



Year 11 Biology Curriculum Overview

Topic	Timing	Key knowledge and skills	Progression and links	SEND/ More able	Assessment & recording; factual recall checks
Ecology	Autumn term	<p>Students should:</p> <ul style="list-style-type: none"> Define the terms community, population, habitat, ecosystem, abiotic factor, biotic factor. Describe what a stable community is and give an example. Suggest how one species relies on another. Describe how a factor influences the distribution of organisms. Record measurements of abiotic factors. Explain how to use a quadrat and transect to estimate population size. Design a method to estimate a population using a sampling technique. Calculate range, mean, median and mode in order to analyse results. Use information to suggest factors that animals are competing for in a given habitat. Explain tactics that help an animal compete for a resource. Describe how the distribution of a species has changed because of competition. Suggest factors that plants are competing for in a given habitat. Explain why plants use seed dispersal. Describe the methods plants use to outcompete others or avoid competition. Suggest features that an organism may have in order to survive in a given habitat. Explain how adaptations allow an organism to survive in its habitat. Classify adaptations as structural, behavioural or functional. Calculate surface area to volume ratio. Describe how animals are adapted to live in hot, dry and cold habitats. Explain how a plant adaptation allows it to survive in its habitat. Explain why plants need to reduce water loss by transpiration. Display data using a graph and describe what it shows. Identify producers, primary consumers, secondary consumers, tertiary consumers, predators and prey in a food web. 	<p>Numeracy</p> <ul style="list-style-type: none"> Analysing graphs <p>Literacy</p> <ul style="list-style-type: none"> Use of tier three words Extended writing opportunities 	<p>Challenge:</p> <ul style="list-style-type: none"> Required practical – Sampling techniques. Required practical – the effect of temperature on pH Higher level questions – explaining the effects of changes to ecosystems <p>Scaffold:</p> <ul style="list-style-type: none"> Pre prepared tables Knowledge organisers Scaffold for extended writing 	<ul style="list-style-type: none"> 5 questions to start – recall activity every lesson. Close the gap questions Self and peer feedback on tasks completed Structure strip Past paper exam Qs. Summative assessment at the end of the unit

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Ecology	Autumn term	<ul style="list-style-type: none"> • Describe what happens to a population in a food web when another changes. • Plot data as a line graph and explain the pattern of predator and prey populations. • Explain why decomposers are important to a stable ecosystem. • Explain the importance of recycling substances. • Describe the events in the decay cycle. • Describe the events in the carbon cycle. • Explain why the carbon cycle is vital to life on Earth. • Write word equations for photosynthesis, respiration and combustion. • Identify factors that speed up or slow down decay. • Choose a suitable dependent variable and plan a way to measure it accurately. • Plot a line graph with more than one line plotted on the same axes. • Describe why a good level of biodiversity is important to the future of the human species. • Describe some effects of human population growth. • Analyse and interpret data and information concerning human population growth. • Describe how sewage, fertilisers, pesticides and herbicides pollute the land and water. • Describe the process of eutrophication and bioaccumulation. • Draw conclusions from data. • Describe how acid rain is formed. • Plan an investigation to find out how acid rain affects the germination of seeds. • Choose a suitable method for analysing data. • Explain the effects of deforestation and peat removal. • Categorise reasons for and effects of deforestation as environmental, social, economic and/or political. • Describe why there is a conflict between using peat to increase food production and the need to conserve peat bogs. • Use the terms greenhouse effect, global warming and climate change correctly. • Describe in detail the biological consequences of global warming. • State some examples of environmental changes that affect the distribution of species in an ecosystem. • Explain how humans can cause environmental changes. • Describe an example of how environmental change has affected the distribution of species. 			

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Ecology	Autumn term	<ul style="list-style-type: none"> • Describe programmes to reduce negative effects on ecosystems and explain how they work. • Use information to explain the conflicting pressures on maintaining biodiversity. • Number the trophic levels on a food chain, food web and pyramid of biomass. • Describe how decomposers feed. • Use data to draw a pyramid of biomass and explain what it shows. • Calculate the percentage of biomass passed between trophic levels. • Calculate the efficiency of transfers with guidance. • Explain how the loss of biomass at each trophic level affects the number of organisms at each level. • Define sustainable food production and describe how it could help increase food security. • Explain how factors affect food security. • Present information based on research. • Explain why there could be more food for everyone if we ate less meat. • Explain why there are ethical objections to some 'factory farming' techniques. • Explain how 'factory farming' techniques increase rate of growth. • Describe the reasons why fish stocks in the ocean are decreasing. • Describe the techniques used to conserve fish stocks. • Describe how mycoprotein is produced. 			

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Inheritance, Variation and Evolution	Spring Term	<p>Students should:</p> <ul style="list-style-type: none"> Describe the differences between asexual and sexual reproduction. Describe the advantages and disadvantages of sexual and asexual reproduction. Design a model to show why variation is produced in offspring from sexual reproduction but not in asexual reproduction. Describe the processes of mitosis and meiosis. Explain how meiosis halves the number of chromosomes in gametes and fertilisation restores the full number. Solve simple probability questions. Describe how malarial parasites and fungi reproduce both asexually and sexually. List the ways plants can reproduce asexually. Explain in detail how plants reproduce sexually. Describe the relationship between DNA, genes and chromosomes. Describe how the four bases make up a code. Design and build a model of DNA to show each part. Describe some of the benefits of studying the human genome. Explain the goal of the 100 000 genomes project. Explain why genome projects are costly and take a long time. Describe the steps involved in producing a protein inside the cell. State what a mutation is. Explain why the correct folding of a protein is important to its function. Use the terms allele, dominant, recessive, homozygous and heterozygous correctly. Describe a phenotype when given the genotype. 	<p>Literacy</p> <ul style="list-style-type: none"> Use of tier three words Extended writing opportunities 	<p>Challenge:</p> <ul style="list-style-type: none"> Explaining how theories become accepted as fact. Higher level questions – how genetic mutations can affect protein synthesis. <p>Scaffold:</p> <ul style="list-style-type: none"> Pre prepared Punnett squares Knowledge organisers Scaffold for extended writing 	<ul style="list-style-type: none"> 5 questions to start – recall activity every lesson. Close the gap questions Self and peer feedback on tasks completed Structure strip Past paper exam Qs. Summative assessment at the end of the unit

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Inheritance, Variation and Evolution	Spring Term	<ul style="list-style-type: none"> • Use a Punnett square diagram to predict the outcome of a monohybrid cross using the theory of probability. • Carry out a genetic cross to show sex inheritance. • Use direct proportion and simple ratios to express the outcome of a genetic cross. • Name examples of inherited disorders, such as cystic fibrosis and polydactyly. • Use a genetic cross to explain how inherited disorders are passed on. • Outline the methods used to screen embryos. • State advantages and disadvantages of embryo screening. • I can list some examples of variation in plants and categorise as being due to genetic, environmental causes or both. • I can suggest reasons why identical twins will start to show variation as they get older. • I can use data to explain why studying identical twins helps scientists investigate which traits have genetic causes. • I can explain how a mutation may lead to a new phenotype. • I can describe the steps that take place during evolution by natural selection. • I can analyse data from an activity modelling natural selection. • I can explain the process of selective breeding. • I can explain why humans have used selective breeding. • I can explain what inbreeding is and why it is a problem in dog breeding. • I can describe the steps used in genetic engineering to produce GM organisms. • I can analyse data to describe why growing GM crops maybe be beneficial to a farmer. • Describe the benefits of reproduction using cuttings or tissue culture rather than seeds, for plant growers. • I can describe how embryo transplants are produced and why they are clones. • I can explain why the animal produced using adult cells cloning is a clone. • I can design a flow chart to describe the process of adult cell cloning. • I can list some benefits and drawbacks of adult cell cloning. • I can outline the potential benefits and risks of genetic engineering. • I can describe economic and ethical concerns that people may have about cloning animals. 			

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Inheritance Variation and Evolution	Spring Term	<ul style="list-style-type: none"> • I can discuss why Mendel’s work was not recognised until after his death. • I can correctly order important discoveries in gene therapy. • I can compare and contrast Darwin’s and Lamarck’s theories of evolution. • I can describe the theory of inheritance of acquired characteristics proposed by Jean-Baptiste Lamarck. • I can design a storyboard to highlight important events that helped Darwin develop his theory. • I can explain how finches on different islands evolved different shaped beaks by natural selection. • I can describe several reasons why most people did not accept his theory when it was first published. • I can explain why it was important that Darwin collected a variety of evidence. • I can describe the steps in the process of speciation. • I can explain why there are species living on Madagascar that share some similarities with species found elsewhere. • I can carry out research to describe other examples of speciation. • I can describe how fossils are formed. • I can describe how fossils are evidence for evolution by natural selection. • I can explain why the fossil record is not complete. • I can describe how other organisms can cause an animal or plant to become extinct. • I can suggest a hypothesis for why an organism became extinct. • I can explain how fossil diagrams show how the horse has evolved. • I can suggest the effects of an asteroid, comet or meteorite strike on Earth. • I can explain how environmental change can cause mass extinctions. • I can identify strengths and weaknesses in two different theories of mass extinction. • I can describe how antibiotic resistant bacteria evolve. • I can explain why scientists need to develop new antibiotics. • I can create an information sheet outlining important facts about antibiotic resistant bacteria to the public. • I can describe the classification system developed by Carl Linnaeus, to include the order of the taxonomic groups. • I can identify genus and species from a scientific name. • I can explain why a binomial naming system is useful. • I can describe how organisms are divided in the three domain system. • I can describe why the three domain system was proposed. • I can draw several conclusions from a simple evolutionary tree. 			