

Year 10 - Physics

Autumn term

Students will now build on the topic of motion and forces by comparing how to define and calculate speed and velocity as scalar and vector quantities respectively. Students will extend their understanding in this area by learning about average and uniform acceleration and Newton's laws of motion and will also start to gain an appreciation that proportionality is an important aspect of many mathematical models which we explore through Newton's second law: $F = ma$.

Next, the topic of energy is reintroduced, building on KS3 learning about how energy is transferred and stored. Students will use equations to calculate efficiency, gravitational potential and kinetic energy and will evaluate the use of renewable and non-renewable energy resources, a topic of great significance in light of the global energy crisis.

Spring term

The first physics topic of this term is waves and builds on KS3 understanding of the nature of light and sound waves and their behaviour. Our knowledge of waves has enabled us to develop a range of scientific insights ranging from the origin of our universe to the cause of earthquakes. In this topic students will again build on their mathematical skills by using and rearranging equations to calculate wave speed, frequency and wavelength using standard form and will also begin to use more sophisticated language when describing transverse and longitudinal waves. They will also develop their practical skills by investigating the behaviour of waves in solids and liquids to show how scientists can understand highly abstract concepts through simple practical models. **Students will then extend their knowledge of sound waves by considering those that are outside the normal human hearing range – infrasound and ultrasound – and explore the many uses of such waves. They will also build on their KS3 knowledge of how the ear works with a particular focus on the role of the cochlea.**

The novel topic of radioactivity is now introduced. This builds on KS3 knowledge and understanding of the particle model of matter and also knowledge of atomic structure gained in chemistry last year. Students will gain an understanding of the different types of radiation and how they affect atoms as well as the uses and dangers of radiation and how we can protect ourselves. Students will develop an understanding of how radioactivity is used in carbon dating, a technique that has enabled us to understand planet Earth's natural history, and in light of the global energy crisis, why nuclear power may be a viable alternative to burning fossil fuels. **Students will further develop their understanding of how nuclear fuels are used by learning about fission and fusion reactions and will also consider the role of radioactivity in medicine.**

Summer term

Students build on their knowledge of the solar system from KS3 and extend their previous learning on mass and weight in the astronomy topic. They will explore how ideas about the solar system have changed over time, the role of gravity in the creation and future of our Universe, evaluate evidence for different theories of the origin of the Universe and finally learn about the life cycles of stars.

Next, the topics of energy and forces are revisited and extended and students will consider the law of energy conservation through examining how energy is transferred in a system and how to calculate the rate of transfer, as well as then exploring how contact, non-contact **and rotational** forces affect objects.

Notes for 2021-22

Due to the disruption caused by the pandemic, students in Year 9 did not start the GCSE course as early as usual and topics were taught in a different order. The current Y10 did not get to carry out the core practical on temperature and radiation and so will be covering this early in Year 10. The students did, however, cover the core elements of the waves topic (excluding infra/ultrasound) and so time gained here is being used to conduct missed practical work.