

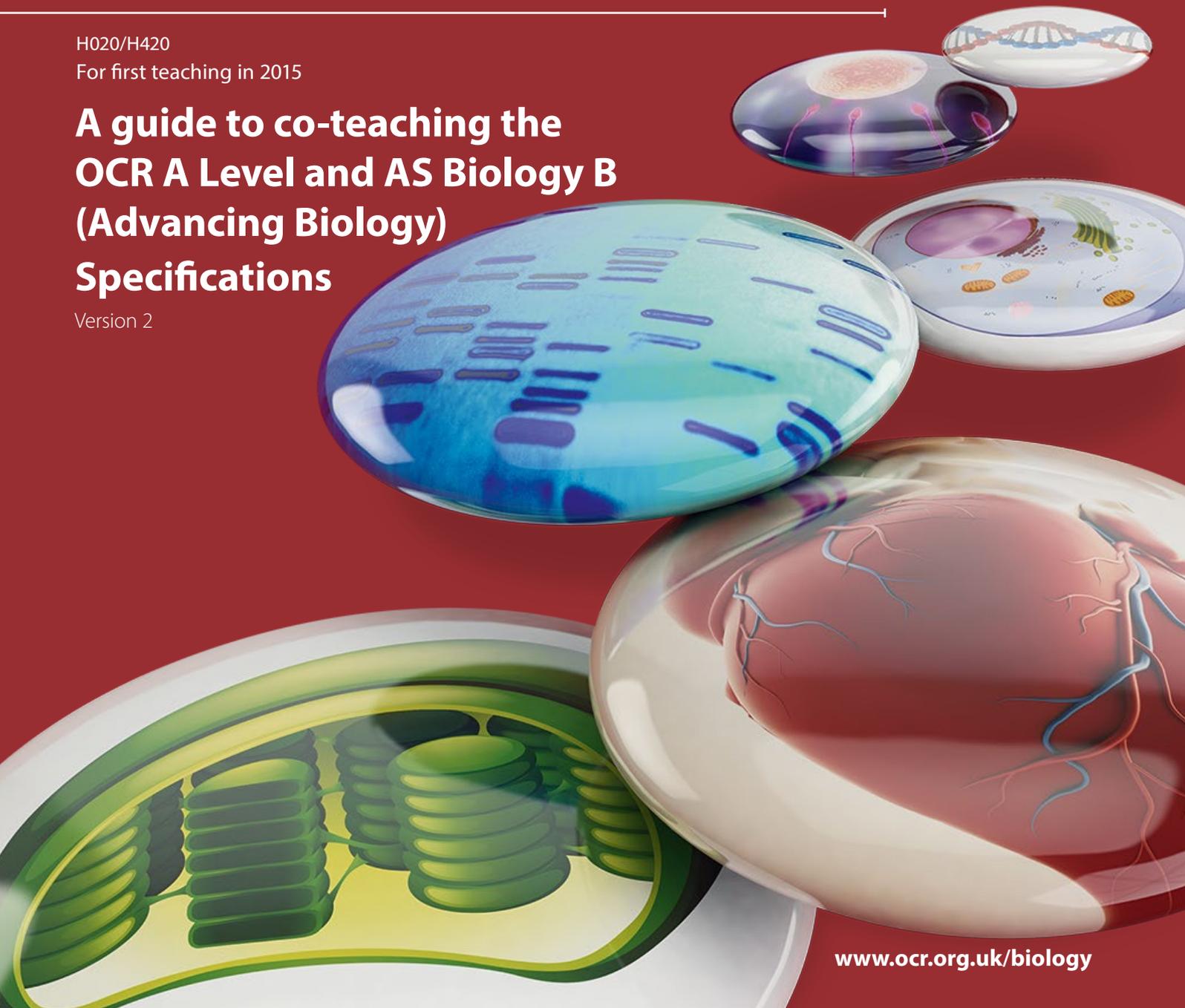
**AS and A LEVEL**  
*Teacher Guide*

# ***BIOLOGY B*** ***(ADVANCING BIOLOGY)***

H020/H420  
For first teaching in 2015

**A guide to co-teaching the  
OCR A Level and AS Biology B  
(Advancing Biology)  
Specifications**

Version 2



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# INTRODUCTION

The OCR AS and A Level specifications in Biology 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 is 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 Biology B Advancing Biology 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 Biology B is divided into 5 teaching modules. The content of the AS Level in Biology B comprises part of module 1, together with modules 2 and 3. 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 Biology B

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

<b>Component 1 – Foundations in biology (Modules 1-3)</b>	1 hour, 30 minutes (70 marks)	Section A: multiple choice questions, 20 marks  Section B: structured questions covering, problem solving and calculations, 50 marks	50% of total AS Level
<b>Component 2 – Biology in depth (Modules 1-3)</b>	1 hour, 30 minutes (70 marks)	Structured questions, extended response questions, problem solving and calculations	50% of total AS Level



## The OCR A Level in Biology B

The assessment of the A Level in Biology 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.

<b>Component 1 – Fundamentals of biology (Modules 1-5)</b>	2 hours, 15 minutes (110 marks)	Section A: multiple choice questions, 30 marks  Section B: structured questions, problem solving and calculations, 80 marks	41% of total A Level
<b>Component 2 – Scientific literacy in biology (Modules 1-5)</b>	2 hours, 15 minutes (100 marks)	Structured questions, extended response questions, problem solving, calculations and scientific literacy	37% of total A Level
<b>Component 3 – Practical skills in biology (Modules 1-5)</b>	1 hour, 30 minutes (60 marks)	Structured questions, extended response questions, problem solving and calculations	22% of total A Level
<b>Component 4 – Practical Endorsement</b>	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 Biology 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 Biology 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 Biology. 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 Biology 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 learners are planning **either**:

- to sit the subject at AS and then drop it completely
- to sit AS Biology B 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 Biology 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.

Timeline	Content	Notes
Throughout the course	Module 1 – Development of practical skills in biology	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.



Timeline	Content	Notes
Year 1, Term 1	Module 2.1.1 – Cells and microscopy  Module 2.1.2 – Water in plants and animals  Module 2.1.3 - Proteins and enzymes	Supporting practical work: <ul style="list-style-type: none"> <li>• using a light microscope</li> <li>• biological drawing, labelling and annotating</li> <li>• qualitative testing for biological molecules</li> <li>• quantitative testing using biological molecules</li> <li>• computer modelling using biological structures</li> <li>• investigations into the factors that affect diffusion and osmosis</li> <li>• investigations into the factors that affect enzymes</li> <li>• investigations into the factors that affect movement across membranes</li> <li>• chromatography.</li> </ul>
	Module 2.1.4 - Nucleic acids  Module 2.2.1 – The heart and monitoring heart function  Module 2.2.2 – Transport systems in mammals  Module 2.2.3 – Gas exchange in mammals and plants  Module 2.2.4 - Transport systems in plants	Supporting practical work: <ul style="list-style-type: none"> <li>• predicting protein sequence from DNA sequence data</li> <li>• purification of DNA</li> <li>• chromatography</li> <li>• investigations into the factors affecting heart rate</li> <li>• interpreting ECGs</li> <li>• using a light microscope</li> <li>• biological drawing, labelling and annotating</li> <li>• interpreting spirometer results.</li> </ul>



Timeline	Content	Notes
Year 1, Term 2	<p>Module 3.1.1 – The developing cell: cell division and cell differentiation</p> <p>Module 3.1.2 – The developing individual: meiosis, growth and development</p> <p>Module 3.1.3 – The development of species: evolution and classification</p>	<p>Supporting practical work:</p> <ul style="list-style-type: none"> <li>• using a light microscope</li> <li>• biological drawing, labelling and annotating</li> <li>• dissection of biological structures</li> <li>• interpreting fetal ultrasound scans and data</li> <li>• investigation into plant adaptations to environmental factors</li> </ul>
	<p>Module 3.2.1 – Pathogenic microorganisms</p> <p>Module 3.2.2 – The immune system</p> <p>Module 3.2.3 – Controlling communicable diseases</p>	<p>Supporting practical work:</p> <ul style="list-style-type: none"> <li>• using a light microscope</li> <li>• biological drawing, labelling and annotating</li> <li>• interpreting epidemiological data</li> <li>• microbiological cultures and sterile technique</li> <li>• investigations into the effect of antibiotics.</li> </ul>



Timeline	Content	Notes
Year 1, Term 3	Module 3.3.1 - The cellular basis of cancer and treatment	Supporting practical work: <ul style="list-style-type: none"> <li>• random and non-random sampling techniques</li> <li>• biological drawing, labelling and annotating</li> <li>• interpreting epidemiological and risk factor data.</li> </ul>
	Module 3.3.2 – Respiratory diseases and treatment	
	Revision and preparation for AS exams	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.
	Post AS exams	A level learners (and AS learners who are considering continuing with the A level) might start Module 4. This time of year is also a good time to carry out practical activities in the field which could count towards the Practical Endorsement.
Year 2, Term 1	Module 4 – Energy, reproduction and populations	Supporting practical work: <ul style="list-style-type: none"> <li>• respirometers</li> <li>• investigations into the factors affecting heart rate</li> <li>• interpreting electron micrographs and light micrographs</li> <li>• chromatography with photosynthetic pigments</li> <li>• investigations into the factors affecting photosynthesis</li> <li>• culturing Rhizobium</li> <li>• interpreting demographic data.</li> </ul>



Timeline	Content	Notes
Year 2, Term 2	Module 5 – Genetics, control and homeostasis	Supporting practical work: <ul style="list-style-type: none"><li>• electrophoresis</li><li>• PCR</li><li>• investigation into factors affecting reaction times</li><li>• visual acuity and colour vision testing</li><li>• qualitative testing of biological fluids</li><li>• chromatography</li><li>• dissection of biological structures</li><li>• microscopy</li><li>• analysis of secondary data (blood glucose levels)</li><li>• interpretation of brain scans in stroke and brain injury.</li></ul>
Year 2, Term 3	Thorough revision and consolidation of all A Level content (modules 1-5)	Exam preparation





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