



## PHYSICS

### **Why is the study of GCSE Physics important?**

Physics is the branch of Science which endeavours to explore and gain understanding of the very large (Universe) right down to the very small (quantum behaviour) and everything in between! These extremes of scale such as the structure of stellar systems right down to the constituents of the elementary particles can be understood by applying theories, models and mathematical reasoning.

Physics is one of the three Sciences that underpin 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 chemical physics. On a larger scale, even at a terrestrial level we have meteorology and then at a stellar scale we have astronomy and astrophysics yet further and grander still we have the study of cosmology.

The key focus of Physics is achieving an understanding of a wide range of what scientists describe as 'phenomena' with the ultimate goal of developing a grand theory of everything (still yet to be achieved!), for example a basic understanding of how a light bulb works can lead to a comprehensive understanding of how stars are formed.

In developing an understanding of this phenomena Physics has led to the discovery and production of materials, structures, processes and devices some of which can have productive ends, or some that can be catastrophically destructive. The contribution that physics has had has created our modern world such as communications, transport, electronic devices has been the backbone to industry and commerce.

Physics will be taught in a way to develop curiosity about the natural and modern 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 physics 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 energy, space physics, electricity, atomic structure, forces and waves. You will develop an appreciation of how these topics are essentially interlinked. Lessons will provide a wide range of opportunities for practical experiments, demonstrations and modelling of complex theories that surround us in our everyday lives. Your Science classroom will be brimming with practical experiments 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! Physics will expand, and at times blow-your mind!

**Big questions:** *How does the light bulb work? How does it switch on so fast? What can this tell us about elementary particles?*

*How can an understanding of magnets lead to a further understanding of how a motor works or how we link our home to power stations?*

*How can an understanding of atomic structure lead to some of the most advanced medical techniques whilst at the same time lead to catastrophic contamination and hazards?*

### **What skills will the study of Physics 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 Physics?**

- Develop scientific knowledge and conceptual understanding of Physics
- Develop understanding of the nature, processes and method of Physics
- 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 your ability to evaluate claims based on Physics through critical analysis of the methodology evidence and conclusions, both qualitatively and quantitatively.

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

Physics touches on so many other subjects such as Mathematics, Applied Mathematics, Chemistry, Biology, Music, Construction and Design. 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, Physics 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, Biology and Chemistry and this will help you to develop your understanding.

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

Our Science department offers lots of great opportunities for you to really engage with this fabulous subject. We offer STEM events and activities that may include visits and we offer after school sessions to support our students in their GCSE years, where students can embed exam skills and techniques.

### **How are you assessed in GCSE Physics?**

Throughout the 2 year GCSE Physics course you are assessed using the following assessment objectives which ensure that you can cumulatively build your subject understanding in preparation for future GCSE, A Level study or BTEC studies. There are regular assessment points each year that we term Praising Stars©. At GCSE we make informed predictions informed by our holistic assessment of your progress against the key assessment objectives and your 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 GCSE Physics support your future?**

Physics is offered at most prestigious universities either as a single honours or a joint honours subject studied alongside other disciplines e.g. Engineering, Mathematics, Astronomy. The very fact that you have been able to study Physics and your analytical thinking and mathematical reasoning will help your future application be they for colleges, universities, apprenticeships or employment. All Science Level 2 (GCSE) and Level 3 (Post 16) are facilitating subjects; they are highly sought after by employers and universities.

Careers that the study of Physics supports include:

- Medicine
- Engineering (electrical, software, medical, civil, mechanical)
- Geophysics
- Scientific research and development
- Product design
- Aeronautical engineering
- Construction
- Architecture
- Civil or medical engineer
- Astrophysics
- Astronomer

## GCSE Physics Curriculum Progression Pathway

Current 10		2022-2024		Subject Key
		Y10	Y11	
Subject		Ph	Ph	
Autumn	HT 1	P1 - Energy	P5 - Forces	Biology
	HT 2	P1 - Energy	Paper 1 Assessments & Gap fill	Chemistry
Spring	HT 1	P2 - Electricity	P6/7 - Waves & Electromagnetism	Physics
	HT 2	P3 - Particle model of matter	Paper 2 Assessments	
Summer	HT 1	P4 - Atomic structure	Exams	
	HT 2	P4/P5 - Forces		
Current Y11		2021-2023		
		Y10		Y11
Autumn	HT 1	Waves/Energy	Matter	Covid Catch-up
	HT 2	Cells/Bioenergetics	Bonding	Paper 1 Assessments + Gap fill
Spring	HT 1	Homeostasis	Energy	Masterclasses Paper 2 (MTP)
	HT 2	Homeostasis	Quantitative Chemistry	Paper 2 Assessments      Masterclasses Paper 1 (MTP)
Summer	HT 1	Electricity	Chemical Changes	Exam preparation/Exams
	HT 2	Ecology	Atomic Structure	

Subject Key
Biology
Chemistry
Physics

*The Y10 timelines are individualised by academy depending on pathways and tiers. The timeline has specialist rotations, the general timeline is below.*