



BIOLOGY

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Why is the study of Biology important?

Biology is the branch of science which endeavours to explore and gain 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 phenomena, 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 has 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, organization, 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 practical's, 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 experiment.
- Apply experimental procedure and understand that it is a measure of 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

What will you know and understand from your study of Biology?

- Develop scientific knowledge and conceptual understanding of Biology
- Develop understanding of the nature, processes and method involved in Biology
- Develop and learn to apply observational, practical, modelling, enquiry and problem-solving skills, both in the laboratory, in the field and in other learning environments
- Develop their ability to evaluate claims linked to Biology through critical analysis of the methodology evidence and conclusions, both qualitatively and quantitatively

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 such as 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, 8 and 9 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 really engage with this fabulous subject. Why not look out for the KS3 Mad Scientists enrichment club on offer, with a different theme each term for Years 7, 8 and 9. We will offer STEM events and activities that may include opportunities to visit local colleges and universities and visitors to the academy offering extra enrichments when circumstances allow. There may be visits to science museums and events that celebrate 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 and geography in science. These involve both practical and theoretical sessions, alongside other fun revision sessions such as themes quizzes and problem solving challenges. Get involved!

How are you assessed in Biology?

Throughout the 5 year Biology course (3 years in KS3 and 2 years in GCSE) you are assessed using the following assessment objectives which ensure 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 in years 10 and 11 we make informed predictions informed by our holistic assessment of their progress against the key assessment objectives and their aspirational GCSE targets.

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 A Level Biology (in our Post 16 academies) 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 REDCAR

	Year 7	Year 8	Year 9	Year 10	Year 11
Autumn 1	Unit 1 Introduction to Science - bridging the gap between KS2 and KS3 and looking at core science skills. Unit 2 - Matter and Energy	Unit 1 - Practical and Investigation skills. Unit 2 - Matter and energy.	Space. The Skeletal System. Rocks.	Waves. Particle Model of Matter.	Masterclasses for;- C2 Bonding, C3 Quantitative Chemistry, C4 Chemical Changes P1 Energy P2 Electricity
Autumn 2	Unit 2 - Matter and Energy. Unit 3 - Chemical substances.	Unit 2 - Matter and energy. Unit 3 - Organ systems.	Light and Sound Waves. Living Organisms.	Cell Biology. Bonding, Structure and the properties of matter.	Masterclasses for;- C1 Atomic Structure B4 Bioenergetics P3 Particle Model of Matter P4 Atomic Structure Gap Analysis
Spring 1	Unit 3 - Chemical substances. Unit 4 - Animal Organ systems.	Unit 3 - Organ systems. Unit 4 - Chemical reactions.	Chemical Patterns.	Organisation and cell transport. Energy.	C6 Rates of Reaction C7 Organic Chemistry C8 Chemical Analysis C9 Chemistry of the Atmosphere P8 Space Triple Only Biology and Physics Paper 2 Masterclasses
Spring 2	Unit 4 - Animal organ systems. Unit 5 - Space, Earth and Sustainability.	Unit 4 - Chemical reactions. Unit 5 - Forces and electricity.	Energy and Electricity.	Homeostasis and Response. Quantitative Chemistry. Electricity. Chemical changes.	Masterclasses for;- B7 Ecology C10 Using Resources . P6 Waves . Teaching based on GAP analysis from March assessment.

Summer 1	Unit 5 - Space, Earth and Sustainability. Unit 6 - Plants, Ecology and Climate change.	Unit 5 - Forces and electricity. Unit 6 - Plants and ecosystems.	Healthy Living.	Electricity. Chemical changes.	Paper 1 Bespoke Masterclasses and Exam Briefings
Summer 2	Unit 6 - Plants, ecology and climate change.	Unit 6 - Plants and ecosystems.	Forces. The Environment.	Ecology. Atomic Structure.	-