**Curriculum and Assessment Review (England) - call for evidence**
*November 2024*

https://www.gov.uk/government/calls-for-evidence/improving-the-curriculum-and-assessment-system

The Royal Society of Biology responded to the Curriculum and Assessment Review panel's call for evidence on 5-19 curriculum, assessment and qualifications pathways in England.

To inform this submission, RSB has drawn on published policy positions in Evolving 5-19 Biology, Developing a Primary Science Curriculum and Framework for a Future Primary Science Curriculum, and sought input from RSB's Council, Education and Science Policy Committee Biology Education Research Group, Curriculum Committee, Education Policy Advisory Group and Teaching Policy Advisory Group and partnerships with other science organisations such as the Science Education Policy Alliance. Over the last ten years, RSB has dedicated significant time and resource into preparing for this review and the curriculum reform process that will follow, all curriculum and qualifications documents can be found at www.rsb.org.uk/curriculum. RSB will also be writing to the panel directly, and seeking to engage further as the interim report and final report are developed by the panel.

We would like to acknowledge the support of our Full and Supporting Member Organisations, a group of approximately 80 organisations, working in diverse disciplines across the biosciences. RSB facilitates a number of policy groups, which meet to discuss and formulate responses to Government and other consultations. Member Organisations contribute their expertise to these groups and the responses, which are submitted on behalf of all RSB members. To find out more about organisational membership, and our current members, visit the RSB website.

## Background

**Why the review matters:** Education is important for its own sake. But it also plays a critical role in supporting all young people to thrive throughout life and in building a stronger economy and a more equitable society.

The curriculum and assessment system must ensure that young people leave education prepared for life and work, equipped with the knowledge, skills and attributes they need to thrive and become well-rounded citizens, who appreciate the diversity and pluralism of our society. Every pupil, across all key stages, should have an experience of education that is both stimulating and enjoyable, and that provides them with the foundation and motivation to pursue lifelong learning. To achieve these goals, we need to ensure that all young people have access to a rich and fulfilling curriculum, meaningful qualifications and assessments that are manageable, valid, fair

and reliable. The panel is focussed on successes and weaknesses of the current system, and would like to hear about opportunities for improvement.

Scope of the review:

- The Review will seek to identify the most significant and pressing issues facing curriculum and assessment. We will focus on addressing these without destabilising the system, making changes where things are working well, or where there is insufficient evidence to warrant change. In short, we seek to bring about evolution, not revolution.
- The Review is not intended to remove well respected and valued qualifications like A levels, GCSEs and T Levels
- The important role of examinations will be maintained within a balanced assessment system that captures the strengths of every young person and aligns with our commitment to high standards
- When the Review is implemented, all state schools, including academies, will be required to teach the national curriculum
- The Review may offer commentary on the impact of the accountability on the curriculum and assessment system

The Review is an opportunity to:

- remove limits and ceilings to high and rising standards for all
- alleviate some of the pressure and constraints on learners and educators
- reduce the assessment burden where feasible and appropriate, while continuing to recognise the socially progressive benefits of public examinations
- support professional expertise
- address longstanding challenges in providing meaningful, rigorous and high-value pathways for all students at 16 to 19
- make sure the curriculum is inclusive and accessible for all young people and address injustices and unintended consequences.

The call for evidence is split into 9 sections:

**Royal Society of Biology response to Curriculum and Assessment Review (England) - call for evidence**

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## Section 2: General views on curriculum, assessment, and qualifications pathways

**Q10. What aspects of the current a) curriculum, b) assessment system and c) qualification pathways are working well to support and recognise educational progress for children and young people?**

**What is working well?**

The Royal Society of Biology has been preparing for curriculum reform in England for the last ten years, since the last round of reforms. RSB's experience of the last round of curriculum reform was that it was not well evidence based, rushed, and not necessarily drawing on the expertise of our community. In response to this, in 2014 Society convened a Curriculum Committee of experts in primary, secondary and tertiary teaching, assessment and teacher training, drawing on research and best practice to form recommendations and a vision for biology education that aims to improve biology teaching and learning for all young people. During this period RSB has worked with awarding organisations, regulatory bodies and governments to inform development of new qualifications, adjustments to existing specifications, and improving biology and science education for all young people, and therefore is uniquely placed to comment on what works well and identify issues in the current system, provide evidence-based recommendations and a long-term view of education for biology and the sciences. RSB's education policy development is informed by biology and science teachers, and a broad range of biology specialisms through its Member Organisations. The Society regularly sits on advisory groups for awarding organisations, CPD providers, research projects such as ASPIRES, PISA and Nuffield funded projects.

Regarding curriculum, the Royal Society of Biology strongly supports the sciences as a core subject across Key Stages 1 to 4. The National Curriculum ensures consistency across schools; RSB supports the rejuvenation of a National Curriculum and programmes of study for the sciences in Key Stages 1 to 4 and welcomes the commitment to require academies to follow the new National Curriculum following this curriculum and assessment review.Within the curriculum, RSB has many considered recommendations to make and will do so throughout this response. However, there is a significant level of detail that is more appropriately covered in RSB's Evolving 5-19 Biology: recommendations and framework for 5-19 biology curricula, and associated documents, and Developing a Primary Science Curriculum. **RSB would welcome an opportunity to present further detail contained within these documents to the panel, including highlighting curriculum content that works well in the current system.**
RSB's recommendations, framework and exemplification can be found here:
https://www.rsb.org.uk/curriculum

On assessment, the Royal Society of Biology finds there is much to be improved, especially at Key Stage 4. There are some elements of the practical assessment in A level that RSB can support, however review of the emphasis and assessment of practical work is required to ensure all students have a good experience of practical activities and field work.

At primary, the Society supports no high stakes assessment for the sciences i.e. no KS2 SATS for the sciences, but notes that a rebalancing of emphasis is required for subjects other than English and Maths in primary education.

The Royal Society of Biology supports a variety of qualification pathways at post-16: A levels, T levels and Level 3 BTECs and clear academic, vocational and technical pathways for students. Schools and colleges should be resourced to provide a range of qualifications pathways, and provide good quality advice and information about qualifications pathways, progression options following completion of post-16 courses, and recognise the value of non-academic pathways. The Royal Society of Biology's vision for 5-19 biology education is one that supports all students to progress through the sciences, and to the world of work in a range of careers and life as a healthy citizen.

In the current KS4 system, RSB supports the intention that both Combined Science GCSE and Biology, Chemistry and Physics GCSEs (or "triple science" route) support progression to A level. However, the **Royal Society of Biology strongly recommends that the dual route for the sciences be addressed and removed, with a view to resolving issues of inequity, perception and barriers to progression**. The Society provides more details on this issue and specific recommendations in answers to questions 11, 12, 13, 29, 41 and 45 in this response.

**Q11. What aspects of the current a) curriculum, b) assessment system and c) qualification pathways should be targeted for improvements to better support and recognise educational progress for children and young people?**

**What should be improved?**

The Royal Society of Biology notes that the sciences are not explicitly mentioned in the terms of reference for the panel or call for evidence. This raises significant concern about the importance the panel places on the sciences as a compulsory subject to 16 that prepares students for their future as citizens, in the world of work, healthy lifestyles and green skills and jobs, as well as progression to further study in the sciences and science related subjects. **RSB strongly recommends that the panel commits to comprehensive review of the sciences across all key stages, to support better education in biology and the sciences for all students.**

The Royal Society of Biology, and our partners in the Science Education Policy Alliance (The Association for Science Education, Institute of Physics, Royal Society and Royal Society of Chemistry) are very well placed to deliver further detail to the panel and recommendations on curriculum, assessment and qualifications pathways that will better support all young people to leave school with knowledge, skills and experience from the sciences that they will need in life and work, whether in the sciences or as a citizen. **RSB recommends that the panel takes a principled approach to curriculum development that draws on the work of RSB and our Science Education Policy Alliance colleagues.**

<u>Curriculum - what should be targeted for improvement:</u>
An inclusive curriculum for the sciences that supports a broad curriculum should build on a set of big ideas or questions that provide a focus and destinations for learning, and engender deep, enduring understanding of those ideas; specifies practices and ways of thinking within each of the sciences and with an explicit focus on skills - how practical skills support knowledge and understanding of the sciences, give practical experience of what scientists do, and support development of a wide range of transferable life skills. For example, interpersonal skills: working in a team, technical skills: manipulation of equipment and making observations, cognitive skills: asking questions about the biological world and problem-solving. Skills developed in biology should be explicit and clearly articulated within Programmes of Study. There are many areas of the curriculum that are overlooked and underserved within Key Stages 1 to 5 including, but not limited to, practical skills and field work, plant science and ecology, sustainability and climate change education. RSB has sought input from its Member Organisations, such as the British Ecological Society and Field Studies Council in developing the recommendations in these documents.

RSB's suite of documents, Evolving 5-19 Biology, sets out clear recommendations for learning progressions and to support overlooked areas of the curriculum, and was developed with a reduction in curriculum content in mind. These policy recommendations were developed drawing on expertise, research and student voice as well as views of RSB's members and trusted partners. **RSB would be happy to further discuss the recommendations in Evolving 5-19 Biology, Framework for a Future Primary Science Curriculum, and Developing a Primary Science Curriculum with the panel:**

Evolving 5-19 Biology: recommendations and framework for 5-19 biology curricula (2021)
https://www.rsb.org.uk/images/Evolving_5-19_Biology.pdf

Evolving 5-19 Biology: transferable skills in biology education (2024)
https://www.rsb.org.uk/images/edpol/Evolving_5-19_Biology_-_Transferable_skills.pdf

Evolving 5-19 Biology: the role of practical activities (2023)
https://www.rsb.org.uk/images/edpol/Evolving_5-19_Biology_-_Practical_Science.pdf

Evolving 5-19 Biology: sustainability education (2023)
https://www.rsb.org.uk/images/edpol/Evolving_5-19_Biology_-_Sustainability_Education.pdf

Evolving 5-19 Biology: improving teacher and student perceptions of ecology (2024)
https://www.rsb.org.uk/images/edpol/Evolving_5-19_Biology_-_Ecology.pdf

And with our recently convened Primary Curriculum Advisory Group and partners at the Association for Science Education, Institute of Physics and Royal Society of Chemistry, we make recommendations for primary science:

Framework for a Future Primary Science Curriculum (2023)
https://www.rsb.org.uk/images/edpol/Primary_Curriculum_Advisory_Group_report.pdf

Developing a Primary Science Curriculum (2024)
https://www.rsb.org.uk/images/edpol/Developing_a_Primary_Science_Curriculum.pdf

It is well accepted that the curriculum is overburdened at Key Stage 4, and this is regularly flagged as being worst in Biology GCSE and the biology content within Combined Science GCSE. The Royal Society of Biology represents individual members that are teachers, and has drawn on the expertise of teachers in developing education policy recommendations and priorities. We know that the majority of schools begin teaching GCSEs for the sciences in Year 9, leading to a compressed curriculum which effectively seems overburdened, just to get through GCSE content. **The Royal Society of Biology's clear message to the panel is: less content, more time for depth and skills** - reducing content to create time for teachers and students to develop understanding and application, consolidate learning, experience valuable hands on practical activities and field work, and local, personal and historical contextualisation alongside global perspectives.

Assessment system - what should be targeted for improvement:
**The Royal Society of Biology recommends that the panel seeks to ensure the education system is driven by high quality curriculum and experience for students, rather than being driven by assessment criteria and qualifications** i.e. overburdened specifications and reduction of practical activities to required practicals. Assessment "wagging the tail" of the education system exacerbates other issues in the system. RSB would prefer GCSE and A level specifications and assessment moved away from short-term memorisation of an exhaustive lists of facts and other minutiae. While recall of learned knowledge may continue to be an assessment outcome, RSB acknowledges that the availability of digital information reduces the relevance of factual recall. The specification and curriculum should focus on using subject content to demonstrate key concepts, develop skills and help pupils transfer these ideas to

other contexts.

The Royal Society of Biology would like to further explore assessment in the sciences, and particularly review what works best for assessment and experience of practical activities with the panel and awarding organisations. There is a vast body of research that explores practical activities, methods of delivery and assessment. Some examples are provided here:

Childs and Baird (2020) General Certificate of Secondary Education (GCSE) and the assessment of science practical work: an historical review of assessment policy
https://bera-journals.onlinelibrary.wiley.com/doi/10.1002/curj.20

Moore, A; Fairhurst, P; Correia, C; Harrison, C; Bennett, J; (2020) Science practical work in a COVID-19 world: are teacher demonstrations, videos and textbooks effective replacements for hands-on practical activities?
https://discovery.ucl.ac.uk/id/eprint/10129206/

Reiss, Abrahams and Sharp (2012) IMproving the assessment of practical work in school science
https://www.gatsby.org.uk/uploads/education/reports/pdf/improving-the-assessment-of-practical-work-in-school-science.pdf

Millar (2009) Analysing practical activities to assess and improve effectiveness:
The Practical Activity Analysis Inventory (PAAI)
https://www.rsc.org/cpd/teachers/content/filerepository/frg/pdf/ResearchbyMillar.pdf

Oliver, Jerrim, Adkins (2021) PISA: Engagement, Attainment and Interest in Science (PEAS)
https://www.nottingham.ac.uk/research/groups/lsri/documents/peas-report.pdf

The RSB points to Gatsby's Good Practical Science benchmarks and five purposes of practical science as best practice for schools and teachers
https://www.gatsby.org.uk/education/programmes/support-for-practical-science-in-schools

**The Royal Society of Biology recommends that the curriculum review process considers the purpose of assessment, the experience students have of assessment in each subject, and whether the existing assessment is in fact detrimental to the sciences**.
For example neither the previous assessment of practical skills nor the current required practical assessment via CPAC at A level and with required practicals at GCSE is optimal.
Conducting and interpreting practical work to develop both practical skills and ability to think like a scientist and the transferable skills developed within a science context. The Royal Society of Biology contributed to Ofsted's science subject report - Finding the Optimum (2023) which suggests that the current requirements for science, particularly practicals are not being met.
https://www.gov.uk/government/publications/subject-report-series-science/finding-the-optimum-the-science-subject-report--2

RSB also explores the student experience of assessment in relation to marks available and grade boundaries, in response to question 48.

**RSB would be interested in exploring with the panel creative approaches to assessment, the use of technology in assessment,** and considering the value in specifying curricular elements within subjects that do not need to be assessed, and so do not need to be dictated by assessment outcomes, or whether the content is suited to questions in exam papers.

Qualifications pathways - what should be targeted for improvement:
**The Royal Society of Biology, along with other organisations in the sciences, strongly advocates for a single route through the sciences at GCSE, and strongly recommends this as a priority for**

**the next phase of the review** - the existing inequitable system of the current dual route (Combined Science GCSE and "triple science" route of separate Biology, Chemistry and Physics GCSEs) should not be replicated in the future qualifications pathways.

The sciences at GCSE should be taught as a single course based on the three separate sciences, and followed by the vast majority of students occupying between 20% and 25% of curriculum time to support a broad and balanced school curriculum. This proposal would retain the best features of the current "triple science" route and Combined Science GCSE, but allow all students to experience those features and benefit from removing barriers to progression and accessibility.

The three sciences should be timetabled separately; taught by a dedicated subject specialist teacher; specified, examined and graded separately. It is these features of the "triple science" route, rather than the additional content in the Biology, Chemistry and Physics GCSEs that has provided benefits and improved outcomes of the existing "triple science" route, including better progression rates to A levels.

Many schools teaching "triple science" do so on 25% or less of timetable time, and the majority start GCSE science teaching in Year 9 in order to get through vastly overburdened specifications, and choose to allocate specialist teachers to the "triple science" classes while Combined Science GCSE students more often make do without specialist teaching. RSB's single route proposal will prevent the sciences being taught at an accelerated pace in Key Stage 3 and 4 and students being selected for the route based primarily on setting in Years 7 and 8, it will reduce the impression that the sciences are the preserve of high attainers, and give students a more accurate view of their own performance in each of the sciences with separate grades. It would also improve school accountability and drive the need to recruit and deploy specialist teachers to teach each of the sciences, and increase students' access to specialist teachers. This is further explored in RSB's response to questions 12, 13, 29, 41 and 45 of this call for evidence.

The Science Education Policy Alliance (Association for Science Education, Institute of Physics, Royal Society, Royal Society of Biology and Royal Society of Chemistry) commissioned research into timetabling models at GCSE in the 2018/19 school year - this research revealed a huge range of models for timetabling the two GCSE routes, with almost none able to timetable the sciences as the qualifications were intended.
Shift Learning - Science Timetable Models Research (2018)
https://www.rsb.org.uk/images/Science_timetable_models_report_January_2019.pdf

The Science Education Tracker was established by Wellcome in 2016, with a second survey commissioned in 2019. The Royal Society has conducted a third survey in partnership with EngineeringUK and funding from Wellcome.
Royal Society Science Education Tracker (2023)
https://royalsociety.org/news-resources/projects/science-education-tracker/

RSB highlights the following findings in the 2023 Science Education Tracker:
Curriculum Pathways: Access to triple science has improved over time, but a significant number of students (19%) wanted to study it but were unable to. Barriers were more often personal (e.g., lack of confidence) than school-imposed.
Post-GCSE Intentions: A declining trend was noted in year 7 students intending to continue science after GCSE (from 70% in 2019 to 64% in 2023). This reflects a growing disinterest or perceived lack of relevance.

The Education Policy Institute's recent report supports our position that students have an illusion of choice when it comes to GCSE options, and that they are unaware of the role prior attainment plays in their steering towards the "triple science" route or Combined Science GCSE. It further states that teachers and leaders spoke of considering students' aspirations and hopes, and realistic expectations. EPI states that most students taking A level science subjects had studied "triple science" at GCSEs. It is

important to note here that both the Combined Science GCSE and "triple science" route (separate Biology, Chemistry and Physics GCSEs) are designed to progress to A level. And that "triple science" is not more difficult, nor does it cover concepts in more depth, it is simply more breadth. However, perceptions of the sciences in schools and the elite perception and school-led setting taking the place of student choice, all contribute to the "triple science" route being seen as more difficult and more appropriate for progression to A level.

EPI and CfEY, Progression at age 16 of young people from underrepresented backgrounds towards careers in STEM (2024)

https://epi.org.uk/publications-and-research/progression-at-age-16-of-young-people-from-underrepresented-backgrounds-towards-careers-in-stem/

## Section 3: Social justice and inclusion

**Q12. In the current curriculum, assessment system and qualification pathways, are there any barriers to improving attainment, progress, access or participation (class ceilings) for learners experiencing socioeconomic disadvantage?**

As in the Royal Society of Biology's answer to question 11 of this call for evidence, the dual route of Combined Science GCSE and "triple science" route of separate Biology, Chemistry and Physics GCSEs is creates barriers to improving attainment, progress, access and participation in the sciences. The issues already present in the system are exacerbated due to compressed timetabling of the sciences, preferential deployment of specialist teachers to the "triple science route", perception of the sciences as elitist and only for the highest attainers, and the illusion of choice due to science routes being determined by early setting by the school rather than student choice.

When developing the Society's position on a single route for the sciences at GCSE we have also drawn on findings from the ASPIRES research, our policy recommendations in Evolving 5-19 Biology that seek to establish a broad biology education for all students to 16, and many discussions with teachers, students, researchers, policymakers and other science organisations. The timetabling research commissioned by SEPA organisations supported the findings in ASPIRES 2, detailed in this blog by Emily MacLeod: Is GCSE Triple Science making the STEM skills gap wider? (2016) https://blogs.ucl.ac.uk/aspires/2016/04/21/triplescience/

**The consequences of the existence of "triple science", the barriers it creates for socially disadvantaged students, and the unfairness of accessibility and progression it creates must be addressed by the panel.** To an employer or university, there is no way of knowing that a student took Combined Science because it was the only route offered by their school, while another student may have studied Biology, Chemistry and Physics GCSE because their school did not offer Combined Science GCSE. For students where both routes are offered, they face a myriad of unintentional consequences due to the school timetable: accelerated pace of study for the "triple science" route, lack of access to specialist teachers for Combined Science GCSE, the perception that only students that achieve well in on the "triple science" route can progress to A level.

Recently RSB has been in discussion with Welsh Government and Qualifications Wales, who conducted research into the attainment of A level science students, allowing comparison between the double science GCSE route and triple science GCSE route that learners can currently study in Wales. The findings of this research suggested there was less than half a grade of difference in attainment at A level. We have not seen such research conducted in England, and **would recommend that the panel**

**requests evidence from Ofqual to investigate further.** However, we would also highlight that the purpose of GCSE science is not just to progress to A level, and that all learners should have an equitable and positive experience of the sciences, to support further study in science-related subjects, technical and vocational routes, non-science careers and in life as citizens that can make informed choices about their health and the world.

For post-16 learners, the Royal Society of Biology would also like to highlight the importance of retaining the funding for BTEC applied science at Level 3, as this qualification supports young people to enter a broad range of careers in the research and innovation workforce.
Along with other science organisation partners, RSB provided a briefing note to the Department for Education in 2021, highlighting that around 60,000 students complete such qualifications annually in science and engineering. For a number of reasons, neither A levels or T levels are able to meet the aims or needs of those students - A levels in the sciences currently have a high barrier to entry, T levels have a narrow focus on specific occupations and are not always available to all students across England due to regional disparity in provision.
Joint briefing to DfE on Level 3 qualifications in applied science and engineering (2021)
https://www.rsb.org.uk/images/DfE_jointbriefing_level3quals_2021.pdf

In Biology, we advocate for increased opportunity for practical activities and field work in the local environment and further afield. However, the cost of field trips can mean that learners from disadvantaged backgrounds are more likely to miss out when they tend to already have lower science capital. Poorer access to high quality green and blue space means they can lack the experiences enjoyed by better off peers that can consolidate learning in informal learning experiences through travel, after school clubs, societies.
All students should experience high quality practical activities and field work, including outdoor learning in a range of environments. Students from socioeconomically disadvantaged backgrounds are unlikely to have this opportunity unless it is firmly embedded as part of the school curriculum.

In primary science, RSB advocates for bringing every day experiences into the classroom and exploring local environments. Across 5-19 biology education **RSB recommends that the biology curriculum provides pupils with ample opportunities to engage in practical and investigative work, including in the field.** The Royal Society of Biology would be happy to explore more of these recommendations with the panel, as detailed in Developing a Primary Science Curriculum and Evolving 5-19 Biology

RSB's Member Organisation, the British Ecological Society (BES) reports that a common theme encountered is that teachers believe that they cannot effectively implement fieldwork unless they have access to a "green space". BES and RSB are keen to dispel this myth, and provide examples of fieldwork that make use of the school and local area and go beyond the traditional quadrat and transects. For example: exploring light and shade, trampled and non-trampled grassy spaces, visiting local natural sites, leaf litter and observing lichen and moss, bird watching and fungi trails.

British Ecological Society (2023) Connecting Schools to Nature in North-East England
https://www.britishecologicalsociety.org//wp-content/uploads/2024/06/Connecting-Schools-Short-Evaluation-Report.pdf

Developing a Primary Science Curriculum (2024)
https://www.rsb.org.uk/images/edpol/Developing_a_Primary_Science_Curriculum.pdf

Evolving 5-19 Biology: recommendations and framework for 5-19 biology curricula (2021)
https://www.rsb.org.uk/images/Evolving_5-19_Biology.pdf

**Q13. In the current curriculum, assessment system and qualification pathways, are there any barriers to improving attainment, progress, access or participation which may disproportionately impact pupils based on other protected characteristics (e.g. gender, ethnicity)?**

The recommendations that Royal Society of Biology presents to the panel, and the principles that informed our recommendations and framework in Evolving 5-19 Biology, Developing a Primary Science Curriculum and Framework for a Future Primary Science Curriculum, have all taken an approach to support attainment, progression, access and participation in the sciences for students of all backgrounds and protected characteristics, including consideration of where barriers exist in the current system.

The RSB response is informed by a vast body of research into barriers that prevent students progressing through the sciences or feeling that the sciences are "for them", including UCL's longitudinal ASPIRES research, reports by partner organisations and RSB's Member Organisations. In addition, the RSB has sought views from education practitioners, school and university students, assessment designers, biology education researchers, academics, RSB Member Organisations and RSB individual members.
Within the sciences, the first area to be addressed is the inequity of the current dual route at GCSE - which cuts off students at an early age from access to specialist teachers. Moreover, the Combined Science GCSE combines the grading of Biology, Chemistry and Physics, thus, masking a student's individual strengths and weaknesses and leading to the perception that one route is for elite, high attaining, high science capital students, while the double route signifies that a student is "less good" or less interested in progression.
**The Royal Society of Biology advocates for a single route through the sciences at GCSE to address many of these issues.**

The next area to be addressed is content, contexts, and accessibility within the curriculum. Presented in contexts students relate to and understand, Biology curriculum content, specifications and qualifications can support a student's recognition of the views of others, through appreciating global perspectives, diverse representation of historic and contemporary figures, use of inclusive language and terminology, and addressing harmful misconceptions about sex, gender, and race. Real world examples of biology in daily life and development of skills should support all students, regardless of destination post-16 or post-19, to make healthy choices, and experience and enjoyment of nature and the local environment.The Royal Society of Biology seeks to address these issues through the panel and review process taking on board recommendations in Evolving 5-19 Biology, Developing a Primary Science Curriculum and Framework for a Future Primary Science Curriculum.

As above, there is a broad range of evidence around gender and ethnicity and STEM progression, attainment and enthusiasm. RSB presents some examples and highlights recommendations below. RSB and its curriculum committee would be happy to explore with the panel in the next phase of the review.

Gender disparity in A level entries, and considering other protected characteristics:
Entries to A level Biology are consistently unequal in terms of gender balance, with female students representing around 65% of the A level entries each year. In Higher education around 60% of first year undergraduate Biology students are female.
Further data exploration through NPD data is required to consider progression and attainment trends for other protected characteristics - this data is not shared by JCQ or exam boards in August exam data releases, and so is less easily interrogated on an annual basis.

ASPIRES longitudinal research has generated new understanding of how young people pursue trajectories both into and out of science, technology, engineering and mathematics, and how their experiences and pathways are shaped by gender, race/ethnicity and social class.
ASPIRES 3 Young peoples STEM trajectories age 10-22 (2023)
(https://discovery.ucl.ac.uk/id/eprint/10181968/1/ASPIRES3%20Main%20Report.pdf

Learning from Wales: Baseline Evidence and Research Project for Gender Equality in STEM

https://www.gov.wales/sites/default/files/publications/2020-11/baseline-evidence-and-research-project-for-gender-equality-in-stem-final-report-data-review.pdf

Inequity between queer people and their non-queer pears in STEM education:
APPG on Diversity and inclusion in STEM - Inquiry on Equity in STEM education (2020)
https://diversityuk.org/wp-content/uploads/2020/06/Final_report_Inquiry_on_Equity_in_STEM_education.pdf
Recommendation 2: STEM education should be more relevant to the lives of all young people, appeal to a wider cross section of young people and do more to create the conditions to enable students to experience STEM as inclusive and 'for me'.

In Higher Education, students identifying as a sexual minority were 7% less likely to be retained in STEM courses compared to switching to a non-STEM programme, and gender disparity in STEM retention appears to be reversed in sexual minority STEM students. The barriers that these students face are less well explored in progression through A level STEM subjects, or in the divide between Combined Science GCSE and "triple science" GCSE.
Hughes, B. E. (2018). Coming out in STEM: Factors affecting retention of sexual minority STEM students. Science Advances, 4(3).
https://www.science.org/doi/10.1126/sciadv.aao6373

Projects and research conducted by the Institute of Physics have sought to explore, and make recommendations to address, gender in balance across a range of subjects, suggesting ways to score gender progression (Closing Doors) by looking at gender breakdown of progression from GCSE to A level in six subjects (physics, economics, mathematics, biology, English and psychology). Further research, interrogating the NPD data, would be beneficial in considering other protected characteristics. Opening Doors recommended that schools use such progression data to identify and address issues in gender equity across all subjects.
Closing Doors (2013) https://www.iop.org/sites/default/files/2019-03/closing-doors.pdf
Opening Doors (2015) https://www.iop.org/sites/default/files/2019-02/opening-doors-countering-stereotyping.pdf

**Q14. In the current curriculum, assessment system and qualification pathways, are there any barriers in continuing to improve attainment, progress, access or participation for learners with SEND?**

Schools need to be well funded to ensure that SEND students are able to access practical activities. There may be particular barriers in laboratory spaces and field work that are not easily addressed through curriculum, assessment and qualifications pathways, but nonetheless impact attainment, progress, access and participation.

The Royal Society of Biology would be keen to explore specific curricular and assessment models that support students with SEND, and would take advice from other organisations and professionals with expertise in this area.

Parity, and understanding, of a range of qualifications pathways is important for SEND learners. Natspec's Rethinking SEND suggests that many young people progress from special schools to general further education colleges, educating 89% of college students with ECHPs, and highlights the need to support SEND students with skills for independence and preparation for work.
https://natspec.org.uk/rethinking-send-what-if-college-send-provision-and-local-authorities-had-an-amicable-separation/

Natspec also calls for fair access for learners with more complex needs to further education, including better collection of SEND data on young people in FE, providing better information and support for young people and families about post-16 options
https://natspec.org.uk/policy/priorities/fair-access-complex-needs/

EPI's report suggests that agriculture and animal science T level pathways, along with digital T levels, have the highest prevalence of SENd out of all the pathways.
EPI (2024) A quantitative analysis of T level access and progression
https://epi.org.uk/wp-content/uploads/2024/11/T-Level-Report-final_1.pdf

**Q15. In the current curriculum, assessment system and qualification pathways, are there any enablers that support attainment, progress, access or participation for the groups listed above? [e.g. socioeconomically disadvantaged young people, pupils with SEND, pupils who are otherwise vulnerable, and young people with protected characteristics]**

There are elements present in the current National Curriculum Programmes of Study for biology and science that can support good education in the sciences for all students, however systemic issues often create barriers to positive elements. For example, the compression of Key Stage 3 undermines the breadth of study and preparation for GCSE intended within the Programme of Study, and the prioritisation of English and Maths at Key Stage 1 and 2 due to high stakes assessment in those subjects takes away time and quality learning experiences from the sciences and other subjects.

A good education in the sciences can and should develop: knowledge of major, culturally significant, ideas and explanations in the sciences and how they can be used to solve global challenges though personal and societal decisions; confidence and ability to discuss scientific ideas and facility with scientific language and the ability to distinguish a well-founded, evidence based scientific claim, from opinion, misinformation and disinformation; transferable life skills and capabilities that have utility within and outside the sciences.

The Royal Society of Biology's Evolving 5-19 Biology: transferable skills in biology education provides examples of a range of transferable skills that all students can develop in 5-19 biology education that are necessary in life and for a broad range of science and non-science careers.
https://www.rsb.org.uk/images/edpol/Evolving_5-19_Biology_-_Transferable_skills.pdf

All students should be supported to progress through the sciences, regardless of their science capital, background or future aspirations, to support their development into citizens capable of making choices about their life and health based on the foundations of knowledge in the school curriculum for the sciences. High quality fieldwork experiences allow for first hand science in the real world, and support developing science capital for a broad range of students. Such experiences can engage those that struggle in a traditional classroom or lab environment, and encourage students to see science as being "for them" and relevant to everyday life as well as a career or further study option.

The Royal Society's Science Education Tracker suggests that barriers persist for disadvantaged students, who are less likely to have family science connections or access STEM opportunities, and for female students, who cite difficulty and workload as deterrents more often than males . Asian and Black students showed higher confidence and interest in science compared to their White and Mixed peers, who were more likely to say science is "not for me" . Biology was also viewed as more engaging and relevant than chemistry or physics, which were often perceived as too difficult .

Royal Society Science Education Tracker (2023)

https://royalsociety.org/news-resources/projects/science-education-tracker/

The Education Policy Institute's recent report highlights pathway, prior qualifications and preferences as factors for underrepresentation in level 3 STEM qualifications. For disadvantaged pupils, the odds of progressing to level 3 STEM are 44% lower compared with more affluent peers. Black Caribbean, White and Black Caribbean, Gypsy/Roma and Travellers of Irish heritage are the least likely to progress to level 3 STEM qualifications.

EPI recommends that the curriculum and assessment review should consider how access to non-A level post-16 STEM qualifications can be improved. "Route to level 3 STEM qualifications are generally quite limited to traditional A level academic routes with prior attainment entry barriers". RSB would go further, and suggest that the impact of the inequities created by the existence of a dual GCSE route for the sciences selects young people out at an early stage from science pathways and is perceived as a route only for the highest attainers. This is discussed in RSB's response to questions 11, 12, 13, 29, 41 and 45.

EPI state that prior attainment is the most important predictor of STEM courses. Our concerns about the triple science route and skewing of grades to the top end is further supported by EPI's finding that STEM subjects are more popular with high-attaining disadvantaged pupils - for Biology A level, 43% of disadvantaged A level students are in the highest prior attainment quintile, compared to 38% of their peers. EPI states that "access to triple or combined GCSE science varies and is strongly linked to future A level choices" and confirms the illusion of choice present in these GCSE options "Students were typically unaware of the role that prior attainment played in their steering towards triple or combined GCSE science, mostly believing that it was their choice"

For BTECs, disadvantaged students are over 6% more likely to be studying health studies and 4% more likely to study applied sciences

EPI and CfEY, Progression at age 16 of young people from underrepresented backgrounds towards careers in STEM (2024)

https://epi.org.uk/publications-and-research/progression-at-age-16-of-young-people-from-underrepresented-backgrounds-towards-careers-in-stem/

## Section 4: Ensuring an excellent foundation in maths and English

**16. To what extent does the content of the national curriculum at primary level (key stages 1 and 2) enable pupils to gain an excellent foundation in a) English and b) maths? Are there ways in which the content could change to better support this aim? [Please note, we invite views specifically on transitions between key stages in section 9.]**

**17. To what extent do the English and maths primary assessments* support pupils to gain an excellent foundation in these key subjects? Are there any changes you would suggest that would support this aim? *These include SATs at the end of key stage 2, the phonics screening check and the multiplication tables check.**

**18. To what extent does the content of the a) English and b) maths national curriculum at secondary level (key stages 3 and 4) equip pupils with the knowledge and skills they need for life and further study? Are there ways in which the content could change to better support this aim?**

**19. To what extent do the current maths and English qualifications at a) pre-16 and b) 16-19 support pupils and learners to gain, and adequately demonstrate that they have achieved, the skills and knowledge they need? Are there any changes you would suggest that would support these outcomes?**

**20. How can we better support learners who do not achieve level 2 in English and maths by 16 to learn what they need to thrive as citizens in work and life? In particular, do we have the right qualifications at level 2 for these 16-19 learners (including the maths and English study requirement)?**

**21. Are there any particular challenges with regard to the English and maths a) curricula and b) assessment for learners in need of additional support (e.g. learners with SEND, socioeconomic disadvantage, English as an additional language (EAL))? Are there any changes you would suggest to overcome these challenges?**

| |
|---|
| RSB did not respond to Section 4 (Questions 16-21) |

## Section 5: Curriculum and qualification content

**Q22. Are there particular curriculum or qualifications subjects* where: a) there is too much content; not enough content; or content is missing; b) the content is out-of-date; c) the content is unhelpfully sequenced (for example to support good curriculum design or pedagogy); d) there is a need for greater flexibility (for example to provide the space for teachers to develop and adapt content)? Please provide detail on specific key stages where appropriate. *This includes both qualifications where the government sets content nationally, and anywhere the content is currently set by awarding organisations.**

Over the last 10 years RSB has been preparing for the next round of curriculum reform in England. The Society is pleased that the panel is considering these questions, and provides here some headline messages in answer to the questions, as well as references to our published policy recommendations and frameworks. **RSB strongly recommends that issues in curriculum and qualifications in the sciences are addressed as a priority in the review, and would welcome the opportunity to provide further evidence to the panel to support our recommendations.** RSB welcomes the panel's commitment to ensuring curriculum and qualification pathways set up young people to progress and thrive in education and work, a priority that underpins all of RSB's education policy work to support excellent teaching and learning in the biosciences.
https://www.rsb.org.uk/images/RSB_Education_Priorities_2023-2028_Final.pdf

In 2014, the Royal Society of Biology set up a Curriculum Committee with the aim of taking time and space away from the cycles of curriculum review, to collect evidence, views and best practice to set out a vision for 5-19 biology education. This committee drew on research, expertise of practitioners and researchers, student voice via surveys and informal discussions, examples from Scotland, Wales and Northern Ireland, International Baccalaureate and international curricula.

RSB student voice surveys - post-16 biology
https://www.rsb.org.uk/education/teaching-resources/secondary-schools/post-16-biology-survey/post-16-biology-survey-2016-17
https://www.rsb.org.uk/education/teaching-resources/secondary-schools/post-16-biology-survey/post-16-biology-survey-2017-18

The Royal Society of Biology's overarching recommendations and framework, Evolving 5-19 Biology, were published in 2021 and following that RSB has published explorations of often overlooked areas of the curriculum. Along with partners in other science organisations, we convened a Primary Curriculum Advisory Group to provide further recommendations for primary science education, again drawing on a breadth of expertise and research. In Evolving 5-19 Biology, an exemplification is laid out in appendices 3A, 3B and 3C for ages 5-7, 7-11, 11-14, 14-16 and 16-19, which was developed to make clear links to be made between areas within biology
across this entire 5-19 age range. It builds upon the biological ideas that pre-school children have explored and developed before starting formal education, is designed to be sufficiently future proofed to reduce the need for regular updates of the curriculum, and considers the accompanying upheaval this causes in schools.
All of the Royal Society of Biology's curriculum and qualifications publications can be found at www.rsb.org.uk/curriculum

Former Curriculum Committee members, provide more insight into the development of Evolving 5-19 Biology in this School Science Review Article (2022)
https://www.rsb.org.uk/images/edpol/Moore_and_Fullick_2022_A_vision_for_the_future_of_the_519_biology_curriculum_-_coherence_learning_progression_and_relevance.pdf

**RSB agrees with the panel that curriculum content should not limit teaching time, and strongly**

**recommends that biology content is reviewed and reduced throughout the 5-19 programmes of study and specifications.** Where RSB has added new content or suggested amends to content in our Evolving 5-19 Biology exemplification, we have carefully considered the impact on 5-19 learning progression and specific key stages, and reduced content where appropriate. Across all stages, more emphasis should be placed on the experience of the student and opportunities for practical activities and field work in the sciences. Less emphasis should be placed on qualification assessment criteria and outcomes defining the entirety of the school curriculum

Findings from the Royal Society of Chemistry's teaching survey state: "In 2024, 72% of teachers from mainstream state secondary schools across all nations reported that an overloaded science curriculum had a detrimental effect on their students. Teachers told us about having to rush through topics, a curriculum that lacks relevance, and no time to promote a love of science." https://www.rsc.org/policy-evidence-campaigns/chemistry-education/education-reports-surveys-campaigns/the-science-teaching-survey/2024/top-issues-impacting-student-learning-outcomes/

This annual survey of teachers reported similar findings in 2023 and suggested support for novel approaches to curriculum content such as an interdisciplinary module focusing on solving problems for the future, as well as echoing many of RSB's Evolving 5-19 recommendations such as making real-life applications more explicit.
https://www.rsc.org/policy-evidence-campaigns/chemistry-education/education-reports-surveys-campaigns/the-science-teaching-survey/2023/teachers-recommend-curriculum-changes/

In Evolving 5-19 Biology, Royal Society of Biology sets out recommendations for all key stages (page 16+17):

1. The biology curriculum should aim to develop pupils' understanding in the three dimensions.
2. The biology curriculum should aim to develop pupils' understanding of big ideas of biology to answer big questions in biology.
3. The biology curriculum content that is set out in policy and guidance documents should enable coherent learning progression from age 5 to age 19.
4. The biology curriculum should provide pupils of all ages with ample opportunities to engage in practical and investigative work, including in the field.
5. The biology curriculum should provide pupils of all ages with ample opportunities to learn about plants and other organisms, in addition to humans and other animals.
6. The development of biology curriculum policy, guidance and content should draw upon previous curriculum development work and evidence from research, where appropriate.
7. The biology curriculum content set out in policy and guidance documents should be clear, teachable and assessable, while allowing scope for innovation in delivery.
8. The biology curriculum should be contemporary yet durable.

In Key Stage 1 and 2 Programme of Study: science, RSB makes recommendations to improve flexibility and sequencing of the biology content in Developing a Primary Science Curriculum, and on in Appendix 3A of Evolving 5-19 Biology sets out an exemplification of content for ages 5-7 and 7-11 structured under 7 big questions of biology and 27 themes within them to address unhelpful sequencing. Of particular concern in terms of out of date or missing content in the current Programme of Study are reproduction, health, and sustainability education.

Evolving 5-19 Biology: recommendations and framework for 5-19 biology curricula (2021)
https://www.rsb.org.uk/images/Evolving_5-19_Biology.pdf

A Primary Curriculum Advisory Group convened by the Association for Science Education, Institute of Physics, Royal Society of Biology and Royal Society of Chemistry, drew extensively on evidence from a wide variety of research sources and many additional experts in the field. The Framework for a Future Primary Science Curriculum (2023) presented to the science organisations was taken on board and

further recommendations from ASE, IOP, RSB and RSC were published in Developing a Primary Science Curriculum (2024).

Framework for a Future Primary Science Curriculum (2023)
https://www.rsb.org.uk/images/edpol/Primary_Curriculum_Advisory_Group_report.pdf

Developing a Primary Science Curriculum (2024)
https://www.rsb.org.uk/images/edpol/Developing_a_Primary_Science_Curriculum.pdf

In Key Stage 3 Programme of Study: science, the purpose of Key Stage 3 is currently unclear, with many schools compressing Key Stage 3 to account for overburdened specifications at GCSE. Timetabling Research by Shift Learning suggests 78% of schools start GCSE teaching in Year 9 for the sciences for both Combined Science GCSE and the "triple science" route of separate Biology, Chemistry and Physics GCSEs. More flexibility is required to better support practical activities and field work accessible to all students in Key Stage 3.

Appendix 3B of Evolving 5-19 Biology sets out an exemplification of content for ages 11 -14 structured under 7 big questions of biology and 27 themes within them to address unhelpful sequencing. Of particular concern in terms of out of date or missing content in the current programme of study are reproduction, health, and sustainability education.
Evolving 5-19 Biology: the role of practical activities (2023)
https://www.rsb.org.uk/images/edpol/Evolving_5-19_Biology_-_Practical_Science.pdf

Evolving 5-19 Biology: sustainability education (2023)
https://www.rsb.org.uk/images/edpol/Evolving_5-19_Biology_-_Sustainability_Education.pdf

The Science Education Tracker was established by Wellcome in 2016, with a second survey commissioned in 2019. The Royal Society has conducted a third survey in partnership with EngineeringUK and funding from Wellcome. RSB notes that the report suggests practical activities are a strong motivator for students in years 7-9, with 52% of students choosing this as a factor for learning science.
Royal Society Science Education Tracker (2023)
https://royalsociety.org/news-resources/projects/science-education-tracker/

In Key Stage 4 Programme of Study: A distinct identity for each of the sciences is required. More flexibility is required to better support practical activities and field work, to develop transferable skills within a science context, and future-proof the curriculum to allow better inclusion of applications and innovation such as mRNA vaccines or CRISPR.

Appendix 3B of Evolving 5-19 Biology sets out an exemplification of content for ages 14 -16 structured under 7 big questions of biology and 27 themes within them to address unhelpful sequencing. Of particular concern in terms of out of date or missing content in the current Programme of Study are reproduction, health, ecology and sustainability education, and overly detailed content statements on biochemistry of photosynthesis and genetics.

Regarding GCSE specification content set by exam boards: Both Combined Science GCSE and Biology GCSE are overburdened specifications, particularly in biology. **The Royal Society of Biology strongly advocates for a reduction in content as part of a new GCSE that takes the best features of the "triple science" Biology GCSE and applies them to a more manageable, common route for all students in the sciences.**

Regarding Key Stage 5, RSB's recommendations in Evolving 5-19 Biology exemplification are aimed at ensuring a broad biology education that supports progression for learners in life, further study and work.

At Key Stage 5, the framework and recommendations continue this, with acknowledgement that an A level in Biology should provide a broad biology basis for progression into biology and biology related subjects in university, as well as other science-related subjects. For T levels and Level 3 BTECs, RSB has used our framework and recommendations with a more focused view with an expectation that those more specialised routes should only focus on particular aspects of the age 16-19 recommendations with a view to supporting progression to a particular career or area of bioscience.

For A level, Appendix 3C of Evolving 5-19 Biology sets out an exemplification of content for ages 11 -14 structured under 7 big questions of biology and 27 themes within them to address unhelpful sequencing. Of particular concern in terms of out of date or missing content in the current Programme of Study include health and genetics.

For T levels, RSB has already worked with the panels on outline core biology content for T levels in Agriculture, Land Management and Production, Animal Care and Management, Health, Healthcare Science and Science, these were informed by Evolving 5-19 Biology. However, occupational specialism units, for example wildlife and ecology, should be considered for updating, improving and future proofing.

For Level 3 BTECs: RSB and representatives of our Member Organisations have recently contributed to panel reviews of Level 3 qualifications: BTEC Medical Science (previously Applied Human Biology) and Applied Science, using Evolving 5-19 Biology as a framework.

Outside of biology curricula: biology plays a significant part in statutory guidance on relationships education, relationships and sex education and health education. Due to the overlaps with reproduction and health education within biology programmes of study and GCSE specifications the sequencing of RSHE and its interaction with biology education is important to consider. RSB was generally supportive of the guidance made statutory in 2021, and liaised with the team at DfE during development of the guidance to discuss potential issues that may arise with RSHE teachers that are not familiar with biology programmes of study and specifications, and possible misconceptions. However, RSB was not supportive of the vast majority of amendments suggested in the new RSHE guidance proposed in May 2024. **RSB responded to the consultation with recommendations based on Evolving 5-19 Biology in July 2024 and would welcome clarity from the panel, or DfE, on the status of the proposed revised guidance and the place of those consultation responses in this review.**
https://www.rsb.org.uk/images/RSB_DfE_RHSE_consultation_response_for_publishing.pdf

**Q23. Are there particular changes that could be made to ensure the curriculum (including qualification content) is more diverse and representative of society?**

A Primary Curriculum Advisory Group convened by the Association for Science Education, Institute of Physics, Royal Society of Biology and Royal Society of Chemistry, drew extensively on evidence from a wide variety of research sources and many additional experts in the field. The Framework for a Future Primary Science Curriculum (2023) presented to the science organisations was taken on board and further recommendations from ASE, IOP, RSB and RSC were published in Developing a Primary Science Curriculum (2024).

Global citizenship is integral to the vision and aims of the framework:
“To enable the design of a contemporary primary science curriculum, this curriculum framework is underpinned by a wider vision for primary education where all children flourish and can take their place in the world as informed and responsible citizens, ready and able to meet the global challenges of sustainable and equitable living”

The purpose of the framework is to enable curriculum designers to develop a primary science curriculum to give children the knowledge and agency to be responsible global citizens, which includes understanding how the world works and a sense of their own place within it, taking responsibility for actions, participating in the wider community from local to global and respecting and valuing diversity. The Nature and Practices of Science defined by PCAG's knowledge maps also include: science is universal, has been and is carried out in all cultures at all ages, creating a diverse scientific global community..

Framework for a Future Primary Science Curriculum (2023)
https://www.rsb.org.uk/images/edpol/Primary_Curriculum_Advisory_Group_report.pdf

ASE, IOP, RSB and RSC further recommend in Developing a Primary Science Curriculum (2024):
Global citizenship:
The PCAG curriculum framework sits within a wider vision for primary education: one where all children have the knowledge and agency to be responsible global citizens. Global citizenship describes individuals and communities who take responsibility for their actions and work towards making the world a more equitable and sustainable place. A new curriculum should enable children to develop the knowledge, skills and values they need to be global citizens through helping them to engage with societal, environmental and economic issues.

Inclusion:
It is essential that all children feel included in the sciences byvaluing their experiences and through the thoughtful use of contexts, imagery and narratives. This is partly achieved by ensuring that they build a repertoire of shared experiences; partly through techniques within the classroom; and partly through the narratives attached to the sciences. Specifically, the curriculum should offer children a chance to learn about historic Western and non-Western contributions to the sciences, as well as cutting-edge contemporary research from diverse teams of scientists. Teachers should be encouraged to frame historic examples of scientific discoveries in the context that some individuals, groups, cultures and nations were disadvantaged in their ability to participate in or to resource research and less able to claim credit and ownership for ideas that had been developed by them.
overlook
Contexts:
Linking important scientific concepts with real-life contexts that are familiar and/or engaging to children, especially those that have a local flavour, can help them identify with the sciences, build their science capital, and improve their knowledge base, which can help them to make informed decisions, such as those regarding their health and wellbeing.

Developing a Primary Science Curriculum (2024)
https://www.rsb.org.uk/images/edpol/Developing_a_Primary_Science_Curriculum.pdf

In development of Evolving 5-19 Biology, similar principles formed the basis of our research, expertise of colleagues from a range of backgrounds, and seeking out expertise on decolonising the curriculum and an approach of "no more heroes" in the curriculum i.e. avoiding prescriptive lists of historic figures in biology, instead exploring opportunities for local, recogniseable, diverse historic and contemporary figures through which discovery and exploration of biological concepts can be explored, and encouraging students to see a wide range of biologists in action.

Evolving 5-19 Biology: recommendations and framework for 5-19 biology curricula (2021)
https://www.rsb.org.uk/images/Evolving_5-19_Biology.pdf

**The Royal Society of Biology aims to promote implementation of the Evolving 5-19 Biology and Developing a Primary Science Curriculum recommendations in reform of primary science and 5-19 biology education.**

**Q24. To what extent does the current curriculum (including qualification content) support students to positively engage with, be knowledgeable about, and respect, others? Are there elements that could be improved?**

There are many areas of the biology curriculum that support positive engagement and address misconceptions. For example, learning about biological similarities and differences through genomics, and understanding that old concepts of race aren't biological but societal.

Studying biology includes exploration of the wonders of the diversity of life, and the Royal Society of Biology seeks to improve biology education for all students, regardless of their post-school destinations by implementing the recommendations in Developing a Primary Science Curriculum and Evolving 5-19 Biology.

**Q25. In which ways does the current primary curriculum support pupils to have the skills and knowledge they need for life and further study, and what could we change to better support this?**

Framework for a Future Primary Curriculum, produced by our Primary Curriculum Advisory Group sets out a vision for children to understand how science ideas and explanations have been used, and are used and applied in everyday life and beyond their communities. The framework presents a knowledge map for the Nature and Practices of Science, and subject knowledge maps for Biology, Chemistry and Physics which include: understanding for global citizenship, subject knowledge children need by age 11 and essential experiences that all children must have by age 11. The Royal Society of Biology's Evolving 5-19 Biology presents carefully considered learning progressions drawing on expertise of a wide range of practitioners, researchers and experts from other organisations. In developing the learning progressions, the working groups considered what students needed to know about health and reproduction to support them in life as well as further study in the sciences and other subjects.

The PCAG Knowledge Map Biology highlights: visiting, observing and handling living things in a variety of habitats, encouraging wildlife into their own environment, learning about the life cycles of irving things, making healthy lifestyle choices, growing plants, preparing and and eating them, observing the weather and its effect, and celebrating green spaces.

RSB's Evolving 5-19 Biology's exemplification in Appendix 3A sets out learning progressions for primary age students, and further emphasises the importance of understanding the basic parts and functions of human bodies, the changes as humans grow and develop including puberty, variation, adaptation and evolution, physical and mental health including use of medicines and impact of diet and lifestyle, health and infectious disease, biodiversity and human impacts.

Both documents prepare students for further study of the sciences in Key Stage 3 and 4 as part of the compulsory, core curriculum.

Framework for a Future Primary Science Curriculum (2023)
https://www.rsb.org.uk/images/edpol/Primary_Curriculum_Advisory_Group_report.pdf

Evolving 5-19 Biology: recommendations and framework for 5-19 biology curricula (2021)
https://www.rsb.org.uk/images/Evolving_5-19_Biology.pdf

Transferable skills are important to work and study at all levels. "All learners should experience curricula

and assessments that prepare them to be scientifically literate, able to make scientifically informed choices and ready them for the diverse and evolving world of work". In primary, children appreciate that "making observations" refers to much more than looking at things, recording observations, using real examples of observations and repeating and increasing accuracy of measurements with equipment such as thermometers and timers all support life and further study.

Evolving 5-19 Biology: transferable skills in biology education (2024)
https://www.rsb.org.uk/images/edpol/Evolving_5-19_Biology_-_Transferable_skills.pdf

**Q26. In which ways do the current secondary curriculum and qualification pathways support pupils to have the skills and knowledge they need for future study, life and work, and what could we change to better support this?**

RSB's Evolving 5-19 Biology's exemplification in Appendices 3B sets out learning progressions for secondary students age 11-16. While developing these learning progressions careful consideration was taken to ensure that all learners would have a good understanding of areas that would support them as citizens to make informed and evidence based healthy choices for themselves and the world, and use the transferable life skills that are developed as part of biology education. This includes, but is not limited to:

RSB's Evolving 5-19 Biology's exemplification in Appendices 3C sets out learning progressions for secondary students age 16-19, to support a broad biology curriculum that supports progression to a variety of routes, including academia. For technical and vocational pathways, RSB makes recommendations based on a narrower set of the big questions of biology in our framework as appropriate to the occupational specialisms or progression route those technical and vocational qualifications will lead to. Practical skills and transferable life skills play an important part of all routes post-16, such as problem-solving, team work, physical manipulation of equipment, observation, analysis and interpretation of data and evidence.

Throughout 11-19 education RSB presents three dimensions as equally important to the biology curriculum: Practice of Biology, Concepts of Biology, and Applications of Biology. These include: asking questions about the biological world, planning and carrying out practical experiments and investigative work, analysing, interpreting and evaluating data, developing explanations, classification systems and models, communicating information and engaging in evidence-based arguments, developing applications to promote human and environmental wellbeing, evaluating impacts of biological knowledge and its applications, and influencing society.

Evolving 5-19 Biology: recommendations and framework for 5-19 biology curricula (2021)
https://www.rsb.org.uk/images/Evolving_5-19_Biology.pdf

Transferable skills are important to work and study at all levels. "All learners should experience curricula and assessments that prepare them to be scientifically literate, able to make scientifically informed choices and ready them for the diverse and evolving world of work".

The Royal Society of Biology points to Gatbsy's Good Career Guidance and benchmarks as recommendations for careers guidance in the sciences. And notes that the benchmarks have been updated and expanded.
https://www.gatsbybenchmarks.org.uk/app/uploads/2024/11/good-career-guidance-the-next-10-years-report.pdf

Gatsby benchmark 4: linking curriculum learning to careers:
As part of the school's programme of careers education, all teachers should link curriculum learning with careers. Subject teachers should highlight the progression routes for their subject and the relevance of the knowledge and skills developed in their subject for a wide range of career pathways.
Criteria for schools: Every year, in every subject, every pupil should have opportunities to learn how the knowledge and skills developed in that subject helps people to gain entry to and be more effective workers within a wide range of careers.

Skills for future work developed in biological education should prepare students for a range of destinations - within and beyond the sciences. Gatsby's benchmark 4: linking curriculum learning to careers, can only be meaningfully achieved by schools if time and space is made in programmes of study and qualifications specifications to support these additional, non-examined components.

Climate Change and sustainability is strongly represented in the Royal Society of Biology's framework and recommendations to improve biology education for all students and prepare them to make healthy and informed choices about their lives and the planet. The curriculum framework, Evolving 5-19 Biology, emphasises: human impact, both positive and negative; biodiversity and ecosystems; developing applications to promote human and environmental wellbeing; and influencing society by asking and answering big questions about biology. RSB has published an exploration of sustainability education in biology, drawing on UN Sustainability Development Goals and the sustainability education aims and strategies of UK Governments.

The Royal Society of Biology attended an event hosted by UCL's Centre for Climate Change and Sustainability Education, and have contributed to the report of that meeting and its recommendations. RSB highlights the following from the report:

In a recent survey of 11-14-year-olds, 87% of respondents expressed concern about what the world will be like in the future because of climate change, expressing negative emotions such as sadness, anxiety, guilt and shame. https://discovery.ucl.ac.uk/id/eprint/10195286/

Delegates made a strong case for embedding climate change and sustainability educationCCSE across the whole curriculum and providing support tailored support to teachers. Given that subject associations exist to promote subject specialisms, a strong case was also made for them to take a lead in supporting teachers to respond to the climate and nature crisis in age- and subject-appropriate ways.

University College London (2024). The role of subjects and subject associations in climate change and sustainability education in England
www.ucl.ac.uk/ioe/departments-and-centres/centres/ucl-centre-climate-change-and-sustainability-education

**Q27. In which ways do the current qualification pathways and content at 16-19 support pupils to have the skills and knowledge they need for future study, life and work, and what could we change to better support this?**

RSB's Evolving 5-19 Biology's exemplification in Appendices 3C sets out learning progressions for secondary students age 16-19, to support a broad biology curriculum that supports progression to a variety of routes, including academia. For technical and vocational pathways, RSB makes recommendations based on a narrower set of the big questions of biology in our framework as appropriate to the occupational specialisms or progression route those technical and vocational qualifications will lead to. Practical skills and transferable life skills play an important part of all routes

post-16, such as problem-solving, team work, physical manipulation of equipment, observation, analysis and interpretation of data and evidence.

Throughout 11-19 education RSB presents three dimensions as equally important to the biology curriculum: Practice of Biology, Concepts of Biology, and Applications of Biology. These include: asking questions about the biological world, planning and carrying out practical experiments and investigative work, analysing, interpreting and evaluating data, developing explanations, classification systems and models, communicating information and engaging in evidence-based arguments, developing applications to promote human and environmental wellbeing, evaluating impacts of biological knowledge and its applications, and influencing society.

## Section 6: A broad and balanced curriculum

**Q28. To what extent does the current primary curriculum support pupils to study a broad and balanced curriculum? Should anything change to better support this?**

Although primary science is a core subject at Key Stage 1 and 2 intended to be taught throughout the year, evidence shows that schools rarely meet our recommendation for 2 hours per week of primary science, and also often compress science teaching into blocks of themed "science week" style topics.

Previously the Wellcome Trust conducted research into primary science, and reported this in their "State of the Nation" reports. Since Wellcome moved away from a focus on science education, there is less up to date information that we can draw upon.
https://wellcome.org/reports/state-nation-report-uk-primary-science-education?gad_source=1&gclid=Cj0KCQjwvpy5BhDTARIsAHSilymsWN6l6aKO2D3I0grEf2Qbyu7kDyMJreZsxNgV0TV7ZhPjqzeIq4IaAks2EALw_wcB

**Q29. To what extent do the current secondary curriculum and, qualifications pathways support pupils to study a broad and balanced curriculum? Should anything change to better support this?**

**The Royal Society of Biology calls for a single route through the sciences at GCSE, and reduced biology content at GCSE, and supports a broad and balanced school curriculum.**

In the current system, schools should try to timetable three GCSEs worth of time on the timetable for students taking the "triple science" route of separate Biology, Chemistry and Physics GCSE, or at least 50% more time than is allocated to Combined Science GCSE - a double award. In practice we find schools are rarely able to do this and instead make compromises that further squeeze the curriculum.

Reduced content in the sciences at GCSE to better support Key Stage 3 science Programme of Study - at 78% of schools begin teaching for GCSEs in the sciences in year 9. This usually requires more space in the timetable from Year 9 for the sciences.

Shift Learning - Science Timetable Models Research (2018)
https://www.rsb.org.uk/images/Science_timetable_models_report_January_2019.pdf

RSB advocates less content at GCSE and a return to a full three year Key Stage 3 for all students. Reducing the burden of content would therefore free up time in the school timetable for a broad and balanced school curriculum, as well as supporting better progression in the sciences and opportunities for breadth and depth as opposed to compressed study, and more opportunity for practical activities and fieldwork. This current system is not optimal for any of: Combined Science GCSE, "triple science" route, or Key Stage 3 students, nor teachers and schools.

RSB's proposal of a single route for the sciences through GCSE would remove the need to try to timetable three GCSEs' worth of time for the "triple science" route. Instead, RSB recommends a new double award GCSE that is more manageable in terms of content, timetable and teacher deployment. Therefore freeing up time for a broad and balanced school curriculum.

If the recommendations in RSB's Evolving 5-19 Biology, and in particular Appendix 3A: Exemplification of the curriculum framework for ages 11-16 are taken on board, we are confident that a revised Key Stage 3 curriculum and double award GCSE for all students can prepare all young people for study, progression and life, working towards a healthy, science literate, nature connected and sustainability aware society, alongside curricula that support this in other subjects. When developing the learning

progressions in Evolving 5-19 Biology, careful consideration was taken to reduce repetition, improve transitions, and support learning through 5-19. For example, currently a student aged 7, 10, 12 or 14 may meet the concept of simple food chains, with contexts and outcomes that are largely the same.

Evolving 5-19 Biology: recommendations and framework for 5-19 biology curricula (2021) https://www.rsb.org.uk/images/Evolving_5-19_Biology.pdf

Study of biology and the sciences should be considered as opportunities to support a broad and balanced curriculum, for example, through practical activities students gain skills including motor skills, understanding and analysing data, asking questions, team work. The sciences also prepare students as citizens who will need to make informed choices to live healthy lives and develop solutions to big challenges, such as climate change and biodiversity loss. In biology, the requirement for fieldwork could be improved and take examples from the geography curriculum to improve fieldwork experiences for all students.

Evolving 5-19 Biology: transferable skills in biology education (2024) https://www.rsb.org.uk/images/edpol/Evolving_5-19_Biology_-_Transferable_skills.pdf

Evolving 5-19 Biology: the role of practical activities (2023) https://www.rsb.org.uk/images/edpol/Evolving_5-19_Biology_-_Practical_Science.pdf

Evolving 5-19 Biology: sustainability education (2023) https://www.rsb.org.uk/images/edpol/Evolving_5-19_Biology_-_Sustainability_Education.pdf

Evolving 5-19 Biology: improving teacher and student perceptions of ecology (2024) https://www.rsb.org.uk/images/edpol/Evolving_5-19_Biology_-_Ecology.pdf

**Q30. To what extent do the current qualifications pathways at 16-19 support learners to study a broad curriculum which gives them the right knowledge and skills to progress? Should anything change to better support this?**

**The Royal Society of Biology supports a broad and balanced curriculum at all stages, which keeps options open for further study with parity of esteem for academic, vocational and technical routes post-16.**

BTEC Applied Science at Level 3 is a vital part of this qualifications landscape, alongside new T levels. Funding for this qualification must be retained to support a broad progression route to a wide range of destinations, for students from all backgrounds. At Level 3, applied science qualifications offer foundations across a range of science content, like A levels, but with more of a practical focus. Aside from progression to degree level education, qualifications in applied sciences can support progression directly into the workplace, or to study at levels 4 or 5. They can also lead to an apprenticeship, or be studied in the context of an apprenticeship. T levels, with their occupational specialism and much smaller intake, are not able to offer the same breadth of progression route for a large number of students.

Joint briefing to DfE on Level 3 qualifications in applied science and engineering (2021) https://www.rsb.org.uk/images/DfE_jointbriefing_level3quals_2021.pdf

Post-16 qualifications pathways do require clarification - students must understand the routes that are open to them following each pathway, and schools must have the resource and information in order to do so.

The Education Policy Institute's recent report finds that students' characteristics vary significantly over T

levels, and that E level students have a lower likelihood of completing a Level 3 qualification by age 18, with disadvantaged and female students most likely to withdraw. Health and science pathways are noted as seeing high rates of withdrawal, worse level 3 attainment outcomes and worse outcomes for students that do withdraw.

EPI (2024), A quantitative analysis of T level access and progression
https://epi.org.uk/wp-content/uploads/2024/11/T-Level-Report-final_1.pdf

The Royal Society of Biology understands that the Department of Education has halted plans to introduce an Advanced British Standard. However, the Society would like to outline some serious concerns about the proposals to guard against similar issues arising from this review process. While RSB would support more teaching time and choice, clarity of purpose, and better preparation for Higher Education study, the proposals for ABS appeared only to be rebranding of the existing system, with an additional expectation that all A level students study English and Maths, and adding an additional burden on T level students to do so.

**Q31. To what extent do the current curriculum (at primary and secondary) and qualifications pathways (at secondary and 16-19) ensure that pupils and learners are able to develop creative skills and have access to creative subjects?**

The science curriculum, given space and time for breadth and depth rather than racing through overburdened specification content, provides many opportunities to develop: curiosity, receptivity, problem-solving, empathy, team work. Science is a creative endeavour and research in the real world draws on creative skills. Therefore STEM education can, and should, be used to develop creativity. Opportunities for extended projects, practical work and field work should be emphasised to support this. In Higher Education, the Royal Society of Biology's degree accreditation criteria include: "Developing creativity and innovation - students are given the opportunity to apply their creative and innovative skills and think beyond their own discipline"

N Sirajudin, J Suratno and Pamuti, Developing creativity through STEM education (2021)
https://iopscience.iop.org/article/10.1088/1742-6596/1806/1/012211/pdf

**Q32. Do you have any explanations for the trends outlined in the analysis and/or suggestions to address any that might be of concern?**

The Royal Society of Biology welcomes the panel's commitment to exploring data on GCSE and A level entries by subject. The Society has reviewed the data appended to this call for evidence, and provide the following commentary from a biology and science point of view:

Entries for GCSE: Physics, Chemistry Biology GCSE around 25%, Combined Science GCSE around 65% - this hasn't changed since first awarded in 2018.This is likely because students do not have a true choice of whether to study a triple science route or Combined Science GCSE - for the most part this decision is made at school level based on setting in Year 7 and 8.

Entries for A level: Biology remains high in terms of entries overall and has increased 1.8% since 2010, though these data disaggregated by gender, ethnicity and socioeconomic factors are more likely to show obvious trends about subject choice and social trends in the sciences.

Teaching time by subject as a proportion of total teaching time in year 10 and 11 - this has been disaggregated by discipline Biology, Chemistry, Physics and “other science”, however this reveals issues with data collection in the school workforce census as timetabling research conducted by Shift Learning showed few schools timetable as separate disciplines, and instead timetable as “science”, and also does not account for the different choices schools make in regard to timetabling the “triple science” route and Combined Science GCSE. For the sciences there is an added issue of specialist and non-specialist teaching in the sciences and how that interacts with the school workforce census. Focussing only on year 10 and 11 for GCSE subjects also overlooks the fact that most schools start GCSE teaching for the sciences in Year 9. There is significant nuance and complicating factors for the sciences both in terms of entry numbers and timetabled teaching time that we are not able to interpret from the data provided. Shift Learning - Science Timetable Models Research (2018) https://www.rsb.org.uk/images/Science_timetable_models_report_January_2019.pdf

RSB is not convinced that the teaching time by subject for year 10 and 11 can be taken as an accurate record for the sciences. Combining the three sciences would suggest that in 2023 and 2024 the timetable totalled 5% for Biology, Chemistry and Physics (2%, 2% and 1%). We suspect that physics does not receive half as much teaching time but the 5% has been split across three subjects evenly. Assuming an average 28.5 hours per week is timetabled lessons, 5% for science would suggest 1.5 hours per week for all three sciences. From the findings of Shift Learning’s timetabling research, the Society expects 15-25% would a be more realistic estimation, and the figures for the sciences should therefore be more similar to English and Maths than appears in table 4.

**Key stage 4 Technical Awards**

**33. To what extent and how do pupils benefit from being able to take vocational or applied qualifications in secondary schools alongside more academically focused GCSEs?**

**34. To what extent does the current pre-16 vocational offer equip pupils with the necessary knowledge and skills and prepare them for further study options, including 16-19 technical pathways and/or A levels? Could the pre-16 vocational offer be improved?**

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|---|
| RSB did not respond to these questions. |

## Section 7: Assessment and accountability

### Primary and national curriculum assessments

**Q35. Is the volume of statutory assessment at key stage 1 and 2 right for the purposes set out above?**

The Royal Society of Biology supports the current system of no high stakes assessment for the sciences at Key Stage 2. However, removal of science SATs has reduced the amount of time allocated to science and other subjects at primary, and may have led to a perception that science is a less important core subject than English and Maths at Key Stages 1 and 2.

This balance of emphasis and the importance placed on a broad and balanced curriculum in primary school should be addressed by the panel in this review, considering the impact of subjects that are assessed in SATs has on the broader programme of study for non-examined areas of the National Curriculum.

**Q36. Are there any changes that could be made to improve efficacy without having a negative impact on pupils' learning or the wider education system?**

RSB did not respond this question

**Q37. Are there other changes to the statutory assessment system at key stages 1 and 2 that could be made to improve pupils' experience of assessment, without having a negative impact on either pupils' learning or the wider education system?**

RSB did not respond this question

**Q38. What can we do to ensure the assessment system at key stages 1 and 2 works well for all learners, including learners in need of additional support in their education (for example SEND, disadvantage, EAL)?**

The Royal Society of Biology does not have an established view on whether English and Maths SATs should continue in their current form, and leaves others to comment on this matter.

However, RSB would support changes to the assessment and accountability processes at primary school that would emphasise the importance of science alongside Maths and English as core subjects, while supporting breadth in the primary curriculum.

**Secondary assessment**

**Q39. Is the volume of assessment required for GCSEs right for the purposes set out above? Are there any changes that could be made without having a negative impact on either pupils' learning or the wider education system?**

Within the context of this curriculum and assessment review, including the panel's preference for "evolution not revolution" in the exam system, the Royal Society of Biology supports retention of the GCSE and A level qualifications system - if the Society's recommendations for GCSEs in the sciences are taken forward.

However, as part of evolution not revolution, and a desire to see stability in the school education system, RSB would not want to see abolition of GCSEs ruled out in future, or the door closed to exploring novel ways to reduce the high-stakes assessment burden on students. If the curriculum and assessment review are led by curriculum, pedagogy and student experience, it should be possible in future to remove GCSEs in favour of another form of assessment without requiring a complete overhaul of the system. The panel should aim to get the foundations of curriculum and 5-19 learning progression organised in a system that better supports teaching and learning, and allows flexibility for innovation in assessment in future years without complete overhaul of the curriculum.

The curriculum should ensure stability for a significant period of time for teachers and students, rather than iterative reform. However, the curriculum should also enable flexibility and be future-proofed to ensure adjustments can be made without wholesale reform. The Royal Society of Biology's Evolving 5-19 Biology seeks to achieve this through its recommendations, framework and exemplifications of 5-19 learning progressions..

Evolving 5-19 Biology: recommendations and framework for 5-19 biology curricula (2021) https://www.rsb.org.uk/images/Evolving_5-19_Biology.pdf

The Royal Society of Biology welcomes the comparison with international qualifications and assessments, which the panel has highlighted via OECD's Education at a Glance 2023. When developing Evolving 5-19 Biology the Society looked at education systems of other UK nations, as well as exploring international examples including International Baccalaureate, while developing our recommendations in Evolving 5-19 Biology. This included drawing lessons from the development of the US Next Generation Science Standards. https://www.nextgenscience.org/developing-standards/developing-standards

The Royal Society of Biology agrees that the volume of assessment at GCSE should be reviewed, and in line with our recommendation that all students study for the same GCSE award in the sciences, with reduced content and in 2 GCSEs' worth of Guided Learning Hours, this would in turn result in fewer high stakes exams in year 11 that are currently associated with the triple science route. See RSB's answers to questions 11 ,12, 13 ,29, 41 and  in this response for more detail

The Royal Society of Biology agrees that externally set and marked assessments still have a place in school education, and recognises the benefits of objectivity and consistency in grading standards. However, RSB would also support teacher assessment that can ensure similar standards, fairness and accessibility. When considering teacher assessed options, RSB urges the panel not to focus on the validity questions raised teacher awarded grades in the pandemic - which were thrust upon teachers and students with no planning, training, or preparation, but to consider a broader body of evidence. There are lessons that can be learned from Higher Education and valid models that would work for teacher assessed grades with appropriate frameworks and training. In a new GCSE for the sciences, with reduced content burden, a fresh approach to assessment could be taken that better supports learning, progression and improves the school experience of the sciences for students by removing the emphasis on high stakes, end of course exams.

Cambridge Assessment's report speaks specifically to the volume of assessment and reliability of individual papers in predicting a student's final grade.
"How long should an exam be? Knowing how long an exam needs to be is essential when exploring the options available for shortening their length or having fewer of them. The average volume of examinations per GCSE subject is 4 hours but there is some variation. Students taking a Maths GCSE are required to sit three papers, each lasting 1 hour 30 mins. We were therefore interested to learn that OCR's GCSE Maths paper 1 is 99.7 percent accurate in predicting, within one grade, what that candidate's final grade will be after completing all three exams.17 Similar levels of accuracy in predicting can be found across the sciences. One of OCR's History A papers is 96 percent accurate and an English paper comes in at 95 percent – all accurate within one grade."
Cambridge Assessment's evidence for the reliability of coursework (2016)
https://www.cambridgeassessment.org.uk/Images/346753-evidence-for-the-reliability-of-coursework.pdf

Currently, students entered into Combined Science GCSE sit 7.5 hours of science exams in Year 11, and students on "triple science" route entered into separate Biology, Chemistry and Physics GCSEs sit 10.5 hours of exams. The panel should consider whether this volume of exams is necessary given Cambridge Assessment's finding that one paper can be close to 99% accurate in predicting grades in the sciences. Other forms of assessment could be considered, or less examination burden at the end of Year 11.

The Royal Society of Biology also agrees that exams cannot validly assess all skills and attributes, and would further add that not everything in the school curriculum needs to be assessed to be a valuable part of a programme of study or specification. Assessment should avoid the need to memorise factual information, and instead move towards more authentic and skills based assessment that can show how students apply knowledge. The panel should address the question of the purpose of assessment at GCSE, which at the moment is almost exclusively focussed on progression to A level with only the top end of grades being valued.

**Q40. What more can we do to ensure that: a) the assessment requirements for GCSEs capture and support the development of knowledge and skills of every young person; and b) young people's wellbeing is effectively considered when assessments are developed, giving pupils the best chance to show what they can do to support their progression**

Not everything in the school curriculum or for a given subject's programme of study should be determined by what is in the specification at GCSE and A level. However, it must be made clear that areas that are not intended to be included in formal assessment are no less important in terms of experience, breadth and depth of study. This would require systemic change to the approach schools take to qualifications, and the perception of non-examined curriculum and skills, and the expectations on schools related to inspection and accountability measures such as Progress 8.

**The Royal Society of Biology would support a move away from qualifications with linear, high stakes exams at the end of the Key Stage, and recommends a reassessment of the place of practical activities within the school curriculum and the assessment methods at GCSE.**

In the sciences at A level, Common Practical Assessment Criteria and required practicals as part of the practical endorsement were introduced to address issues with internal examination of practicals. Required practicals were also introduced at GCSE. RSB is not convinced that this approach represents the optimum experience for students or teachers of practical activities, and has concerns that there is anecdotal evidence that some schools reduce practical activity to the bare minimum of only required

practicals across 2 years of GCSE or A level study.

The Science Education Tracker was established by Wellcome in 2016, with a second survey commissioned in 2019. The Royal Society has conducted a third survey in partnership with EngineeringUK and funding from Wellcome. RSB notes that the report highlights a decline in practical science: There has been a noticeable decline in both hands-on and teacher-demonstrated practicals since 2019. More students now report watching videos of practicals (49%) than engaging in hands-on activities (38%). The report highlights practical work as a key motivator for students, with 71% of years 7–11 wanting more, especially in biology. However, access to hands-on practicals has declined, with only 26% of years 10–11 students doing these fortnightly in 2023, down from 44% in 2016
Royal Society Science Education Tracker (2023)
https://royalsociety.org/news-resources/projects/science-education-tracker/

**The Royal Society of Biology would like to explore with the panel and exam boards the vast body of research available on the purpose of practical and fieldwork activities in the sciences, and methods of assessment to find a better solution that emphasises the importance of practical activities without requiring that they are limited by assessment processes**.

The panel should consider whether the full range of grades is meaningful and valuable, and a students experience of the exam process. A good pass in a science GCSE or Combined Science, can support progression to A levels, T levels or BTEC applied science, but all too often students are dissuaded from pursuing the sciences unless they are likely to achieve an A or a B at A level. This high barrier to entry further exacerbates the perception of the sciences as elite and only for the top students, however even high attaining students awarded a 7 or above in Biology GCSE or 77 or above in Combined Science GCSE can come out of an exam having performed well on only half of the available marks.

**Q41. Are there particular GCSE subjects where changes could be made to the qualification content and/or assessment that would be beneficial for pupils' learning?**

**The Royal Society of Biology, along with other organisations in the sciences, strongly advocates for a single route through the sciences at GCSE, and strongly recommends this as a priority for the next phase of the review** - the existing inequitable system of the current dual route (Combined Science GCSE and “triple science” route of Biology, Chemistry and Physics GCSE) is not replicated in the future qualifications pathways.

The sciences at GCSE should be taught as a single course based on the three separate sciences, and followed by the vast majority of students occupying between 20% and 25% of curriculum time to support a broad and balanced school curriculum. This proposal would retain the best features of the current “triple science” route and Combined Science GCSE, but allow all students to experience those features and benefit from removing barriers to progression and accessibility.

A new, better and more manageable GCSE for the sciences should be: **specified separately**: the exam specification should have separate sections marked Biology, Chemistry, Physics, and **examined and graded separately;** each of the sciences will have identifiable papers that are sat and marked separately. To support progression, students should receive a grade for each of the sciences, so they can identify how they performed in each discipline.

Although each of the sciences will not have sufficient content to count as a full GCSE, it is essential that the sciences are graded separately. Firstly, this means that students get fully rewarded for their success

and capability. In the double award system, a student achieving 9, 7, 5 in the biology, chemistry and physics aspects of Double Science will be graded as a 7,7. Therefore, they will not think of biology as being one of their top grades. Indeed, the averaging process means that a combined grade of three different grades will always be less than the highest grade – thereby masking the student's capability in that discipline.

Secondly, providing separate grades will improve teacher ownership within each discipline. The successes of a group in biology will not be masked by the averaging above. This same incentivisation (through ownership and accountability) extends to the school. If, for example, a school does not have any physics teachers and its grades in physics are lower than the other sciences, there will be an incentive to recruit (or retrain) a physics specialist.

As part of a new GCSE for the sciences, studied by all students, the Royal Society of Biology would be open to considering creative approaches to the sciences e.g. A GCSE for the sciences split into four: biology, chemistry, physics and interdisciplinary unit that could explore climate change and sustainability, or extended practical and fieldwork skills and projects.

**Q42. Are there ways in which we could support improvement in pupil progress and outcomes at key stage 3?**

As in the Royal Society of Biology''s answers to questions 1, 12, 29, and 32 in this response, RSB has evidence from research commissioned into the timetabling of GCSE sciences, that in 2018/19, 78% of schools began teaching GCSEs for the sciences in Year 9. This leads to compression of the Key Stage 3 curriculum, which will have a disproportionate effect on students that are lower attaining or disadvantaged in a variety of ways. The Society agrees with the panel's assessment that emphasis on Progress 8 focuses available teaching time on the subjects that contribute to that accountability measure. RSB's findings from timetabling research suggest that a bigger driver in the sciences is the difficulty in timetabling two routes at GCSE (Combined Science GCSE and the "triple science" route of Biology, Chemistry and Physics GCSE) and the overburdened specifications within them.
Shift Learning - Science Timetable Models Research (2018)
https://www.rsb.org.uk/images/Science_timetable_models_report_January_2019.pdf

**RSB recommends that either Key Stage 3 remains a 3 year programme of study of all subjects, with no GCSE teaching taking place in Year 9.** Or, the Key Stages are reviewed with Year 9 becoming part of the Key Stage 4 programme of study for all subjects. There is a unique role for Key Stage 3 in developing students' practical, analytical and thinking skills before embarking on a GCSE. Losing those opportunities and breadth and depth in the curriculum to start GCSE teaching in Year 9 is detrimental to the student experience.

RSB's Evolving 5-19 Biology exemplifies a learning progression across 5-19, and with that has reviewed the existing curriculum to support a more coherent and cohesive curriculum across all key stages. Transitions from Key stage 2 to 3 and 3 to 4 were also considered as part of this process. See appendix 3B of Evolving 5-19 Biology for further detail at Key Stage 3.
Evolving 5-19 Biology: recommendations and framework for 5-19 biology curricula (2021)
https://www.rsb.org.uk/images/Evolving_5-19_Biology.pdf

**Q43. Are there ways in which we could support pupils who do not meet the expected standard at key stage 2?**

RSB did not respond to this question

**Accountability**

**Q44. To what extent, and in what ways, does the accountability system influence curriculum and assessment decisions in schools and colleges?**

The accountability system has a clear impact on the importance placed on subjects at Key Stages 1 and 2 by schools, parents and teachers - this is seen by the emphasis on English and Maths over science, despite all three being core subjects in the programme of study.

The current accountability system's influence over curriculum in terms of content and time allocated to subjects is less clear at Key Stages 3 and 4. However, it could be reasonably assumed that more time is dedicated to those subjects that contribute to Progress 8 and EBacc.

Similarly, the Royal Society of Biology understands that the decision to make entries into "triple science" (separate Biology, Chemistry and Physics GCSEs) a headline measure for school accountability, was introduced with the aim of encouraging uptake of "triple science". RSB advised DfE at the time that the Society would not support a requirement or entitlement for all students to study the "triple science" route due to the inequities it creates in the system and barriers to progression that disproportionately affect those from socioeconomically disadvantaged backgrounds, or those in schools with fewer specialist teachers in the sciences.

As there is only one year of accountability data with entries to "triple science" as a headline measure and decisions about "triple science" or Combined Science GCSE routes are generally made 2-3 years in advance, it is difficult to predict what impact of this increased emphasis of the "triple science" accountability measure has been on the number of entries to "triple science" and Combined Science at this time.

Table 1 in the panel's data on Curriculum subject trends suggests that there has been little change to the percentage of entries to Combined Science and "triple science" routes 2018-2023 (roughly 65% : 25% each year). If "triple science" entries as a headline measure has had an impact on the uptake of "triple science", we would expect to see a slight change in percentages in 2025, and a significant change in 2026 and 2027 depending on when schools select their students into the Combined Science GCSE or "triple science" route.

**Q45. How well does the current accountability system support and recognise progress for all pupils and learners? What works well and what could be improved?**

In answers to questions 11, 12, 13, 29 and 41 of this response, the Royal Society of Biology has highlighted issues with the current dual route through the sciences related to equity, access, progression, difficulty due to compressed timetabling, and perception of the sciences as elitist, and the illusion of

choice.

RSB advocates for a single route for the sciences at GCSE, and as such does not believe that the change in emphasis of the performance measures in 2023/24 to include percentage of pupils entered for separate Biology, Chemistry and Physics GCSEs ("triple science" route) as a headline measure is a beneficial performance measure for schools, students or pupils.

The Royal Society of Biology notes that although Ofsted is mentioned in relation to accountability in this part of the call for evidence, Ofqual is not. RSB considers accountability of the system as a whole to include the grading and assessment of qualifications as having an impact on the progression of all pupils and learners. While Ofqual assesses distribution of grades year on year for individual qualifications, it does not consider comparison of grades across subjects. Research has been commissioned previously to investigate the impact of grading severity on the sciences and on modern foreign languages. While changes were made to modern foreign languages, this was not the case for the sciences, which see a skew towards the top end of grades - likely due to the selective nature of the "triple science" route. In a review of assessment, RSB would recommend that issues related to grading severity and intersubject compatibility are considered to ensure our assessment system works for all students to support progression across the full range of grades and that qualifications and assessment year on year are held accountable.

SCORE (2008) Relative difficulty of examinations in different subjects
https://www.rsb.org.uk/images/SCORE2008report_2.pdf

Ofqual (2017) Comparative Progression Analysis as a new approach to investigating inter-subject comparability
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/610077/Progression_from_GCSE_to_A_level_-_Comparative_Progression_Analysis_as_a_new_approach_to_investigating_inter-subject_comparability.pdf

Ofqual (2018) Policy-decision: Inter-subject comparability in A level sciences and modern foreign languages
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/757841/ISC_Decision_Document_20.11.18.pdf

Letter from RSB, IOP and RSC Education Chairs to Ofqual on inter-subject comparability and its effect on the take up of the sciences (2019)
https://www.rsb.org.uk/images/Inter_subject_comparability-_letter_to_Ofqual_3.pdf

**Q46. Should there be any changes to the current accountability system in order to better support progress and incentivise inclusion for young people with SEND and/or from socioeconomically disadvantaged backgrounds? If so, what should those changes be?**

RSB did not respond to this question.

## Section 8: Qualification pathways 16-19

**Q47. To what extent does the range of programmes and qualifications on offer at each level meet the needs and aspirations of learners? a) Level 3 b) Level 2 c) Level 1 and entry level**

The Royal Society of Biology comments here on b) Level 3 qualifications pathways for learners ages 16-19.

RSB provided input to the core content outlines of T Levels in Agriculture, Land Management and Production, Animal Care and Management, Health, Healthcare Science and Science were informed already by Evolving 5-19 Biology, though our Member Organisations have advised that many areas of occupational specialisms are already out of date and not fit for purposes, for example in the Agriculture and Animal Care pathways. RSB did not contribute to occupational specialism units, and would seek to explore this further as part of 5-19 review informed by expertise of our Member Organisations representing those specialism.

RSB would like to see BTEC Applied Science Level 3 retained as a broad general science qualification that has proven good progression and attainment. Applied science qualifications offer foundations across a range of science content, like A levels, but with more of a practical focus. Aside from progression to degree level education, qualifications in applied sciences can support progression directly into the workplace, or to study at levels 4 or 5. They can also lead to an apprenticeship, or be studied in the context of an apprenticeship. T levels, with their occupational specialism and much smaller intake, are not able to offer the same breadth of progression route for a large number of students.

Joint briefing to DfE on Level 3 qualifications in applied science and engineering (2021)
https://www.rsb.org.uk/images/DfE_jointbriefing_level3quals_2021.pdf

Biology A level offers good progression to a range of post-19 destinations, including a range of undergraduate courses in the biosciences, science-related fields, degree apprenticeships and other destinations.

**Q48. Are there particular changes that could be made to the following programmes and qualifications, and/or their assessment that would be beneficial to learners: a) AS/A level qualifications b) T Level and T Level Foundation Year programmes c) Other applied or vocational qualifications at level 3 d) Other applied or vocational qualifications at level 2 and below**

AS / A level qualifications:
Reintroduction of AS levels may support more students in keeping options open at post-16, rather than narrowing choices based on decisions made in Year 11 ahead of results days. RSB would be open to exploring this possibility further with the panel.

The experience of high stakes A level examination papers should be considered by the panel, alongside the purpose of linear examinations. In 2024 an A* grade in Biology A level is 74% (192/260 marks). 8.6% of students gained A*, meaning 26% of marks are only available to 8.6% of students. RSB has previously discussed issues of grading severity in the sciences, and a skewing of grades in A level science qualifications towards the top end. RSB would like to see the bell shaped curve of grade distribution shift to the left so that more students have access to more of the paper. This should not result in a drop in the standard, would improve student experience, and make a meaningful step towards valuing the full range of grades within the qualification.

Letter from RSB, IOP and RSC Education Chairs to Ofqual on inter-subject comparability and its effect on the take up of the sciences (2019)
https://www.rsb.org.uk/images/Inter_subject_comparability-_letter_to_Ofqual_3.pdf

Informed by RSB's Evolving 5-19 Biology, a revised Biology A level could better support the transition from GCSE to A level and on to further study, and address areas of the curriculum that are out of date or missing from the current specifications. Appendix 3C of Evolving 5-19 Biology sets out a learning progression for 16-19 year olds studying biology, this exemplification takes into account that skills, knowledge and understanding set out by DfE in A level subject content for biology sets out 60% of what a specification should entail.

Evolving 5-19 Biology: recommendations and framework for 5-19 biology curricula (2021)
https://www.rsb.org.uk/images/Evolving_5-19_Biology.pdf

T Level and T Level Foundation Programmes:
T levels are currently being presented as a route to Higher Education undergraduate courses, however the courses were designed for progression via occupational specialisms rather than preparing students for undergraduate courses. If T levels are to meaningfully support progression to Higher Education, RSB suggests the panel considers the introduction of a transition year post-T level as was mooted when T levels were introduced.

RSB is also aware that the small number of entries - around 5000 for Health and Science pathways - means that there are regional disparities and T levels are not accessible to all students across the country.

In their recent report, EPI have suggested that foundation programmes are not currently suitable for many level 3 learners, with over one third of those withdrawing leaving education and training altogether. EPI (2024) A quantitative analysis of T level access and progression
https://epi.org.uk/wp-content/uploads/2024/11/T-Level-Report-final_1.pdf

**Q49. How can we improve learners' understanding of how the different programmes and qualifications on offer will prepare them for university, employment (including apprenticeships) and/or further technical study?**

There needs to be clarity of purpose, available options for progressions after completing various qualifications pathways, and better careers advice available to all students. The Royal Society of Biology points to Gatbsy's Good Career Guidance and benchmarks as recommendations for careers guidance in the sciences. And notes that the benchmarks have been updated and expanded.
https://www.gatsbybenchmarks.org.uk/app/uploads/2024/11/good-career-guidance-the-next-10-years-report.pdf

In post-16 qualifications, and the pre-16 curriculum that prepares students and determines their post-16 choices, students should be shown that there are many and varied people, race, gender, level of disability, in a wide range of careers underpinned by Biology. Roles in the biosciences and science-related subjects are often much more recognisable than students might imagine, and for those starting from a point of low science capital, may never be made aware of outside of school education.

Mapping qualifications pathways and journeys towards a range of careers can show different ways to progress and go beyond a traditional academic route of A levels, undergraduate course, career within

that field. The Royal Society of Biology has outreach campaigns that support this approach, and many of our Member Organisations have similar resources.

A centralised information point for teachers, students and parents would be welcomed by many of our Members, highlighting that apprenticeships, BTECs, foundation degrees, A levels, T levels and undergraduate degrees lead to different futures and outcomes.

RSB's A to Z of the Biosciences videos - find your future biosciences career
https://www.rsb.org.uk/get-involved/biology-for-all/a-to-z-of-the-biosciences

RSB's Biology for a Better Tomorrow video series - highlighting the work of biologists
https://contentwithpurpose.co.uk/rsb/biology-for-a-better-tomorrow/

**Q50. To what extent is there enough scope and flexibility in the system to support learners who may need to change course?**

RSB did not respond to this question.

**Q51. Are there additional skills, subjects, or experiences that all learners should develop or study during 16-19 education, regardless of their chosen programmes and qualifications, to support them to be prepared for life and work?**

The Royal Society of Biology's Evolving 5-19 Biology focuses on preparing students for life and work with biology knowledge, skills and experiences by 16 - the end of compulsory education in the sciences as a core National Curriculum subject.

However, RSB would highlight that health, reproduction, nature-connectivity, positive and negative human impact on biodiversity and ecosystems, and how individual choices impact on personal, national and global scales. These areas could be further explored in post-16 studies for all students. If a novel approach was suggested for post-16 education that moves away from A levels, T levels and other qualifications, RSB would seek to engage with development of any curriculum that overlapped with biology in the same manner as it engaged with DfE and PSHE Association during development of RSHE guidance.

RSB represents and draws on the expertise of individual Members and Fellows in Higher Education Institutions, and accredits undergraduate and post-graduate courses through RSB degree accreditation. We hear from Higher Education teachers that school students could benefit from developing skills and confidence to take ownership of their studies through independent learning, self-direction, organisation, knowing when to ask for help and communicating with others. These skills are beneficial in further or higher education in all subject areas, and the world of work.

## Section 9: Other issues on which we would welcome views

### Transitions

**Q52. How can the curriculum, assessment and wraparound support better enable transitions between key stages to ensure continuous learning and support attainment?**

The Royal Society of Biology's overarching recommendations and framework, Evolving 5-19 Biology, were published in 2021 and following that RSB has published explorations of often overlooked areas of the curriculum. Along with partners in other science organisations, the Society convened a Primary Curriculum Advisory Group to provide further recommendations for primary science education, again drawing on a breadth of expertise and research. In Evolving 5-19 Biology, an exemplification is laid out in appendices for ages 5-11, 11-16 and 16-19, which was developed to make clear links to be made between areas within biology across this entire 5-19 age range and that builds upon the biological ideas that pre-school children have explored and developed before starting formal education.

This exemplification can be found in appendices 3A, 3B and 3C of RSB's Evolving 5-19 Biology. While developing these documents particular care was taken to consider learning progressions in the curriculum that would better support transitions between each of the key stages, and particularly the transition from primary to secondary.

Evolving 5-19 Biology: recommendations and framework for 5-19 biology curricula (2021)
https://www.rsb.org.uk/images/Evolving_5-19_Biology.pdf

Further detail on how RSB developed the framework can be found in School Science Review article by Lauren McLeod including the questions considered by the group for each key stage, big question, theme and content statements within the exemplification: whether themes and learning progressions develop sensibly through compulsory education and post-16; are there instances of unnecessary repetition of ideas between age ranges; where there are gaps should ideas be added or rearranged; do any statements need to be moved to a higher or lower age range to improve cohesion; is there consistency of language (operational and technical) across the age ranges and between themes; are any of the statements outdated or scientifically incorrect; do any of the statements need to be rewritten to improve clarity or remove unnecessary detail; could any statements be removed to lighten the content load?

McLeod, Developing a framework for the biology curriculum (2018)
http://www.rsb.org.uk/images/SSR_September_2018_23-29_McLeod.pdf

The principles within Royal Society of Biology's Evolving 5-19 Biology and Developing a Primary Science Curriculum fit well with the goals of the review panel.

### Technology

**Q53. How could technology be used to improve how we deliver the curriculum, assessment and qualifications in England?**

RSB did not respond to this question.

## Further Views

**Q54. Do you have any further views on anything else associated with the Curriculum and Assessment Review not covered in the questions throughout the call for evidence?**

The Royal Society of Biology welcomes the independent nature of this review, and the emphasis on evidence and expertise to inform change. Subject experts should be at the heart of curriculum and assessment reform, RSB is keen to provide further evidence to the panel on biology and science education, and to engage with curriculum and assessment development - similar work is currently underway in Wales and Scotland with RSB as a key stakeholder for Government, regulatory bodies and awarding organisations. RSB represents a broad range of students, teachers, practitioners, academics, researchers, and individual and organisational members. The Society regularly provides subject expert advice to awarding organisations, regulatory bodies, CPD providers, initial teacher training providers, schools and researchers.

RSB recognises the panel's preference for "evolution not revolution" of the current system, however RSB has, over many years, drawn on the expertise of 5-19 pupils and undergraduate students, teachers, specification and curriculum designers, assessment experts, initial teacher trainers, academics, researchers, policymakers, individual RSB members, RSB Member Organisations, and trusted partner organisations to inform our policy positions related to curriculum and qualifications in order to address issues in the current system. All of this work, over ten years, has led to the Society calling for comprehensive curriculum reform for the sciences for ages 5-19. The Royal Society of Bioolgy advocates for stability in teaching and learning, but before that can be implemented we must resolve issues in the current system and allow for flexibility and development in the future that benefits teachers and learners. RSB would welcome the panel putting forward a long term vision for the education system beyond the scope and lifetime of this review, with decisions about curriculum and assessment taken out of the political cycle and overseen by a curriculum oversight body.

**The Royal Society of Biology's main priorities for this stage of the review are to highlight the importance of subject voice and subject organisations as stakeholders and inclusion of science in comprehensive 5-19 curriculum review.**

**The Royal Society of Biology strongly advocates for a single route through the sciences at GCSE, and equitable, inclusive and accessible qualifications - a new, double award GCSE that is more manageable for schools, teachers and students, and supports progression to post-16 qualifications by removing current barriers unique to the sciences.**

School curriculum development should be led by best evidence on curriculum and assessment, and student experience, rather than how qualifications and assessments determine what should be in the curriculum. **The Royal Society of Biology is uniquely placed, and well prepared, to provide advice and recommends: embedding recommendations in Evolving 5-19 Biology and Developing a Primary Science Curriculum**; coherent and cohesive learning progression across Key Stages 1 to 5, including academic and technical routes and preparing young people as citizens; less content in the biology curriculum, more time for practical activities, fieldwork, breadth and depth; and overlooked areas of the curriculum should be addressed, for example plant science, ecology, transferable skills, practical activities, sustainability education

All of RSB's published policy recommendations and frameworks related to curriculum and qualifications are available here: www.rsb.org.uk/curriculum

Alongside English and Maths, science is a core subject in Key Stages 1 to 4. That the sciences are not explicitly mentioned in the terms of reference for the panel or call for evidence (reading, writing, maths and broader subjects of music, art, sport and drama) leads RSB to raise significant concern about the importance the panel places on the sciences as a compulsory subject that prepares students for their

future as citizens, in the world of work, healthy lifestyles and green skills and jobs, as well as progression to further study in the sciences and science related subjects.

Science and Biology in the school curriculum and qualifications require reform to address issues in the current system (overburdened specification, inequity) and should be a key component of the curriculum and assessment review, informed by the work of RSB and our partners in other science organisations, and drawing on extensive time, resource, expertise, research and deep-thinking in our published recommendations: Evolving 5-19 Biology and Developing a Primary Science Curriculum. **The sciences must be included in phase 2 of the review for ages 5 - 19, to address the issues outlined in RSB's response and embed recommendations in Evolving 5-19 Biology and Developing a Primary Science Curriculum**

The introduction of a Natural History GCSE remains uncertain, but RSB supports Catherine McKinnell's response to Alex Mayer's parliamentary questions that the Natural History GCSE should be folded into consideration in the curriculum and assessment review. Introduction of such a GCSE is not a priority for the Royal Society of Biology. While RSB supports the goal of developing secondary school students' of, and engagement with, natural history and wider themes, it questions whether a new GCSE in Natural History is the best way to achieve this for all students and is concerned that the previous Government proposed introduction of the Natural History GCSE as part of the sustainability and climate change strategy and the implication that this would support all "young people to explore organisms and environments in more depth, gain knowledge and practical experience of fieldwork and develop a greater understanding of conservation." RSB would recommend that many of those elements are better emphasised within the core science programmes of study and a GCSE available to all students. The Society's recommendations to reduce content, and increase emphasis of plant sciences and animals beyond humans would enable all students in science as a core subject for Key Stage 1 to 4 to spend more time experiencing natural phenomena first hand, including experiences in and with nature.

Written question for the Department of Education from Alex Mayer MP on the introduction of a Natural History GCSE
https://questions-statements.parliament.uk/written-questions/detail/2024-08-30/3413

Royal Society of Biology (2020) response to OCR consultation on proposals for a new Natural History GCSE
https://www.rsb.org.uk/images/pdf/RSB_response_OCR_consultation_Natural_History_GCSE_17_July_2020.pdf