>	<p><i>Disciplinary knowledge:</i> This is the action taken within a particular topic in order to gain substantive knowledge.</p> <ul style="list-style-type: none"><li>• To use the equation triangle for calculating the size of image, magnification and size of object.</li><li>• To explain differences between scanning and transmission electron microscopes including limitations.</li><li>• To be able to calibrate an eye piece graticule.</li><li>• Describe the structure and function of eukaryotic cell structures found in animal and plant cells.</li><li>• To describe how cells are arranged into tissues, organs, organ systems and give examples.</li><li>• Comparison of prokaryotic and eukaryotic cells.</li><li>• Label the basic structure of a virus.</li></ul>	<p>What assessments will be used to measure student progress?</p> <ul style="list-style-type: none"><li>• Keywords.</li><li>• Exam style questions in independent study book.</li><li>• To be able to prepare a microscope slide and do a biological drawing in line with exam board specifications.</li><li>• Mathematical skills.</li><li>• Exam questions.</li><li>• Topic test 2.1 Cells and magnification</li></ul>

<p>Biological Molecules and Enzymes</p>	<ul style="list-style-type: none"> <li>• Properties of water.</li> <li>• Structure and function of monomers and polymers.</li> <li>• Examples of use.</li> <li>• Enzyme theory and action including the lock and key model and induced fit.</li> <li>• Factors affecting enzyme action.</li> <li>• Enzyme inhibition.</li> </ul>	<ul style="list-style-type: none"> <li>• Explain condensation and hydrolysis reactions.</li> <li>• Correctly identify bonds and their use.</li> <li>• Recall the tests for all biological molecules.</li> <li>• Describe the properties of water and the importance of the water molecule in living things.</li> <li>• Describe inorganic ions and their roles.</li> <li>• Describe the two models of enzyme action.</li> <li>• Analyse graphs showing how factors affect the rate of enzyme action.</li> </ul>	<ul style="list-style-type: none"> <li>• Keywords.</li> <li>• Exam style questions in independent study book.</li> <li>• Safely perform all tests for biological molecules.</li> <li>• Analyse the results to reach a valid conclusion.</li> <li>• PAG 5.2 Determining glucose concentration</li> <li>• PAG 9.1- 9.3 Qualitative testing for proteins, lipids and glucose</li> <li>• PAG 4.1-4.3 The effect of substrate concentration, enzyme concentration and temperature on enzyme activity.</li> <li>• Topic test 2.2 Biological molecules</li> <li>• Topic test 2.4 Enzymes</li> </ul>
<p>Nucleic acids and protein synthesis</p>	<ul style="list-style-type: none"> <li>• The structure of RNA and DNA.</li> <li>• DNA replication.</li> <li>• DNA, Chromosomes and the Genetic code.</li> <li>• The structure of mRNA and tRNA.</li> <li>• Protein synthesis: transcription and splicing.</li> <li>• Protein synthesis: translation.</li> </ul>	<ul style="list-style-type: none"> <li>• To describe the differences between the structure of RNA and DNA and how they are related to their function.</li> <li>• To explain the semi-conservative process of DNA replication and discuss evidence for this process.</li> <li>• Explain genes code for polypeptides.</li> <li>• To describe the differences between DNA in prokaryotic cells and eukaryotic cells.</li> <li>• To explain the nature of homologous chromosomes.</li> <li>• To describe the role of messenger RNA (mRNA) and transfer RNA (tRNA).</li> <li>• To explain how pre-mRNA is produced and modified to form mRNA.</li> <li>• To explain how a polypeptide is synthesised</li> </ul>	<ul style="list-style-type: none"> <li>• Keywords.</li> <li>• Exam style questions in independent study book.</li> <li>• Mathematical skills.</li> <li>• Practical extract DNA from fruit</li> <li>• Topic test 2.3 Nucleic acids</li> </ul>

<p>Transport across cell surface membranes</p>	<ul style="list-style-type: none"> <li>• Structure of cell surface membrane.</li> <li>• Transport across membrane using diffusion, facilitated diffusion, osmosis and active transport.</li> </ul>	<ul style="list-style-type: none"> <li>• Explain the fluid mosaic model of the cell membrane structure.</li> <li>• Distinguish the difference between diffusion and facilitated diffusion.</li> <li>• To explain how water potential affects water movement including the effects of solutes.</li> <li>• Explain the process of active transport and the conditions required.</li> </ul>	<ul style="list-style-type: none"> <li>• Keywords.</li> <li>• Exam style questions in independent study book.</li> <li>• PAG 5.1 The effect of temperature</li> <li>• PAG 8.1 Investigation into the water potential of a potato</li> <li>• Mathematical skills.</li> <li>• Topic test: 2.5 Membranes</li> </ul>
<p>Cell division and diversity</p>	<ul style="list-style-type: none"> <li>• Mitosis and the Cell Cycle.</li> <li>• Gene mutations.</li> <li>• Meiosis and genetic variations.</li> <li>• Genetic diversity and adaptation.</li> <li>• Types of selection.</li> <li>• Quantitative investigations of variation.</li> </ul>	<ul style="list-style-type: none"> <li>• To be able to distinguish the stages of mitosis in animal cells.</li> <li>• To explain how mitosis is controlled and how cancer and its treatment relates to the cell cycle.</li> <li>• To explain how deletion and substitution of bases results in a different amino acid sequence.</li> <li>• To describe the process of meiosis and explain how it creates genetic variation.</li> <li>• Describe what factors influence genetic diversity and how it enables natural selection.</li> <li>• Describe environmental factors which exert selection pressure.</li> </ul>	<ul style="list-style-type: none"> <li>• Keywords.</li> <li>• Exam style questions in independent study book.</li> <li>• To be able to interpret life cycles of animals and plants.</li> <li>• Distinguish stages of mitosis using electro micrographs.</li> <li>• Work out mitotic index.</li> <li>• To be able to calculate standard deviation.</li> <li>• To interpret error bars on graphical data.</li> <li>• PAG 1.1 Using a light microscope to study mitosis</li> <li>• Topic test 2.6 Cell division</li> </ul>

<p>Exchange surfaces and breathing</p>	<ul style="list-style-type: none"> <li>• Exchange between organisms and their environment with reference to single celled organisms, insects, fish, plants and humans.</li> <li>• Risk factors for lung disease.</li> </ul>	<ul style="list-style-type: none"> <li>• Describe the relationship between the size of an organism or structure and its surface area to volume ratio.</li> <li>• Describe the exchange surface in living things and how structure relates to function- in mammals, insects and in fish.</li> <li>• Describe the difference between ventilation and exchange in mammalian lungs.</li> <li>• Recognise correlations and causal relationships.</li> </ul>	<ul style="list-style-type: none"> <li>• Keywords.</li> <li>• Exam style questions in independent study book.</li> <li>• SA:V calculation.</li> <li>• Calculate rate of exchange.</li> <li>• Interpret graphs including tidal volumes and breathing rates.</li> <li>• Calculations relating to spirometry</li> <li>• Practical: Fish head dissection</li> <li>• Topic test 3.1 Exchange surfaces and breathing.</li> </ul>
--	---	--	--

<p>Transport in animals</p>	<ul style="list-style-type: none"> <li>• Structure and role of haemoglobin.</li> <li>• Oxygen dissociation curves.</li> <li>• Circulatory system of a mammal.</li> <li>• Structure of the heart and vessels.</li> <li>• Risk factors associated with cardiovascular disease.</li> <li>• The cardiac cycle.</li> <li>• Tissue fluid formation.</li> <li>• Transport of water and organic substances in plants.</li> </ul>	<ul style="list-style-type: none"> <li>• Describe the structure and function of haemoglobin.</li> <li>• Interpret and explain oxygen dissociation curves with reference to the loading and unloading of oxygen, and to the environment the organism lives in.</li> <li>• Describe the key features of a mammalian circulatory system and label key components.</li> <li>• Label the key features of the heart and explain the key features of the cardiac cycle with reference to volume and pressure.</li> <li>• Label key features of blood vessels and relate to function.</li> <li>• Describe the formation of tissue fluid.</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Keywords.</li> <li>• Exam style questions in independent study book.</li> <li>• Analyse and interpret data associated with specific risk factors and the incidence of cardiovascular disease.</li> <li>• Calculate cardiac output and interpret graphs relating to pressure and volume changes in the heart.</li> <li>• PAG 2.1 Dissection of the mammalian heart</li> <li>• PAG 11.1 Investigation into the effect of exercise on pulse rate.</li> <li>• Topic test 3.2 Transport in animals</li> <li>• Exam questions</li> </ul>
<p>Transport in plants</p>	<ul style="list-style-type: none"> <li>• Transport of water and organic substances in plants.</li> <li>• Structure of vessels</li> </ul>	<ul style="list-style-type: none"> <li>• Describe movement of water through the xylem with reference to transpiration, evaporation and cohesion tension.</li> <li>• Describe the mass flow mechanism for the transport of organic substances in the phloem.</li> </ul>	<ul style="list-style-type: none"> <li>• Keywords.</li> <li>• Exam style questions in independent study book in independent study book.</li> <li>• Interpret data collected using a potometer.</li> <li>• PAG 2.2 Dissection of a stem</li> <li>• Practical microscope observations of plant vessel</li> <li>• PAG 11.1 Investigation into the effect of exercise on pulse rate.</li> <li>• Topic test 3.2 Transport in animals</li> </ul>

<p>Statistical Tests (across the course)</p>	<ul style="list-style-type: none"> <li>• Standard deviation and error bars.</li> <li>• Chi-squared.</li> <li>• T-test.</li> <li>• Spearman's rank.</li> <li>• Probability and chance.</li> </ul>	<ul style="list-style-type: none"> <li>• Correctly identify when to use a particular statistical test.</li> <li>• Correctly perform each statistical test.</li> <li>• Effectively use the four statistical tests to identify the degree of significance of data collected.</li> <li>• Define probability and chance and interpret a given probability value in terms of acceptance or rejection of a null hypothesis, using 0.05 as the critical probability value.</li> </ul>	<ul style="list-style-type: none"> <li>• Keywords.</li> <li>• Exam style questions.</li> <li>• Successful use of statistical tests to determine the significance of data.</li> <li>• Practical activities to design experiments that collect appropriate data for a statistical test.</li> </ul>
<p>Communicable diseases</p>	<ul style="list-style-type: none"> <li>• Defence mechanisms and phagocytosis.</li> <li>• T lymphocytes and cell mediated immunity.</li> <li>• B lymphocytes and humoral immunity.</li> <li>• Antibodies.</li> <li>• Vaccination.</li> <li>• Human Immunodeficiency Virus (HIV).</li> </ul>	<ul style="list-style-type: none"> <li>• To explain the difference between specific and non-specific defence systems including the process of phagocytosis.</li> <li>• To explain the role of T-cells and cell mediated immunity.</li> <li>• To explain the role of B-cells and the production of antibodies including the roles of plasma cells and memory cells in the secondary immune response.</li> <li>• To be able to label the antibody structure and discuss its function.</li> <li>• Explain how monoclonal antibodies are produced and used.</li> <li>• Describe the features of an effective vaccination programme including ethical issues associated.</li> <li>• Describe the structure of HIV and explain how it replicates.</li> <li>• To distinguish between stabilising and directional selection using antibiotic resistance as an example.</li> <li>• To explain what is meant by the mean and standard deviation.</li> </ul>	<ul style="list-style-type: none"> <li>• Keywords.</li> <li>• Exam style questions in independent study book.</li> <li>• Interpret graphs of primary and secondary response.</li> <li>• Topic test 4.1 Communicable diseases</li> </ul>

<p>Biodiversity and Classification and evolution</p>	<ul style="list-style-type: none"> <li>• Species and taxonomy.</li> <li>• Diversity within a community.</li> <li>• Species diversity and human activities.</li> <li>• Investigating diversity.</li> </ul>	<ul style="list-style-type: none"> <li>• To explain the concept of a species and how they are named.</li> <li>• To explain the principles of classification and how they are related to evolution.</li> <li>• To explain the importance of courtship behaviour for the survival of the species.</li> <li>• Explain how the diversity index is used to measure species diversity.</li> <li>• Describe the impact of agriculture on species diversity.</li> <li>• Explain the importance of conservation.</li> <li>• To explain the use of a range of techniques in comparing genetic diversity within and between species.</li> </ul>	<ul style="list-style-type: none"> <li>• Calculating the index of diversity.</li> <li>• Research for conservation methods.</li> <li>• Exam Questions in independent study book.</li> <li>• PAG 3.1 Calculation of species diversity</li> <li>• PAG 3.2 Measurement of the distribution and abundance of plants in a habitat</li> <li>• PAG 3.3 Investigating a correlation between a named species and a biotics and/or abiotic factor</li> <li>• Topic test 4.2 Biodiversity.</li> <li>• Topic test 4.3 Classification and evolution</li> </ul>
<p>Homeostasis and Hormonal communication</p>	<ul style="list-style-type: none"> <li>• Principles of homeostasis.</li> <li>• Feedback mechanisms.</li> <li>• Hormones and the regulation of blood glucose concentration.</li> <li>• Diabetes and its control.</li> <li>• The role of hormones in osmoregulation.</li> </ul>	<ul style="list-style-type: none"> <li>• Explain the importance of homeostasis and how the control mechanisms are coordinated.</li> <li>• Explain what homeostasis is and how it helps to control homeostatic processes.</li> <li>• Distinguish between positive and negative feedback.</li> <li>• Explain how hormones work, with reference to adrenaline on regulating blood glucose.</li> <li>• Explain the roles of organs and hormones in the regulation of blood glucose.</li> <li>• Distinguish between type 1 and type 2 diabetes and how they are controlled.</li> </ul>	<ul style="list-style-type: none"> <li>• Keywords.</li> <li>• Exam style questions in independent study book.</li> <li>• Interpret information in reference to positive and negative feedback.</li> <li>• Interpret graphs showing blood glucose levels to determine if someone is likely to be diabetic.</li> <li>• Topic test: 5.1 and 5.4 Homeostasis.</li> </ul>

<p>Excretion</p>	<ul style="list-style-type: none"> <li>• Liver anatomy and the role of hepatocytes.</li> <li>• Kidney anatomy, the role of the nephron and osmoregulation.</li> <li>• The role of hormones in osmoregulation.</li> </ul>	<ul style="list-style-type: none"> <li>• Describe the structure of the liver and lobules.</li> <li>• Describe deamination, ornithine cycle, decomposition of alcohol.</li> <li>• Describe the structure of the nephron and relate it to the function.</li> <li>• Explain the role of hormones in osmoregulation.</li> </ul>	<ul style="list-style-type: none"> <li>• Keywords.</li> <li>• Exam style questions in independent study book.</li> <li>• Practical kidney dissection</li> <li>• Topic test 5.2 Excretion.</li> </ul>
<p>Neuronal communication and Plant and animal responses</p>	<ul style="list-style-type: none"> <li>• Survival and response.</li> <li>• Plant growth factors.</li> <li>• The brain.</li> <li>• A reflex arc.</li> <li>• Receptors.</li> <li>• Control of heart rate.</li> <li>• Neurones, the nervous system and nerve impulse.</li> <li>• Passage and speed of an action potential.</li> <li>• Structure and function of the synapse.</li> <li>• Transmission across a synapse.</li> <li>• Drugs and the synapse.</li> <li>• Structure of skeletal muscle and types of muscle fibre.</li> <li>• Neuromuscular junctions.</li> <li>• Contraction of skeletal muscles.</li> </ul>	<ul style="list-style-type: none"> <li>• Define stimulus, response, taxis, kinesis and tropism.</li> <li>• Explain the response in plants to specific stimuli.</li> <li>• Locate and describe the main parts of the brain.</li> <li>• Explain how a specific reflex arc works with reference to sensory, intermediate and motor neurones and how it improves likelihood of survival.</li> <li>• Describe the main features of the Pacinian corpuscle, rod and cone cells and how it relates to function.</li> <li>• Describe and explain how the heart rate is controlled with reference to chemoreceptors and pressure receptors.</li> <li>• Explain how the autonomic nervous system controls heart rate.</li> <li>• Draw and label a myelinated motor neurone and link to function.</li> <li>• Describe the nature of the resting and action potential and how it works within a neurone.</li> <li>• Compare and contrast an action potential in a myelinated and unmyelinated neurone.</li> <li>• Describe the factors that affect the speed of the action potential with reference to the refractory period and the all-or-nothing principle.</li> </ul>	<ul style="list-style-type: none"> <li>• Keywords.</li> <li>• Exam style questions in independent study book.</li> <li>• PAG 11.3 Practical investigation into phototropism</li> <li>• Topic test 5.3 Neuronal communication</li> <li>• Topic test 5.5 Plant and animal responses</li> </ul>



		<ul style="list-style-type: none"> <li>• Describe the structure and function of the synapse and explain how information is transmitted.</li> <li>• Research and describe how drugs affect the nervous system.</li> <li>• Label gross and microscopic structure of a skeletal muscle and relate key features to function.</li> <li>• Distinguish between the two types of muscle fibre.</li> <li>• Describe what happens at a neuromuscular junction when a nerve impulse is received and compare to a synapse.</li> <li>• Explain the mechanism of contraction in skeletal muscles.</li> <li>• Evaluate evidence for the sliding filament mechanism.</li> </ul>	
<p>Photosynthesis</p>	<ul style="list-style-type: none"> <li>• Photosynthesis overview.</li> <li>• The light-dependent and light-independent reaction.</li> <li>• Factors affecting the rate of photosynthesis</li> </ul>	<ul style="list-style-type: none"> <li>• To be able to explain how the plant leaf is adapted to carry out photosynthesis.</li> <li>• To explain the processes of oxidation and reduction reactions in the light-dependent cycle.</li> <li>• Explain how ATP and NADPH is made during the light-dependent reaction.</li> <li>• Describe the role of photolysis in the light-dependent reaction.</li> <li>• Describe the roles of ATP and NADPH in the light in-dependent reaction.</li> <li>• Describe the events of the Calvin Cycle.</li> </ul>	<ul style="list-style-type: none"> <li>• Keywords.</li> <li>• Exam style questions in independent study book.</li> <li>• Research different Pigments and their absorption wavelengths.</li> <li>• PAG 6.3 Investigation into TLC to separate photosynthetic pigments</li> <li>• Mathematical skills.</li> <li>• Topic Test 5.6 Photosynthesis</li> </ul>

Respiration	<ul style="list-style-type: none"> <li>• Glycolysis, link reaction and Krebs cycle.</li> <li>• Oxidative phosphorylation.</li> <li>• Anaerobic respiration.</li> </ul>	<ul style="list-style-type: none"> <li>• Describe the main stages of and the products formed in glycolysis, the link reaction and the Krebs cycle.</li> <li>• Explain the significance of each stage with reference to coenzymes and ATP.</li> <li>• Explain the process of oxidative phosphorylation in the electron transfer chain.</li> <li>• Explain the process of anaerobic respiration and how it differs from aerobic respiration.</li> <li>• Make comparisons between anaerobic respiration in mammals and microorganisms.</li> </ul>	<ul style="list-style-type: none"> <li>• Keywords.</li> <li>• Exam style questions in independent study book.</li> <li>• Interpret experimental data relating to respiration to determine factors affecting the rate.</li> <li>• PAG 12.1 Investigation into the respiration rate of yeast</li> <li>• Topic test 5.7 Respiration.</li> </ul>
Cellular control and Manipulating genomes	<ul style="list-style-type: none"> <li>• Gene Mutations.</li> <li>• Stem Cells and Totipotency.</li> <li>• Regulation of Transcription and Translation.</li> <li>• Epigenetic control and gene expression.</li> <li>• Gene expression and Cancer.</li> <li>• Producing DNA fragments.</li> <li>• The use of Vectors.</li> <li>• In-vitro gene cloning and polymerase chain reaction (PCR).</li> <li>• Locating genes, genetic screening and counselling.</li> <li>• Genetic fingerprinting.</li> </ul>	<ul style="list-style-type: none"> <li>• To explain how different types of gene mutations lead to different amino acid sequences in polypeptides.</li> <li>• To explain how cells lose their totipotency and become specialised.</li> <li>• To describe cell differentiation and cell specialisation.</li> <li>• Explain how pluripotent stem cells can be used to treat humans.</li> <li>• Explain how Oestrogen siRNA effects gene expression.</li> <li>• Explain the effect of epigenetic factors on DNA and histones.</li> <li>• Explain the effects of decreased acetylation and increased methylation of DNA.</li> <li>• Distinguish between benign and malignant tumours.</li> <li>• The role of oncogenes and tumour suppressor genes in the development of tumours.</li> <li>• To explain how complementary DNA is made using reverse transcriptase.</li> <li>• To explain how restriction endonucleases</li> </ul>	<ul style="list-style-type: none"> <li>• Keywords</li> <li>• Exam style questions in independent study book.</li> <li>• Mathematical skills.</li> <li>• PAG 6.2 Electrophoresis of DNA fragments for analysis</li> <li>• Topic Test 6.1 and 6.3.</li> </ul>

		<p>are used to cut DNA into fragments.</p> <ul style="list-style-type: none"> <li>• To explain the importance of sticky ends when inserting vectors.</li> <li>• Describe and explain how gene markers are used.</li> <li>• To explain how the polymerase chain reaction is carried out.</li> <li>• Describe how DNA probes are used to screen for heritable condition.</li> <li>• To explain the technique of gel electrophoresis with regards to genetic fingerprinting.</li> </ul>	
<p>Patterns of inheritance</p>	<ul style="list-style-type: none"> <li>• Monohybrid inheritance.</li> <li>• Dihybrid inheritance and probability and genetic crosses.</li> <li>• Co-dominance and multiple alleles.</li> <li>• Sex linkage autosomal linkage and Epistasis.</li> <li>• Chi-Squared test in relation to genetics Population Genetics.</li> <li>• Variation in Phenotype.</li> <li>• Natural Selection.</li> <li>• Effects of different forms of selection on evolution.</li> <li>• Isolation and Speciation.</li> </ul>	<ul style="list-style-type: none"> <li>• To be able to define the genetic terminology.</li> <li>• Explain how a single gene is inherited.</li> <li>• Explain how single and two different genes on different chromosomes are inherited.</li> <li>• Explain why results of genetic results differ from predicted results.</li> <li>• To explain how co-dominance and multiply alleles affect inheritance.</li> <li>• To explain how sex-linked diseases are inherited.</li> <li>• To describe and explain how autosomal linkage affects the combinations of alleles in gametes.</li> <li>• To explain the effects of Epistasis.</li> <li>• To demonstrate how Chi-Square test is used in Genetics.</li> <li>• To be able to use the Hardy Weinberg Principle to calculate allele frequencies.</li> <li>• To describe variations due to genetic and environmental factors.</li> <li>• To explain the role of variation in selection and describe the effects of different forms of selection on evolution.</li> </ul>	<ul style="list-style-type: none"> <li>• Keywords.</li> <li>• Complete various types of genetic crosses.</li> <li>• Mathematic Skills to calculate Hardy Weinberg and interpret the Chi-Squared Test.</li> <li>• Exam Questions in independent study book.</li> <li>• Topic Test 6.2 Patterns of inheritance</li> </ul>

		<ul style="list-style-type: none"> <li>To explain how new species are formed by allopatric and sympatric speciation.</li> </ul>	
Cloning and biotechnology	<ul style="list-style-type: none"> <li>Natural clones in plants and production of natural clones for horticulture</li> <li>Cloning techniques in plants and animals</li> <li>Use of microorganisms in biotechnological processes</li> <li>Using microorganisms for food production</li> <li>Culturing microorganisms</li> <li></li> </ul>	<ul style="list-style-type: none"> <li>Describe plant cloning techniques – plant cuttings, micropropagation, and tissue culture</li> <li>Evaluate arguments for/against artificial cloning</li> <li>Describe animal cloning techniques – artificial embryo twinning, or enucleation and somatic cell nuclear transfer</li> <li>Manipulating growing conditions in batch and continuous fermentation to maximize yield Describe the standard growth curve of a microorganism in a closed culture</li> </ul>	<ul style="list-style-type: none"> <li>Keywords</li> <li>Exam questions in independent study book.</li> <li>Topic test: 6.4 Cloning and biotechnology</li> </ul>
Ecosystems and Populations and sustainability	<ul style="list-style-type: none"> <li>Food chains, energy transfer, and productivity.</li> <li>Nutrient cycles, including nitrogen, phosphorous, and decay.</li> <li>Use of natural and artificial fertilisers.</li> <li>Environmental issues concerning the use of nitrogen-containing fertilisers.</li> <li>Variation in Population size.</li> <li>Intraspecific and interspecific competition.</li> <li>Predation.</li> <li>Succession and conservation of habitats.</li> </ul>	<ul style="list-style-type: none"> <li>Explain how energy is entered, transferred and lost between organisms in an ecosystem.</li> <li>Explain what is meant by GPP and NPP and use appropriate formulas to calculate values using given data.</li> <li>Describe the stages involved in decay and how nutrients are recycled.</li> <li>Describe the role of mycorrhizae in nutrient cycles.</li> <li>Describe why fertilisers are needed in agricultural ecosystems, how they increase productivity and the main environmental effects with reference to species diversity, leaching and eutrophication.</li> <li>To be able to define all key terms such as environment, communities, population and niche.</li> <li>To explain how factors influence population</li> </ul>	<ul style="list-style-type: none"> <li>Keywords.</li> <li>Exam style questions in independent study book.</li> <li>Calculate net and primary production.</li> <li>Calculate the efficiency of energy transfers.</li> <li>Interpret data and graphs relating to energy transfers.</li> <li>Topic test 6.5 Ecosystems</li> <li>Topic test 6.6 Populations and sustainability</li> <li>Interpreting predator- prey graphs.</li> <li>Mathematical skills.</li> </ul>

size.

- Describe how competition influences population size.
- Explain how predator-prey relationships affect population size.
- Explain how to use a quadrat and transect to obtain quantitative data.
- Explain how to use mark-release – recapture method.
- Describe the changes that occur during succession.
- Explain how to manage succession to help
- conserve habitats.