










	TERM 1	TERM 2	TERM 3
Unit title & description	Topic 1: Lifestyle, Health and Risk Topic 2: Genes and Health	Topic 3: Voice of the Genome	Topic 4: Biodiversity and Natural Resources
Knowledge 	<p>Topic 1</p> <ul style="list-style-type: none"> • Cardiovascular disease, risks and treatments • Circulation and cardiac cycle • Blood vessels • Atherosclerosis • Blood-clotting • Structure of carbohydrates, lipids and proteins • Saturated and unsaturated lipids • High and low density lipoproteins <p>Topic 2</p> <ul style="list-style-type: none"> • Properties of gas exchange surfaces • Diffusion • Cell membrane • Osmosis • Active transport • Structure of mononucleotides • Process of protein synthesis • Genetic code • Structure of amino acids • Structure of proteins • Enzymes • DNA replication • Meselson and Stahl's classic experiment • Mutations • Genetics • Genetic screening 	<p>Topic 3</p> <ul style="list-style-type: none"> • Eukaryotic cells and organelles • Prokaryotic cells • Looking at cells and organelles • Cell organisation • The cell cycle and mitosis • Gametes and fertilisation • Meiosis and inheritance • Cell differentiation and gene expression • Stem cells in medicine • Variation 	<p>Topic 4</p> <ul style="list-style-type: none"> • Biodiversity and endemism • Adaptation and evolution • The Hardy-Weinberg principle • Classification • Conservation of Biodiversity • Plant cells structure • Plant stems • Starch, Cellulose and Plant Fibres • Sustainability and plant minerals • Drugs from plants and drug testing
Skills 	<p>CORE PRACTICAL 1: Investigate the effect of caffeine on heart rate in <i>Daphnia</i>.</p> <p>CORE PRACTICAL 2:</p>	<p>CORE PRACTICAL 5: Prepare and stain a root tip squash to observe the stages of mitosis.</p>	<p>CORE PRACTICAL 6: Identify sclerenchyma fibres, phloem sieve tubes and xylem vessels and their location within stems through a light microscope.</p>

	<p>Investigate the vitamin C content of food and drink.</p> <p>CORE PRACTICAL 3: Investigate membrane structure, including the effect of alcohol concentration or temperature on membrane permeability.</p> <p>CORE PRACTICAL 4: Investigate the effect of enzyme and substrate concentrations on the initial rates of reactions.</p> <ul style="list-style-type: none"> • Safely use instruments for dissection of an animal or plant organ • use appropriate apparatus to record a range of quantitative measurements (to include mass, time, volume, temperature, length and pH) • use of light microscope at high power and low power, including use of a graticule • use laboratory glassware apparatus for a variety of experimental techniques to include serial dilutions 	<ul style="list-style-type: none"> • Produce scientific drawing from observation with annotations • Safely use instruments for dissection of an animal or plant organ 	<p>CORE PRACTICAL 7: Investigate plant mineral deficiencies.</p> <p>CORE PRACTICAL 8: Determine the tensile strength of plant fibres.</p> <p>CORE PRACTICAL 9: Investigate the antimicrobial properties of plants, including aseptic techniques for the safe handling of bacteria.</p> <ul style="list-style-type: none"> • Safely use instruments for dissection of an animal or plant organ • Use microbiological aseptic techniques, including the use of agar plates and broth
<p>Literacy</p> 	<p>Know the meaning of the terms: gene, allele, genotype, phenotype, recessive, dominant, incomplete dominance, homozygote and heterozygote.</p> <p>Evaluate the design of studies used to determine health risk factors, including sample selection and sample size used to collect data that is both valid and reliable.</p>	<p>Understand what is meant by the terms 'stem cell, pluripotency and totipotency'.</p> <p>Use online and offline research skills including websites, textbooks and other printed scientific sources of information</p> <ul style="list-style-type: none"> • correctly cite sources of information 	<p>Be able to evaluate the methods used by zoos and seed banks in the conservation of endangered species and their genetic diversity, including scientific research, captive breeding programmes, reintroduction programmes and education.</p>
<p>Numeracy</p> 	<ul style="list-style-type: none"> • Recognise and make use of appropriate units in calculations • Use an appropriate number of significant figures • Recognise and use expressions in decimal and standard form • Use ratios, fractions and percentages. • Estimate results • Use calculators to find and use power, exponential and logarithmic functions 		

	<ul style="list-style-type: none"> • Find arithmetic means • Construct and interpret frequency tables and diagrams, bar charts and histograms • Understand simple probability • Understand the principles of sampling as applied to scientific data • Understand the terms mean, median and mode • Use a scatter diagram to identify a correlation between two variables • Make order of magnitude calculations • Select and use a statistical test (Chi squared test to test the significance of the difference between observed and expected results, the Student's t-test and the correlation coefficient) • Understand measures of dispersion, including standard deviation and range • Identify uncertainties in measurements and use simple techniques to determine uncertainty when data are combined • Change the subject of an equation • Substitute numerical values into algebraic equations using appropriate units for physical quantities. • Use logarithms in relation to quantities that range over several orders of magnitude • Translate information between graphical, numerical and algebraic forms • Plot two variables from experimental or other data • Understand that $y = mx + c$ represents a linear relationship • Determine the intercept of a graph • Calculate rate of change from a graph showing a linear relationship • Draw and use the slope of a tangent to a curve as a measure of rate of change • Calculate the circumferences, surface areas and volumes of regular shapes (circumference and area of a circle, the surface area and volume of rectangular prisms, of cylindrical prisms and of spheres) 		
Enrichment learning 	Know how factors such as genetics, diet, age, gender, high blood pressure, smoking and inactivity increase the risk of cardiovascular disease (CVD).	Stem cell research	Understand the process and importance of critical evaluation of new data by the scientific community, which leads to new taxonomic groupings, including the three domains of life based on molecular phylogeny, which are Bacteria, Archaea, Eukaryota.
British values 	Be able to discuss the potential ethical issues regarding the use of invertebrates in research. Be able to identify and discuss the social and ethical issues related to genetic screening from a range of ethical viewpoints. Safely and ethically use organisms to measure: <ul style="list-style-type: none"> • plant or animal responses • physiological functions 	Be able to discuss the way society uses scientific knowledge to make decisions about the use of stem cells in medical therapies.	Know that over time the variety of life has become extensive but is now being threatened by human activity.

Personal Development 	Cognitive <ul style="list-style-type: none"> ● Non-routine problem solving – expert thinking, metacognition, creativity. ● Systems thinking – decision making and reasoning. ● Critical thinking – definitions of critical thinking are broad and usually involve general cognitive skills such as analysing, synthesising and reasoning skills. ● ICT literacy – access, manage, integrate, evaluate, construct and communicate. 	Interpersonal <ul style="list-style-type: none"> ● Communication – active listening, oral communication, written communication, assertive communication and non-verbal communication. ● Relationship-building skills – teamwork, trust, intercultural sensitivity, service orientation, self-presentation, social influence, conflict resolution and negotiation. ● Collaborative problem solving – establishing and maintaining shared understanding, taking appropriate action, establishing and maintaining team organisation. 	Intrapersonal <ul style="list-style-type: none"> ● Adaptability – ability and willingness to cope with the uncertain, handling work stress, adapting to different personalities, communication styles and cultures, and physical adaptability to various indoor and outdoor work environments. ● Self-management and self-development – ability to work remotely in virtual teams, work autonomously, be self-motivating and self-monitoring, willing and able to acquire new information and skills related to work.
Careers 	Understand how Scientists and Doctors use scientific knowledge about the effects of diet, including obesity indicators, body mass index and waist-to-hip ratio, exercise and smoking to reduce their risk of coronary heart disease.	Scientists involved in stem cell research	Understand the development of drug testing from historic to contemporary protocols, including William Withering's digitalis soup, double blind trials, placebo, three-phased testing. How zoos and seed banks are used in the conservation of endangered species and their genetic diversity, including scientific research, captive breeding programmes, reintroduction programmes and education.
Assessment opportunities 	<ul style="list-style-type: none"> ● Assessed through CPAC, ● Homework, ● AP points ● End of Topic mini-tests ● AfL in lessons ● DO now activities that assess knowledge recall ● Extended writing DIRT tasks 	<ul style="list-style-type: none"> ● Assessed through CPAC, ● Homework, ● AP points ● End of Topic mini-tests ● AfL in lessons ● DO now activities that assess knowledge recall ● Extended writing DIRT tasks 	<ul style="list-style-type: none"> ● Assessed through CPAC, ● Homework, ● AP points ● End of Topic mini-tests ● AfL in lessons ● DO now activities that assess knowledge recall ● Extended writing DIRT tasks
Differentiation for MA and LA	<ul style="list-style-type: none"> ● Individual feedback provided for students when books are marked. ● Individual DIRT tasks using GAP analysis ● A01 type questions for LA ● A03 type questions for MA ● In class support for students who are LA 		

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| | <ul style="list-style-type: none">• Work books given to LA students• Use command words to set differentiated questions for the class• Set homework which is varied in difficulty so all students can be challenged. |
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