Qualification Accredited

OCR
Oxford Cambridge and RSA

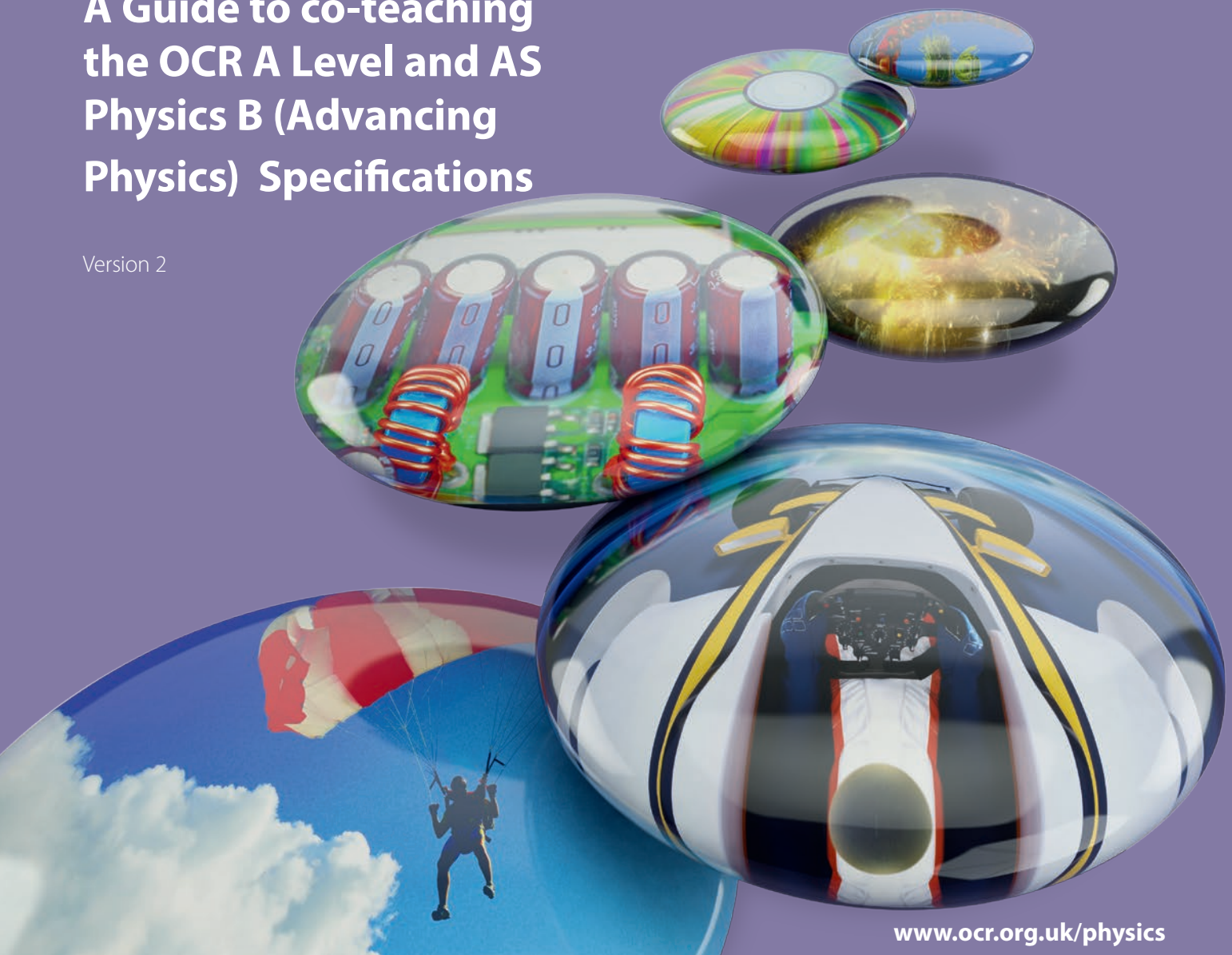
AS and A LEVEL
Co-teach Guide

PHYSICS B (ADVANCING PHYSICS)

H157, H557
For first teaching in 2015

A Guide to co-teaching the OCR A Level and AS Physics B (Advancing Physics) Specifications

Version 2



www.ocr.org.uk/physics

CONTENTS

INTRODUCTION

The OCR AS and A Level specifications in Physics B are deliberately structured to facilitate co-teaching. As such they have been designed to be as accessible as possible for teachers.

- Both specifications share the same Assessment Objectives and the same assessment aims and outcomes. The same approach to the subject apparent at each level.
- The content of the AS Level specification is a subset of the content of the A Level specification, which can be taught in the first year of the A Level course. This allows AS and A Level learners to be taught together throughout the first year until the AS assessments.
- Assessments will contain the same question types (multiple choice questions, structured questions and extended response questions), allowing similar materials to be used in revision and exam preparation.
- The creative and innovative teaching and learning resources being developed by OCR will be equally useful for AS and A Level learners in the first year.

THE NEW QUALIFICATIONS

The AS in Physics B Advancing Physics is a separate qualification to the GCE A Level in the subject. Its structure does, however, reflect that of the A Level. The content of the A Level in Physics B is divided into 6 teaching modules. The content of the AS Level in Physics B comprises part of module 1, together with modules 2, 3 and 4. The variation in skills and content between modules means that the AS modules represent about half of the skills and content covered in the A Level.

Learners are not required to sit the AS Level before proceeding to the A Level, as in the current 'legacy' system. If learners do take the AS Level and then move on to the A Level, this means that they will be reassessed on material that they have already covered at AS. The experience of sitting the AS Level could therefore be useful practice for taking the A Level components. This is true in terms of question types as well as content, as can be seen from the summaries of the papers for each qualification below.

The OCR AS Level in Physics B

The assessment of the AS Level Physics B course consists of two components which are both externally assessed examinations. Both examined components of the AS Level in Physics B cover all four modules in the AS specification.

Component 1 – H157/01 Foundations of Physics **(Modules 1-4)**	1 hour, 30 minutes (70 marks)	Section A: multiple choice questions, 20 marks. Section B: short answer structured questions covering theory and practical skills, about 20 marks Section C: longer answer structured questions covering theory and practical skills, about 30 marks	50% of total AS Level
Component 2 – H157/02 Physics in depth **(Modules 1-4)**	1 hour, 30 minutes (70 marks)	Structured questions and extended response questions covering theory and practical skills. Section A: Short answer, about 25 marks Section B: Short answer and extended response, about 30 marks Section C: Longer structured question including extended response, focusing on practical skills, about 15 marks	50% of total AS Level

PRACTICAL SKILLS

Ofqual has decided that there will be no direct assessment of practical skills in AS Physics qualifications. There is therefore no internally-assessed practical assessment in the current OCR AS model. This does not mean that the development of practical skills should not form part of the teaching and learning at this level. Practical skills will be assessed in the written examinations at both AS and A Level.

OCR have embedded practical skills into the AS and A Level Physics B specifications, so that practical activities may be easily integrated into the teaching of the course, and will support the teaching and assessment of the content of both AS and A Level Physics. AS learners will benefit from taking part in the practical activities, and will be able to count their performance (as long as adequate records are kept) towards the A Level Practical Endorsement if they decide to proceed to the full A Level after taking the AS examinations. OCR recommends that AS learners join in with any Practical Endorsement activities undertaken in the first year of the A Level course, particularly as the skills developed while undertaking the practical activities will be tested in the AS written examination.

SUMMARY

Taken together, these factors all ensure that the AS and A Level in Physics B can be co-taught such that members of the same Year 12 (or equivalent) teaching group are able to follow the same Scheme of Learning – delivered by the same teacher – whether individual students are planning **either**:

- to sit the subject at AS and then drop it completely
- to sit AS Physics with a view to going on to take A Level the following year
- to take A Level without sitting the AS exams at the 'half-way' stage.

The OCR A Level in Physics B

The assessment of the A Level in Physics B consists of four components: three externally assessed examinations and the Practical Endorsement, which is internally assessed by the centre and externally moderated. The Practical Endorsement is reported separately from the overall grade issued for the A Level, which is determined by performance in the examinations.

Component 1 – H557/01 Fundamentals of physics **(Modules 1,2,3,4,5,6)**	2 hours, 15 minutes (110 marks)	Section A: multiple choice questions, 30 marks Section B: short answer questions, approximately 20 marks Section C: short answer and extended response question styles, approximately 60 marks	41% of total A Level
Component 2 – H557/02 Scientific literacy in physics **(Modules 1,2,3,4,5,6)**	2 hours, 15 minutes (100 marks)	Section A: short answer questions, approximately 30 marks Section B: short answer and extended response questions covering theory and practical skills, approximately 45 marks Section C: short answer and extended response questions based on the Advance Notice article, approximately 25 marks	37% of total A Level
Component 3 – H557/03 Practical Skills in Advancing Physics **(Modules 1-6)**	1 hour, 30 minutes (60 marks)	Section A: short answer questions and extended response questions, 40 marks Section B: a longer structured question focusing on data analysis, 20 marks	22% of total A Level
Component 4 – H557/04 Practical Endorsement	Completed over the course	Minimum of 12 practical activities	Reported separately

SUGGESTED PLANNER

Here is a possible planner for teaching both years of the Physics B course, with the AS course co-taught alongside the first year of the A Level. This planner could be adapted to fit the needs of the individual centre. It should always be possible to teach the AS and A Level at the same time within a centre.

The suggested schemes for teaching either by a single teacher or alternatively with teaching being shared between two teachers are based on the assumption that students will sit either the AS exam or an internally generated end of year exam. Alternatives are suggested should teaching continue unimpeded to the end of the summer term.

Timeline	Content	Notes
Autumn Term	Single Teacher model	
Throughout the course	Module 1, Development of practical skills in physics	Teaching of Specification section 1.1 – *Practical skills assessed in a written examination* should be embedded in teaching throughout the course, ideally combined with teaching of the practical techniques included in the specification content. Many of these practical activities can also be used to develop and assess competency in practical skills to count towards the Practical Endorsement, as set out in section 1.2 of the A level specification.
1st Half Term	Module 2 Fundamental data analysis Module 3 .1.1 Imaging and signalling	Supporting practical work: • Determination of the power or focal length of a lens • Observing polarising effects using microwaves and light
2nd Half Term	Module 4.2 Space, time and motion Module 3.2 Mechanical properties of materials	Supporting practical work using light gates, data loggers and video techniques to investigate: • Collisions • Acceleration of free fall • Terminal velocity • Plotting force-extension characteristics • Determining the Young modulus for a metal

Timeline	Content	Notes
Spring Term		
1st Half Term	Module 3.1.2 Sensing	Supporting practical work: • Investigating electrical characteristics • Determining resistivity and conductivity • Potential divider circuits • Emf and internal resistance
2nd Half Term	Module 4.1 Waves	Supporting practical work: • Using an oscilloscope • Determining refractive index • Superposition experiments • Determining wavelength with double-slit or diffraction grating • Determining speed of sound by formation of stationary waves

Timeline	Content	Notes
Summer Term		
1st Half Term	Module 4.1 Quantum behaviour Revision	Supporting practical work: • Determining the Planck constant using different coloured LEDs A Level learners not taking AS exams might use this period to consolidate A Level study at the midpoint of the course, or to complete mock exams as an indicator of progress. Additionally, A Level learners may be given more extensive practical work – e.g. an extended investigation including risk assessment and analysis – to complete while AS learners are revising; this would promote practical skills development.
If there is no exam period	*Introduction to ionising radiation and risk from A level 6.2.2*	
2nd Half Term	Our place in the universe A level section 5.1.3	

The suggested plan may be shared amongst two teachers as shown below:

Timeline	Teacher 1	Teacher 2
Autumn Term		
Throughout the course	Module 1 Development of practical skills in physics	
1st Half Term	Module 3 .1.1 Imaging and signalling	Module 2 Fundamental data analysis
2nd Half Term	Module 3.1.2 Sensing	Module 4.2 Space, time and motion
Spring Term		
1st Half Term	Module 3.1.2 Sensing	Module 4.2 Space, time and motion
2nd Half Term	Module 3.2 Mechanical properties of materials	Module 4.1 Waves
Summer Term		
1st Half Term	Module 3.2 Mechanical properties of materials Revision	Module 4.1 Quantum behaviour Revision
Exam period		
2nd Half Term	Introduction to ionising radiation and risk from A level 6.2.2	Our place in the universe A level section 5.1.3

Or alternatively:

Timeline	Teacher 1	Teacher 2
Autumn Term		
Throughout the course	Module 1 Development of practical skills in physics	
1st Half Term	Module 3 .1.1 Imaging and signalling	Module 2 Fundamental data analysis
2nd Half Term	Module 3.1.2 Sensing	Module 3.2 Mechanical properties of materials
Spring Term		
1st Half Term	Module 3.1.2 Sensing	Module 3.2 Mechanical properties of materials
2nd Half Term	Module 4.2 Space, time and motion	Module 4.1 Waves
Summer Term		
1st Half Term	Module 4.2 Space, time and motion Revision	Module 4.1 Quantum behaviour Revision
Exam period		
2nd Half Term	Introduction to ionising radiation and risk from A level 6.2.2	Our place in the universe A level section 5.1.3

The small print

We'd like to know your view on the resources we produce. By clicking on the 'Like' or 'Dislike' button you can help us to ensure that our resources work for you. When the email template pops up please add additional comments if you wish and then just click 'Send'. Thank you.

If you do not currently offer this OCR qualification but would like to do so, please complete the Expression of Interest Form which can be found here: www.ocr.org.uk/expression-of-interest

OCR Resources: *the small print*
OCR's resources are provided to support the teaching of OCR specifications, but in no way constitute an endorsed teaching method that is required by the Board and the decision to use them lies with the individual teacher. Whilst every effort is made to ensure the accuracy of the content, OCR cannot be held responsible for any errors or omissions within these resources. We update our resources on a regular basis, so please check the OCR website to ensure you have the most up to date version.

OCR acknowledges the use of the following content:
Square down andSquare up: alexwhite/Shutterstock.com

Please get in touch if you want to discuss the accessibility of resources we offer to support delivery of our qualifications: resources.feedback@ocr.org.uk

We will inform centres about any changes to the specification. We will also publish changes on our website. The latest version of our specification will always be the one on our website (www.ocr.org.uk) and this may differ from printed versions.

ocr.org.uk/alevelreform
OCR customer contact centre

General qualifications
Telephone 01223 553998
Facsimile 01223 552627
Email general.qualifications@ocr.org.uk