



## 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, 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. Seem 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?**

The 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.

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

Our Science departments offer lots of great opportunities for you to really engage with this fabulous subject. Why not look out for the large range of enrichment clubs on offer such as our astronomy club and KS3 Science club. We have fantastic links with STEM and provide students with the opportunity to meet with a range of STEM ambassadors linking clearly to industry. Throughout KS4 we offer bespoke biology study support sessions to deepen our students' understanding and enjoyment of Biology.

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

Throughout the 5 year Science course you are assessed in Biology 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 6 assessment points each year that we term Praising Stars©. We assess how students at their current stage of study are on track to reach their end of stage targets which are formulated on aspirational expectation from their KS2 starting points. We make an informed prediction from our holistic assessments based on our subject mapping of expectation across the Biology curriculum.

#### **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. Due to the very fact that you have been able to study biology, your analytical thinking and mathematical reasoning will help your future applications whether they are for colleges, universities, apprenticeships or employment.

Careers that the study of Biology supports include:

- Teaching
- Medicine/Dentistry/Veterinary Science
- Marine Biology
- Geneticist/Genomicist
- Nanotechnology
- Biostatistician
- Science journal editor
- Physiotherapist

	Term 1: Autumn 1	Term 1: Autumn 2	Term 2: Spring 1	Term 2: Spring 2	Term 3: Summer 1	Term 3: Summer 2
7	Unit 1 - Introduction to Science (Bridging the gap between KS2 and KS3) Unit 2 - Matter and Energy	Unit 2 - Matter and Energy Unit 3 - Chemical Substances	Unit 3 - Chemical Substances Unit 4 - Animal Organ Systems	Unit 4 - Animal Organ Systems Unit 5 - Space, Earth and Sustainability	Unit 5 - Space, Earth and Sustainability Unit 6 - Plants, Ecology and Climate change	Unit 6 - Plants, Ecology and Climate change
8	Unit 6 - Plants, Ecology and Climate change Unit 7 - Forces	Unit 7 - Forces Unit 8 - Chemical Reactions	Unit 8 - Chemical Reactions	Unit 8 - Chemical Reactions Unit 9 - Cells, Evolution and Inheritance	Unit 9 - Cells, Evolution and Inheritance Unit 10 - Waves	Unit 10 - Waves Unit 11 - Electromagnetism
9	Unit 12 - Electromagnetism Review & Assessments	B1 - Cell Biology  Triple: B1, C1	C1 - Atomic Structure & the Periodic Table P1 - Energy  Triple: B1, P1	C2 - Bonding P1 - Energy  Triple: C2, P1	B2 - Organisation C2 - Bonding P2 - Electricity  Triple: B2, C2	B2 - Organisation P2 - Electricity  Triple: B2, P2
10	B2 - Organisation C2 - Bonding and Structure P2 - Electricity  Triple: B2, C2, C3, P2	B2 - Organisation B3 - Infection and Response C2 - Bonding and Structure C3 - Quantitative Chemistry P2 - Electricity P3 - Particle Model of Matter  Triple: B2, B3, C3, C4, P3	B3 - Infection and Response B4 - Bioenergetics C3 - Quantitative Chemistry C4 - Chemical Changes P3 - Particle Model of Matter P4 - Atomic Structure P5 - Forces  Triple: B3, B4, C4, P4	B4 - Bioenergetics B5 - Homeostasis & Response C4 - Chemical Changes P4 - Atomic Structure P5 - Forces  Triple: B4, C5, C6 P4, P5	C4 - Chemical Changes C5 - Energy Changes C9 - Chemistry of the Atmosphere P5 - Forces  Triple: B5, C6, P5	Revision & Y10 Exams  C9 - Chemistry of the Atmosphere B5 - Homeostasis & Response P5 - Forces  Triple: B5, P5
11	B5 - Homeostasis and Response B6 - Inheritance, Variation and Evolution C6 - The Rate and Extent of Chemical Change C7 - Organic Chemistry P5 - Forces  Triple: B5, B6, C6, C7, P5	B6 - Inheritance, Variation and Evolution B7 - Ecology C7 - Organic Chemistry C8 - Chemical Analysis C9 - Chemistry of the Atmosphere P5 - Forces P6 - Waves Revision & Nov Exams  Triple: B6, C7, C8, C9, P5, P6	B7 - Ecology C9 - Chemistry of the Atmosphere (Combined) C10 - Using Resources P6 - Waves (Combined) P7 - Magnetism and Electromagnetism  Triple: B7, C9, C10, P6, P7	C10 - Using Resources (Triple) B7 - Ecology (Triple) P7 - Magnetism and Electromagnetism (Triple) P8 - Space (Triple)  Masterclasses, Revision and Mock Exams	Masterclasses, Revision and Final Exams	Revision and Final Exams