



## BIOLOGY

### **Why is the study of Biology important?**

Biology is the branch of Science that endeavours to explore and gain an understanding of the complex and diverse wonders of living organisms within the natural world, looking at origin, morphology, physiology, anatomy, behaviour, and distribution. It is one of the three Sciences that underpins most, if not all, scientific understanding. The lines between the three Sciences can cross and with this are 'bridging' Sciences such as biophysics, biochemistry, and bioengineering.

The key focus of Biology is achieving an understanding of a wide range of what scientists describe as 'phenomena'. In developing an understanding of this phenomenon, Biology has led to the discovery and production of materials, structures, processes, and devices. The contribution that biology has made has led to the manufacture of life-saving and life-improving devices such as: artificial heart valves, intraocular devices, dental implants, and hip replacements; diagnostic aids, such as DNA probes, that can determine the species of bacteria that have caused infection to looking at controlling hormone production to aid growth of specific plant species.

Biology will be taught in a way to develop curiosity about the natural world. The curriculum will develop insight into how Science works and a full appreciation of its relevance to our everyday lives. The scope and nature of studying biology will be broad, practical, and relevant. It is our vision to encourage students to be inspired, motivated, and challenged by Science and its contribution to society.

Across your study, you will explore cell structure, organisation, infection and response, bioenergetics, homeostasis ecology, inheritance selection, and evolution. You will develop an appreciation of how these topics are essentially interlinked. Lessons will provide a wide range of opportunities for practicals, demonstrations, and modelling of complex theories that surround us in our everyday lives. Your Science classroom will be brimming with practicals where you will learn to formulate hypotheses, analyse data and write conclusions. You will engage with ideas such as the scientific process and how throughout history this process has led to some of the greatest scientific discoveries. Seems challenging? You are going to love it! Biology will expand your mind!

### **Big Questions**

- What is the structure and function of cells? Why is mitosis and meiosis important for life?
- How do photosynthetic reactions and aerobic and anaerobic respiration formulate life on Earth?
- What variation occurs when gametes fuse at fertilisation?
- What is metabolism?
- How is life sustained by the recycling of all molecules between the living world and the environment?

### **What skills will the study of Biology teach you?**

You are a citizen in this world and you need to know how the natural and modern world works. It will teach you to...

- Understand theories that explain phenomena
- Apply basic ideas and models that support understanding
- Evaluate models and theories
- Present theories in mathematical form
- Recall quantitative relationships
- Derive quantitative relationships between various measured quantities
- Explain how theories are borne out by experiments.
- Apply experimental procedure and understand that it is a measure of the success of a theory
- Present, interpret, and evaluate experimental data
- Apply mathematical skills to solve problems
- Develop a deeper understanding of everyday experiences including the natural world and modern devices.

### **How does your study of Biology support your study in other subjects?**

Study of any subject in our curriculum takes full advantage of links with other subject areas- we term these as interdisciplinary links and we make the most of them because we know that deep learning requires the transference of knowledge and skills from one topic of learning to another. Once you can transfer your learning across topics and subject areas then you are really mastering what you know and how to apply your understanding and skills.

Biology touches on so many other subjects: chemistry, physics, physiology, and health care. You will learn methods of thinking and research that are widely applicable to other subject areas helping your thinking in all subjects. As a Science, Biology relies heavily upon evidence to test predictions and theories. Through developing mathematical techniques, as well as applying reasoning, your skills to present and justify information can be applied to most careers and further education.

Across the teaching of subjects, teachers will make reference to your learning in other areas such as mathematics, Physics and Chemistry and this will help you to develop your understanding. There are even opportunities to apply this learning in Y7 and 8 when interdisciplinary study days are organised to deepen your understanding across the curriculum such as when our STEM departments work together to solve a common problem.

### **How can you deepen your understanding of Biology?**

Our Science department offers lots of great opportunities for you to engage in this fabulous subject. Why not look out for the large range of enrichment clubs on offer? We offer STEM events and activities that may include opportunities to visit local colleges and universities and visitors to the academy offering extra enrichments. There may be visits to Science museums and events celebrating great scientists and discoveries. We offer after-school support sessions for GCSE students and work with other departments to enhance learning such as maths in Science. We have a thriving weekly Science club where students get lots of practical experience and develop their curiosity and creativity.

### **How are you assessed in Biology?**

Throughout the 5-year Biology course, 2.5 years in KS3, and 2.5 years in KS4 you are assessed using the following assessment objectives, ensuring that you can cumulatively build your subject understanding in preparation for future GCSE and A Level study. There are half-termly assessment points each year that we term Praising Stars©. For years 7,8 and 9 we base our assessment on our subject mapping of the age-related expectations across the curriculum, assessing students' performance at their current stage of study against expectation. At GCSE we make informed predictions informed by our holistic assessment of their progress against the key assessment objectives and their aspirational GCSE targets. These are also the basis for any appropriate support and intervention.

### **Key Assessment Objectives**

AO1: Demonstrate knowledge and understanding of:

- Scientific ideas
- Scientific techniques
- Scientific procedures

AO2: Apply knowledge and understanding of:

- Scientific ideas
- Scientific enquiry
- Scientific techniques and procedures

AO3: Analyse information and ideas to:

- Interpret and evaluate
- Make judgements and draw conclusions

- Develop and improve experimental procedures.

### **How can Biology support your future?**

Of course, we offer the study of GCSE and we encourage your continued study in this fantastic subject. Biology is offered at most prestigious universities, either as a single honours or a joint honours subject studied alongside other disciplines e.g. English Literature. The very fact that you have been able to study biology, your analytical thinking and mathematical reasoning will help your future application be they for colleges, universities, apprenticeships, or employment.

Careers that the study of Biology supports include:

- Teaching
- Medicine/Dentistry/Veterinary
- Marine biology
- Geneticist/Genomicist
- Nanotechnology
- Biostatistician
- Science journal editor
- Law

**Science CURRICULUM PROGRESSION PATHWAY AT OUTWOOD ACADEMY Carlton 24/25**

	<b>Year 7</b>	<b>Year 8</b>	<b>Year 9</b>	<b>Year 10</b>	<b>Year 11</b>
<b>Autumn 1</b>	Unit 1 - Introduction to Science Unit 2 - Matter and Energy	Unit 6 - Plants, Ecology and Climate change Unit 7 – Forces	Unit 11 - Electricity and Magnetism Unit 12 - Patterns and Materials Unit 13 - Health End of KS3 assessments and consolidation	B2 - Organisation P2- Electricity C2 - Bonding and Structure	P5 - Forces B5 - Homeostasis and Response B6 - Inheritance C6 - Rates of reaction
<b>Autumn 2</b>	Unit 2 - Matter and Energy Unit 3 - Chemical Substances	Unit 7 – Forces Unit 8 - Chemical Reactions	Transitional Unit   Chemistry - Atomic structure Transitional Unit   Biology - Cells	C3 - Quantitative Chemistry B3 - Infection and Response B4 - Bioenergetics	P6 - Waves B6 - Inheritance C7 - Organic Chemistry C8 - Chemical analysis
<b>Spring 1</b>	Unit 3 - Chemical Substances Unit 4 - Animal Organ Systems	Unit 8 - Chemical Reactions Unit 9 - Cells, Evolution and Inheritance	Transitional Unit   Physics - Energy	C4 - Chemical changes P3 - Particle model	P7 - Magnetism and Electromagnetism C9 - Chemistry of the atmosphere C10 - Using Resources
<b>Spring 2</b>	Unit 4 - Animal Organ Systems Unit 5 - Space, Earth and Sustainability	Unit 9 - Cells, Evolution and Inheritance Unit 10 - Waves	C2 - Bonding and Structure	P4 - Atoms and Radiation C5 - Energy Changes Paper 1 Consolidation P5 - Forces C6 - Rates of Reaction (F)	P8 - Space (Triple Science) Paper 2 Consolidation
<b>Summer 1</b>	Unit 5 - Space, Earth and Sustainability Unit 6 - Plants, Ecology and Climate Change	Unit 10 - Waves Unit 11 - Electricity and Magnetism	C2 - Bonding and Structure B2 - Organisation	P5 - Forces P7 - Magnetism	Masterclasses, Revision & Exams
<b>Summer 2</b>	Unit 6 - Plants, Ecology and Climate Change	Unit 11 - Electricity and Magnetism Unit 12 - Patterns and Materials	P2 - Electricity	B7 - Ecology	Exams

## Science CURRICULUM PROGRESSION PATHWAY AT OUTWOOD ACADEMY Carlton 25/26

	Year 7	Year 8	Year 9	Year 10	Year 11
<b>Autumn 1</b>	Unit 1 - Introduction to Science Unit 2 - Matter and Energy	Unit 7 – Forces	Unit 13 Health End of KS3 assessments and consolidation	B3 - Infection and Response P2 - Electricity	B6 - Inheritance C6 - Rates of reaction P6 - Waves
<b>Autumn 2</b>	Unit 2 - Matter and Energy Unit 3 - Chemical Substances	Unit 7 – Forces Unit 8 - Chemical Reactions	C1 - Atomic Structure B1 - Cell Biology	P3 - Particle Model of Matter C3 - Quantitative Chemistry	B7 - Ecology C7 - Organic Chemistry P7 - Magnetism and Electromagnetism
<b>Spring 1</b>	Unit 3 - Chemical Substances Unit 4 - Animal Organ Systems	Unit 8 - Chemical Reactions Unit 9 - Cells, Evolution and Inheritance	B1 - Cell Biology P1 - Energy	B4 - Bioenergetics P4 - Atomic structure and radiation	B7 - Ecology C8 - Chemical Analysis C9 - Chemistry of the Atmosphere P8 - Space Triple Science only
<b>Spring 2</b>	Unit 4 - Animal Organ Systems Unit 5 - Space, Earth and Sustainability	Unit 9 - Cells, Evolution and Inheritance Unit 10 - Waves	P1 - Energy C2 - Bonding and Structure	C4 - Chemical Changes C5 - Energy Changes	C10 - Using resources Masterclasses and Revision
<b>Summer 1</b>	Unit 5 - Space, Earth and Sustainability Unit 6 - Plants, Ecology and Climate Change	Unit 10 - Waves Unit 11 - Electricity and Magnetism	B2 - Organisation	P5 - Forces B5 - Homeostasis and Response  Paper 1 Consolidation	Masterclasses, Revision and Exams
<b>Summer 2</b>	Unit 6 - Plants, Ecology and Climate Change	Unit 12 - Patterns and Materials	B2 - Organisation P2 - Electricity	C6 - Rates of reaction B5 - Homeostasis and Response P5 - Forces  End of year exams	Exams