

The intention is to cover the KS3 specification in Years 7 and 8. Almost every detail of the KS3 content recurs in GCSE so this is all useful grounding for further study.

Covering KS3 in Years 7 and 8 will allow us to begin the GCSE course in Year 9 and so have enough teaching time to offer separate science GCSEs.

Key areas of development in year 7 and 8 include: practical skills; the importance of accurate scientific terminology; confidence with numbers and formulae

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
7	<p>Topic: Forces and materials</p> <p>Exam: GCSE Paper 2</p> <p>Subject Content: Force types; contact and non-contact forces; springs and Hooke's law</p> <p>Learner Skills: practical work; graph plotting; technical vocabulary</p>	<p>Topic: Forces and motion</p> <p>Exam: GCSE Paper 2</p> <p>Subject Content: Resultant forces; friction, drag and speed; rotation and moments</p> <p>Learner Skills: technical vocabulary; practical skills; applying physics ideas; data handling and formula use</p>	<p>Topic: Energy types and transfers</p> <p>Exam: GCSE Paper 1</p> <p>Subject Content: Energy types and transfers; energy conservation; work formula</p> <p>Learner Skills: technical vocabulary; practical skills; formula use</p>	<p>Topic: Waves and sound</p> <p>Exam: GCSE Paper 2</p> <p>Subject Content: Wave properties; sound and ultrasound</p> <p>Learner Skills: technical vocabulary; applying physics to everyday life</p>	<p>Topic: Magnetic and electric fields</p> <p>Exam: GCSE Paper 2</p> <p>Subject Content: Permanent magnets and fields; charge and electric fields</p> <p>Learner Skills: technical vocabulary; practical skills;</p>	<p>Topic: Pressure</p> <p>Exam: GCSE Paper 1 and 2</p> <p>Subject Content: Pressure in solids and in liquids</p> <p>Learner Skills: technical vocabulary; formula use</p>
	<p>Rationale: a good hands-on topic that is easily accessible. Plenty of scope for simple practical work. Some simple mathematical and graph work</p>	<p>Rationale: extends ideas of forces and looks at their effects. More practical work. A chance to develop mathematical competence with moments.</p>	<p>Rationale: a vital concept underpinning all physics - a little more abstract and harder to measure than forces, which is why we don't start with this.</p>	<p>Rationale: Follows on usefully from energy transfers. More room for practical work and the development of scientific terminology. Also great fun!</p>	<p>Rationale: Links with earlier ideas about forces. Magnetic and electrostatic forces are both non-contact and involve the concept of 'fields'.</p>	<p>Rationale: Links with earlier ideas about forces. A further chance to develop mathematical competence.</p>
8	<p>Topic: Speed graphs; household insulation</p> <p>Exam: GCSE Papers 1 and 2</p> <p>Subject Content: distance-time graphs, relative velocity, household bills, insulation</p> <p>Learner Skills: graph skills; maths skills; technical vocabulary</p>	<p>Topic: Magnets and space</p> <p>Exam: GCSE Paper 2</p> <p>Subject Content: permanent magnets and navigation; seasons; solar system; galaxies, the light year</p> <p>Learner Skills: technical vocabulary</p>	<p>Topic: Electricity</p> <p>Exam: GCSE Paper 1</p> <p>Subject Content: circuits; current; series and parallel circuits; PD and voltage; resistance; $V = IR$;</p> <p>Learner Skills: technical vocabulary; mathematical skills; practical skills (hopefully)</p>	<p>Topic: Electromagnets; Waves and superposition</p> <p>Exam: GCSE Paper 2</p> <p>Subject Content: electromagnets; wave superposition</p> <p>Learner Skills: technical vocabulary; practical skills (hopefully)</p>	<p>Topic: Light wave behaviour</p> <p>Exam: GCSE Paper 2</p> <p>Subject Content: Reflection and refraction</p> <p>Learner Skills: technical vocabulary; practicals skills</p>	<p>Topic: Light applications</p> <p>Exam: GCSE Paper 2</p> <p>Subject Content: colour; lenses and images; pinhole camera and the eye.</p> <p>Learner Skills: technical vocabulary; practicals skills</p>
	<p>Rationale: The topics allow a bit of practical work and are demanding enough to form the basis for a meaningful test for the RA before half-term</p>	<p>Rationale: Some good practical work and interesting content in the run up to Christmas. Permanent magnets are a necessary precursor to electromagnets.</p>	<p>Rationale: An important topic at GCSE that deserves significant time. Useful practical work and a necessary precursor for electromagnets.</p>	<p>Rationale: 'Electromagnets' topic ties together magnetism and electricity. 'Superposition' reviews some wave ideas from Year 7.</p>	<p>Rationale: Builds on wave ideas from Year 7, particularly with reflection.</p>	<p>Rationale: Application of various bits of theory taught in previous block; some fun practicals to end the year!</p>

The intention is to cover (almost all of) the AQA GCSE Combined Science (Trilogy) specification in Years 9 and 10, allowing a genuine GCSE science paper to be set for the Year 10 exam.

Our students come with a wide variety of background experience from different feeder schools and we will often need to start with ideas from KS3.

As of September 2021, we anticipate that all students will continue with the separate science GCSE Physics course (AKA 'triple award').

If it better suits a year group then it may be that small numbers of students sit combined science in Year 11 (AKA 'double award').

A key theme in Years 9 and 10 is proficiency with formulae as the new style exam is mathematically more challenging.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
9	Topic: Forces and energy Exam: primarily GCSE Paper 1 Subject Content: Energy stores and transfers; efficiency; forces; work, GPE and power formulae; energy resources and electricity generation. Learner Skills: practical work; technical vocabulary; data handling and formula use		Topic: Materials Exam: GCSE Paper 1 and 2 Subject Content: springs; density; the particle model Learner Skills: practical work; technical vocabulary; data handling and formula use	Topic: Waves and their applications Exam: GCSE Paper 2 Subject Content: wave types and measurements; frequency and wave speed formulae; reflection and refraction; sound and ultrasound; seismic waves; colour; EM spectrum Learner Skills: practical work; technical vocabulary; data handling and formula use		
	Rationale: Energy and forces underpin the GCSE course and it is unusual that even a foreign student hasn't got some background to draw on. Leads to energy formulae allowing us to develop that aspect of physics.		Rationale: a block of work on materials that links to both forces and energy. More formula practise.	Rationale: Waves is reasonably straightforward but full of key vocabulary and detail. It is well suited to Year 9 and there is a chance to practice simple formulae to develop skills and confidence. A significant number of students join us in Year 10. The Year 9 material has been chosen as it's less conceptually challenging and most students have some good basics from their previous schools. Students can more easily catch up with this material than with the rest of the course.		
10	Topic: Electricity, magnetism and electromagnetism Exam: GCSE Paper 1 and 2 Subject Content: Electric circuits; mains electricity; magnetism; electromagnets and motors Learner Skills: practical work; technical vocabulary; data handling and patterns; formula use		Topic: Radioactivity and particles Exam: GCSE Paper 1 Subject Content: Atomic structure; radioactive decay; particle model and internal energy. Learner Skills: technical vocabulary; data handling; formula use for internal energy	Topic: Motion, forces and kinetic energy Exam: GCSE Paper 2 Subject Content: Distance, speed and velocity; forces as vectors and equilibrium; acceleration; Newton's laws of motion; falling motion and terminal velocity; KE; braking and car safety Learner Skills: practical work; technical vocabulary; data handling and patterns; formula use		
	Rationale: The work with electric circuits naturally links to electromagnets. Plenty of practical work. Lots of formulae that start to interleave usefully but are individually not too demanding. Material can be extended to give examples of level 8 and 9 questions for the more able.		Rationale: A bit of a break from formulae for those still developing maths skills but returning to formulae at the end of the topic. Material links with topics studied in chemistry by this stage in Year 10.	Rationale: The last part of the Combined Science (Trilogy) material! This topic is quite mathematical and is deliberately left until last to allow students to cover topics such as trigonometry and graph gradients in maths. Allows plentiful extension work for those aiming at level 8 and 9, and provides further opportunities to practise multiple-step calculations (a feature of the new GCSE)		

In 2021-22, all Year 11 will sit separate (triple award) science GCSEs, taking advantage of any efforts made to simplify exams post-covid. Students who struggles significantly with the challenge can sit foundation tier in physics as necessary, reducing the content to be learnt as well as avoiding the most demanding material.

All classes will sit a Paper 1 mock in November. All classes will sit a Paper 2 mock in March. After this, we will give further mock papers in class (using CGP papers as needed) in order to refine exam skills.

Decisions about higher tier or foundation tier will not be made until after the March mock.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
11 Triple award physics	<p>Topic: Finish paper 1 content</p> <p>Exam: GCSE Paper 1</p> <p>Subject Content: particles and heat; pressure; fission and fusion; static electricity;</p> <p>Learner Skills: technical vocabulary; data handling and patterns; some formula use and practical work</p>	<p>Topic: Mock paper 1 and start paper 2 content</p> <p>Exam: GCSE Paper 2</p> <p>Subject Content: space physics; moments and gears</p> <p>Learner Skills: formula use and practical work; technical vocabulary</p>	<p>Topic: Finish paper 2 content</p> <p>Exam: GCSE Paper 2</p> <p>Subject Content: lenses; electromagnetic induction; IR</p> <p>Learner Skills: technical vocabulary; ray diagrams; some formula use and practical work</p>	<p>Topic: Mock paper 2</p> <p>Exam: GCSE Paper 2</p> <p>Subject Content: Consolidation and mocks</p> <p>Learner Skills: Revision and exam skills</p>	<p>Topic: Further P1 and P2 mocks</p> <p>Exam: GCSE Paper 1 and 2</p> <p>Subject Content: Consolidation and mocks</p> <p>Learner Skills: Revision and exam skills</p>	GCSE Exams
	<p>Rationale: Finish the triple award paper 1 material before half-term to allow revision for the mock.</p>	<p>Rationale: A return to practical work with moments and levers. Space science works well as a topic that can be taught in and around the mock exam and paper review.</p>	<p>Rationale: Finish the paper 2 content in time for half-term to allow revision for the second mock.</p>	<p>Rationale: There should be time to do some revision in class before Easter – use the mock papers to see what topics or skills need addressing (e.g. multiple step calculations)</p>	<p>Rationale: Students need more exam practice. Focus on exam technique – reading questions, structuring answers, making use of information.</p>	

The new A level course content is very similar to the old A level course and so the old modules serve as useful past papers for practice questions.

The course content is in the order of the old modules to make it easier for students to find practice papers. It also divides topics usefully in time for the Year 12 exams near Christmas and various Year 13 exams.

I've omitted 'Learner skills' from this document as it will be the same throughout: technical vocabulary; writing good extended explanations; increasing proficiency with formulae and numerical problems; development of practical skills (necessary for both the exam papers and the Practical Assessment at the end of Year 13).

The Year 13 course is considerably more challenging than the Year 12 course as almost none of the content has been met at GCSE. There is also a significant jump in the level of demand in exam questions and the mathematical difficulty of numerical questions (almost all of which involve multiple-step calculations).

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 12	Topic: old 'Unit 2' = Mechanics and waves Exam: AS exam and A2 Paper 1 Subject Content: Vectors; moments; linear motion; energy; materials; wave properties; refraction; interference and diffraction		Topic: old 'Unit 1' = Electricity and quantum physics Exam: AS exam and A2 Paper 1 Subject Content: electrical circuits, potential dividers and internal resistance; photons and energy levels, wave-particle duality; quarks and particle physics		Topic: Revision and mocks and a little bit of 'Unit 4' Exam: AS exams Subject Content: Circular motion for 'Unit 4'	Topic: UCAS mocks and start old 'Unit 4' Exam: A2 paper 1 Subject Content: SHM and resonance. Logarithms.
	Rationale: we start the course with some of the heavier Year 12 maths content. Some of our students are less mathematically able and this allows them to quickly find out if they are suited to A level physics and can make an early change if the mathematical demands are beyond them. The Christmas exam will be an old 'Unit 2' module paper.		Rationale: start this unit with 'electricity' as this topic is hard for students to visualise and they will need lots of practice. The particle physics material is more straightforward but hasn't been met at GCSE and so needs taking at a measured pace. We aim to finish by Easter and ideally by the March mock so that we can use a proper AS paper to get students used to the new-style exam and the questions on required practicals.		Rationale: we would expect to be finished by Easter and can spend this term working on exam technique while starting the Year 13 content to prevent students getting bored and stale.	Rationale: SHM and resonance follow usefully from circular motion and completes the content for A2 paper 1. Exponentials and the use of logarithms are required for A2 paper content and Year 13 required practicals.
Year 13	Topic: old 'Unit 4' = gravitational, electric and magnetic fields, electromagnetic induction Exam: A2 papers 1 and 2 Subject Content: gravitational fields and potential, electric fields and potential, capacitors, magnetic fields, induction.	Topic: old 'unit 5A' = nuclear physics, heat and gases Exam: A2 paper 2 Subject Content: the nuclear atom, radioactivity, SHC and latent heat, ideal gases	Topic: Option topic Exam: A2 paper 3A Subject Content: A free choice of option from medical physics; astrophysics; engineering physics; turning points in physics. We will not offer the electronics option.	Topic: Revision and mocks Exam: Subject Content:	A2 Exams	
	Rationale: The toughest parts of the A2 course and those that will need most revisiting by students. A considerable jump in mathematical demand occurs which will raise awareness of the standards needed for the A2 exams and allow useful practice at this level.	Rationale: The final bit of the compulsory content. This should easily be finished in time for the March mock.	Rationale: A free choice of option as our teaching approach should mean that students are now good independent learners and can study with little assistance. Electronics was not on the old course and there are too few past papers for students to practise.	Rationale: Exam technique is needed, particularly reading questions properly and how to handle complex numerical questions. Sustained revision.		