

Learning Aims and Curriculum Intent:

Studying Biology at GCSE enables students to learn about the world around us.

- Students will gain surface and some deeper understanding of cellular processes as well as environmental interactions, becoming more capable of applying familiar content to new scenarios.
 Students will be able to plan experiments, analyse problems, interpret the impact of changes to organisms and to ecosystems, and apply biological knowledge to unseen investigations.
 They will learn how to apply mathematical skills to 'real world' contexts to investigate relationships.
 Students will carry out experimental work to develop their experimental knowledge and practical skills.

Term	Content, Key Questions and Knowledge	Skills	Assessment
Michaelmas	 Life processes, cells, systems, and organisms Understand the eight basic characteristics shared by all living organisms. Describe the levels of organisation in organisms. Describe the common features shown by all eukaryotic organisms including the cell structures and their functions. Compare and contrast the structure of plant and animal cells. Compare and contrast the structures of prokaryotic and eukaryotic organisms. Understand the term pathogen and the diseases caused by pathogens. Understand the features of viruses and how viruses cause disease. Explain the importance of differentiation in the development of specialised cells, and the advantages and disadvantages of using stem cells in medicine. Understand the processes of diffusion, osmosis, and active transport. Understand how factors affect the rate of movement of substances into and out of cells, including practical investigations. Describe the structure of carbohydrates, proteins and lipids, and investigate food samples for the presence of glucose, starch, protein and fat. Understand the requirements of a balanced diet, and lifestyle factors affecting the energy requirements of an individual's diet. Describe the structure and function of the human alimentary canal (gut), including the processes occurring in each organ/section, and the conditions which enable effective digestion and absorption. Understand how the small intestine is adapted for absorption. Practically investigate the energy content in a food sample. 	 Apply prior knowledge to new concepts. Learn definitions for (and practice remembering) new key words. Preparation and viewing of slides for light microscopy. Convert numbers between orders of magnitude (e.g. micrometres to millimetres) and use this to calculate magnification. Write methods to validly test hypotheses. Predict expected results of required practicals, explaining reasons. Present data in a scientific way (tables, graphs). Interpret information and results of experiments to draw conclusions and explain them using scientific understanding. Suggest the limitations of an experimental procedure. Suggest ways to improve experimental validity, accuracy and reliability (distinguishing between each one). 	 All of the Biology teachers at Forest will use some or all of the following modes of assessment throughout the IGCSE course: Retrieval quizzes. Online topic progress multiple choice quizzes. Exam questions from Edexcel IGCSE board. Extended-response questions. End of topic tests composed of IGCSE exam questions.



2023 / 2024

Lent	 4. Respiration Understand how different organisms release energy from glucose, including the differences between aerobic and anaerobic respiration. Understand simple controlled experiments that demonstrate production of carbon dioxide and heat from respiring organisms. 5. Gas Exchange in Humans Describe the structure of the human thorax and how structures within are adapted for gas exchange. Understand the piccess of breathing, including pressure changes in the thorax. Understand the biological consequences of smoking, including lung diseases and the impact on foetal growth. Practically investigate factors affecting breathing rate/volume in humans. 6. Transport in Humans Understand the roles and specialisations of the components of the blood within the circulatory system. Understand the eroles and specialisations of the circulatory system. Understand the effects of exercise and adrenaline on the circulatory system. Understand the effects of exercise and adrenaline on the circulatory system. Understand the diseases of the circulatory system (e.g. CHD), including the risk factors and consequences. 7. Nutrition in Plants Understand he process, purpose and factors which affect the rate of photosynthesis. Practically investigate limiting factors via changing conditions to measure their effect on the rate of oxygen production in prodweed. Understand how the structure of a leaf is specialised for photosynthesis. Describe controlled experiments to show the requirement of light, CO₂ and chlorophyll for photosynthesis, via testing for starch. B. Gas Exchange in Plants Understand how the leaf acts as an organ of excretion. Understand how the leaf acts as an organ of excretion. Understand the balance of respiration and photosynthesis in plants. Practically inves	 Apply prior knowledge to new concepts. Learn definitions for (and practice remembering new key words. Calculate SA:Vol ratio. Write methods to validly test hypotheses. Predict expected results of required practicals, explaining reasons. Present data in a scientific way (tables, graphs). Sketch and explain trends in graphs. Explain suitable control variables for required practical experiments. Interpret information and results of experimental draw conclusions and explain them using scientiunderstanding. Suggest the limitations of an experimental procedure. Suggest ways to improve experimental validity, accuracy and reliability (distinguishing between each one).
Trinity	 9. Transport in Plants Understand how water, minerals and nutrients are transported around plants. Understand how water is absorbed in the roots, linking this to water transport through the xylem and from the leaves via the transpiration stream. Understand how the rate of transpiration is affected by environmental changes. Practically investigate the effect of changing environmental factors on the rate of transpiration, using a mass or volume potometer. 10. Ecology and the Environment Understand how carbon and nitrogen are cycled within ecosystems. Practical: investigate the population size of an organism using quadrats, and the distribution of organisms using transects. 11. Human Influences on the Environment Understand how human activities contribute to greenhouse gases, and how this links to the causes and consequences of global warming. Understand the global consequences of deforestation. 	 Apply prior knowledge to new concepts. Learn definitions for (and practice remembering new key words. Write methods to validly test hypotheses. Predict expected results of required practicals, explaining reasons. Present data in a scientific way (tables, graphs). Sketch and explain trends in graphs. Interpret information and results of experiment draw conclusions and explain them using scient understanding. Explain suitable control variables for required practical experiments. Suggest ways to improve experimental validity, accuracy and reliability (distinguishing between each one). Conduct ecological fieldwork to investigate population size and distribution. Consider source reliability when using research skills.

ng)	All of the Biology teachers at Forest will use some or all of the following modes of assessment throughout the IGCSE course:
). nts to ntific	 Retrieval quizzes. Online topic progress multiple choice quizzes. Exam questions from Edexcel IGCSE board. Extended-response questions. End of topic tests composed of IGCSE exam questions.
'n	
ng)	All of the Biology teachers at Forest will use some or all of the following modes of assessment throughout the IGCSE course:
). nts to ntific	 Retrieval quizzes. Online topic progress multiple choice quizzes. Exam questions from Edexcel IGCSE board. Extended-response questions. End of topic tests composed of IGCSE exam questions.
, n	End of year exam (covering all content learned throughout the year).
h	

2023 / 2024

What consolidation looks like in this subject	Use of departmental checklists (on SharePoint), using flashcards and/or quizlet regularly, CenturyTech, mind-mapping, using past paper question		
Examples of Homework	Practice question booklets, past paper questions, extended response questions (CORMMSS and SCAP), research tasks, experimental planning, experimental		
Key terminology	Topic specific key words: Eukaryote, prokaryote, unicellular, multicellular, protoctists, pathogens, bacteria, organelle, mitochondria, ribosomes, v embryonic stem cells, adult stem cells, therapeutic cloning, magnification, tissue, organ, system, diffusion, osmosis, active transport, diffusion, sur plasmolysed, kinetic energy, enzyme, active site, activation energy, enzyme-substrate complex, denature, optimum, substrate, product, protein, ca insoluble, balanced diet, oesophagus, peristalsis, bile, hydrochloric acid, villi, microvilli, anaemia, kwashiorkor, scurvy, rickets, aerobic respiratior oxygen debt, coronary heart disease, artery, vein, platelets, haemoglobin, phagocytes, lymphocytes, vaccination, adrenaline, photosynthesis, chlor compensation point, biodiversity, ecosystem, community, population, distribution, abundance, habitat, species, producer, decomposer, consumer eutrophication, greenhouse effect, global warming, deforestation. Practical skills key words: accuracy, reliability, validity, precision, concordance, control variable, independent variable, dependent variable, control		
Super-curricular enrichment and scholarly extension	 Read: Entangled Life (Merlin Sheldrake), The Immortal Life of Henrietta Lacks (Rebecca Skloot), The Diversity of Life (Edward O. Wilson), The Soul of an O Biomimicry: Innovation Inspired by Nature (Janine M. Benyus), I Contain Multitudes (Ed Yong). Watch: Planet Earth I & II (David Attenborough, BBC), The Private Life of Plants (David Attenborough, BBC), Fantastic Fungi (Apple TV, Netflix), Pain, Pus Institution Lectures (YouTube), Inside Nature's Giants (old Channel 4 show, YouTube), The Hunt (TV series, not the horror film! Amazon prime, YouTube), The Pets (Netflix), My Octopus Teacher (Netflix), Chimp Empire (Netflix), Life in Colour (David Attenborough, Netflix), Human – The World Within (Netflix). Listen: Science Vs. (Spotify& others), The Naked Scientists (Spotify & others), Ologies (Spotify & others), Stuff You Should Know (Spotify & others). Visit: Natural History and Science Museums, Kew Gardens, The Grant Museum of Zoology, Hunterian Museum, London Wetland Centre, ZSL London Zoo. 		
Useful websites	Websites for revision/catch up are all linked onto the topic checklists (on SharePoint).		
	Head of Department	Mrs Annie Plumb, <u>amp@forest.org.uk</u>	
Who can I contact?	Teachers	Mr Luke Bouzguenda (<u>lb@forest.org.uk</u>), Mrs Katie Brosnan (<u>kev@forest.org.uk</u>), Mr Daniel Cawley (<u>dac@i</u> (<u>mc@forest.org.uk</u>), Mrs Vicki-Ann Jermutus (<u>vj@forest.org.uk</u>), Mr Martin Bassett-Jones (<u>mgb@forest.or</u> Farah Naz (<u>fn@forest.org.uk</u>)	

conclusion/evaluation, other worksheets.

ellulose, peptidoglycan, hyphae, plasmid, differentiation, volume ratio, concentration gradient, turgid, flaccid, e, lipid, mineral, vitamin, monomer, polymer, soluble, c respiration, ATP, thorax, alveolus, capillary bed, mata, xylem, phloem, transpiration, translocation, tor, abiotic factor, competition, pollution, acidification,

nt.

Octopus (Sy Montgomery), Lab Girl (Hope Jahren),

is & Poison (old Channel 4 show, YouTube), Royal The Genius of Britain (YouTube), The Hidden Lives of

<u>forest.org.uk</u>), Mr Matthew Clifford <u>g.uk</u>), Ms Jill White (<u>jrw@forest.org.uk</u>), Ms

2023 / 2024