NEW

AQA

Sciences
Third Edition

New and updated editions for the (9–1) specifications

For GCSE 9–1

All Student Books have been approved by AQA
Course Structure

<table>
<thead>
<tr>
<th>Subject</th>
<th>Separate Sciences</th>
<th>Biology for Combined Science: Trilogy</th>
<th>Chemistry for Combined Science: Trilogy</th>
<th>Physics for Combined Science: Trilogy</th>
<th>Combined Science: Synergy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Student Book*</td>
<td>Teacher Handbook</td>
<td>Revision Guide</td>
<td>Workbook</td>
<td></td>
</tr>
<tr>
<td></td>
<td>978 019 835937 1</td>
<td>978 019 835943 2</td>
<td>978 019 835940 1</td>
<td>978 019 835936 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>978 019 835926 5</td>
<td>978 019 835917 9</td>
<td>978 019 835911 9</td>
<td>978 019 835935 7</td>
<td></td>
</tr>
</tbody>
</table>

**Biology**

- Separate Sciences
- Biology for Combined Science: Trilogy

**Chemistry**

- Separate Sciences
- Chemistry for Combined Science: Trilogy

**Physics**

- Separate Sciences
- Physics for Combined Science: Trilogy

**Combined Science: Synergy**

- Covers all specifications

---

**AQA GCSE Sciences Third Edition**

These new editions of AQA GCSE Sciences have been tailored for the new AQA GCSE (9–1) specifications. They support your students with the new content and increased maths requirements, as well as the new required practicals. All Student Books have been approved by AQA.

- **Matched to the new specifications**
  These new editions have been tailored specifically for the new 9–1 specifications. Student Books are available to cover the separate Biology, Chemistry and Physics specifications, Combined Science: Trilogy and Combined Science: Synergy.

- **Prepare for the new practicals**
  Development of practical skills is embedded throughout the Student Books, with specific practice for the new practical questions. Practical resources on Kerboodle cover the new required practicals plus more.

- **Plenty of practice questions**
  Multiple-choice, maths, practical and synoptic practice questions are included throughout.

- **Making assessment and progress tracking easy**
  **AQA GCSE Sciences Third Edition** has built-in assessment and progress tracking based on the widely-adopted structure used in **Activate** for KS3, to support effective assessment right the way from KS3 to GCSE.

- **Supporting students of all abilities**
  Supporting students of all abilities through the new, more demanding GCSE, with ramped questions for every topic in the Student Books, Foundation and Higher Workbooks, and further support and extension material on Kerboodle.

- **Building maths skills**
  Worked examples, interactive activities and practice questions are incorporated throughout the Student Books and on Kerboodle to support your students with the new increased maths requirement. Kerboodle also has direct links to maths learning platform MyMaths.co.uk.

---

**How to evaluate**

Order your AQA GCSE Sciences Third Edition Evaluation Pack (978 019 837527 2) by emailing schools.orders.uk@oup.com and quoting K43690.

---

*All Student Books have been approved by AQA.*
### Reliable assessment across five years

**AQA GCSE Sciences Third Edition** provides a five-year progress tracking and assessment solution developed by Dr Andrew Chandler-Grevatt, building on the assessment principles behind Oxford’s Key Stage 3 course, *Activate*. However, the five-year assessment framework is based on the Programme of Study and the new 9–1 grades for Key Stage 4, so it can also be used to dovetail any Key Stage 3 course you’re currently using. It also builds on the assessment framework used in new AQA *Activate* for KS3, tailored for the AQA KS3 Science syllabus. AQA *Activate* for KS3 has been selected for the AQA approval process for KS3 science.

#### Five-year assessment model

<table>
<thead>
<tr>
<th>Key stage</th>
<th>Band</th>
<th>Level</th>
<th>Know</th>
<th>Apply</th>
<th>Extend</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCSE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Band</td>
<td>Aiming for 4</td>
<td>Aiming for 6</td>
<td>Aiming for 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Demand</td>
<td>Low</td>
<td>Standard</td>
<td>High</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Outcomes inform all learning activities

1. Sort the following characteristics into those affected by genetic variation, environmental variation or both: (3 marks)
   - stem mass
   - number of fruit produced
   - blood group
   - skin colour
   - eye colour
   - leaf size
   - presence of a scar

2. Explain the advantage of using identical twins for the NASA study into the effects of living in space. (2 marks)

3. Using named examples, state and explain the difference between continuous and discontinuous variation. (6 marks)

All learning outcomes are differentiated and linked to lesson activities and questions to help track progress throughout the course.

#### Assessment for Learning with our Checkpoint system

The Checkpoint assessment system assesses students at the end of every chapter, helping to ensure that all students achieve their full potential. Follow-up lessons are provided, with support and extension tasks designed to allow everyone to perform at their best. Use the Checkpoint system for GCSE or right through from Year 7 to Year 11 to ensure all your students make progress and are ready for the challenges of GCSE assessment.
How far away is the Moon?

Student Books

recognise and use expressions in
standard form

The calculations of energy changes using bond energy take place due to the breaking and formation of bonds. The heating or

assessment model designed for the new GCSE 9–1 grading. Available for Biology, Chemistry, Physics, Combined Science: Trilogy and Combined Science: Synergy.

C3 Structure and bonding

C14 The Earth's resources

1b Standard form

1a Decimal form

Whole numbers, but numbers

not
to show very large or very small numbers

The reactions of acids with metals to

produce a salt plus hydrogen

000 000 1 m = 1.0 × 10−10 m

000 000 000 m = 1.5 × 1011 m

Study tip

Other acids, such as the weak acid citric acid, are not harmful when in

dilute and concentrated, and weak

as corrosive. However, when that solution is diluted by adding water to

in solution. However, in weak acids,

it is the

H

Cl

308 309

Learn what can be done to conserve

biological diversity, and describe the

benefits

World catches of major tuna species,

Atlantic

World catches of cod by country

Figures: 1-3

How are pH values related to the concentration

of a strong acid, with a higher pH value than a concentrated solution of a

What will be the pH of a 1.0 × 10−5 mol/dm3 solution of dilute hydrochloric acid?

Therefore, given two aqueous solutions of equal concentration, the

in Figure 2. This shows that the

temperature in °C, the results give

Figure 1 shows dry air in a sealed

container. The pressure of a gas on a surface is the total force exerted on a

particles constantly

The random motion of tiny particles

molecules on surfaces that are in

constantly moving about and changing

is evidence of the random

306 307

As the pH decreases by one unit, the

with concentrations in standard form,

incorporated

throughout to support

GCE Biology only

B18.12 Sustainable food production

Managing the oceans

Tackling the problem of overfishing

The role of biotechnology

Study tips to

Practical skills boxes provide further context to develop understanding

Higher tier content and single science

Learning objectives are laid out at the start of each topic

Ramped summary questions on every spread to embed students’ understanding, plus end-of-

chapter practice questions

Go further boxes with content beyond the specification to stretch and engage high-

attaining students

Synoptic links are highlighted throughout to give a rounded understanding and help students make links between topics

Key points are summarised at the end of each topic

All Student Books have been approved by AQA
Aiming for chemical reactions using bond energies supplied.

- energy is released when bonds in the products are formed.
- energy must be supplied to break bonds in the reactants

AQA spec Link:
• a vehicle slowing down
• work done when a current flows

Maths
State the processes that can transfer energy from one store to another.

Different energy stores describe the energy a substance has because
changes for the following chemical reactions:

\[ \text{H}_2(g) + \text{H}_2(g) \rightarrow \text{H}_2\text{O}(l) \]

Higher tier
transferred in chemical reactions
breaking in the reactants and bond
as these bonds are formed, the amount of energy involved is the same (see
1
how much energy is needed to break the chemical bonds in

Bond Bond energy in kJ/mol

\[ \text{H}_2\text{O}(l) \rightarrow \text{H}_2(g) + \text{O}_2(g) \]

\[ (498 \text{ kJ} = 2346 \text{ kJ}) \text{ (the energy is transferred to the surroundings as this is an exothermic process).} \]

Plenary 2

Figure 1

MS 1a, 1b, 1c, 2a, 2h, 3a, 3b, 3c

energy dissipation of energy

Go further

Figure 2

C
Calculate the overall energy change for the forward reaction using
the formula:

\[ \Delta H = \text{H}_2\text{O}(l) - \text{H}_2(g) + \text{O}_2(g) \]

Plenary 2

Describe the energy transfers that take place when:

- food moves up a hill at constant speed
- you have a power cut. For each object, describe the energy
changes for the following chemical reactions:

\[ \text{N}_2(g) + 3\text{H}_2(g) \rightarrow 2\text{NH}_3(g) \]

Support:
• inoculating loops used to transfer microorganisms to the
- Petri dishes on which you will grow your microorganisms must
- uncontaminated cultures of microorganisms to investigate the
- need uncontaminated cultures of microorganisms to investigate the
- gel, nutrient broth solution, mutation,

Revision Guides and Student Workbooks will be available from Spring 2017. Find out more at www.oxfordsecondary.co.uk/aqagcsescience
The online learning, resources and assessment package

AQA GCSE Sciences 9–1 Kerboodle provides excellent digital support for the new AQA GCSE Science (9–1) specifications, with a bank of resources, activities and a complete online assessment package.

Building practical skills

All required practicals are supported by three differentiated worksheets to cater for students of all levels. Student method sheets guide students through each practical step-by-step. Teacher and technician notes provide detailed guidance and example data for each practical.

Maths and literacy skills support

Maths skills interactives include step-by-step worked solutions and practice questions with feedback, as well as exclusive links to resources on MyMaths.co.uk. Maths calculation worksheets provide worked solutions and ramped practice questions. Student literacy sheets support and build literacy skills.

Engage your students

Interactive activities for use as starters or plenaries. Resources are built into each lesson presentation, including practical activity sheets, interactive activities and progress quizzes. Each lesson is accompanied by teacher notes to support your lesson delivery. Ready-to-play lesson presentations are provided for whiteboard use, to help you run creative and effective lessons.

Prepare for the linear exam

Practice questions and full practice papers for both Higher and Foundation levels provide checkpoints of students’ progress. Student checklists to help your students track their own progress. Retoxon podcasts with Higher and Foundation content highlighted. Checkpoint quizzes with differentiated follow-up activities track students’ progress and provide formative feedback.

Support and extension

Practicals are fully differentiated, with separate resources for students working at different grades. Extension worksheets stretch higher-ability students and increase depth of knowledge. Webquest research tasks encourage independent learning and study. Go further worksheets for high-ability students bridge the gap between GCSE and A Level.

Animations clearly linked to learning objectives to help consolidate learning. Includes access to digital editions of the Student Books.

Evaluate – free for 30 days

Tick to receive your copy of the AQA GCSE Science Third Edition Evaluation Pack. Fill in your details below and return this tear-off form to us free of charge.

Yes, please send me a copy of the AQA GCSE Sciences Third Edition Evaluation Pack (978 019 837527 2)

Name

Job title

School/College

Address

Postcode

Yes, I’d like to hear more from Oxford University Press about AQA GCSE Sciences and other relevant products and resources. Email address*

*By giving us your email address you are agreeing to us sending you emails about relevant Oxford University Press products and resources. This includes the scientific newsletter which contains the latest information, updates and special offers. Your email address will not be passed on to third parties outside of Oxford University Press.
About the authors

Chemistry

Lawrie Ryan (Series Editor)

Lawrie Ryan is an experienced author and science educator, having worked for over 20 years in schools as Head of Science, LA adviser and inspector. He has written and edited a number of best-selling courses and titles including Chemistry for You, AQA GCSE Science, Spotlight Science and Advanced Chemistry for You, as well as many electronic resources.

Biology

Ann Fullick

Ann Fullick was a biology teacher and Head of Science for many years. She is a successful published author of more than 90 titles, including many UK A Level and GCSE biology textbooks, as well as a producer of online resources and apps. She also has examining experience, has been closely involved in UK curriculum development, and is a Fellow of the Royal Society of Biology.

Physics

Jim Breithaupt

Jim Breithaupt has extensive experience of teaching Physics in schools and colleges, and was the Physics author for the previous editions of Nelson Thornes’s popular AQA GCSE Science series. He has also written a number of highly regarded A Level textbooks including AQA Physics A and Understanding Physics for A Level.

Dr Andrew Chandler-Grevatt (Assessment Consultant)

Dr Andrew Chandler-Grevatt has a PhD in school assessment, and a real passion for science teaching and learning. Having worked as a science teacher for ten years, of which five were spent as an AST, Andy has a real understanding of the pressures and joys of teaching in the classroom.

Alongside his national and international research in school assessment, Andrew is a teaching fellow on the PGCE course at the University of Sussex, and is a successful published assessment author. He is the Assessment Editor for Activate and Assessment Consultant for AQA GCSE Sciences Third Edition and OCR Gateway GCSE Science. Find out more about Andrew’s five-year assessment model at www.oxfordsecondary.co.uk/aqagcsescience