Mastery:

Sandbach School Science Curriculum:

Y13 Physics Curriculum Sequence

Intent: To embed knowledge and understanding in AQA A level Physics and supervise practical work to enable students to achieve Practical competency

Term 1	Term 2	Term 3
Further mechanics, Gravitational and electric fields	**Capacitors, Magnetic fields and Nuclear**	**Astrophysics and revision**
Why start here? Mechanics is a topic that was covered in Year 12 so the students completing this at the start of Year 13 should hopefully give them the confidence with the step up in difficulty.	Why move onto these units? The fields part of the course is widely considered to be the most difficult. This section of the course requires the use of natural mathematical logarithms and the ability resolve equation by using them. Having these topics covered at this point means that they will have covered this in detail in Maths at this point.	Why move onto these units? Having the astrophysics part here works well as there are a number of previous topics that are key to understanding here. For example in order to understand absorption spectra then the students needed to have covered waves. To understand the energy from a star then the students need to have covered nuclear fusion.
Spec links: 3.6 Further mechanics and thermal physics (A-level only) The earlier study of mechanics is further advanced through a consideration of circular motion and simple harmonic motion (the harmonic oscillator). A further section allows the thermal properties of materials, the properties and nature of ideal gases, and the molecular kinetic theory to be studied in depth. 3.7 Fields and their consequences (A-level only) The concept of field is one of the great unifying ideas in physics. The ideas of gravitation, electrostatics and magnetic field theory are developed within the topic to emphasise this unification. Many ideas from mechanics and electricity from earlier in the course support this and are further developed. Practical applications considered include: planetary and satellite orbits, capacitance and capacitors, their charge and discharge through resistors, and electromagnetic induction. These topics have considerable impact on modern society.	**Spec links:** 3.7 Fields and their consequences (A-level only) The concept of field is one of the great unifying ideas in physics. The ideas of gravitation, electrostatics and magnetic field theory are developed within the topic to emphasise this unification. Many ideas from mechanics and electricity from earlier in the course support this and are further developed. Practical applications considered include: planetary and satellite orbits, capacitance and capacitors, their charge and discharge through resistors, and electromagnetic induction. These topics have considerable impact on modern society. 3.8 Nuclear physics (A-level only) This section builds on the work of Particles and radiation to link the properties of the nucleus to the production of nuclear power through the characteristics of the nucleus, the properties of unstable nuclei, and the link between energy and mass. Students should become aware of the physics that underpins nuclear energy production and also of the impact that it can have on society.	**Spec links:** 3.9 Astrophysics (A-level only) Fundamental physical principles are applied to the study and interpretation of the Universe. Students gain deeper insight into the behaviour of objects at great distances from Earth and discover the ways in which information from these objects can be gathered. The underlying physical principles of the devices used are covered and some indication is given of the new information gained by the use of radio astronomy. The discovery of exoplanets is an example of the way in which new information is gained by astronomers.
Teaching these topics here supports: • Core mathematics with differentiation of trigonometric functions • Term 2 magnetic fields • Year 12 Waves	Teaching these topics here supports: • Year 12 particles and radiation • Year 12 electricity • Core mathematics	Teaching these topics here supports: Year 13 radioactivity
These topics feed from: Year 12 mechanics Year 12 waves Year 12 electricity GCSE particles	These topics feed from: GCSE magnetism GCSE radioactivity Year 12 Electricity	These topics feed from: Year 12 Waves Year 13 Radioactivity