



THE BROMFORDS SCHOOL
ACHIEVE ENRICH PREPARE

The Bromfords School

Science Faculty.

Intent of Biology Curriculum



The intent of Biology in Science at Bromfords is the systematic study of the physical and natural world through observations and experimentation. Our intent is to make students scientifically literate in order to make sense of information and to communicate their ideas to contribute to a better and more advanced world.

Achieve:

Students are supported and challenged to think scientifically. To be inquisitive and pose genuine investigative questions. Through problem solving approaches they will use experimental observations to deepen their understanding.

Enrich:

To offer a blend of independent investigation and team working skills to explore and suggest solutions to real world problems. To help students be better members of society through a deeper understanding of how science works, and consequently help students make better life decisions. Enable students to acquire accurate information about the natural world and about society and culture.

Prepare:

To re-visit key skills in real world contexts. Allow students to reflect on the purpose of the topic in the bigger picture of how the world works and future career opportunities. Students are aware of implications of actions through application of real science.

Department: Biology	Curriculum Map What does Biology within the Science Faculty at Bromfords look like?					
Entry KS2	Year 7	Year 8	Year 9	Year 10	Year 11	Post-16
<u>Knowledge:</u> Classification of plants and animals. Reproduction & changes to old age. Comparing life cycles. Impact of drugs, lack of exercise and poor Nutrition. Non-communicable diseases. Circulatory and respiratory system. Habitat changes. Comparing plant requirements. Food webs. Teeth and digestion. <u>Skills:</u> - Use results in a variety of ways to help in answering questions. - Plan different types of scientific enquiries to answer questions.	<u>Knowledge:</u> Structure of cells Organ Systems Puberty Reproduction <u>Skills:</u> - Understand scientific Keywords - Follow teach guidance to solve scientific calculations - Follow teacher guidance to draw a scatter graph - Understand that models are used to help explain scientific ideas	<u>Knowledge:</u> Health Ecosystems Inheritance Adaptations <u>Skills:</u> - Use scientific keywords in their writing. - Independently solve scientific calculations. - Independently draw graphs and scientific diagrams - Understand that models are used to help explain scientific ideas. - Working as part of a team to identify and investigate the impact of different variables on experiments - understand the impacts of lifestyle factors on human health	<u>Knowledge:</u> Biodiversity Inheritance Cells <u>Skills:</u> - Use more ambitious scientific keywords in their writing. - Describe trends shown in graphs to understand impacts of humans on biodiversity - Refer to models in explanations. - Enhance mathematical skills in preparation for Year 10 and beyond - Working as part of a team to identify, investigate and predict the impact of different variables on experiments	<u>Knowledge:</u> Cell structure Cell Division Transport across membranes Cellular organisation Health and Disease Enzymes and Digestion Infection and Response Photosynthesis Respiration Metabolism <u>Skills:</u> - Describe scientific concepts using keywords in extended writing. - Correctly draw and label scientific diagrams - Use scientific ideas to explain trends shown in graphs. - Refer to models in explanations and how models change over time. - Analyse data from graphs and tables - Understand and express opinions based on scientific reasoning. - Working independently to	<u>Knowledge:</u> The Nervous System The Endocrine System Plant Hormones DNA Reproduction Evolution Classification Sustainability Biodiversity Human impact Biomass Deforestation Food and Biotech <u>Skills:</u> - Link scientific keywords and concepts together in extended writing. - - - - Use science and data to explain trends shown in graphs. - - Evaluate scientific models - - Interpret graphs & diagram to explain the effect of forces on objects. - - Analyse data from graphs and tables - Understand & express opinions	<u>Knowledge:</u> Biological Molecules Cells Exchange transport systems DNA and Diversity Genetics and populations Coordination and control Gene expression Gene Technologies Photosynthesis Energy, Ecosystems and Nutrient cycles <u>Skills:</u> - Practical Biology - Follow written procedures - Apply investigative approaches and methods when using instruments and equipment - Safely use a range of practical equipment and materials - Make and record observations - Research reference and report. - Summative Essay writing

				identify, investigate and predict the impact of different variables on experiments	based on scientific reasoning. - Working independently to identify, investigate and predict the impact of different variables on experiments. - Use evidence presented, and prior knowledge, to justify conclusions	
Enrichment, Careers, Real-world Experience.	<p>Opportunities to link knowledge to careers through lessons.</p> <p>Students will explore microscopy and will prepare slides for viewing, this will come from the world around them and maybe even their own cheek.</p> <p>Science clubs and trips are run periodically on the availability of local and national competitions eg National Rocket Launch Competition</p>	<p>Opportunities to link knowledge to careers through lessons.</p> <p>Students will explore health and what their behaviours around health can show them about their body, eg how they feel after a big meal. Students take a look at DNA by extracting it from fruit.</p> <p>Science clubs and trips are run periodically on the availability of local and national competitions eg National Rocket Launch Competition</p>	<p>Opportunities to link knowledge to careers through lessons.</p> <p>Students will be challenged to improve the impact of our school on the environment. Considering the impact of our Carbon footprint on the natural world around us.</p> <p>Science clubs and trips are run periodically on the availability of local and national competitions eg National Rocket Launch Competition</p>	<p>Opportunities to link knowledge to careers through lessons.</p> <p>Students continue to expand their skills in using advanced practical equipment in science lab settings.</p> <p>STEM activities and sessions enthuse students to consider a career in the STEM field.</p> <p>Science clubs and trips are run periodically on the availability of local and national competitions eg National Rocket Launch Competition</p>	<p>Opportunities to link knowledge to careers through lessons.</p> <p>Students continue to expand their skills in using advanced practical equipment in science lab settings.</p> <p>STEM activities and sessions enthuse students to consider a career in the STEM field.</p> <p>Science clubs and trips are run periodically on the availability of local and national competitions eg National Rocket Launch Competition</p>	<p>Opportunities to link knowledge to careers through lessons.</p> <p>Several excursions to University providers to enlighten students to the variety of FE options available including vocational and apprenticeships.</p> <p>Assessed practical work supports knowledge and skill delivery.</p>
	Careers & Real-World links: Archaeologist, Forensic Scientist, Veterinarian, Doctor, Teacher/Lecturer, Marine Biologist, Farming, Nurse, Phlebotomist, Botanist, Dental Hygienist/Nurse, Carer, Healthcare assistant to name just a few!					

Year 7 – Intent: Engage and enthuse students in the application of Science (including literacy and numeracy skills). To gain understanding of it in a physical and natural world.

Term 1		Term 2	Term 3
Scheme of Work: Year 7 Transition to Science (revised July 2022) Learning Intent: To capture prior knowledge of students and explore the purpose of Science through the development of practical skills.		Scheme of Work: B1 & B2 From Cells to Organ Systems Learning Intent: To understand building blocks of life and how they work together to create functioning living systems	Scheme of Work: B3 Reproduction Learning Intent: To understand the scientific basics behind puberty, reproduction and contraception. (SMSC Opportunity) Home project – plant reproduction
Measuring Impact through:	Baseline assessment	Measuring Impact through:	AFL and internal assessment practices. These include detailed and levelled end of topic tests and short individual topic-based assessments where appropriate

Year 8 – Intent: Engage and enthuse students in the application of Science (including literacy and numeracy skills). To gain understanding of it in a physical and natural world. Students have the opportunities to develop practical skills and to apply to real world problems.

Term 1		Term 2	Term 3
Scheme of Work: B1 Health Learning Intent: To understand what constitutes a healthy lifestyle and be aware of risk factors associated with unhealthy lifestyles.		Scheme of Work: B2 Ecosystems Learning Intent: To understand how organisms are interdependent and evaluate human impact on ecosystems.	Scheme of Work: B3 Adaptation Learning Intent: To understand the processes of inheritance and how they explain the variety of life on Earth. To develop maths in science skills.
Measuring Impact through:	AFL and internal assessment practices. These include detailed and levelled end of topic tests and short individual topic-based assessments where appropriate		

Year 9 – Intent: Expose students to the developing nature of learning resources, including the implications of use. Building on prior knowledge to tackle more complex problems. Continue to use analytical skill and interpret data in readiness for Key Stage 4 Curriculum, which commences in Term 3.

Term 1	Term 2	Term 3
<p>Scheme of Work: 9ba - Biodiversity and human impact</p> <p>Learning Intent: To consider the facts and myths of human impact on our Earth and explore the question 'Are humans reducing biodiversity?'</p>	<p>Scheme of Work: 9ba - Biodiversity and human impact</p> <p>Learning Intent: To consider the facts and myths of human impact on our Earth and explore the question 'Are humans reducing biodiversity?'</p>	<p>Scheme of Work: 9bc – Cells</p> <p>Learning Intent: Consider examples of the smallest units of life, whilst exploring the question 'How do cells form more complicated systems?'</p>
Measuring Impact through:	AFL and internal assessment practices. These include detailed and levelled end of topic tests and short individual topic-based assessments where appropriate	

Year 10– Intent: To have a deeper understanding of various biological principles, such as cell, reproduction and essential reactions for life to be sustained on Earth.

Term 1	Term 2		Term 3
<p>Scheme of Work: B1 Cell structure and division and Transport</p> <p>Learning Intent: How organisms in the natural world carry out the 7 life processes of life.</p>	<p>Scheme of Work: B2 Tissues, organs, organ systems. Health and disease and Enzymes and Digestion</p> <p>Learning Intent: How multicellular organisms are structured to thrive, and potential consequences of poor lifestyle</p>	<p>Scheme of Work: B3 – Infection and Response</p> <p>Learning Intent: The impact on modern medicine of understanding how infection occurs and how to support our natural immune system in destroying pathogens and preventing, (including the spreading of) disease</p>	<p>Scheme of Work: B4 – Bioenergetics</p> <p>Learning Intent: How living organisms source, store and transfer energy in order to sustain life. Explore how human behaviour impact on this.</p>
Measuring Impact through: Individual end of unit internal tests (50 Marks) and in Paper 1 of external exam in Year 11. In class AFL activities			

Year 11– Intent: To have a deeper understanding of various biological principles, such as cell, reproduction and essential reactions for life to be sustained on Earth.

Term 1	Term 2/3		
<p>Scheme of Work: B5 – The nervous and Endocrine system and Animal and Plant Hormones</p> <p>Learning Intent: How living organisms detect, process and respond to changes in the environment. How nervous and hormonal coordination manages systems such as human fertility and reflex actions.</p>	<p>Scheme of Work: B6 – DNA, Reproduction and Genetics. Evolution and Classification</p> <p>Learning Intent: To learn that processes such as meiosis and gene mutation effect new life and functioning of an animal or plant. Deeper understanding on how such processes allow scientists to weigh up potential benefits and risks, in addition to what technology students will learn that genetic modification is highly controversial.</p>	<p>Scheme of Work: B7i – Organisms, the Environment and human impact.</p> <p>Learning Intent: Realise humans must engage with the environment in a sustainable way. Explore how humans threaten biodiversity and the natural systems that support it. Actions are considered and discussed to ensure a healthy environment is secured.</p>	<p>Scheme of Work: B7ii Biomass, food and biotech (Bio only)</p> <p>Learning Intent: Explain the global impact of deforestation and global warming through the use of data and statistics, and how they have an immediate impact on biodiversity.</p>
Measuring Impact through: Individual end of unit internal tests (50 Marks) and in Paper 2 of external exam in Year 11. In class AFL activities			

Year 12– Intent: A-Level Biology students will have a love for learning about the natural world. Students will cover a wide range of Biological processes over the course of two years and will link these together to build up a broad understanding of the complex mechanisms within living organisms. Through a range of practical investigations students will develop skills to allow them to access Science courses at University. During the course students will identify where Biology links to careers and the wider world, developing a firm understanding of the scientific method.

Term 1		Term 2		Term 3	
Scheme of Work: Biological molecules	Scheme of Work: Cells	Scheme of Work: Exchange transport systems	Scheme of Work: DNA and diversity	Scheme of Work: Genetics and populations (A)	Scheme of Work: Coordination and control (A & B)
Learning Intent:	Learning Intent:	Learning Intent:	Learning Intent:	Learning Intent:	Learning Intent:
To understand how Biological molecules form the basis of our knowledge of Biology. Students will understand how Carbohydrates, Lipids, Proteins, water and nucleotides are formed and link their understanding to the roles of biological molecules within living organisms.	To secure an understanding of the cell theory and that it is a unifying concept in biology. Students will develop their knowledge of cells, cell division, and substance exchange, microscopes and immunity.	To secure an understanding that the internal environment of a cell or organism is different from its external environment. Students will develop their understanding of gas exchange in different organisms and how substances are transported in plants and mammals.	Students build on their knowledge of DNA as a biological molecule and apply this to understand how genetic information is stored, copied and used in living organisms. Students will understand how mutations can lead to health issues and also contribute towards diversity and selection.	Students build on their basic understanding of inheritance of DNA to now be able to explain and predict the inheritance of characteristics. Students will apply a range of complex statistical analysis to these problems to make conclusions regarding inheritance.	To secure an understanding of how the body responds to internal and external stimuli. Students will develop their knowledge of animal and plant responses, synaptic transmission, muscle structure and transmission. Students will develop practical skills by developing investigations from scratch.
Students will be introduced to the CPAC element of their course and practical techniques needed to be successful in Biology.	Students will be introduced to the CPAC element of their course and practical techniques needed to be successful in Biology. Students will be able to explore ethical arguments surrounding vaccinations. This topic is the foundation and knowledge will be built on throughout the course to move on to University or other career options.	Students will Develop maths skills within biology, apply techniques to answer comprehension questions and develop dissection skills. This topic allows students to develop arguments around the ethical issues surrounding dissections of animals within Biology. This topic also allows students to discover a range of possible careers linked to the study of Biology	Students will start to explore gene technologies and their role in classifying organisms. Students will explore ethical arguments with regards to gene technology, genetic diseases and selection. Students will discuss the different careers available to geneticists and other specialist brands of Biology.	Students will also build on their understanding of natural selection to now include mechanisms behind changes in allele frequencies. This topic allows students to build on their understanding of ethical issues regarding genetic diseases and their treatment.	Students will be able to create links between chemistry and P.E and suggest how their knowledge of human and plant responses can link to different career opportunities.
Measuring Impact though:	All units in year 12 will be assessed by AFL in lessons, CPAC skills in practical assessment and End of unit assessments.				

Year 13– Intent: A-Level Biology students will have a love for learning about the natural world. Students will cover a wide range of Biological processes over the course of two years and will link these together to build up a broad understanding of the complex mechanisms within living organisms. Through a range of practical investigations students will develop skills to allow them to access Science courses at University. During the course students will identify where Biology links to careers and the wider world, developing a firm understanding of the scientific method.

Term 1			Term 2/3		
Scheme of Work:	Scheme of Work:	Scheme of Work:	Scheme of Work:	Scheme of Work:	Scheme of Work:
Genetics and populations Learning Intent:	Coordination and control Learning Intent:	Gene expression Learning Intent:	Gene Technologies Learning Intent:	Photosynthesis Learning Intent:	Energy, ecosystems and nutrient cycles Learning Intent:
Students build on their basic understand of inheritance of DNA to now be able to explain and predict the inheritance of characteristics. Students will apply a range of complex statistical analysis to these problems to make conclusions regarding inheritance.	To build on knowledge of coordination and control. Students will be able to explain how the body maintains a constant internal environment. Students will be able to analyse data to draw conclusions and apply maths skills to complex problems. Students will be able to understand common medical problems linked with diabetes and kidney disease.	Students will build on their knowledge of genes and genetics to understand how genes are expressed in living organisms. Students will understand the role of gene expression in cancer and suggest how epigenetics can influence the expression of genes. Students will apply this to understand how humans manipulate genes and through gene technology, use this to diagnose medical issues and consider treatment opportunities.	To build on student understanding of gene technologies and application to real life. Students will gain experience sequencing key processes within producing DNA fragments, comparing in vivo and in vitro gene cloning. Students will evaluate ethical issues surrounding gene therapy. Students will be able to look at real life application of gene therapy within medicine, plant and animal breeding and genetic fingerprinting	To build on student knowledge of photosynthesis and respiration to include the light dependent and light independent reaction. Students to describe mitochondrial reactions with respiration. Students develop CPAC skills and use complex practical techniques.	To secure an understanding of energy transfers through ecosystems and the importance of nutrient cycles in ecosystems. Students will research and evaluate the use of fertilisers and consider their impact on the environment. Students will make own decisions on whether organic or inorganic fertilisers should be used in farming and the impact of human interference of ecosystems.
Measuring Impact though:			All units in year 13 will be assessed by AFL in lessons, CPAC skills in practical assessment and End of unit assessments.		