

Year 9 Biology Curriculum

Unit:	Core knowledge/skill development:	Sequence:	Assessment:	Literacy, numeracy, PSHE, FBV, other links:	Key areas of ACP and VAA development:	Home learning and enrichment:
9B Plant nutrients	This topic introduces the concept of photosynthesis and the reactants/ products involved	9Ba Reactions in plants 9Bb Plant adaptations 9Bc Plant products 9Bd Growing crops 9Be Farming problems	Starter questions Exam-type questions Hinge questions Use of web-based applications to assess knowledge in lesson (e.g. Educake, Seneca, Active Learn etc.) There is a Working Scientifically opportunity looking at decimal places and significant figures. End-of-topic tests.	Literacy: key words, definitions, summary notes.	Connection finding (linking) to use connections, to generalise the abstract concept of particle theory, energy released in reactions and reactivity Analysing Determining whether a reaction would go ahead based on the reactivity of the reactants, whether a reaction would be exothermic or endothermic	Homework typically set via online platforms such as Educake, Seneca, Active Learn. Worksheets. Exam preparation via exam / test papers.
Key concepts in Biology	Explain how the sub-cellular structures of eukaryotic and prokaryotic cells are related to their	Sb1a microscopes Sb1b Plant and animal cells Sb1b core practical microscopes		Literacy: key words, definitions, summary notes.	Linking: abstract thinking Being able to understand the microscopic structures in cells	

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	functions, including: a animal cells – nucleus, cell membrane, mitochondria and ribosomes b plant cells – nucleus, cell membrane, cell wall, chloroplasts, mitochondria, vacuole and ribosomes c bacteria – chromosomal DNA, plasmid DNA, cell membrane, ribosomes and flagella Describe how specialised cells are adapted to their function, including: a sperm cells – acrosome, haploid nucleus, mitochondria and tail b egg cells – nutrients in the cytoplasm, haploid nucleus and changes in the cell membrane	Sb1c Specialised cells Sb1d Inside bacteria Sb1e enzymes and nutrition Sb1f Testing foods Sb1f core practical testing foods Sb1g enzyme action Sb 1h enzyme activity Sb1h core practical pH and enzymes Sb1i Transporting substances Sb1i osmosis		Numeracy: calculations involving microscopy	Analysing: precision Carrying out the core practicals methodically and safely	

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	after fertilisation ciliated epithelial cells Explain how changes in microscope technology, including electron microscopy, have enabled us to see cell structures and organelles with more clarity and detail than in the past and increased our understanding of the role of sub-cellular structures Demonstrate an understanding of number, size and scale, including the use of estimations and explain when they should be used Demonstrate an understanding of the relationship between quantitative units in relation to cells, including: a milli (10⁻³) b micro (10⁻⁶)					

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	c nano (10–9) d pico (10–12) e calculations with numbers written in standard form Core Practical: Investigate biological specimens using microscopes, including magnification calculations and labelled scientific drawings from observations Explain the mechanism of enzyme action including the active site and enzyme specificity Explain how enzymes can be denatured due to changes in the shape of the active site Explain the effects of temperature, substrate concentration and pH on enzyme activity					

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	Students should: Maths skills 1.10 Core Practical: Investigate the effect of pH on enzyme activity Demonstrate an understanding of rate calculations for enzyme activity Explain the importance of enzymes as biological catalysts in the synthesis of carbohydrates, proteins and lipids and their breakdown into sugars, amino acids and fatty acids and glycerol Core Practical: Investigate the use of chemical reagents to identify starch, reducing sugars, proteins and fats Explain how the energy contained in food can be					

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	measured using calorimetry Explain how substances are transported into and out of cells, including by diffusion, osmosis and active transport Core Practical: Investigate osmosis in potatoes Calculate percentage gain and loss of mass in osmosis					
Environmental Biology	Describe the different levels of organisation from individual organisms, populations, communities, to the whole ecosystem Explain how communities can be affected by abiotic and biotic factors, including: a temperature, light, water, pollutants b competition,			Literacy: key words, definitions, summary notes. Numeracy: calculations involving working out percentage loss or gain in mass	Linking; big picture thinking Understanding the effect of changing one aspect of an ecosystem on the rest of the ecosystem	

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	predation. Describe the importance of interdependence in a community Describe how the survival of some organisms is dependent on other species, including parasitism and mutualism Core Practical: Investigate the relationship between organisms and their environment using field-work techniques, including quadrats and belt transects Explain how to determine the number of organisms in a given area using raw data from field-work techniques, including quadrats and belt transects Explain how some energy is transferred to less useful forms at					

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	each trophic level and that this affects the number of organisms at each trophic level, limits the length of a food chain and determines the shape of a pyramid of biomass in an ecosystem Calculate the efficiency of energy transfers between trophic levels and percentage calculations of biomass Explain the positive and negative human interactions within ecosystems and their impacts on biodiversity, including: a fish farming b introduction of non-indigenous species c eutrophication Explain the benefits of maintaining local and					

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	global biodiversity, including the conservation of animal species and the impact of reforestation Describe the biological factors affecting levels of food security, including: a increasing human population b increasing animal farming and the increased meat and fish consumption c the impact of new pests and pathogens d environmental change caused by human activity e sustainability issues, e.g. use of land for biofuel production and the cost of agricultural inputs Describe how different materials			Literacy: key words, definitions, summary notes. Numeracy: calculations involving efficiencies		

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	cycle through the abiotic and biotic components of an ecosystem Evaluate the use of indicator species as evidence to assess the level of pollution, including: a polluted water – bloodworm, sludgeworm b clean water – freshwater shrimps, stonefly c air quality – different species of lichen, blackspot fungus on roses Explain the effects of temperature, water content and oxygen availability on the rate of decomposition in food preservation Explain the effects of temperature, water content and oxygen availability on the rate of decomposition in composting					

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	Calculate rate changes in the decay of biological material					