

The Royal Society of Chemistry's response to WJEC's consultation on GCSE The Sciences

November 2023

WJEC presented a [high-level overview](#) of their proposed qualification titled GCSE The Sciences (Double Award). The overview was based on Qualifications Wales's approval criteria. This consultation response addresses questions asked around this overview.

*Q.1 (a) Please tell us if you are answering this survey:
on behalf of a school or another organisation
as a learner
as a parent
Other (please specify)
or, prefer not to say.
Bottom of Form*

*Q.2 (a) Please note that the Approval Criteria includes detail relating to the qualification structure. We have reflected this in the qualification outline. To what extent do you agree with our proposed qualification structure?
Agree
Partially agree
Disagree
If you partially agree or disagree, please outline your reasons*

We have previously stressed the importance of maintaining the separate disciplinary identity of chemistry (and biology and physics) within this single qualification. Therefore we are pleased to see the three sciences being examined separately. WJEC need to ensure that upon completing the qualification learners receive a proper breakdown by discipline, whether this is raw marks or a grade, so that they, and employers, HE and FE are able to identify how learners did in each discipline to support progression.

We are pleased to see practical science as a separate assessment, highlighting its importance as part of a sciences qualification. We still maintain that ideally, any practical assessment should assess skills and knowledge from all three of the sciences. Including only one or two of the sciences in the assessment could result in a lack of time afforded to practical skills development for the remaining science subject(s). However, we recognise that the proposed approach offers some flexibility for schools to manage their staff and equipment. We want to see WJEC closely monitoring the uptake (as they do currently) of the biology, chemistry and physics tasks offered each year in the practical assessment, to ensure even uptake between the three overall. It is important that every learner has a rich practical experience in each of the sciences, so WJEC should also ensure other practical tasks from all three sciences are assessed in the written papers. This should help ensure that learners do not miss out on experiencing broader practical activities.

Q.2 (b) The Approval Criteria states that the qualification must be tiered - higher tier A-D and foundation tier C-G. To what extent do you agree with our proposed approach to tiering?*

Agree

Partially agree

Disagree

If you partially agree or disagree, please outline your reasons

We have previously called for an effective assessment system, which will allow the majority of learners to obtain a GCSE qualification. Some feel a two-tier assessment system is the best approach to this, as it will allow for a greater degree of stretch and challenge in the assessment items, while also allowing for lower-achieving learners to receive a grade demonstrating their level of achievement. However, some international examples suggest that a single tier of entry is the most effective, as all of the content is potentially accessible to all. Some argue this allows learners to access any questions on content they feel comfortable with (rather than their tier of entry dictating which questions are most suitable), giving them more opportunities to gain marks. WJEC should consider this when deciding on the final approach to tiering; for example, would a larger overlap between achievable grades at foundation and higher tiers allow more learners to access more content. We would like to see WJEC implement mixed tiering across the qualification, for example a learner could undertake a foundation exam for unit 5 (physics) but higher exam for unit 4 (chemistry). This would allow a learner to tailor their qualification depending on their individual strengths and would reflect our preference for incorporating the best features of the outgoing triple science qualification.

We agree with there being an overlap between achievable grades on higher and foundation tier. This should prevent some learners 'falling off the bottom' of higher tier if they do not quite achieve a C grade. With overlapping tiers, we would expect to see (as is done already) questions at the end of the foundation paper identical to the first questions on the higher paper. WJEC should ensure when constructing papers that the topics used in these overlap questions are varied and are not repeated year after year. Foundation students working at grade C should be stretched on a variety of different concepts. We also agree with the practical unit being untiered, due to the nature of the tasks being completed. We would like to see more clarity around how a final representative grade is awarded if the practical unit grade is significantly different to the other units.

Q.3 To what extent do you agree that the proposed unit purpose meets the qualification purpose and aims?

	Agree	Partially Agree	Disagree
GCSE The Sciences (double) Unit 1		Y	
GCSE The Sciences (double) Unit 2		Y	
GCSE The Sciences (double) Unit 3		Y	
GCSE The Sciences (double) Unit 4		Y	
GCSE The Sciences (double) Unit 5		Y	

If you partially agree or disagree, please outline your reasons

The proposed purposes of the three science units seem to meet the qualification aim of 'explain[ing] phenomena scientifically to demonstrate how the world works'. We would assume this will be demonstrated by learners via the relevant assessments. What is not currently clear is how context will be provided, and to what extent examples that promote and represent inclusion and diversity will be used (as these are not referenced in the document).

The proposed practical assessment unit purpose seems to meet the qualification aim of 'construct and evaluate designs for scientific enquiry and interpret scientific data and evidence critically'. Still, with the practical assessment being focused on two (of three) subject-specific practical tasks it is currently unclear how much time will be afforded to developing learner knowledge and skills in scientific enquiry. We are pleased to see that the concept of scientific enquiry, as well as interpreting data and evidence also seem to be a key purpose of the other units.

However, the proposed purposes of the practical assessment unit do not seem to meet some of the other aims outlined by Qualification Wales, specifically around 'develop[ing] a variety of practical and research skills, enabling them to successfully refine their ways of working' and 'understand relationships between data, evidence and explorations through **quantitative and qualitative** analysis and research'. The unit purpose does not refer to developing a variety of skills, instead simply to 'undertake practical science experiments'. The reason for completing a practical assessment unit should not be 'to do experiments' but instead reflect the benefits of undertaking practical science, for example the development of [practical and interpersonal] skills and exploring and contextualising a theoretical concept.

Finally, we would like to see the whole qualification (not just in the 'Bringing the sciences together' unit) to have an element of flexibility for schools to devise their own curriculums, drawing on relevant contexts and examples.

Q.4 To what extent do you agree that the proposed unit purpose is relevant and engaging for learners?

	Agree	Partially Agree	Disagree
GCSE The Sciences (double) Unit 1		<input checked="" type="radio"/>	
GCSE The Sciences (double) Unit 2		<input checked="" type="radio"/>	
GCSE The Sciences (double) Unit 3		<input checked="" type="radio"/>	
GCSE The Sciences (double) Unit 4		<input checked="" type="radio"/>	
GCSE The Sciences (double) Unit 5		<input checked="" type="radio"/>	

If you partially agree or disagree, please outline your reasons

Until further details are known we cannot fully answer this question. The purpose statements provided are quite vague and do not indicate the scientific focus of the unit, how context and content will be delivered etc. The specific content, order, contextualisation and relevance of the units themselves will be the main determining factors of whether the units are relevant and engaging for learners.

Q.5 To what extent do you agree that the unit focus is appropriate?

	Agree	Partially Agree	Disagree
GCSE The Sciences (double) Unit 1		<input checked="" type="radio"/>	
GCSE The Sciences (double) Unit 2		<input checked="" type="radio"/>	
GCSE The Sciences (double) Unit 3		<input checked="" type="radio"/>	
GCSE The Sciences (double) Unit 4		<input checked="" type="radio"/>	
GCSE The Sciences (double) Unit 5		<input checked="" type="radio"/>	

If you partially agree or disagree, please outline your reasons

The unit foci seem to be appropriate as they make use of the 'what matters' statements from Curriculum for Wales. We would like to see more detail around the unit focus beyond it exploring matter and being curious (which is a shared focus across the three sciences units). For example; will there be a contextual focus, will the chemistry content have a firm grounding in sustainability and climate change concepts, is skills development in the three sciences units being considered?

Q.6 To what extent do you agree that the proposed approach to assessment is appropriate?

	Agree	Partially Agree	Disagree
GCSE The Sciences (double) Unit 1			<input checked="" type="radio"/>
GCSE The Sciences (double) Unit 2		<input checked="" type="radio"/>	
GCSE The Sciences (double) Unit 3		<input checked="" type="radio"/>	
GCSE The Sciences (double) Unit 4		<input checked="" type="radio"/>	
GCSE The Sciences (double) Unit 5		<input checked="" type="radio"/>	

If you partially agree or disagree, please outline your reasons

All units are externally assessed, with 90% of the final qualification coming from written examinations. This proposed assessment approach is in line with Qualifications Wales' awarding criteria.

We disagree with the current proposed approach, delivery and assessment of the 'Bringing the sciences together' unit (unit 1). We have previously advocated to Qualifications Wales for this unit to be assessed in year 11, as we felt this would give learners more time to build core conceptual knowledge and therefore more easily make connections between the sciences in these interdisciplinary topics. With this unit being delivered in year 10, not only will learners be less able to draw upon their knowledge to make these connections, the order and delivery of content across the sciences is likely to be compromised. Any sensible narrative of building up concepts in chemistry across the two years may need to be sacrificed, so that certain concepts which fit in with the pre-determined 'Bringing the Sciences together' topics can be taught in year 10. This could confuse learners if parts of units are delivered before the groundwork has been laid. Also, by having this unit examined in year 10 means there is less content that can be covered in these topics, limiting their scope.

With a high proportion of the qualification being based on written exams, WJEC must be cautious around the literacy demand of the questions, to ensure the accessibility of the exams is maintained and as many learners as possible can access and attempt the questions. Many members of our teaching community have raised concerns around how inaccessible the current science papers are with respect to literacy.

The revised assessment objective weightings mean that exams are likely to be more rigorous (including compared to current, comparable exams in England) with more focus on application and evaluation. Whilst we are not necessarily against this change, care must be taken when writing exams to ensure these AO2 and AO3 questions are accessible despite examining higher order skills.

Otherwise, an unintended consequence may be to push more learners towards the single award qualification currently being developed (which is currently intended for a very small cohort of learners). WJEC need to ensure that the opportunity for individual/local context is maintained. This could be done through the careful writing of exam questions to ensure learners aren't forced into writing about one specific context e.g. 'refer to a relevant context in your answer'. This would avoid teachers 'teaching to the test' and enable them to choose relevant, local examples to bring the content to life. It would also likely avoid disadvantaging certain areas of the country through area-specific industrial context. Teachers could then be supported by being provided with examples of local contexts that could be drawn upon, in the specification (the WJEC geography qualification currently does this). WJEC could also consider the use of choice or options in some exam questions (for example extended response questions) where multiple contexts are mentioned, and learners can choose the question most relevant to them.

Q.7 To what extent do you agree that the proposed qualification will support the Curriculum for Wales?

Agree

Partially agree

Disagree

If you partially agree or disagree, please outline your reasons

At this stage it is difficult to answer this question as there is not enough detail in the proposals. It does appear that the 'what matters' statement, 'matter and the way it behaves defines our universe and shapes our lives', will be met through the proposed qualification. However, it is not clear from the proposal that the science-based statements of what matters will be addressed holistically.

Q.8 To what extent do you agree that the proposed qualification will be manageable for learners?

Agree

Partially agree

Disagree

If you partially agree or disagree, please outline your reasons

At this stage it is difficult to answer this question as there is not enough detail in the proposals. We currently do not know the spacing and length of the exams, the quality (having a varied style of questions, the effective use of diagrams etc) of the questions, the accessibility (language style, amount of text etc) of the exam papers, or the use of context among other things. For many teachers it will be a big adjustment changing from a unitised approach that spread assessments out for learners across the two years. With all the core subject content in biology, chemistry and physics now being examined solely in year 11, teachers will likely need support on how to best prepare their learners for this new approach. With that being said, terminal exams at the end of year 11 for the sciences units does afford more flexibility to teachers over the teaching order (and brings this qualification more in line with Curriculum for Wales in doing so), gives more time for delivery of the content, and allows learners more time to digest and understand challenging concepts before being examined.

As mentioned previously, we do have concerns over the approach, delivery and assessment of the 'Bringing the sciences together' unit. We have previously advocated to Qualifications Wales for this unit to be assessed in year 11, as we felt this would give learners more time to build core conceptual knowledge and therefore more easily make connections between the sciences in these interdisciplinary topics. With this unit being delivered in year 10, not only will learners be less able to draw upon their knowledge to make these connections, the order and delivery of content across the sciences is likely to be compromised. Any sensible narrative of building up concepts in chemistry across the two years may need to be sacrificed, so that certain concepts which fit in with the pre-determined 'Bringing the Sciences together' topics can be taught in year 10. This could confuse learners if parts of units are delivered before the groundwork has been laid. Also, by having this unit examined in year 10 means there is less content that can be covered in these topics, limiting their scope.

Q.9 To what extent do you agree that the proposed qualification will be manageable for centres (e.g., schools)?

Agree

Partially agree

Disagree

If you partially agree or disagree, please outline your reasons

It is currently unclear how the 'Bringing the sciences together' unit/content will be expected to be taught or delivered. For example, will schools be allowed to teach the sciences unit content as 'normal' and then contextualise and bring together once learned, or will schools be expected to teach out of sequence and combine the disparate concepts from different units in a sequence of lessons? If this decision is left to schools, WJEC needs to ensure they provide enough support and guidance to schools to enable them to choose the best option for their learners, and not inadvertently introduce an advantage for one teaching approach over another.

The practical assessment proposals outlined in this consultation are very similar to what currently exists. This will mean less of an adjustment for schools; however, we hope this is not the main driver behind maintaining the status quo, and not introducing a more innovative and engaging practical assessment. With regards to the timescale for letting schools know the equipment needs for the practical assessments, we feel it would be more helpful to centres if this notice was given in the proceeding summer term. This would allow more time for budgeting, securing funding if needed, planning teacher time and organising lab access.

At this stage it is difficult to comment on other aspects of manageability as there is not enough detail in the proposals. More detail around examination length and spacing would help determine potential manageability (demands on exam spaces, preparing learners for long vs short gaps between exams etc). There is also still a lack of detail around the amount of content to be learned, and the expected learning hours needed. Again, these details would help schools determine potential manageability. There does need to be some caution taken around balancing the amount of content in the qualification to make it manageable, whilst at the same time not removing the more interesting and engaging (but less traditional) content to achieve this.

Q.10 Please provide any additional comments you wish to make about the qualification outline.

Generally, we feel that there is not enough detail in this proposal document to pass informed comment or to get a good understanding of what the qualification will look like. We would want to see a further consultation with more detail before any final decisions on qualification content and structure are made.

This qualification is an opportunity to adopt a new approach to learning about the sciences, however many of the core features outlined in this proposal seem to be the same as the outgoing qualifications. The timing and weighting of the practical assessment, the mode of assessment (written examinations heavily favoured) and the approach to tiering have all been carried across. We urge WJEC to ensure that they do not also adopt the same 'cut and paste' approach to content, whereby the content is not modernised and updated, and is delivered in the same order as the outgoing qualifications.

We do have concerns over a lack of reference to mathematical (and quantitative) skills. As stated in our [Curriculum Framework](#), we believe that mathematics is integral to chemistry to produce and analyse quantitative results, and to help us predict chemical behaviour. Mathematical content and (the development of these) skills should therefore be a key component and aim of the new GCSE.