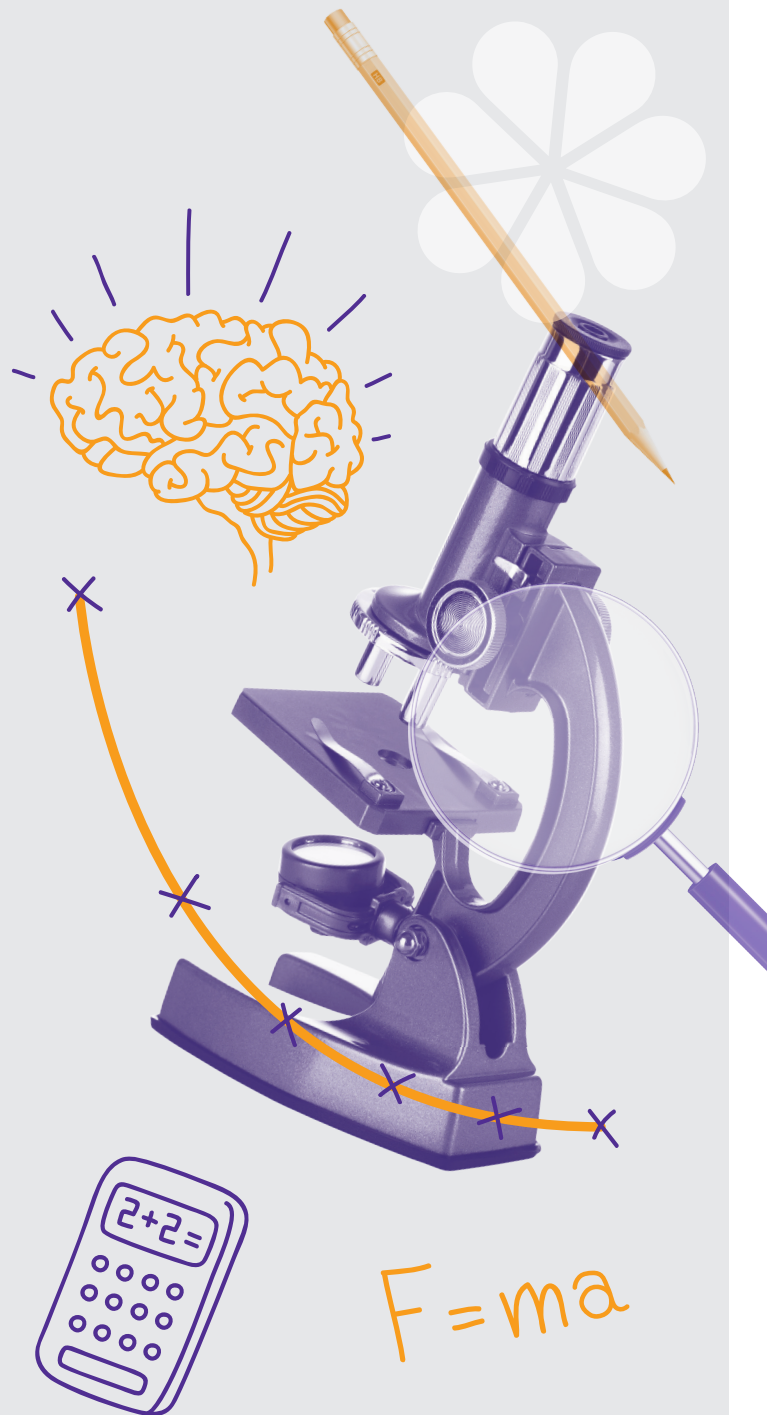


Focus on success: GCSE science

A02

Build on your students' assessment performance using our self-guided, modular training pack

Pre-reading
booklet



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Using this resource

This pack is designed to help you deliver a CPD session on Assessment Objective 2 (AO2) for your teaching colleagues.

Using the completed pre-session questionnaires and provided route map, you'll be able to design a bespoke session to focus learning on the areas your colleagues are less confident teaching.

This resource pack is intended to help you:

- deliver a CPD session for teaching colleagues on Assessment Objective 2 (AO2) giving them the opportunity to understand what is assessed as part of AO2 and the types of questions used to do this
- discuss the challenges faced by teachers when planning opportunities to set scientific content and practical work in an unfamiliar context
- discuss the challenges faced by students when scientific content and practical work questions are in an unfamiliar context
- model how a scheme of work (SoW) could be edited to contextualise the teaching and learning.

Before the session

- Ask your colleagues to each complete the pre-session health check (page 11 in this booklet)
- Use the responses to the health check to tailor the training session to the needs of your colleagues. The route map on page 7 will help you plan which activities to use in the session.
- Each colleague should have a copy of the activities booklet. Health checks will need to be photocopied in advance.
- Due to the answers to the quiz appearing in the guidance presentation, do not provide the group with a printed copy.
- Select a SoW you would like colleagues to look at in Activity 3.

Running the session

- Download the guidance presentation from [aqa.org.uk/subjects/science/gcse/focus-on-success-science](https://www.aqa.org.uk/subjects/science/gcse/focus-on-success-science)
- Establish an understanding as to what AO2 covers and the types of questions students are likely to encounter that are assigned to this Assessment Objective.
- This is an opportunity to discuss the challenges faced by both students and teachers to help develop the confidence to tackle the challenge of answering questions written in unfamiliar contexts.
- The guidance presentation will provide direction and discussion questions to move you through your bespoke session.

After the session

- Ask your colleagues to each complete the post-session health check (page 12 in this booklet) to ensure the training has been successful.
- As a group, discuss how you can support each other to embed the learnings in your teaching. Use the prompt questions on slide 22 of the guidance presentation to guide your discussion.
- Complete the individual and group action plan templates (pages 59-61 in the activities booklet).

Summary of activities

Understanding AO2

Activity 1a - What does AO2 assess

- Slides 3-4 on the guidance presentation.
- A group activity to answer the quiz on the general principles of AO2. The answers can be found on slide 5 on the guidance presentation.

Activity 1b- Understanding the different assessment strands of AO2

- Slide 6 on the guidance presentation.
- A more in-depth look at AO2 criteria using the Ofqual subject level guidance document for combined science.
- Highlight or underline the Ofqual document on page 6 of the activities booklet to identify what might need to be considered when planning lessons or writing a scheme of work to ensure they reflect elements of AO2.
- Summary slides (slides 7 and 8 on the guidance presentation) are provided, with key assessment points highlighted and as a list of bullet points to help clarify these important points.
- The Working Scientifically criteria can be found on pages 7-12 of the activity booklet for reference if required.
- Once activities 1a and 1b have been completed, use the prompt questions on slide 9 of the guidance presentation to conduct a group discussion.

Activity 2 - Assigning AOs to exam items

- Slide 10 on the guidance presentation.
- In small groups, review the exam questions in the activity booklet on pages 15-32 and decide what the Assessment Objective is for each item. If the item is addressing AO2, identify which strand (2/1 or 2/2). The answers can be found on page 58 of the activities booklet.
- Use the discussion questions on slide 12 on the guidance presentation to share findings.
 - NB: Assigning AOs can be open to interpretation, so don't get side tracked discussing the finer details of this if there are differences of opinion.
- Slides 13 and 14 on the guidance presentation outline the challenges we've been told teachers and students face with regards to AO2. These points will be familiar and you may want to add some of your own particular issues. They may help when completing your action plans.

Using AO2 in the classroom

The following activities focus on just one part of the Assessment Objective and suggest ways of adding opportunities to carry out teaching and learning using unfamiliar context. This has been split into contextualising content and integrating aspects of AO2 into practicals.

It is important throughout these two activities to reassure your colleagues that this is just one aspect of AO2 and although it is difficult for students, there are things they can do to support them. If students are made aware that science content and practicals may not be presented in exactly the same way as they have experienced in class, and they practice techniques to unpick the science behind the questions, they will be able to improve how they access and succeed with these types of questions.

Activity 3 – Adding unfamiliar context into schemes of work

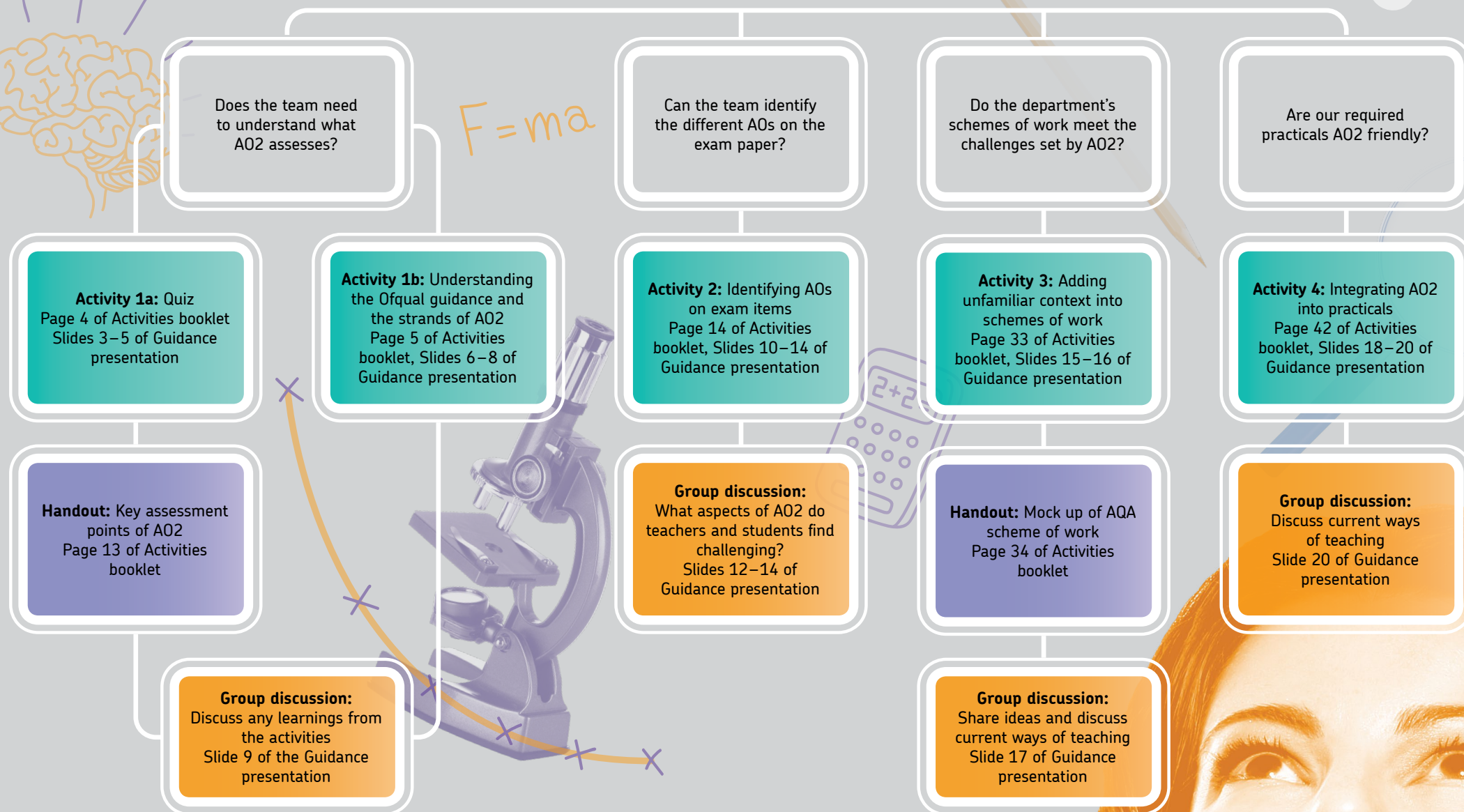
- Slides 15 and 16 on guidance presentation.
- Before the training session, review which of your schemes of work you want the group to look at as not all will be suitable.
- In groups, choose a topic you feel could benefit from the addition of unfamiliar context. (Note that some topics, eg the environment in biology will already contain examples of content in context. In these instances, focus more on ensuring students understand these specific examples might not be used in the exam.) This could be done in a number of ways. For example, context could be added as part of the introduction to the topic being taught or, once the basic concepts have been covered, an example of where the content might be applied in an everyday context could be discussed with the students.
- Amended schemes of work are on pages 34-41 of the activities booklet to assist with this activity.
- There is an optional opportunity to discuss sources of ideas for context before starting the activity. Source suggestions:
 - Teachit 'Science in the news'
 - legacy science questions – science B and additional applied
 - STEM Learning
 - Textbooks.
- It is important to stress only some lessons need to be contextualised. The aim of this activity is to get students used to thinking about and applying the basic concepts they are learning in a context that they haven't necessarily met before.
- Group discussion questions are on slide 17 on the guidance presentation.

Activity 4 – Integrating AO2 into practicals

- Slides 18-19 on guidance presentation.
- The notes on page 10 of this booklet explain in more detail how practical work can be enhanced to address the aspects of AO2 that concern practical skills.
- In groups, look at the tables on pages 44-56 of the activities booklet.
- This is modelling how you could add some context to practicals and/or alter them so students have a different learning experience of the practical.
- Choose one or two other RPs or common experiments and add to the 'themes and ideas' column.
- Share ideas as a whole group.
- Group discussion questions are on slide 20 on the guidance presentation.



Area for development



Introduction to AO2

The Ofqual definition of AO2 is ‘Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures.’

The subject level guidance given by Ofqual clearly sets out the two strands of AO2:

- Apply knowledge and understanding of scientific ideas
- Apply knowledge and understanding of scientific enquiry, techniques and procedures.

AO2 assesses how well students can apply what they know and understand about all the different areas of the specification. This includes Working Scientifically, the content, Required Practicals (RPs), maths skills and, in physics, the formulas.

As it is application that is being assessed, many of the questions need to be written in context. Ofqual requires that this context should be ‘novel’ and so likely to be unfamiliar to students.

It is impossible to second guess what context the examiner will use. It’s, therefore, important that students are aware that unfamiliar context will be used and have some experience of what this looks like in the exam.

The challenge with AO2

The skills encompassed by AO2 are examined by a wide range of assessment types, some of which are more accessible than others.

- Graph plotting is an accessible skill, although students don't always achieve full marks.
- Punnett squares are usually done well, whereas vector diagrams are often challenging.
- There is a lot of variation in how well students tackle the various aspects of maths questions, depending on the skill being assessed and the level of demand.
- Similarly, working scientifically encompasses a large range of different transferable skills across the three science disciplines, some being better done than others.

All these skills fall under AO2, so teachers should be reassured that they are covering AO2 in many of their lessons. However, one common theme of AO2 that all students and some teachers struggle with is applying what you know to an unfamiliar context. This training pack hopes to encourage teachers to move (a little) away from focusing on straight recall in their teaching and assessments to applying the knowledge and understanding in an unfamiliar context.

This training is about starting to address the unfamiliar context part of assessing AO2.

Many teachers say they don't have time to teach the skills covered by AO2 in addition to the content and required practicals. However, application of knowledge and understanding of AO2 is not an add on, it is what scientists do all the time. Scientists take a body of knowledge, a set of skills and techniques and apply them to explaining phenomena and evidence they have collected. To demonstrate real understanding, you have to be able to apply that knowledge. When aiming for the highest grades the ability to do this is a strong differentiator.

A02 and practicals

There are two strands to A02; one which addresses scientific ideas and the other scientific enquiry techniques and procedures. The Ofqual requirements mean that not only the content but also practical work (including the required practical activities) can be assessed in an unfamiliar context.

Unfamiliar contexts could take the form of simply using different chemicals or materials from what is normally taught (for example a different acid to make salts than those covered in the practical handbook) or putting the practical in a context of everyday life.

The important teaching and learning points are:

- Does the student understand the science behind the practical?
- Does the student understand why they are doing a particular step in a method?
- Can the student relate what they are doing to a situation different from the one they have encountered in class?

It is the real understanding of what they are doing that is important – not just recalling the steps in a method, which have no meaning to the student if presented in a different way.

It's important to find opportunities in lessons to explain this requirement to students and to give them practice by presenting what they have learnt in class in a different context for their homework.

Pre-session health check

Grade the area of development statements according to your confidence where 0 is not confident at all and 5 is very confident.

Hand back to your Head of Department.

Area of development	Grading 0-5	Reasons/notes/previous training
I know and understand the key assessment points for AO2.		
I can correctly identify different AOs and the strands of AO2 on exam questions.		
My teaching offers opportunities for students to see scientific ideas being applied in unfamiliar contexts.		
My teaching of practicals integrates application of knowledge and understanding in unfamiliar context as far as possible.		

Post-session health check

Grade the area of development statements according to your confidence where 0 is not confident at all and 5 is very confident.

Area of development	Grading 0-5	Reasons/notes
I know and understand the key assessment points for AO2.		
I can correctly identify different AOs and the strands of AO2 on exam questions.		
My teaching offers opportunities for students to see scientific ideas being applied in unfamiliar contexts.		
My teaching of practicals integrates application of knowledge and understanding in unfamiliar context as far as possible.		

Notes

Notes

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