NEW

Activate
Know • Apply • Extend

From the UK’s no.1 KS3 science publisher*, Activate for the AQA KS3 syllabus

AQA Activate for KS3 has been specifically tailored to the new AQA KS3 Syllabus and Big Ideas principle, while retaining Activate’s most popular features including maths and literacy support, Checkpoint lessons and the widely-adopted assessment model. It helps prepare your students for using AQA GCSE Sciences Third Edition (9–1) resources at KS4. AQA Activate for KS3 Student Books are approved by AQA.

Prepare for the new AQA (9–1) GCSEs

Summary and practice questions with GCSE command words, as well as extended writing tasks and maths and practical skills are incorporated throughout, to help your students build confidence as they approach the new (9–1) GCSEs.

Engage your students

Engaging and inquisitive, packed full of fun activities, practicals, quizzes and questions to spark your students’ interest in science.

Build key skills

Maths, literacy and enquiry processes are embedded throughout, with progression of skills carefully planned, and supported by tasks and assessments to help monitor progress.

Assessment you can trust

AQA Activate for KS3 assessment has been designed and quality assured by our assessment expert, Dr Andrew Chandler-Grevatt.

Support and extend

Support and extension is provided for every lesson, with differentiated questions, support sheets, and extension tasks. End-of-chapter checkpoints provide further support and extension.

“Designed to engage students’ interest in science from Year 7 and take them through to GCSE success.”

Teach Secondary magazine on Activate
Covering the AQA KS3 Science Syllabus

The AQA KS3 Science Syllabus is split into two parts, and can be taught as part of a two-year or a three-year KS3. AQA Activate Student Book 1 covers Part 1 of the AQA Syllabus, and AQA Activate Student Book 2 covers Part 2. Part 1 can be taught in Year 7 or Year 7/8, and Part 2 in Year 8 or Year 8/9. The Student Books are accompanied by a bank of online resources and assessment on Kerboodle. The Student Books have been approved by AQA for the KS3 Science Syllabus.

Reliable five-year assessment for seamless transition and progress

KS3 and KS4 assessment

Our expert Assessment Editor Dr Andrew Chandler-Grevatt has devised a flexible five-year assessment package you can use for the new AQA KS3 Science Syllabus and AQA 9–1 GCSE. Track your students’ progress seamlessly through KS3 and KS4 to ensure GCSE success.

The AQA Activate for KS3 bands, Know, Apply and Extend, allow you to monitor progress against what’s required by the KS3 programme of study and AQA KS3 Syllabus. They are also matched to the new GCSE grading system (9–1), to ensure seamless transition to KS4.

Targeted intervention and extension with our Checkpoint system

The checkpoint assessment system assesses students at the end of each Big Idea, 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 reach the required level of understanding. Use the checkpoint system to help all your students make progress and are ready for the challenges of the curriculum ahead.
9 Ecosystems

Our environment is very important. It gives us the things we need to live, like food, water, and shelter. We share our environment with many different types of plants and animals. In this topic you will learn about how these organisms are connected and how they interact within ecosystems. You will look closely at the feeding relationships and competition between species. You will also study the life cycle of flowering plants. You will then follow the steps of reproduction from pollination to fertilisation, and finally to germination.

You already know
- Food chains show the feeding relationships between organisms.
- Environments change and this can sometimes be harmful to living things.
- Plants need light, space, water, and minerals to grow.
- Pollen needs to be transferred between flowers so that seeds can be made leading to new plants.

BIG Questions
- How do organisms interact within an ecosystem?
- Why is happiness in organisms if ecosystems change?
- How do plants reproduce?

You already know provides a recap of KS2 material
 ‘Big questions’ for each unit to intrigue students

4.1.3 Frequency and pitch

Learning objectives
After this section you will be able to:
- Describe the links between frequency, wavelength and pitch.
- Describe the frequency of a wave from a diagram or oscilloscope picture.
- Describe how to use a stopwatch, and how to measure time changes with a stopwatch.

If you play a loud note exactly the right pitch, you can shatter a glass. What’s the difference between loudness and pitch?

What affects the pitch of a sound?
Some organisms can hear frequencies that are much higher than the frequency on our human ear.

- The pitch of a sound is determined by the frequency of the wave.
- The frequency of a wave depends on the number of wave crests passing a point in a given time.

Quick listen! Which animal can hear the highest frequency?

What are the main frequency ranges that occur in nature?

- High-pitched sounds are produced by smaller animals.
- Low-pitched sounds are produced by larger animals.

You can also hear sounds that are higher than the range of frequencies you can hear. These sounds are called ultrasonics.

What frequencies can other animals hear?
Birds, crocodiles, and grasshoppers have a completely different auditory range to humans. Some people can hear frequencies that are much higher than the frequency on our human ear.

Different frequencies produce different types of sound.

What frequency can humans hear?
Humans can hear frequencies between 20 Hz and 20 000 Hz.

- High sound has a higher frequency than a low sound.
- The pitch of a sound depends on the frequency.

What are the properties of a sound wave that affect the pitch?

- Pitch is a property of the sound wave that affects the number of sound waves produced in a given time.
- The pitch of a sound wave is determined by the frequency of the wave.

What affects the pitch of a sound?

- The pitch of a sound wave depends on the frequency of the wave.
- The pitch of a sound wave can be changed by altering the frequency of the wave.

You can increase the frequency by increasing the number of wave crests passing a point in a given time.

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1. People used to think that everything orbited the Earth. We now know that the Sun is at the centre of the Solar System, and the Solar System orbits the centre of our galaxy.

2. The Earth spins and orbits the Sun. This explains why we have night, day, and seasons.

3. Our Sun is one of billions of stars in our galaxy. There are billions of galaxies in the Universe. Other stars have planets in orbit around them.

4. When we look into the night sky we are looking back in time.

5. We use light years not kilometres to measure distances in astronomy.

6. Ceramic materials include pottery and brick. They are hard and brittle. Sedimentary, igneous, and metamorphic rocks are formed by different processes and have different properties as a result.

7. The Earth consists of the crust, mantle, and core.

8. Marble is a metamorphic rock. Suggest reasons why it formed only in the position shown on the diagram.

9. Granite is an igneous rock. Explain how the granite in the diagram was formed.

10. Rocks A, B, and C are sedimentary rocks. Copy the diagram and add these labels:

   - rock A
   - rock B
   - rock C

   Explain why the granite sticks up above the surface of the Earth, and the Moon.

11. The diagram shows the rocks on a cliff face. The changing of the model of the Solar System to this model.

12. Explain why Harry must control the other variable.

13. Harry lists the variables in his investigation:
   - X temperature of microscope slide
   - Y size of crystals
   - Z amount of salol
   - environmental factor

   Harry observes the crystals. He places drops of liquid salol onto microscope slides. Once the salol freezes, Harry records the crystal size. He places drops of liquid salol onto microscope slides. Once the salol freezes, Harry records the crystal size.

14. Describe what Harry would observe if the experiment was done under different conditions.

15. Explain how the materials that rocks are made from are recycled in the rock cycle.

16. The diagram below shows the angle of tilt (°) of the planets from the Sun. Complete the table below.

<table>
<thead>
<tr>
<th>Planet</th>
<th>Angle of tilt (°)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venus</td>
<td>37</td>
</tr>
<tr>
<td>Earth</td>
<td>23.5</td>
</tr>
<tr>
<td>Mars</td>
<td>25</td>
</tr>
<tr>
<td>Jupiter</td>
<td>3</td>
</tr>
<tr>
<td>Saturn</td>
<td>27</td>
</tr>
<tr>
<td>Uranus</td>
<td>98</td>
</tr>
<tr>
<td>Neptune</td>
<td>30</td>
</tr>
</tbody>
</table>

   Describe how this information could be used to the language and question format that can be expected at GCSE level.
AQA Activate for KS3 is accompanied by Kerboodle, an online bank of teaching material for running creative and effective lessons, with a flexible, fully integrated assessment model and solution for KS3 assessment without levels. It’s intuitive to use, customizable and can be accessed online anytime, anywhere.

Assessment

Auto-marked assessment

Auto-marked assessments with confidence selectors and targeted feedback help assess:

- Content from the chapter
- Maths skills
- Literacy skills (including spelling)
- Enquiry processes
- KS2 knowledge

You can assign assessments to students at home and track their progress in the Kerboodle markbook.

After having looked at all the schemes available for the new KS3 National Curriculum, Activate has by far the best thought out assessment package.

Mat Power, Head of Science, Holy Cross Catholic High School

Kerboodle is not part of the AQA approval process.
Check your students’ knowledge of KS2

- Downloadable paper-based tests assess your Year 7 students’ knowledge and understanding of KS2
- Follow-up lessons help with intervention and extension

Make progress with key skills

- Progress tasks for the end of each chapter help monitor progress and set targets in key skill areas
- Progress trackers help students track progress and record areas for improvement
- Interactive investigations and progress quizzes provide auto-marked assessment of skills for each chapter
- Paper-based end-of-Big Idea tests are easily downloadable to help assess students’ progress at the end of each Big Idea

Prepare for the AQA 9–1 GCSEs

- Maths and practical skills are embedded throughout to help prepare students for GCSE
- Exam-style question papers build confidence in GCSE-style questions and provide accurate summative marks for the end of each Big Idea, and at the end of the year

Follow assessment with learning

AQA Activate for KS3 includes a Checkpoint assessment system.

1. Use the auto-marked Checkpoint assessment at the end of each Big Idea to determine next steps
2. Use the Checkpoint lesson and resources to support and extend your students as needed
Kerboodle

Lessons

Ready-to-play lesson presentations are provided to complement every double page spread in the Student Book. Each lesson presentation is fully customizable, meaning you can edit, add, or delete screens to suit your needs.

Resources

WebQuests build literacy and research skills, and can be used as homework tasks. Interactive screens are provided for every lesson for use on your whiteboard.

To find out more about AQA Activate for KS3 Kerboodle, visit www.oxfordsecondary.co.uk/aqaactivatekerboodle

“Lots of flexibility and complete support for KS3. I can see that teachers and students will really enjoy using it in class!”

Guy Winters, Head of Science, Cardinal Newman Catholic School on Activate

Kerboodle is not part of the AQA approval process.
Students will be using the following literacy skills:

- Expressing ideas and information clearly and accurately in writing and speaking.
- Making connections between ideas and topics.
- Applying scientific concepts and ideas to their everyday lives.
- Using scientific language to communicate their findings.

How do metals react with oxygen?

Aims

- To investigate the reactivity of different metals.
- To understand the concept of displacement reactions.

Setting the scene

The reactivity series lists metals in order of how reactive they are. More reactive metals are able to displace less reactive metals from their compounds. This is a displacement reaction.

Aims

In this practical you will:

- Use the reactivity series to predict if displacement reactions will occur.
- Use different metals with different nitrate solutions and decide if a displacement reaction has occurred.

You will be using enquiry processes to:

- Enquire: use your knowledge of the reactivity series and displacement reactions to predict if a reaction will take place.
- Enquire: record your observations.
- Analyse: present observations using an appropriate table.
- Analyse: use your observations to decide if a displacement reaction has happened.
- Communicate: explain what has happened during the reactions, using observations to help you.

Safety

- Magnesium is flammable. Keep it away from naked flames.
- Lead(II) nitrate is toxic. Keep it out of the reach of children.
- Copper(II) nitrate is harmful.
- Lead nitrate is toxic.
- Lead nitrate solution is toxic.

- Wear chemical splash-proof eye protection throughout the practical activity. If any chemical gets on your eye, wash it off immediately and inform your teacher.

Teacher notes

- Before starting the practical, discuss with students how metals and oxygen react. Go over the general equation of metal + oxygen → metal oxide.
- Demonstrate to students the copper will turn black in an oxygen flame. The reaction is exothermic and can be observed.
- Students will need to record observations from each reaction and go on to write a word equation for the reaction.

Experiment

1. Copper and oxygen should be lit by students, under teacher supervision only. It is possible to light copper with a Bunsen burner. Use a Bunsen burner to heat the copper, ensuring to cover all the copper. Copper will glow red in a Bunsen burner. The copper should be heated to the point where it will be hot to the touch. Copper may lose its original color.

How do metals react with oxygen?

Predictions

- Copper oxide will form. Copper is an element in Group IIB, and oxygen is in Group VI.
- The oxidation state of copper will be +II.
- The oxidation reaction can be written as 2Cu + O₂ → 2CuO.
- The technique is to prepare a dilute solution of copper(II) nitrate and examine its reaction with various metals.

Questions

1. What happens when copper is heated in the presence of oxygen? How can you account for the observation?
2. How does the appearance of the metal change as it reacts with oxygen? What are the possible reasons for this change?
3. What is the evidence that the reaction has occurred? How do you know a reaction has taken place?
4. What is the role of copper in the reaction? How does copper participate in the reaction?
5. What is the role of oxygen in the reaction? How does oxygen participate in the reaction?

Answers

1. Copper turns a dull red and becomes black. This is due to the formation of copper oxide. Copper oxide is a metal oxide.
2. Copper oxide formation can be observed as a black substance forming on the surface of the copper. The black substance is copper oxide.
3. Evidence that the reaction has occurred includes the color change of the copper. The reaction is exothermic and can be observed as the copper turns black.
4. Copper participates in the reaction by reacting with oxygen to form copper oxide.
5. Oxygen participates in the reaction by reacting with copper to form copper oxide.

Support sheet

To a support sheet containing a table for students to record their observations.
About the Assessment Editor

**Dr Andrew Chandler-Grevatt**
Assessment Editor

**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, Andy is a teaching fellow on the PGCE course at the University of Sussex, and is a successful published assessment author.

Find out more about Andy and the AQA Activate assessment model at [www.oxfordsecondary.co.uk/aqaactivate](http://www.oxfordsecondary.co.uk/aqaactivate).

About the authors

**Philippa Gardom Hulme**

**Philippa Gardom Hulme** has 15 years’ experience teaching secondary science and is now a science tutor on the PGCE course at Oxford University. Philippa also has experience examining for OCR and KS3 SATs, and is an experienced science textbook author for KS3, GCSE and IGCSE. Philippa has an honours degree in Chemistry, Resources and the Environment from York University, an MEd degree from Bristol University and a PGCE from the University of Oxford.

**Jo Locke**

**Jo Locke** has many years’ experience teaching secondary science, working on KS3 through to A-level and with experience as a Head of Science. She has examining experience and currently examines for International Baccalaureate and Edexcel A-levels. Jo is an author, and has written material for KS3, GCSE, BTEC, Entry Level Certificate and A-levels. Jo has a first class honours degree in Biology and a Science PGCE from the University of Bath.

**Helen Reynolds**

**Helen Reynolds** is an Institute of Physics Teaching and Learning Coach, and a former Head of Science. She is an experienced secondary science teacher, and has a MA in Physics and a PGCE from the University of Oxford. Helen’s authoring experience includes recent student and teacher materials for the Cambridge International KS3 equivalent (Secondary 1).
**BIG IDEAS**
- The Big Ideas principle puts generalisations, principles and models which connects concepts at the heart of the syllabus, complementing the KS3 Programme of Study by exploring the links between ideas at KS3.
- There are 10 Big Ideas: Forces, Electromagnetism, Energy, Waves, Matter, Reactions, Earth, Organisms, Ecosystems and Genes.

**ASSESSMENT**
- The AQA KS3 Science Syllabus is based on a mastery approach to students’ understanding.
- Uses mastery goals ‘Know,’ ‘Apply’ and ‘Extend’.
- Prepares students for following the AQA GCSE 9–1 specifications at KS4.

**ENQUIRY PROCESSES**
- Enquiry processes cover the working scientifically skills required by the Programme of Study.
- Enquiry is divided into four areas: Analyse, Communicate, Enquire, Solve.

**PREPARATION FOR 9–1 GCSES**
- The AQA KS3 Science Syllabus has been specifically designed to develop the required competencies for the AQA GCSE 9–1 specifications at KS4.

**How does AQA Activate for KS3 deliver?**
- AQA Activate for KS3 has been structured to reflect the AQA Syllabus and Big Ideas.
- Two Student Books to reflect Parts 1 and 2 of the AQA syllabus.

- Five-year assessment model by Dr Andrew Chandler-Grevatt is matched to the AQA ‘Know,’ ‘Apply’ and ‘Extend’ bands.
- Matched to the new AQA GCSE 9–1 grades for seamless progression from KS3 to GCSE.

- Enquiry processes and working scientifically are embedded throughout to develop the required key skills.

- AQA command words and exam-question skills are embedded throughout.
- Big Ideas Checkpoints provide intervention and extension to ensure students enter KS4 with the required proficiency.
- Designed to progress into AQA GCSE Sciences (9–1) Third Edition resources for GCSE.
Evaluate – free for 30 days

The AQA Activate for KS3 Evaluation Pack contains a copy of the AQA Activate for KS3 Student Book 1, Teacher Handbook samples and a guide to Kerboodle.

☐ Yes, please order my AQA Activate for KS3 Evaluation Pack

978 019 841361 5
## Course structure

<table>
<thead>
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<th>Teacher Handbooks</th>
<th>Kerboodle Books</th>
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<td>AQA Activate Teacher Handbook 1</td>
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The Student Books (print and digital) have been approved by AQA. Other resources shown here are not part of the AQA approval process.

**COMING SOON:**
AQA Activate Workbooks and digital Teacher Handbooks on Kerboodle