

Royal Society of Biology response to WJEC consultation on Made for Wales GCSE qualification outline - The Sciences (double award)

November 2023

The Royal Society of Biology responded to to WJEC's consultation on Made for Wales GCSE qualification outline The Sciences (double award).

Q2b. 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
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Q3. To what extent do you agree that the proposed unit purpose meets the qualification purpose and aims?

Unit 1	Agree	Partially agree	Disagree
Unit 2	Agree	Partially agree	Disagree
Unit 3	Agree	Partially agree	Disagree
Unit 4	Agree	Partially agree	Disagree
Unit 5	Agree	Partially agree	Disagree

If you partially agree or disagree, please outline your reasons

The Royal Society of Biology supports the purposes and aims of the proposed GCSE The Sciences (double award).

In November 2021, The Royal Society of Biology published *Evolving 5-19 Biology: recommendations and framework for 5-19 biology curricula*, setting out RSB's vision for biology curricula as defined in 7 big questions of biology, and set out 8 recommendations for policy makers and curriculum designers. We intend for this document to be a starting point for discussions around curriculum reform and would be happy to meet with Welsh government officials to further discuss the framework. The full document as well as a summary for policy makers can be found at www.rsb.org.uk/curriculum

The proposed purposes and aims align well with the big questions, themes and exemplification set out for 14-16 in RSB's *Evolving 5-19 Biology* and we have used this framework to inform the response that follows. The Society and its Curriculum Committee would welcome further discussion and input on the qualification as WJEC moves into the final phase of co-construction.

Q4. To what extent do you agree that the proposed unit purpose is relevant and engaging for learners?

Unit 1	Agree	Partially agree	Disagree
Unit 2	Agree	Partially agree	Disagree
Unit 3	Agree	Partially agree	Disagree
Unit 4	Agree	Partially agree	Disagree
Unit 5	Agree	Partially agree	Disagree

If you partially agree or disagree, please outline your reasons

Whilst the proposed unit purpose broadly aligns with RSB's Evolving 5-19 Biology, it is unclear as to the direct implications the proposed unit purpose will have on the content of the qualification, and therefore commenting on the qualification being relevant and engaging is difficult.

When viewing previous proposals from Qualifications Wales, RSB mapped the proposals and appendix against RSB's Evolving 5-19 Biology, where we highlighted some particular concerns. Mapping is available via this link:

https://www.rsb.org.uk/images/Mapping_proposed_GCSE_The_Sciences_against_RSBs_Evolving_5-19_Biology_-_December_2022.pdf

Our 14-16 exemplification as part of Evolving 5-19 Biology is available as an extract here: https://www.rsb.org.uk/images/Evolving_5-19_Biology_extract_-_11-16_exemplification.pdf

Within i) Variation, mutation and natural selection, including genomes, competition and natural selection, leading to diversity:

The purposes of mitosis and meiosis have been proposed as a topic, but the processes of mitosis and meiosis have not been included.

The RSB would recommend that evolution and extinction are included, as they align well with the other topics, and would lead into teaching around fossils. It would also compliment the teaching of conservation and sustainability, linking with ecosystems.

The formation of fossils would be a welcome addition if it is the intention they are going to be used as a way to look at natural selection.

The addition of selective breeding would also work well with the topics that have been suggested.

Within ii) Dynamic ecosystems:

The name of the chapter itself suggests there is a focus on ecosystems that experience lots of change, frequently. Through consultation with the Curriculum Committee, a suggestion of Ecosystems as the title felt more appropriate.

Carbon and nutrient cycling have not been mentioned in the current proposed topics. When considering ecosystems as a whole, the exclusion of microorganisms and prokaryotes is concerning, especially when looking at the decay cycle, since they play an arguably large role in balancing an ecosystem.

The RSB would recommend making some links to climate change within this topic, and whilst it is taught as one of the interdisciplinary subjects, it would be beneficial to add some additional detail in context with human population and the impacts on ecosystems.

Surrounding the energy transfers section, including pyramids of biomass and the calculations needed for the efficiency of energy transfers between trophic levels.

Environmental problems should be framed in terms of positive contributions and solving global contributions

Within iii) Biological processes that maintain life by supporting the functions of cells, tissues, organs and organ systems:

There needs to be a clearer link between increasing the yield/biomass of plants grown and including teaching of limiting factors in photosynthesis.

The teaching of anaerobic respiration would also be an ideal place to teach about anaerobic respiration in industry and other processes such as fermentation.

Within iv) Human health and wellbeing and factors that can positively and negatively affect it: How pathogens cause symptoms of diseases in animals and plants is not specifically mentioned, and given the movements in the scientific landscape recently, it is vital that students are aware of this, alongside the teaching of vaccines and their mechanisms.

Drugs, alcohol, diet and other lifestyle choices are not mentioned. Whilst some of this could be covered in the interdisciplinary section, the depth of the coverage is a concern.

When infectious diseases and natural defence systems are mentioned, it does not specify if this will be in both plants and animals, this raises a concern that plant based content will be missed from the curriculum.

Our Evolving 5-19 Framework takes care to recommend in the exemplification for 14-16 bioscience curricula, that humans are included in consideration of ecosystems, health and wellbeing, but are not the focus to the detriment of other organisms. The Society also notes that there is a surprising lack of ecology in the proposed curriculum. Where ecology is included, the Society feels it is poorly defined and would ill-prepare students for a world in which environmental issues are becoming increasingly important, and for tackling particular climate and biodiversity crises in the Welsh context.

The RSB feels there is a significant disadvantage if a focus on humans over other organisms is emphasized within a curriculum or specification. The Society is therefore concerned about the approach taken in sections ii) dynamic ecosystems and iv) human health and wellbeing and would prefer to see a more holistic specification in these areas. The Society would be happy to provide further support, informed by our curriculum framework, and can provide additional input from our member organisations such as the British Ecological Society.

Q5. To what extent do you agree that the unit focus is appropriate?

Unit 1	Agree	Partially agree	Disagree
Unit 2	Agree	Partially agree	Disagree
Unit 3	Agree	Partially agree	Disagree
Unit 4	Agree	Partially agree	Disagree
Unit 5	Agree	Partially agree	Disagree

If you partially agree or disagree, please outline your reasons

The RSB's main concern with the focus for Unit 1: Bringing the Sciences Together is the content. Teachers having the option to construct their own curriculum surrounding prescribed themes within a unit that has not been modelled before has the potential to cause issues for many students and teachers. Students will be assessed using pre-released material that will be available to teachers one month prior to the exam, and those teaching staff with less experience or staff within smaller departments who have less guidance may be left in a difficult position in not having covered the areas on the pre-release material. The concern is for teachers who have constructed a perfectly well-suited curriculum based on the information given to them, yet in light of the pre-release material, change the content they are teaching to cover the exam, and prepare students for the exam, cutting content from the already decided curriculum. The RSB would urge WJEC to ensure that Unit 1 is adequately resourced in order to support all teachers, irrespective of experience or department size, ensuring that students are not disadvantaged by a lack of information.

It is also important that the content for Unit 1: Bringing the Sciences Together continues to avoid topics that are typically seen within a 14-16 science curriculum, ensuring that the unit stays distinct and is not seen as an add on to extend knowledge of already covered topics.

Assessment is an area of concern within Unit 2: Practical science. The assessment model means students have the two highest scoring assignments out of three submitted by teaching staff, after sitting one for each of the three sciences. It is imperative that the submission of each science is monitored by WJEC and Qualifications Wales to ensure that the spread between biology, chemistry and physics is even each year and that there is a continuous rotation between the subjects to ensure that one discipline is not being consistently removed from students' learning due to perceived difficulty.

Q6. To what extent do you agree that the proposed approach to assessment is appropriate?

Unit 1	Agree	Partially agree	Disagree
Unit 2	Agree	Partially agree	Disagree
Unit 3	Agree	Partially agree	Disagree
Unit 4	Agree	Partially agree	Disagree
Unit 5	Agree	Partially agree	Disagree

Q7. To what extent do you agree that the proposed qualifications will support the Curriculum for Wales?

Agree	Partially Agree	Disagree
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If you partially agree or disagree, please outline your reasons

The Royal Society of Biology agrees that the proposals set out by WJEC support the Curriculum for Wales. However, the Society remains concerned regarding: the disconnect between 3-16 curriculum; GCSE qualification reform; and the existing suite of A levels which have not been included in the reform process so far; the lack of detail in the Curriculum for Wales and the burden on teachers to develop their own curriculum; the potential for inconsistency across Wales in Key Stage 1-3, and in turn, the preparedness of students for these new qualifications.

RSB also supports the inclusion of digital exams, and the intention to roll these out over a number of years.

Q8. To what extent do you agree that the proposed qualifications will be manageable for learners?

Agree	Partially Agree	Disagree
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If you partially agree or disagree, please outline your reasons

RSB seeks to ensure that all young people in Wales have equal access to high quality teaching and learning in the sciences, preparing students to be scientifically literate, make scientifically informed choices and ready them for a diverse and evolving world of work, and strongly advocates for a single route through the sciences at GCSE. The existing multiple routes at GCSE create inequity in the system, and exacerbate the perception that the sciences are only for the most able students.

Alongside other science organisations, RSB has supported the creation of a new double award GCSE, with separate grading of the sciences, assessment of practical skills, and a breadth of content within a more easily timetabled double GCSE that will enable progression to A levels. We welcome the title of "The Sciences", emphasising the nature of the three disciplines while also emphasising interdisciplinary content. However, introduction of a single award GCSE recreates the existing stratification of The Sciences and risks a continuation of students being selected out of the sciences at an early stage in their schooling, through options choices that aren't truly their own.

The decision to introduce a single award GCSE for the Sciences was not formally consulted on, and the existence of such a qualification alongside the double award does not align with the

RSB's position on a single route through the sciences. We are unable to comment on the content of a single award due to the lateness of this decision. The multiple pathways described in Qualification Wales decision report do not align with the evidence-based approach discussed by the learned societies and Qualifications Wales over many months. Qualifications Wales sent an open letter to RSB in response to RSB's open letter after the single GCSE route was introduced, and although it answered some questions, there are still some questions behind the reasoning of why the route was introduced.

RSB advocates for a single route through the sciences at GCSE, which would enable all students to study science, keeping their options open for longer, and caters to students of all attainment levels through tiering of the assessment, and ensures there is not gatekeeping of the sciences based on prior attainment in Key Stages 2 and 3. The proposals for multiple pathways at GCSE, including a level 1 foundation qualification, in the science, muddy the waters and maintain inequity in the system.

Q9. To what extent do you agree that the proposed qualification will be manageable for centres (eg schools)?

Agree	Partially Agree	Disagree
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If you partially agree or disagree, please outline your reasons

The Royal Society of Biology will work with WJEC to make sure any biology related qualification is as good as it can be, despite reservations about the introduction of a single award in the Welsh qualification landscape

The Society feels that the previously suggest single route through the sciences would be a preferable offering for learners and the decision to introduce a new single award GCSE in The Sciences, without consultation, undermines the positive reforms in the new double award GCSE.

It is a concern that the Double Award is still only considered as a suggested route for most learners, and that no entitlement has been put in place to stronghold the idea that it is the most suitable offer for the vast majority of learners. It is still possible that centres who do not have the provision to offer the Double Award to all students could offer the single route GCSE to some students to cover situations such as lack of staffing or funding issues.

The Royal Society of Biology recommends that WJEC, Qualifications Wales and Welsh Government set out expectations alongside the implementation of new qualifications that support and promote all learners being able to access The Science Double Award.