

# The new A and AS level physics (OCR A)

## AS and A level Assessment

### AS LEVEL PHYSICS A (H156) – FIRST EXAM JUNE 2016

Paper		Marks	Duration	Weighting
Paper 1	<b>Breadth in physics</b> Content – Modules 1, 2, 3, 4	70	1 hr 30 mins	50%
	Section A – Multiple choice	20		
	Section B – Structured questions, covering theory and practical skills	50		
Paper 2	<b>Depth in physics</b> Content – Modules 1, 2, 3, 4	70	1 hr 30 mins	50%
	Structured questions and extended response questions covering theory and practical skills	70		

### A LEVEL PHYSICS A (H556) – FIRST EXAM JUNE 2017

Paper		Marks	Duration	Weighting
Paper 1	<b>Modelling physics</b> Content – Modules 1, 2, 3, 5	100	2 hr 15 mins	37%
	Section A – Multiple choice	15		
	Section B – Structured questions, covering theory and practical skills	85		
Paper 2	<b>Exploring physics</b> Content – Modules 1, 2, 4, 6	100	2 hr 15 mins	37%
	Section A – Multiple choice	15		
	Section B – Structured questions, covering theory and practical skills	85		
Paper 3	<b>Unified physics</b> Content – all modules	70	1 hr 30 mins	26%
	Structured questions and extended response questions covering theory and practical skills	70		
Non-exam assessment	<b>Practical endorsement for physics</b>	Pass/Fail	Non-exam assessment	Reported separately
	See pages 28-29. Teacher-assessed component common to Physics A and Physics B (Advancing Physics). Candidates complete a minimum of 12 practical activities to demonstrate practical competence. Performance reported separately to the A Level grade. Moderation details still to be confirmed by Ofqual at the time of going to press	Reported separately		

## Subject content.

Module	AS / A level	Content
Module 1 – Development of practical skills in physics	Both.	Skills of planning, implementing, analysis and evaluation Assessed in written papers, and in the Practical Endorsement for A level.
Module 2 – Foundations of Physics	Both	<ul style="list-style-type: none"><li>• Physical quantities and units</li><li>• Making measurements and analysing data</li><li>• Nature of quantities.</li></ul>
Module 3 – Forces and motion	Both	<ul style="list-style-type: none"><li>• Motion</li><li>• Forces in action</li><li>• Work, energy and power</li><li>• Materials</li><li>• Newton’s laws of motion and momentum.</li></ul>
Module 4 – Electrons, waves and photons	Both	<ul style="list-style-type: none"><li>• Charge and current</li><li>• Energy, power and resistance</li><li>• Electrical circuits</li><li>• Waves</li><li>• Quantum physics.</li></ul>
Module 5 – Newtonian world and astrophysics	A level	<ul style="list-style-type: none"><li>• Thermal physics</li><li>• Circular motion</li><li>• Oscillations</li><li>• Gravitational fields</li><li>• Astrophysics.</li></ul>
Module 6 – Particles and medical physics	A level	<ul style="list-style-type: none"><li>• Capacitors</li><li>• Electric fields</li><li>• Electromagnetism</li><li>• Nuclear and particle physics</li><li>• Medical imaging.</li></ul>

## QWC

QWC has been replaced with extended responses, which ‘provide learners with the opportunity to demonstrate their ability to construct and develop a sustained and coherent line of reasoning and marks for extended responses are integrated into the marking criteria’.

Extended response questions are generally the longer questions and are shown with an \*. Marks are awarded according to levels (similar to GCSE).

## Practical skills

The first module is all about practical skills; we will study key practical skills at the start of the year and continue to develop them throughout the year as we cover the other modules.

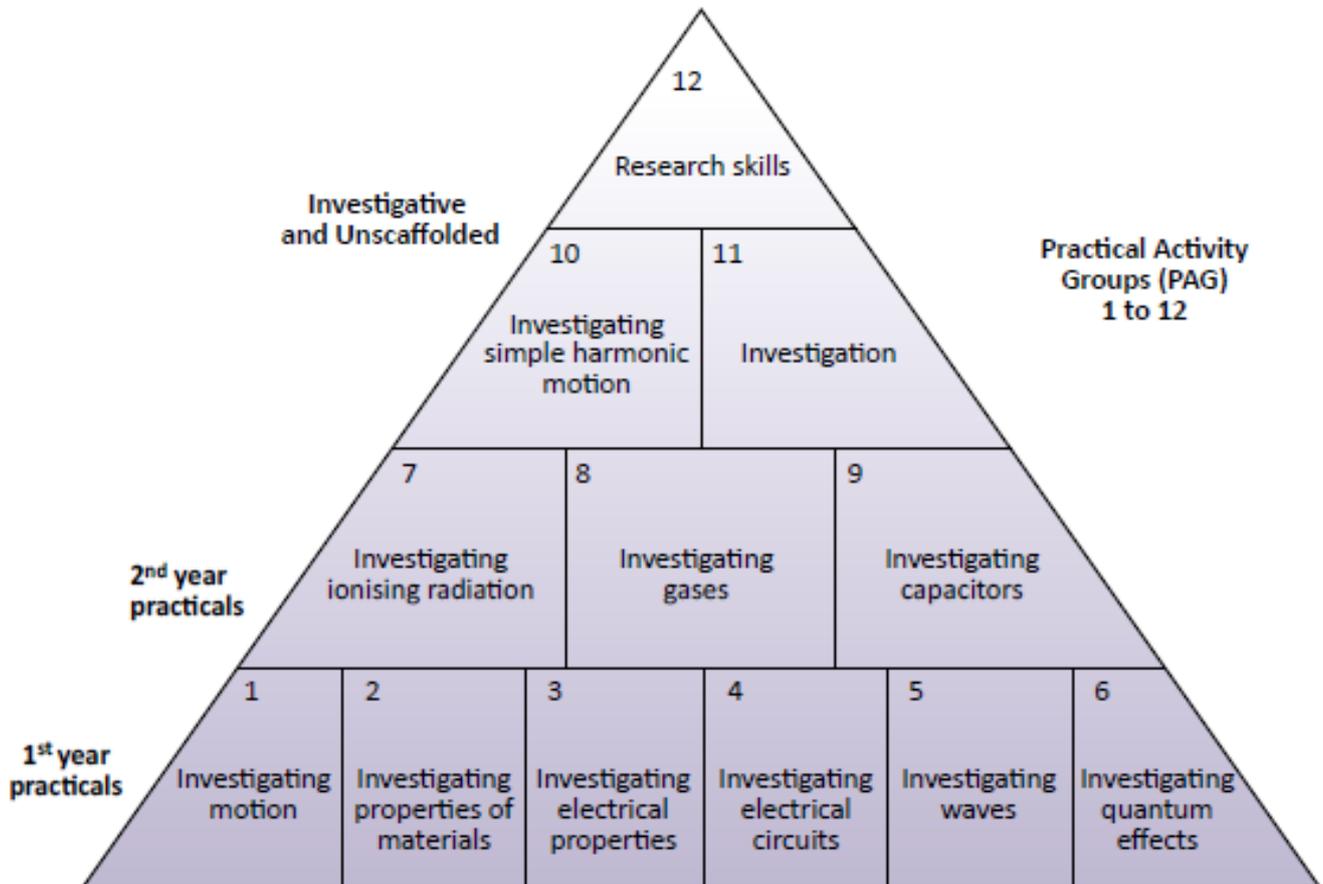
At AS, practical skills are only assessed in the written exams, but A level includes the Practical Endorsement.

## The Practical Endorsement (Only for A level)

Teacher-assessed with common assessment criteria.

Requires a minimum of 12 practical activities to be carried out over the two-year course. The 12 activities must cover the 12 PAGs (Practical Activity Groups), as well as skills such as safe usage, recording observations, tables, etc.

The PAGs are:



A level candidates should maintain a record of practical activities carried out that will count towards the practical endorsement; it is also recommended that AS students do the same should they later decide to carry on with A level.

## Maths skills

Within A Level Physics, 40% of the marks available within written examinations will be for assessment of mathematics, in the context of physics, at a Level 2 standard, or higher. Lower level mathematical skills will still be assessed within examination papers but will not count within the 40% weighting for physics.

The following will be counted as Level 2 (or higher) mathematics:

- Application and understanding requiring choice of data or equation to be used
- Problem solving involving use of mathematics from different areas of maths and decisions about direction to proceed
- Questions involving use of A level mathematical content, e.g. use of logarithmic equations.

A-level physics students will be assessed on the following mathematical skills:

M0 – Arithmetic and numerical computation

M1 – Handling data

M2 – Algebra

M3 – Graphs

M4 – Geometry and trigonometry

## Textbook

You will have access to the Kerboodle online textbook and various online resources for the fee of £5.00 per year.

**Please bring this with you in September.** If you would also like to buy additional textbooks to support your learning please see the list on the back page of this booklet.

## Head start to A-Level Physics

Bridge the gap between GCSE and A Level with the CPG book Head Start to A-Level Physics. This book will fill any gaps in your knowledge of GCSE physics and ensure that you are fully prepared to start you're a-levels. ISBN 978 1 84762 115 3 £4.95

## Summer work

Please complete the summer work booklet on Velocity, Acceleration and Graphs of Motion. **You MUST bring this to your first lesson in September.**

## Independent learning

It is expected that every student logs their independent learning carried out each week (2-3 hours is recommended). This is in addition to the work set by your class teacher. Useful resources for wider reading are listed below.

### Books

Richard Feynman:

- Surely you're joking Mr Feynman
- The pleasure of finding things out
- QED
- The meaning of it all

Stephen Hawking

- A brief history of time
- The Universe in a nutshell
- The theory of everything

John Gribbin

- Schrödinger's kittens
- Space Warps
- The case of the missing neutrinos

New Scientist:

- How to make a tornado
- Does anything eat wasps?
- How to fossilise your hamster
- Why don't penguins feet freeze?
- Do polar bears get lonely?

Very short introductions:

- Cosmology
- Particle physics
- Relativity
- Magnetism

Jim AL-Khalili: Quantum

Randall Munroe: What if?

Jim Steinmeyer: Hiding the elephant

Brian Cox: Why does  $E=mc^2$ ?

Brian Greene: The elegant Universe

Carl Sagan: Cosmos

Bill Bryson: A Short History of Nearly Everything

Philip Ball: Critical Mass

## Websites

1. <http://www.sixtysymbols.com> – Videos and clips about amazing physics theories
2. <http://www.galaxyzoo.org> – Identify and classify galaxies
3. <http://home.web.cern.ch> – See what is happening at the most powerful particle accelerator
4. <http://www.youtube.com> – Just thousands of weird, wonderful and informative physics videos
5. <http://hyperphysics.phy-astr.gsu.edu/hbase/hph.html> - Great revision/support resource
6. <http://physicsworld.com/> - Physics news and lots besides
7. <http://tap.iop.org/> - For teachers really, but great for revision/support
8. <https://phet.colorado.edu/en/simulations/category/physics> - Helpful animations
9. <http://www.seti.org/> - You can help in the search for ET
10. <http://www.particleadventure.org/> - Great for, err, particle physics
11. <http://nobelprize.org> – Details of the history of the best scientific discoveries
12. <http://royalsociety.org> – Podcasts, news and interviews with scientists about recent scientific developments
13. [http://www.bbc.co.uk/news/science\\_and\\_environment](http://www.bbc.co.uk/news/science_and_environment) - The BBC news page for Science and the Environment

## Magazine subscription

New Scientist  
Physics World  
How it works  
Physics review  
Scientific American

## Follow on twitter

CERN  
IOP  
Brian Cox  
NASA  
Stephen Hawking

## Textbooks to support your learning

Oxford University Press – Nelson Thornes is now part of OUP

### OCR

1. A Level Physics A for OCR Student Book, ISBN 978-0-19-835218-1, £40  
**Publication date:** 02/07/2015 (estimated)  
<https://global.oup.com/education/product/9780198352181/?region=uk>
2. A Level Physics A for OCR Year 1 and AS Student Book, ISBN 978-0-19-835217-4, £24.99  
**Publication date:** 26/03/2015  
<https://global.oup.com/education/product/9780198352174/?region=uk>
3. A Level Physics for OCR Year 2 Student Book, ISBN 978-0-19-835766-7, £24.99  
**Publication date:** 09/07/2015 (estimated)  
<https://global.oup.com/education/product/9780198357667/?region=uk>
4. A Level Physics A for OCR Kerboodle **annual subscription**  
<https://global.oup.com/education/product/9780198352211/?region=uk>  
**This is the resource we will be asking you to pay £5.00 for each year.**

### Pearson Schools

#### OCR

1. OCR AS/A level Physics A Student Book 1 + ActiveBook, ISBN 9781447990826, £21.46  
Publication Date: June 2015  
[http://www.pearsonschoolsandcolleges.co.uk/Secondary/Science/16Physics/OCR-A-level-Science-2015/buy/buy.aspx#TryBuy1\\_180457](http://www.pearsonschoolsandcolleges.co.uk/Secondary/Science/16Physics/OCR-A-level-Science-2015/buy/buy.aspx#TryBuy1_180457)
2. OCR A level Physics A Student Book 2 + ActiveBook, ISBN 9781447990833, £21.46  
Publication Date: December 2015  
[http://www.pearsonschoolsandcolleges.co.uk/Secondary/Science/16Physics/OCR-A-level-Science-2015/buy/buy.aspx#TryBuy1\\_180457](http://www.pearsonschoolsandcolleges.co.uk/Secondary/Science/16Physics/OCR-A-level-Science-2015/buy/buy.aspx#TryBuy1_180457)