

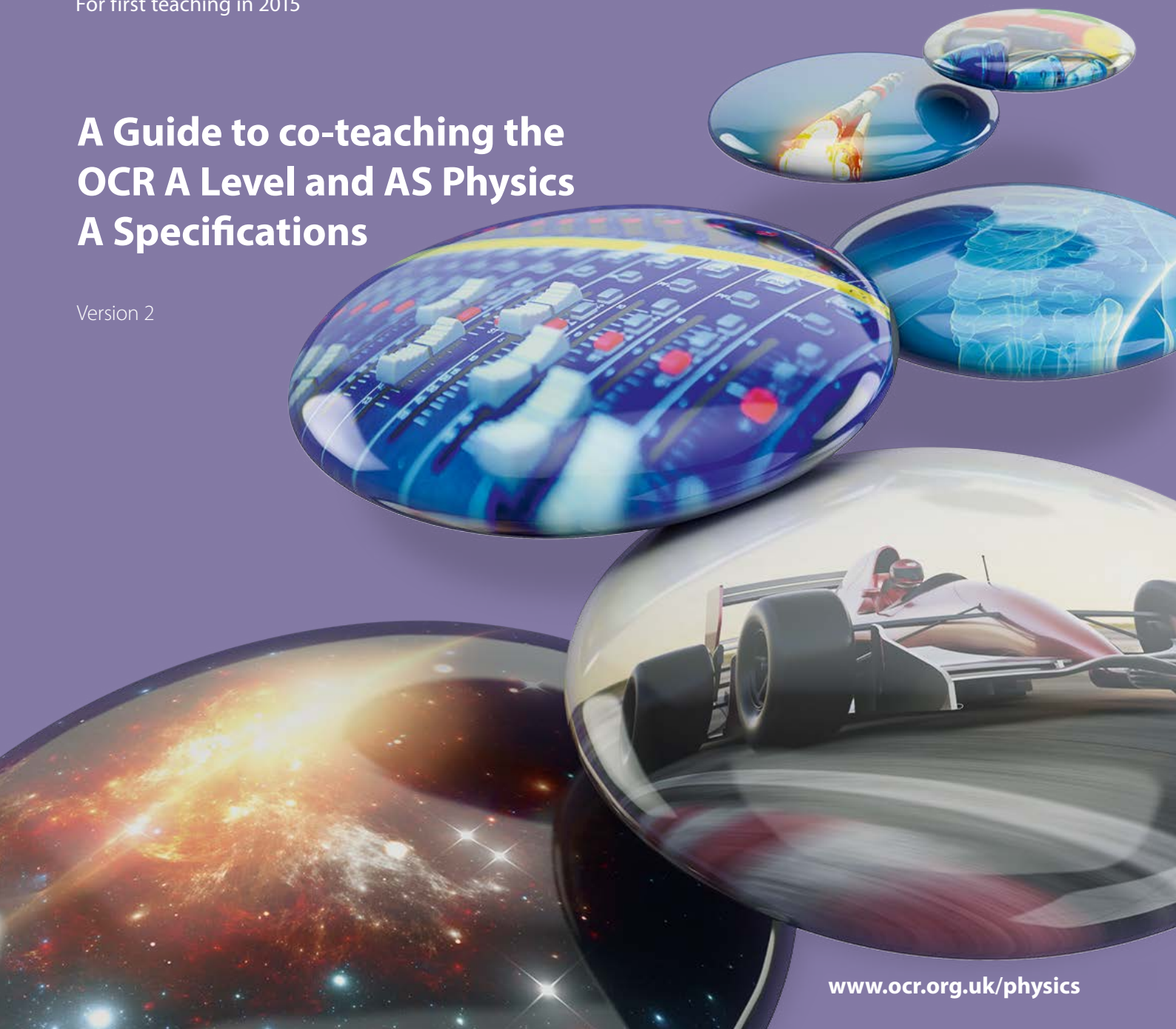
AS and A LEVEL
Co-teach Guide

PHYSICS A

H156, H556
For first teaching in 2015

**A Guide to co-teaching the
OCR A Level and AS Physics
A Specifications**

Version 2



CONTENTS

| | |
|------------------------|--------|
| INTRODUCTION | PAGE 3 |
| THE NEW QUALIFICATIONS | PAGE 4 |
| SUGGESTED PLANNER | PAGE 6 |



INTRODUCTION

The OCR AS and A Level specifications in Physics A 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, assessment aims and outcomes. There is 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 A 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 A is divided into 6 teaching modules. The content of the AS Level in Physics A 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 A

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

| | | | |
|---|----------------------------------|--|-----------------------|
| Component 1 – H156/01 Breadth in physics (Modules 1-4) | 1 hour, 30 minutes (70 marks) | Section A: multiple choice questions, 20 marks Section B: structured questions covering theory and practical skills, 50 marks | 50% of total AS Level |
| Component 2 – H156/02 Depth in physics (Modules 1-4) | 1 hour, 30 minutes (70 marks) | Structured questions and extended response questions covering theory and practical skills | 50% of total AS Level |



The OCR A Level in Physics A

The assessment of the A Level in Physics A 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 – H556/01 Modelling physics (Modules 1,2,3,5) | 2 hours, 15 minutes (100 marks) | Section A: multiple choice questions, 15 marks Section B: structured questions and extended response questions covering theory and practical skills, 85 marks | 37% of total A Level |
| Component 2 – H556/02 Exploring physics (Modules 1,2,4,6) | 2 hours, 15 minutes (100 marks) | Section A: multiple choice questions, 15 marks Section B: structured questions and extended response questions covering theory and practical skills, 85 marks | 37% of total A Level |
| Component 3 – H556/03 Unified physics (Modules 1-6) | 1 hour, 30 minutes (70 marks) | Structured questions and extended response questions covering theory and practical skills | 26% of total A Level |
| Component 4 – H556/04 Practical Endorsement | Completed over the course | Minimum of 12 practical activities | Reported separately |

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 A 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 A 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 learners are planning **either**:

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



SUGGESTED PLANNER

Here is a possible planner for teaching both years of the Physics A 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 | |
| 1st Half Term | Module 2 Foundations of Physics Module 3.1 Motion | Supporting practical work: <ul style="list-style-type: none"> Investigating the motion and collisions of objects Determining the acceleration of free fall Investigating reaction time, thinking distance, braking distance and stopping distance |
| 2nd Half Term | Module 3.2 Forces in action Module 3.3 Work, energy and power Module 3.4 Materials Module 3.5 Newton's laws of motion | Supporting practical work using light gates, data loggers and video techniques to investigate: <ul style="list-style-type: none"> Determining terminal velocity Techniques and procedures for force-extension graphs Determining the Young modulus for a material Investigating elastic and plastic deformation of materials |



| Timeline | Content | Notes |
|---------------------------------|---|--|
| Spring Term | | |
| 1st Half Term | Module 4.1 Charge and current Module 4.2 Energy, power and resistance | Supporting practical work: <ul style="list-style-type: none"> Investigating the I-V characteristics for ohmic and non-ohmic components Determining the resistivity of a material |
| 2nd Half Term | Module 4.3 Electrical Circuits Module 4.4.1 Wave motion Module 4.4.2 Electromagnetic waves Module 4.4.3 Superposition Module 4.4.4 Stationary waves | Supporting practical work: <ul style="list-style-type: none"> Investigating potential divider circuits which may include an LDR or thermistor Using an oscilloscope to determine frequency Observing polarising effects using microwaves and light Determining speed of sound by formation of stationary waves Determining wavelength with double-slit or diffraction grating |



| Timeline | Content | Notes |
|--|--|--|
| Summer Term | | |
| 1st Half Term | Module 4.5 Quantum Physics Revision | Supporting practical work: <ul style="list-style-type: none"> Determining the Planck constant using different coloured LEDs <p>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.</p> |
| <i>If there is no exam period</i> | <i>Introduction to nuclear and particle physics from A level 6.4.1 & 3</i> | |
| 2nd Half Term | Astrophysics and cosmology from A level section 5.5 | |



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 | Introduction; equations and standard form from module 2 Module 3.1 Motion | Introduction; measurements and units from module 2 Module 4.1 Charge and current Module 4.2 Energy, power and resistance |
| 2nd Half Term | Module 3.2 Forces in action | Module 4.3 Electrical Circuits |
| Spring Term | | |
| 1st Half Term | Module 3.3 Work, energy and power Module 3.4 Materials Module 3.5 Newton's laws of motion | Module 4.4.1 Wave motion Module 4.4.3 Superposition |
| 2nd Half Term | Module 4.4.2 Electromagnetic waves | Module 4.4.4 Stationary waves |
| Summer Term | | |
| 1st Half Term | Module 4.5 Quantum Physics Revision | Module 4.3 Recap of electricity Revision |
| Exam period | | |
| 2nd Half Term | Introduction to nuclear and particle physics from A level 6.4.1 & 3 | Astrophysics and cosmology from A level section 5.5 |





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