

Curriculum Intent

Physics involves the study of matter, its motion and behaviour through space and time, and studies of forces and energy. The main goal of Physics is to understand how the universe behaves. The study of physical concepts over time has led, sometimes inadvertently, to the development of many technologies that have transformed modern-day society. We aim for all students to:

- be curious and interested in Physics
- to know how to use specialist Physics vocabulary
- to apply their knowledge to develop their scientific practical skills
- to extend students' preconceptions of Physics and progress their understanding
- appreciate that the behaviour of the universe can be described mathematically
- embed core concepts so that they can access and apply the key skills needed to enjoy and succeed in Physics

Autumn Term | Electromagnets

Students will learn:-

- Potential difference
- Resistance
- Series and Parallel Circuits
- Current
- Charge
- Magnets and magnetic fields
- Electromagnets
- Using electromagnets

What does excellence look like?

- Predict the effect of changing the rating of a battery or bulb in a circuit. Explain what factors affect the resistance of a resistor
- Explain why p.d. varies in series and parallel circuits
- Use a model to explain how current flows in a circuit
- Explain how a compass works
- Suggest improvements to an experiment to observe field lines around a magnet
- Predict the effect of changes on the strength of different electromagnets
- Suggest how two wires both carrying currents placed next to each other might behave
- Suggest investigations about electromagnets used in different applications

How will we assess impact?

Peer and self-assessment
Previous lesson recap quiz
Land mark tasks
End of topic test

Knowledge, understanding & Skills

- Use appropriate equipment to measure potential difference
- Describe the difference between conductors and insulators in terms of resistance
- Construct simple series and parallel circuits to measure the current and voltage of components
- Use an ammeter to measure current
- Describe what happens when you bring similarly charged objects together, and when you bring differently charged objects together
- Draw the magnetic field lines around a bar magnet
- Describe how magnets interact
- Construct an electromagnet and test the factors that affect its strength
- State some uses of electromagnets
- State the main parts of an electric bell, circuit breaker, or loudspeaker

How is homework used to enhance learning?

Kerboodle <https://www.kerboodle.com/app>
BBC bitesize <https://www.bbc.co.uk/bitesize/subjects/zh2xsbk>
AES student science website
<https://sites.google.com/view/angloscience>

Suggested homework tasks

Learn spelling and definitions of key words
Prepare a list of pieces of electrical equipment used at home and the potential difference supplied, either from batteries or the mains (230 V)
Draw a circuit diagram for the lighting in your home



Students will learn:-

- Sound waves and speed
- Loudness and amplitude
- Frequency and pitch
- The ear and hearing
- Light
- Reflection
- Refraction
- The eye and vision
- Colour
- Sound waves, water waves and energy
- Radiation and energy
- Modelling waves

What does excellence look like?

- Describe sound as the transfer of energy through vibrations and explain why sound cannot travel through a vacuum
- Explain how you can make measurements of the amplitude of a sound wave
- Present a reasoned prediction using data of how sounds will be differently heard by different animals
- Predict how light will interact with different materials
- Predict how light will reflect from different types of surface
- Predict whether light will refract when it hits a surface.
- Explain how the eye forms an image
- Explain the formation of secondary colours
- Explain, in terms of frequency, why we use ultrasound for cleaning and physiotherapy
- Evaluate locations for the use of waves to generate electricity.
- Describe all the waves of the electromagnetic spectrum in terms of increasing wavelength or increasing frequency
- Explain why ionisation can be harmful to living cells
- Evaluate different models of waves
- Explain why you can add sound waves and light waves and get less than you started with

How will we assess impact?

Peer and self-assessment
Previous lesson recap quiz
Land mark tasks
End of topic test

Knowledge, understanding & Skills

- Use data to compare the speed of sound in different materials
- Label amplitude on a diagram of an oscilloscope trace of a wave
- Label time period on a diagram of a sound wave on an oscilloscope
- State some ways that hearing can be damaged
- Explain how ray diagrams can explain the formation of shadows
- Use appropriate equipment safely with guidance
- Record some observations as a diagram
- Name parts of the eye
- State the effect of coloured filters on light
- Describe the link between amplitude or frequency and energy
- Define frequency and amplitude
- Name some waves of the electromagnetic spectrum
- Name an electromagnetic wave that can be harmful to living cells.
- Compare transverse and longitudinal waves
- Describe how to use a wave model to explain observations of the reflection, absorption, and transmission of waves

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Suggested homework tasks

- Learn spelling and definitions of key words.
- Research supersonic travel
- Plan an investigation to see how far different types of seeds can be dispersed
- Identify and write about items that use lenses (or refraction) at home
- Write a guide telling police how to collect accurate witness statements for crimes committed in yellow street light



Students will learn:-

- Inspired by the IET Faraday Challenge Days, students will learn to collaborate to solve an engineering problem
- They will work as a group to plan and develop their engineering solution
- They will prepare and present their solutions

What does excellence look like?

- Working effectively as part of a team
- Being able to understand what the problem is and develop ideas to solve it
- Explain ideas to members of their group
- Develop their ideas into a well structured presentation
- Present a well prepared presentation of their ideas

How will we assess impact?

Peer and self-assessment
Presentation of final proposal

Knowledge, understanding & Skills

- Use prior knowledge to develop ideas
- Use communication skills to share ideas
- Design and build any useful models
- Prepare presentation resources to show ideas
- Present ideas to a wider audience
- Use appropriate equipment safely with guidance

How is homework used to enhance learning?

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Suggested homework tasks

- Learn spelling and definitions of key words
- Research engineering careers
- Plan how to present final work



International Opportunities

Visits Programmes

La Coupole -Planetarium – Solar system
La Couploe Bunker – secret Nazi V2 launch site (Wernher von Braun – Nazi scientist and space travel)
Alessandro Volta Tower (Lake Como) - Y8 Saronno Exchange

Within the curriculum

The KS3 Physics curriculum is designed to introduce students to the key scientific concepts, supported through the study of international examples and theories.

Students are encouraged to engage with scientific concepts and theories beyond the syllabus by exploring key examples of international collaboration, or scientific discovery where the common language of scientific discovery is utilised. Reference is additionally made to key scientists with connections to countries and cities visited as part of the school's international exchange programme.