AS and A Level

Physics A

Switching to OCR from Pearson (Edexcel)

Introduction

We are really excited about our GCE Physics A qualification. Whether taking on the AS or the full A Level, this fantastic course is a great qualification for those with an interest in the subject. Why choose Physics A?

- The 'Big Ideas' of Physics are covered
- The topics are selected and structured to underpin the knowledge and understanding needed for the next generation of physicists
- Physics A is enjoyable to teach and learn, giving students the essentials for physics-related higher education courses, as well as many transferable, marketable skills
- There are many opportunities for 'hands-on' practical, linking to our flexible practical assessment model
- The topics of physics are presented in a clear and logical linear order with practical, maths and contextual opportunities highlighted.

Textbook comparison

We have not included a textbook comparison in this switching document as there are a number of textbooks available for each exam board's qualifications, and the order and organisation of content within these textbooks can vary. However, similarities in content across exam boards mean that it is possible to use any textbook for the core content of any board's qualifications. The specification can be used to identify relevant content, as well as that which is not required for a specific qualification. If you need further clarification on any specific content, you can email our Subject Advisor team at science@ocr.org.uk.

Support from OCR

We offer a range of support to teachers of our qualifications. This includes:

- A dedicated Subject Advisor team, with teaching and assessment experience, available to answer your queries and support your delivery of our qualifications. You can contact us by email at science@ocr.org.uk or by phone on 01223 553998.
- Monthly newsletters highlighting new resources, CPD courses, and other news about our qualifications.
- A wide range of support materials, including handbooks covering practical and mathematical skills, delivery guides, lesson elements, practical activity suggestions, candidate exemplar resources, and more.
- Free access to ExamBuilder, our mock assessment service that allows you to create your own bespoke assessments.

- Termly Science Teacher Networks, giving you the opportunity to meet with other teachers and our Subject Advisors.
- CPD courses, including courses for teachers new to teaching our qualifications and courses on outcomes from previous examination series to help inform your teaching.
- You can also follow and interact with our Subject Advisors on Twitter (@ocr_science).

Key differences

OCR Physics A	Pearson (Edexcel) Physics
Flexible practical assessment allows you to select from our suggested activities or use your own preferred practical activities	16 required practical activities you have to deliver
Practical skills take centre stage, detailed in full at the start of the specification in a separate module for **clarity** and prominence	Required practical activities listed in the specification
A section of **multiple choice questions** in the exams to allow breadth of coverage. 20 in total at AS and 30 at A level.	Approximately 16 multiple choice questions at AS, approximately 20 at A level

Content

The content within the OCR Physics A specification covers the 'Big Ideas' of physics and will be very familiar. We've laid it out to support the co-teaching of the AS and A level and provide a logical linear progression through the A level.

OCR Physics A	Pearson (Edexcel) Physics
Module 1: Practical skills Planning, implementing, analysis and evaluation Plus all the skills to be covered in the Practical Endorsement	The same practical skills, as mandated by the DfE, are listed in appendix 5a and 5b of the Pearson Edexcel specification
Module 2: Foundations of physics • Physical quantities • S.I. units • Measurements and uncertainties • Scalars and vectors	**Topic 1: Working as a physicist** • Base and derived quantities • Practical skills • Physical measurements • Communicating scientific ideas • Applications of Science • Science in society
Module 3: Forces and motion • Kinematics and dynamics • Linear motion • Projectile motion • Motion with non-uniform acceleration • Equilibrium • Density [and pressure] • Work, energy and power • Springs • Mechanical properties of materials • Newton's laws of motion • Momentum	**Topic 2: Mechanics** • Moments • Motion along a straight line • Projectile motion • Newton's laws of motion • Momentum • Work, energy and power • Conservation of energy • Vectors **Topic 4: Materials** • Stoke's law • Density • Mechanical properties of materials • Springs

OCR Physics A	Pearson (Edexcel) Physics
Module 4: Electrons, waves and photons • Charge and current • E.m.f. and p.d. • Resistivity and resistance • Power • Series and parallel circuits • Internal resistance • Potential dividers • Wave motion • Electromagnetic waves • Superposition • Stationary waves • Quantum physics • Photons • The photoelectric effect • Wave particle duality	**Topic 3 Electric circuits** • Charge and current • Current voltage characteristics • Resistivity • Circuits • Potential dividers • E.m.f. and internal resistance • Drift velocity • Electrical power • Modelling conduction electrons **Topic 5: Wave and particle nature of light** • Progressive waves • Longitudinal and transverse waves • Superposition and stationary waves • Refraction, diffraction and interference • Lense equations • Photoelectric effect
Module 5: Newtonian world and astrophysics • Temperature • Solid, liquid and gas • Thermal properties of materials • Ideal gases • Circular motion • Centripetal force • Simple harmonic oscillations • Energy of a simple harmonic oscillator • Damping • Point and spherical masses • Newton's law of gravitation • Planetary motion • Gravitational potential and energy • Stars • Electromagnetic radiation from stars • Cosmology	**Topic 6 : Further mechanics** • Impulse • Circular motion • Collisions **Topic 13 : Oscillations** • Simple harmonic motion • Forced vibrations and resonance • Damping **Topic 9 : Thermodynamics** • Thermal energy transfer • Ideal gases • Molecular kinetic theory model • Stefan-Boltzmann law • Wein's law **Topic 10 : Space** • Luminosity • Standard candles/stars • Cosmology **Topic 12 : Gravitational fields** • Gravitational fields

OCR Physics A	Pearson (Edexcel) Physics
	• Gravitational field strength and potential • Orbits of planets and satellites
Module 6: Particles and medical physics • Capacitors • Energy stored by a capacitor • Charging and discharging capacitors • Point and spherical charges • Coulomb's law • Uniform electric field • Electric potential energy • Magnetic fields • Motion of charged particles • Electromagnetism • The nuclear atom • Fundamental particles • Radioactivity • Nuclear fission and fusion • Using X rays • Diagnostic methods in medicine • Using ultrasound	**Topic 7 : Electric and magnetic fields** • Coulomb's law • Electric field strength • Electric potential • Capacitance • Energy stored by a capacitor • Capacitor discharge • Motion of charged particles in a magnetic field • Magnetic flux density • Magnetic flux linkage • Electromagnetic induction • Alternating current rms voltages and currents **Topic 8 : Nuclear and particle physics** • Particle tracks • Particle interactions • Mass-energy equivalence **Topic 11: Nuclear radiation** • The nuclear atom • Binding energy • Radioactivity • Fission/fusion
Appendix 5f: Mathematical requirements • Arithmetic and numerical computation • Handling data • Algebra • Graphs • Geometry and trigonometry	**Appendix 6: Mathematical skills and exemplifications** • Arithmetic and numerical computation • Handling data • Algebra • Graphs • Geometry and trigonometry

Assessment

OCR Physics A	Pearson (Edexcel) Physics
AS Paper 1: Breadth in Physics, Modules 1-4 50% of AS Written paper 1hr 30 minutes 70 marks Section A multiple choice questions, 20 marks. Section B short structured questions, covering problem solving, calculations, practical and theory, 50 marks.	**AS Paper 1: Core Physics 1** 50% of AS Written paper 1hr 30 minutes 80 marks Section A **Topics 1-3** 56–60 marks Section B **Synoptic** 20–24 marks. The paper may include multiple-choice, short open, open-response, calculation and extended writing questions.
AS Paper 2: Depth in Physics, Modules 1-4 50% of AS Written paper 1hr 30 minutes 70 marks Short structured questions and extended response questions, problem solving, calculations, practical and theory.	**AS Paper 2: Core Physics II** 50% of AS Written paper 1 hr 30 minutes 80 marks Section A Topics 1,4,5 56-60 marks Section B Synoptic and will include a short article The paper may include multiple-choice, short open, open-response, calculations and extended writing questions.
A Level Paper 1: Modelling Physics, Modules 1, 2, 3 & 5 37% of A level Written paper 2 hours 15 minutes 100 marks Section A multiple choice questions, 15 marks. Section B short structured questions, and extended response questions, problem solving, calculations, practical and theory 85 marks.	**A Level Paper 1: Advanced Physics I** 30% of A level Written paper 1hour 45 minutes 90 marks Topics 6-8 plus some from AS1-3 The paper may include multiple-choice, short open, open-response, calculations and extended writing questions.

OCR Physics A	Pearson (Edexcel) Physics
A Level Paper 2: Exploring Physics, Modules 1, 2, 4 & 6 37% of A level Written paper 2 hours 15 minutes 100 marks Section A multiple choice questions, 15 marks. Section B short structured questions and extended response questions, problem solving, calculations, practical and theory 85 marks.	**A Level Paper 2: Advanced physics II** 30% of A level Written paper 1 hour 45 minutes 90 marks Topics 9-13 plus some from AS 1,5,6 The paper may include multiple-choice, short open, open-response, calculations and extended writing questions.
A Level Paper 3: Unified Physics, Modules 1-6 26% of A level Written paper 1 hour 30 minutes 70 marks Short structured questions and extended response questions, problem solving, calculations, practical and theory.	**A Level Paper 3: General and practical principles in Physics** 40% of A level Written paper 2 hours 30 minutes 120 marks Questions in this paper may draw on any of the topics in this specification. The paper will include synoptic questions that may draw on two or more different topics. The paper will include questions that assess conceptual and theoretical understanding of experimental methods (indirect practical skills) that will draw on students' experiences of the core practicals.

Want to switch to OCR?

If you're an OCR-approved centre, all you need to do is download the specification and start teaching.

Your exams officer can complete an expression of interest form which enables us to provide appropriate support to them. When you're ready to enter your students, you just need to speak to your exams officer to:

1. Make estimated entries by 10 October so we can send you any early release materials, prepare the question papers and ensure we've got enough examiners.
2. Make final entries by 21 February

If you are not already an OCR-approved centre please refer your exams officer to the centre approval section of our admin guide.

Practical Endorsement Administration (A Level only)

The requirements for the practical endorsement have been set by the Department for Education and Ofqual working with all awarding bodies to ensure a common approach.

Just as when following the AQA A Level Physics qualification, your A Level students studying OCR Physics A will need to demonstrate to you, their teacher(s), that they are consistently and routinely competent in each of the skills and techniques defined for A Level Physicists.

You will need to:

- Keep records of carrying out practical activities as well as your assessment of competence of each of your students in each of these skills and techniques. This can be done, if you wish, using our OCR tracker spreadsheet, available in both fixed format and new flexible format, editable version.
- Designate a 'Lead Teacher' who will need to make sure that they have completed the online Lead Teacher training.
- Email us at science@ocr.org.uk to let us know you've started teaching the qualification. This will make sure we have up-to-date information on your centre for planning monitoring visits. When a monitoring visit takes place at your centre for Physics it will be carried out by an OCR-appointed monitor applying the criteria agreed across all awarding organisations. Up-to-date details on the monitoring process are available on the Positive about practical page.

Students need to keep records of their practical work, which can be done in whatever format best suits you and your students, be it a lab book, a loose leaf folder or an electronic record.

Help and guidance are available from our Positive about practical page.

Next steps

1. Familiarise yourself with the specification, sample assessment materials and teaching resources on the OCR Physics A qualification page of the OCR website.

2. Browse the online delivery guides in Teach Cambridge for teaching ideas and our scheme of work to prepare for teaching.

3. Ask your exams officer to provide access to our secure resources on Teach Cambridge, or sign-up for a free trial – allows you to access the latest past/practice papers and use our results analysis service, Active Results.

4. Sign up to receive subject updates by email.

5. Sign up to attend a training event or take part in webinars on specific topics running throughout the year and or our Q&A webinar sessions every half term.

6. Attend one of our free teacher network events that are run online every term. These are hosted at the end of the school day in a school or college near you, with teachers sharing best practice and subject advisors on hand to lead discussion and answer questions.

7. Follow us on Twitter (@ocr_science) where you can have discussions with other teachers and OCR Subject Advisors, and where new resources are developed and posted first.

