



Curriculum Intent

Physics is the study of energy and matter and their interactions. The GCSE Physics course provides an interesting and challenging experience to link key physical ideas and understand how they relate to each other.

The course aims for all students to:

- develop essential knowledge, understanding and application of different areas of the subject and how they relate to each other
- understand how society makes decisions about scientific issues and how Physics contributes to the success of the economy and society
- develop competence and confidence in a variety of practical, mathematical and problem solving skills
- develop and demonstrate a deep appreciation of the skills, knowledge and understanding of scientific methods

Promote students' interest in and enthusiasm for the subject, including an interest in further study and careers associated with the subject

Autumn Term | Waves

Students will learn:-

Transverse and longitudinal waves

Wave properties

Electromagnetic waves

What does excellence look like?

Recall and apply the wavespeed equation

Manipulate the wavespeed equation in complex problems involving converting units

Recall and apply the relationship between frequency and time period

Explain how different substances may absorb, transmit, refract or reflect electromagnetic waves in ways that vary with wavelength.

Use wave front diagrams to explain refraction in terms of the change of speed that happens when a wave travels from one medium to a different medium.

Explain why each type of electromagnetic wave is suitable for particular practical applications.

How will we assess impact?

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

How is homework used to enhance learning?

✓ AQA website

<https://www.aqa.org.uk/subjects/science/gcse/physics-8463/specification-at-a-glance>

✓ BBC bitesize <https://www.bbc.co.uk/bitesize/examspecs/zsc9rdm>

✓ Grade gorilla <https://gradegorilla.com/>

✓ Isaac Physics <https://isaacphysics.org/>

✓ Physics tube <http://physicstube.org/>

✓ Minute physics <https://www.youtube.com/user/minutephysics>

✓ Hyperphysics <http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html>

Suggested homework tasks

- Learn definitions of key terms.
- Group and independent research projects
- Past examination questions practice

Practical activity preparation, simulations and follow-up.

Knowledge, Understanding & Skills

Describe the difference between longitudinal and transverse waves. Students should be able to describe evidence that, for both ripples on a water surface and sound waves in air, it is the wave and not the water or air itself that travels.

Describe wave motion in terms of their amplitude, wavelength, frequency and period.

Identify amplitude and wavelength from given diagrams

Describe a method to measure the speed of sound waves in air

Describe a method to measure the speed of ripples on a water surface.

Identify the suitability of apparatus to measure the frequency, wavelength and speed of waves in a ripple tank and waves in a solid and take appropriate measurements.

Recall the regions of the electromagnetic spectrum.

Give examples that illustrate the transfer of energy by electromagnetic waves.



Students will learn:-

Describing motion
 Newton's laws
 Forces and braking
 Momentum
 Poles of a magnet
 Magnetic fields
 The Motor Effect
 Fleming's Left Hand Rule
 Electric motors

**Knowledge, Understanding & Skills**

Measuring and calculating distance, displacement, speed, velocity and acceleration

Recall typical values of speed for a person walking, running and cycling as well as the typical values of speed for different types of transportation systems.

Apply Newton's First Law to explain the motion of objects moving with a uniform velocity and objects where the speed and/or direction changes.

Recall and use the equation for Newton's second law

Apply Newton's third law to equilibrium situations

Describe stopping distance and the factors that affect it

Explain the dangers caused by large decelerations

Calculate linear momentum

Describe and explain examples of momentum in an event, such as a collision

Describe the attraction and repulsion between unlike and like poles for permanent magnets

Describe the difference between permanent and induced magnets.

Describe how to plot the magnetic field pattern of a magnet using a compass

Draw the magnetic field pattern of a bar magnet showing how strength and direction change from one point to another

describe how the magnetic effect of a current can be demonstrated

Draw the magnetic field pattern for a straight wire carrying a current and for a solenoid

Show that Fleming's left-hand rule represents the relative orientation of the force, the current in the conductor and the magnetic field.

Recall the factors that affect the size of the force on the conductor.

What does excellence look like?

Explain qualitatively, with examples, that motion in a circle involves constant speed but changing velocity.

Determine the speed of an object from a distance time graph

Determine the acceleration of an object from its velocity-time graph

Estimate the magnitude of every day accelerations

Explain how different factors that affect stopping distance either affect thinking distance or braking distance

Explain methods used to measure human reaction times and recall typical results

Estimate the forces involved in the deceleration of road vehicles in typical situations on a public road.

Use the idea of conservation of momentum to calculate momentum changes for two interacting objects

Explain how the behaviour of a magnetic compass is related to evidence that the core of the Earth must be magnetic.

Explain how a solenoid arrangement can increase the magnetic effect of the current.

Manipulate and apply the equation for magnetic force.

How is homework used to enhance learning?

AQA website <https://www.aqa.org.uk/subjects/science/gcse/physics-8463/specification-at-a-glance>

BBC bitesize <https://www.bbc.co.uk/bitesize/examspecs/zsc9rdm>

Grade gorilla <https://gradedgorilla.com/>

Isaac Physics <https://isaacphysics.org/>

Physics tube <http://physicstube.org/>

Minute physics <https://www.youtube.com/user/minutephysics>

Hyperphysics <http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html>

Suggested homework tasks

- Learn definitions of key terms.
- Group and independent research projects
- Past examination questions practice

Practical activity preparation, simulations and follow-up.

How will we assess impact? (3D)

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

International Opportunities**Within the curriculum**

The GCSE Physics curriculum is designed to deepen understanding and appreciation of how the International scientific society collaborates and makes decisions about world scientific issues.

Students are encouraged to research each theme beyond lessons, exploring topical international scientific examples.

Classwork and homework is designed to ensure that they can draw upon a worldwide knowledge of skills, techniques and theoretical understanding required for their examinations and the potential further study of Physics at an International level at global universities.