Curriculum Plan Physics

Intent: We aim to provide students with a curriculum that develops their understanding of, and appreciation for, the world around them. As they discover more about their place, impact and role in the world, students will be able to make good choices on a personal level and to grow into responsible global citizens. We will also help students to develop practical skills so that they can safely use the methods and processes that help scientists to make new discoveries and develop new technologies.

Studying physics will help students to understand how the universe is structured. They will solve problems using their imagination and by developing their modelling skills. There are many areas in which this knowledge is vital to a responsible citizen, such as understanding the need for cleaner power generation through technologies like nuclear fusion.

Year	What will students learn?	Rationale	How will students be assessed?
7	Phase 1 – Space, Waves and Sound Phase 2 – Energy and Energy resources	In Y7, we aim to teach the basic skills of scientific enquiry, lateral thinking, logical/mathematic modelling and practical skills whilst providing an engaging context where students can use their imagination and engage fully. To this end, we chose Space for its highly engaging context as the introductory physics topic followed by Waves and Sound which provides opportunities for modelling and practical activities. After this, we have chosen energy as this is a fundamental part of all physics learning in the future. Once this key concept is covered, we continue along to the current social context of Energy resources. Our reasoning behind this is that it shows how the student's learning can be used in a wider (and arguably important) context in their own lives.	Students will sit a summative test at the end of each phase. This will also be used in formative assessment and, where appropriate, to regroup the student into a group better suited to their needs. These assessments are provided by the "Activate" education group, which also write the textbooks we use in lessons.
8	Phase 1 – Forces, Motion and Pressure	In Y8, we continue with the development of logical/mathematical modelling in preparation for the KS4 course. For this reason, we have chosen to start with Force, Motion and Pressure. This gives us an opportunity to explore mathematical modelling and how to most	

	Phase 2 – Light, Electricity and Magnetism	effectively assign, use and solve basic physics formulae. This is also a more "physical" context and therefore easier for students to picture and model logically, allowing us to build these skills After this, we move to more advanced modelling with Light, Electricity and Magnetism. As these contexts are entirely dependent on logical modelling (they can't be "seen" and can be challenging to imagine), this gives us an opportunity to describe how observations, experimentation and repeated changes shape how we model these concepts and how models are continually adapted and revised based on improved results and understanding.	
9	Phase 1 – Energy and Energy Resources Phase 2 – Forces in Action	In Y9, students now have a stronger grasp on modelling and scientific method then they had when they started learning science. For this reason, we revisit the most fundamental key concept of physics – Energy. This time, however, we can use and further develop the logical and mathematical modelling skills students have developed over KS3 to better understand and explore this key concept. As before, we then demonstrate how scientific understanding can be applied to real-world social issues by discussing Energy resources and their effect on the environment. Similar to the beginning of Y8, we feel strongly that a firm grasp of basic formulaic manipulation and mathematic modeling is essential for the rest of the course. For this reason, the next topic we teach is Forces in Action. As this topic contains the majority of the mathematic work in the course, this gives us an excellent opportunity to build these basic key skills to a high level, in turn making the rest of the course easier to access. This is also, again, one of the more "physical" contexts which is easier to imagine and understand, allowing us opportunity to develop logical modelling and understanding.	Students will sit a summative test at the end of each phase. This will also be used in formative assessment and, where appropriate, to regroup the student into a group better suited to their needs. These exams are based upon past paper questions provided by AQA, the examining body and the provider of our textbooks
10	Phase 1 – Electricity and Electric Circuits Phase 2 - Waves and Magnetic Fields	In Y10, we then move to more challenging modelling but with the advanced logic and mathematical skill built in Y9. Electric circuits can still be learnt in a physical approach using circuits and other equipment but require a strong model to understand what is happening as the direct mechanism cannot be seen. This also rounds up the majority of	Students will sit a summative test at the end of each phase. This will also be used in formative assessment and, where appropriate, to regroup the

		mathematical formulae in the course allowing us to further develop and polish mathematical modelling and problem-solving skills. Waves and magnetic fields allow us to take logical modelling to a higher degree as well as explore more abstract context. This also allows us to build a foundation of understanding and knowledge for the start of the Y11 course.	student into a group better suited to their needs. These exams are based upon past paper questions provided by AQA, the examining body and the provider of our textbooks At the end of the year, students will also sit an adapted examination paper (containing questions on the Y9 and Y10 topics stated previously) lasting 1 hour 15 minutes (Double award) or 1 hour 45 minutes (Triple award)
11	Electromagnetic interaction, Atomic Structure/Radioactivity and Particle model of matter (Triple award only) - Further Mechanics, Advanced Wave behavior and Astrophysics	In Y11, we explore the use of higher-level modelling in advanced contexts to solve more challenging logical problems. Electromagnetic interaction is amongst the most challenging context to imagine and logically model as it requires an understanding of interaction between two fields that cannot be directly seen. This allows us to really stretch students in the skills built up to this point as well as stretch their abilities to apply their learning to unfamiliar contexts. After that, we move on to Atomic Structure/Radioactivity and Particle model of matter. These provide a welcome practice to the skills built across the course as well as a snapshot of how other sciences, such as Chemistry and Biology, can be informed and explored further with Physics. They also share a context with makes them easier to engage with and demonstrates the wider combination of ideas in physics. At this point, Triple award students will continue to learn about more advanced concepts and application of key ideas in mechanics (momentum, levers and moments), Waves (refraction in lenses) and Astrophysics (which uses multiple previous learning points such as	Students will sit a summative test at the end of each phase. This will also be used in formative assessment and, where appropriate, to regroup the student into a group better suited to their needs. These exams are based upon past paper questions provided by AQA, the examining body and the provider of our textbooks At points of the year, students will sit practice examinations based on adapted examination papers (containing topics learnt up to the point of the exam) lasting 1 hour and 45 minutes. There may be multiple practice exams, however

		nuclear processes, electromagnetic radiation and forces in order to access, providing an excellent opportunity for recap and further practice in application	students will be made aware with plenty of advanced notice if the teacher/school decides this is required. At the end of the academic year, students will sit 2 physics papers, each lasting 1 hour 15 minute (Double award) or 1 hour 45 minutes (Triple award). The papers will cover the following topics; • Paper 1 – Energy, Electricity, Particle Model of Matter and Atomic Structure/Radioactivity • Paper 2 – Forces, Waves, Magnetism and Astrophysics
12	**Topic 1 – Working as a Physicist** **Topic 2 – Mechanics** **Topic 3 – Electric Circuits** **Topic 4 – Materials** **Topic 5 – Waves and the Particle Nature of Light**	The order of topics in KS5 follows the order given in the Pearson Edexcel Specification – our examining body. We have chosen to follow this structure as the development of mathematic and logical thinking skills given by this order allows us to better support our students, especially those who are not doing mathematics (something we recommend but do not insist upon). Our professional staff do make some minor changes on the topic order to better fit practice examinations, revision or if certain topics work better in combination (for example, some teachers prefer to teach Nuclear Radiation immediately before Nuclear and Particle Physics as this has a shared context), however any such changes are communicated to students ahead of time and are made to better serve the teaching of the content.	Students will sit Three papers at the end of the Y13 academic year; • Paper 1, consisting of topics 1,2,3,6,7 and 8 (1 hour 45 minutes) • Paper 2, consisting of topics 1,4,5,9,10,11,12 and 13 (1 hour 45 minutes) • Paper 3, which contains content from all topics but will be entirely in an experimental physics context. (2 hours 30 minutes)
13	**Topic 1 – Working as a Physicist** **Topic 6 – Further Mechanics** **Topic 7 – Electric and Magnetic Fields**		

	<u>Topic 8 – Nuclear and Particle Physics</u> **<u>Topic 9 – Thermodynamics</u>** **<u>Topic 10 – Astrophysics</u>** **<u>Topic 11 – Nuclear Radiation</u>** **<u>Topic 12 – Gravitational Fields</u>** **<u>Topic 13 - Oscillations</u>**	Throughout the topics, Students are also learning practical skills as outlined in Topic 1 – this is done over the period of teaching as it gives us plenty of opportunity to use specialist tools and equipment in suitable contexts.	The examinations are summative and test the entirety of the course. There unfortunately is no option to "bank" a grade at As. In terms of in-school regular assessment, students sit a short formative assessment at the end of each topic. In Y12, Students will also complete a practice As Paper 1 (topics 1,2 and 3 only) and Paper 2 (Topics 1,4 and 5 only) as a summative assessment as well as for formative feedback. Where possible, Students will also sit a practice paper focused on experimental context-based questions and more advanced contexts. In Y13, in addition to the end of topic tests describes previously, students also sit a practice Paper 1,2 and 3 over the year, again as both a formative and summative assessment.