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.

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

The redrafted sequencing has been driven by the lack of lab access in the early parts of the year. We are hoping to get back into labs later on in the year.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
7	**Topic: Forces and materials** **Exam: GCSE Paper 2** **Subject Content:** Force types; contact and non-contact forces; springs and Hooke's law **Learner Skills:** practical work; graph plotting; technical vocabulary	**Topic: Forces and motion** **Exam: GCSE Paper 2** **Subject Content:** Resultant forces; friction, drag and speed; rotation and moments **Learner Skills**: technical vocabulary; practical skills; applying physics ideas; data handling and formula use	**Topic: Energy types and transfers** **Exam: GCSE Paper 1** **Subject Content:** Energy types and transfers; energy conservation; work formula **Learner Skills:** technical vocabulary; practical skills; formula use	**Topic: Waves and sound** **Exam: GCSE Paper 2** **Subject Content:** Wave properties; sound and ultrasound **Learner Skills:** technical vocabulary; applying physics to everyday life	**Topic: Magnetic and electric fields** **Exam: GCSE Paper 2** **Subject Content:** Permanent magnets and fields; charge and electric fields **Learner Skills:** technical vocabulary; practical skills;	**Topic: Pressure** **Exam: GCSE Paper 1 and 2** **Subject Content:** Pressure in solids and in liquids **Learner Skills:** technical vocabulary; formula use
	Rationale: a good hands-on topic that is easily accessible. Some simple practical work can be done in classrooms. Simple mathematical and graph work.	**Rationale:** extends ideas of forces. More practical work might be possible out of labs. Develop mathematical competence with 'moments'.	**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.	**Rationale:** Follows on usefully from energy transfers. Practical work does need labs but this might be possible at this stage in the year?	**Rationale:** Links with earlier ideas about forces. Magnetic and electrostatic forces are both non-contact and involve the concept of 'fields'.	**Rationale:** Links with earlier ideas about forces. A further chance to develop mathematical competence.
8	**Topic: Speed graphs; household insulation** **Exam: GCSE Papers 1 and 2** **Subject Content:** distance-time graphs, relative velocity, household bills, insulation **Learner Skills**: graph skills; maths skills; technical vocabulary	**Topic: Magnets and space** **Exam: GCSE Paper 2** **Subject Content:** permanent magnets and navigation; seasons; solar system; galaxies, the light year **Learner Skills:** technical vocabulary	**Topic: Electricity** **Exam: GCSE Paper 1** **Subject Content:** circuits; current; series and parallel circuits; PD and voltage; resistance; V =IR; **Learner Skills:** technical vocabulary; mathematical skills; practical skills (hopefully)	**Topic: Electromagnets; Waves and superposition** **Exam: GCSE Paper 2** **Subject Content:** electromagnets; wave superposition **Learner Skills:** technical vocabulary; practical skills (hopefully)	**Topic: Light wave behaviour** **Exam: GCSE Paper 2** **Subject Content:** Reflection and refraction **Learner Skills:** technical vocabulary; practicals skills	**Topic: Light applications** **Exam: GCSE Paper 2** **Subject Content:** colour; **l**enses and images; pinhole camera and the eye. **Learner Skills:** technical vocabulary; practicals skills
	Rationale: No practical work and discrete topics allow us to set a meaningful test for the RA before half-term	**Rationale:** Some simple practical work that <u>can</u> be done out of a lab for 'magnets' and interesting ideas for 'space'.	**Rationale:** An important topic at GCSE that deserves significant time. We might be able to run at least some simple electricity practical work outside of labs?	**Rationale:** 'Electromagnets' topic ties together magnetism and electricity. 'Superposition' reviews some wave ideas from Year 7.	**Rationale:** Builds on wave ideas from Year 7, particularly with reflection. Practicals will need lab access.	**Rationale:** Application of theory taught in previous block; some fun practicals to end the year (but does need lab access)

The intention is to cover (almost all of) the AQA GCSE Combined Science (Trilogy) specification in Years 9 and 10.

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.

At the end of Year 10, most students will continue with the separate science GCSE Physics course. Some will be better suited to the Combined Science GCSE and will spend Year 11 revisiting important content.

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

The redrafted sequences for Years 9 and 10 assume no lab access for at least the first half of the year.

	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. Some simple practical work can be done outside labs.		**Rationale:** a block of work on materials that links to both forces and energy. More formula practise. Some practical work outside labs is still possible.	**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. Year 9 material is reasonably straightforward and students can more easily catch up with this material than with the rest of the course. We need to be back in a lab by Easter in order to do <u>any</u> practical work for these topics.		
10	**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		**Topic: Radioactivity and particles** **Exam: GCSE Paper 1** **Subject Content:** Atomic structure; radioactive decay; **Learner Skills:** technical vocabulary	**Topic:** Basic electric circuits and electromagnetism **Exam: GCSE Paper 1 and 2** **Subject Content:** Current, PD, resistance, power, electromagnets **Learner Skills:** practical work; technical vocabulary; formula use	**Topic:** Applications of electromagnetism and electric circuits. **Exam: GCSE Paper 1 and 2** **Subject Content:** Electric motors; lamps, diodes, LDRs and thermistors; mains electricity; internal energy and particles **Learner Skills:** practical work; technical vocabulary; formula use	
	Rationale: This material can be taught with little practical work (using some videos as necessary). It's a solid block of material that links together well and has real-world applications. It's a good opportunity to continually revisit and develop maths skills.		**Rationale:** Can also be taught outside of a lab. Links to ideas from chemistry. Very little maths which will be a pleasant change for some students!	**Rationale:** Electricity is a key topic and deserves a significant amount of time to be spent on it. We need lab access to teach this well but that may be possible?	**Rationale:** Starting with electric motors finishes the Paper 2 GCSE content ready for a meaningful Year 10 exam. Electricity applications builds on last term's work. Internal energy practicals rely on electric circuits and so must come after that topic.	

The majority of students continue with separate sciences in Year 11 (aka 'Triple award'). Some will be better suited to the combined science trilogy course (aka double award). Double award students are often those who join us at various stages in Year 10 or who have been off school for long periods of illness. Others may have struggled in Year 9 or 10 or simply wish to spend more time on other GCSE subjects.

All classes will sit a Paper 1 mock in November. The triple award students can finish the P1 content by this date and the double award students will review Paper 1 material and required practicals.

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.

<table>
<tr><th></th><th colspan="2">Autumn 1</th><th>Autumn 2</th><th>Spring 1</th><th>Spring 2</th><th>Summer 1</th><th>Summer 2</th></tr>
<tr><td rowspan="2">11 Triple</td><td colspan="3">Topic: Finish practical work

Exam: GCSE Papers 1 and 2

Subject Content: Momentum; fission and fusion; moments, levers and gears; lenses; induction; transformers

Learner Skills: technical vocabulary; data handling and patterns; ray diagrams; formula use and lots of practical work</td><td>Topic: Prepare for mock

Exam: GCSE Papers 1 and 2

Subject Content: space physics; IR; pressure in gases and fluids

Learner Skills: technical vocabulary; ray diagrams; some formula use and practical work</td><td>Topic: Finish the course

Exam: GCSE Paper 2

Subject Content: static charge and electric fields; consolidation and extra mocks

Learner Skills: Mostly revision and exam skills</td><td>Topic: Further P1 and P2 mocks

Exam: GCSE Paper 1 and 2

Subject Content: Consolidation and mocks

Learner Skills: Revision and exam skills</td><td rowspan="2">GCSE Exams</td></tr>
<tr><td colspan="3">Rationale: We will need to swap labs with the Year 10 bubble after Christmas. We will do all of the topics with important practical work first.</td><td>Rationale: Finish P1 content in time for the February mock. Then move on with paper 2.

A few simple practicals can still occur out of labs.</td><td>Rationale: There should only be a little of paper 2 left to cover (if things go to plan) and we can run some extra mocks in class, revising topics as needed (e.g. lockdown work)</td><td>Rationale: Students need more exam practice. Focus on exam technique – reading questions, structuring answers, making use of information.</td></tr>
<tr><td rowspan="2">11 Double</td><td>Topic: Paper 1 'hard stuff' and required practicals

Exam: GCSE Paper 1

Subject Content: Energy transfers; particle model; electric circuits

Learner Skills: Revision and exam skills.</td><td>Topic: Paper 1 'hard stuff' and mock. Start paper 2.

Exam: GCSE Paper 1 and 2

Subject Content: nuclear model of the atom; radioactivity

Learner Skills: Revision and exam skills</td><td>Topic: Paper 2 'hard stuff' and required practicals

Exam: GCSE Paper 2

Subject Content: Magnetism and electromagnetism; forces and motion

Learner Skills: Revision and exam skills</td><td>Topic: Paper 2 'hard stuff' and mock

Exam: GCSE Paper 2

Subject Content: Waves

Learner Skills: Revision and exam skills</td><td>Topic: Further P1 and P2 mocks

Exam: GCSE Paper 1 and 2

Subject Content:

Learner Skills: Revision and exam skills</td><td rowspan="2">GCSE Exams</td></tr>
<tr><td>Rationale: Material chosen to cover the 'usual' weak areas and to develop exam skills. Start with material from Year 9 and early Year 10.</td><td>Rationale: This material from later in Year 10 should be more familiar and can be left until nearer the mocks</td><td>Rationale: This is the harder paper 2 material and needs to be done first to give student longer to revise.</td><td>Rationale: This is not particularly hard but has lots of detail. Those who miss Year 9 will need to pay attention here but it can be covered swiftly.</td><td>Rationale: Students need more exam practice. Focus on exam technique – reading questions, structuring answers, making use of information.</td></tr>
</table>

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.

'Learner skills' is omitted 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).

<table>
<tr><th></th><th>Autumn 1</th><th>Autumn 2</th><th>Spring 1</th><th>Spring 2</th><th>Summer 1</th><th>Summer 2</th></tr>
<tr><td rowspan="2">Year 12</td><td colspan="2">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</td><td colspan="2">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</td><td>Topic: Revision and mocks and a little bit of 'Unit 4'

Exam: AS exams

Subject Content: Circular motion for 'Unit 4'</td><td>Topic: UCAS mocks and start old 'Unit 4'

Exam: A2 paper 1

Subject Content: SHM and resonance. Logarithms.</td></tr>
<tr><td colspan="2">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.</td><td colspan="2">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.</td><td>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.</td><td>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.</td></tr>
<tr><td rowspan="2">Year 13</td><td>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.</td><td>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</td><td>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.</td><td>Topic: Revision and mocks

Exam:

Subject Content:</td><td rowspan="2">A2 Exams</td></tr>
<tr><td>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.</td><td>Rationale: The final bit of the compulsory content.

This should easily be finished in time for the March mock.</td><td>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.</td><td>Rationale: Exam technique is needed, particularly reading questions properly and how to handle complex numerical questions.

Sustained revision.</td></tr>
</table>