

## House of Lords Education for 11-16 Year Olds Committee inquiry into Education for 11-16 year olds

April 2023

<https://committees.parliament.uk/work/7268/education-for-1116-year-olds/>

The Royal Society of Biology responded to the House of Lords 11-16 Education inquiry, advocating for a single route through the science sat GCSE. This submission draws the Society's policy positions set out in the *Evolving 5-19 Biology: recommendations and recommendations for 5-19 biology curricula*<sup>1</sup>, the RSB's Education Policy Priorities 2023-28<sup>2</sup>, RSB's general election manifesto<sup>3</sup>, and input from RSB's Education and Science Policy Committee and Curriculum Committee. RSB also works closely with partner organisations as part of the Science Education Policy Alliance (SEPA) - Association for Science Education, Institute of Physics, Royal Society, Royal Society of Biology and Royal Society of Chemistry - collaborating and coordinating on matters related to education policy and developing our individual policy positions following discussion with the alliance.

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 facilitate 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

The Committee on Education for 11 to 16 Year Olds was appointed in January 2023. It is chaired by Lord Johnson of Marylebone and will report by 30 November 2023. The Committee has been asked to focus on an important stage in a young person's education, from year 7, when they start secondary school, to year 11. During this period, most young people will work towards national qualifications, usually GCSEs, as well as making important decisions about their future education and training. Educational provision for this age range has seen significant reforms in recent years, particularly changes to GCSE subject content and assessment.

This inquiry will consider the challenges and opportunities faced by the secondary education system in England, building on the findings of several recent reports, including:

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<sup>1</sup> <https://www.rsb.org.uk/images/RSB - Curriculum Framework - Summary for Policy Makers - D1.pdf>

<sup>2</sup> <https://www.rsb.org.uk/images/RSB Education Priorities 2023-2028 Final.pdf>

<sup>3</sup> <https://www.rsb.org.uk/images/doc/RSB manifesto 2023.pdf>

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- HMC, The state of education: time to talk<sup>4</sup>
- Institute for Fiscal Studies, *Education inequalities*<sup>5</sup>
- Institute for Fiscal Studies, School spending and costs: the coming crunch<sup>6</sup>
- Institute for Government, The exam question: changing the model of assessment reform<sup>7</sup>
- Times Education Commission, *Bringing out the best*<sup>8</sup>
- Tony Blair Institute for Global Change, Ending the big squeeze on skills: how to futureproof education in England<sup>9</sup>

The inquiry will look critically at the effectiveness of the current curriculum and assessment model, exploring whether these are preparing young people for the job opportunities they will encounter in a future digital and green economy, and will consider proposals for significant reform.

The Committee is seeking written submissions addressing any or all of the following topics:

- The range and breadth of subjects covered in the 11-16 curriculum
- The effectiveness of the 11-16 curriculum in equipping young people with the skills they need to progress into post-16 education and employment in a future digital and green economy
- The availability and attractiveness of technical and vocational options in the 11-16 phase
- The impact of the 11-16 system on the motivation and confidence of pupils of all abilities
- The effectiveness of GCSEs as a means of assessing the achievements of all pupils at the end of the 11-16 phase
- Alternative methods of assessment for measuring progress that could be considered either alongside or instead of GCSEs
- How the school accountability system affects the 11-16 curriculum
- The role technology can play in education in this phase, including in assessment, the personalisation of learning and reducing teachers' workload
- How the 11-16 system could be adapted to improve the attractiveness of the teaching profession, and the recruitment, training and retention of teachers
- How spending for this phase of education should be prioritised, in the context of the current fiscal climate
- Lessons for improving education for the 11-16 phase from educational policy and practice from overseas, or from the devolved administrations

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<sup>4</sup> <https://www.hmc.org.uk/reports/state-of-education-time-to-talk-an-hmc-report/>

<sup>5</sup> <https://ifs.org.uk/inequality/education-inequalities/>

<sup>6</sup> <https://ifs.org.uk/publications/school-spending-and-costs-coming-crunch>

<sup>7</sup> <https://www.instituteforgovernment.org.uk/publication/exam-question>

<sup>8</sup> <https://lordslibrary.parliament.uk/times-education-commission-bringing-out-the-best/>

<sup>9</sup> <https://www.institute.global/insights/public-services/ending-big-squeeze-skills-how-futureproof-education-england>

## Royal Society of Biology written submission the Education for 11-16 Year Olds Committee inquiry into Education for 11-16 year olds

1. The Royal Society of Biology (RSB) is a single unified voice for biology: advising Government and influencing policy; advancing education and professional development; supporting our members, and engaging and encouraging public interest in the life science. The Society represents a diverse membership of individuals, learned societies and other organisations. Individual members include practicing scientists, students at all levels, professionals in academia, industry and education, and non-professionals with an interest in biology.
2. School education is an essential foundation to inspiring the scientists of the future, who will then be able to fulfil the UK's science superpower ambition, address pressing societal challenges such as climate change, and drive economic growth. The Society supports the vision set out in the UK Science and Technology Framework<sup>10</sup> to increase the skill base, respond to the needs of industry, academia and government and place and emphasis on high quality FE and careers. School education is at the heart of such goals, and to support STEM related teaching and learning the UK must invest in subject specific expertise, deployment and CPD, and develop STEM curricula based on research and best evidence.
3. The Royal Society of Biology welcomes this timely inquiry by the Education for 11-16 Year Olds Committee, and welcomes the opportunity to advocate for a single route through the sciences at GCSE and share the recommendations and principles of our Evolving 5-19 Biology framework. The Society has organised our submission under the following sub-headings under the topics in the Committee's call for evidence:

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<sup>10</sup> <https://www.gov.uk/government/publications/uk-science-and-technology-framework>

4. The Royal Society of Biology makes the following recommendations as part of this written submission:
- I. **The Royal Society of Biology strongly recommends a single route through the sciences at GCSE that draws on the beneficial features of Separate Sciences.**  
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  - II. **The Royal Society of Biology recommends resources are dedicated to increase awareness of these topics and interdisciplinary learning opportunities as part of the existing Combined Science and Separate Sciences GCSE pathways, and any future science qualifications that may be developed.**  
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  - III. **The Royal Society of Biology recommends that, alongside inter-year comparability within a subject, inter-subject comparability is applied as a principle of 14-16 qualifications and grading.**  
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  - IV. **The Royal Society of Biology calls for national curriculum reform, and for subject organisations to play a key part in informing the new curriculum in their subject.**  
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  - V. **The Royal Society of Biology recommends that, where possible, teachers are employed within their specialism, rather than a teacher of science.**  
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  - VI. **The Royal Society of Biology recommends a long-term commitment to an ITT of at least £20,000 for biology specialists.**  
(Page 11)
  - VII. **The Royal Society of Biology recommends that the government establish close links with professional bodies and subject associations to drive innovation in professional development and support teachers' professional learning.**  
(Page 11)
  - VIII. **The Royal Society of Biology recommends an investment of up to £100m over three years to develop and deliver a systematic approach to subject-specific CPD and retraining in the sciences as part of the STEM education strategy, representing an additional £44m investment from the existing spending.**  
(Page 12)

### **The range and breadth of subjects covered in the 11-16 curriculum**

#### *A single route for the sciences*

5. The existing system of multiple qualification pathways in the sciences has led to inequitable access to studying the sciences, and has created an illusion of choice for students at Key Stage 4. Not all routes are open to all students - some schools will decide which qualifications are offered, and which students these will be offered to. This could be for a range of reasons, including marks in a specific science assessment or the set the student is in for science. Inequitable access to science qualifications also arises as students who study separate sciences are more likely to come from socially advantages

backgrounds<sup>11</sup>. 61% of students who took Separate Sciences, and 58% of those taking Combined Science report that they had no personal choice of which award to take, and that their educational setting had decided for them<sup>12</sup>.

6. Science education to 16 is crucial for ensuring that the UK has a scientifically literate general population, equipped to make informed choices and deal with everyday issues in modern life.
7. Science is a compulsory subject in the national curriculum at key stage 3 and 4, alongside Maths and English. Every student should have the same access to the same route for core subjects regardless of region, school type or timetable structure. The existence of a “Separate Science” or “triple science” route for the sciences – individual Biology, Chemistry and Physics GCSEs - creates inequity of provision, access and progression through the sciences. A single route would also allow for greater coherence between the curricula in the sciences and other science-aligned subjects, such as Maths and Computing<sup>13</sup>. These subjects share common principles and ways of working, such as the importance of observation and evidence, and would allow for greater interdisciplinary connections to be made. Note: the terms “separate Science” and “triple science” are often used interchangeably to refer to the route taken by students studying individual Biology, Chemistry and Physics GCSEs.
8. **In order to support equal access to the sciences the Royal Society of Biology strongly recommends a single route through the sciences at GCSE that draws on the beneficial features of “triple science” or “Separate Sciences”, to include:**
  - **A double award qualification in the sciences, taught over 2 GCSEs worth of time and with 2 GCSEs worth of content**
  - **Higher and Foundation tiered exams**
  - **Separate grading of the three sciences, whether at GCSE award level or transcript level**
9. In 2018/19, the RSB commissioned timetabling research<sup>14</sup> on behalf of the Science Education Policy Alliance – the Association for Science Education, Institute of Physics, Royal Society, Royal Society of Biology and Royal Society of Chemistry. 513 schools responded to the survey carried out by Shift Learning, and a sample representative of region, type of school and Ofsted rating was sought to investigate the variety of timetabling models for GCSEs in England. The rationale for the data collection was to look at how time is allocated for students who study Combined Science and those who study Separate Sciences, and how specialist teachers are deployed within the teaching of the three separate disciplines.
10. Of the 513 schools surveyed:
  - Every school either fails to give the sciences their full allocation of time, fails to deploy appropriate teacher expertise, or both.
  - The majority begin teaching of GCSE sciences in Year 9, despite it being a statutory requirement to teach a three-year programme at Key Stage 3.

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<sup>11</sup> <https://teachertapp.co.uk/articles/triple-science-teaching-arrangements-in-schools/>

<sup>12</sup> [https://discovery.ucl.ac.uk/id/eprint/10080169/1/aspires\\_2\\_triple\\_science\\_policy\\_briefing.pdf](https://discovery.ucl.ac.uk/id/eprint/10080169/1/aspires_2_triple_science_policy_briefing.pdf)

<sup>13</sup> [https://www.rsb.org.uk/images/score\\_sciences\\_at\\_ks4\\_final.pdf](https://www.rsb.org.uk/images/score_sciences_at_ks4_final.pdf)

<sup>14</sup> <https://goto.rsb.org.uk/rsbie7a9>

- Only 13% allow students a completely free choice of either Combined Science or separate sciences; the majority of the remaining schools use at least one measure of attainment in allocating students, such as the student's set for science, a science assessment or exam, or the student's ability on entering the school.
- 94% offered Separate Sciences as an option. 91% of these schools allocated less teaching time for Separate Sciences than they would have to other GCSE option subjects.
- 87% offered both Combined Science and Separate Sciences. 76% taught the Separate Sciences GCSE in less than 1.5 times the time allocated to teaching the Combined Science course.
- 78% of schools surveyed begin teaching GCSE science begin teaching of GCSE sciences in year 9, despite it being a statutory requirement to teach a three-year programme at Key Stage 3 (years 7, 8 and 9, ages 12-14).

#### 11. Our conclusions from this research are as follows:

- Currently, rather than educational needs, best evidence from pedagogic research or good practice, it is timetabling constraints that determine how the sciences are taught within school, and even well-resourced schools in low deprivation areas are not able to timetable three full GCSEs worth of time to the Separate Sciences course. This disproportionately affects the Separate Sciences course making the route appear more challenging for students as they are required to study 3 GCSEs worth of content in less than 3 GCSEs of allocated time.
- GCSE sciences are routinely given less time on the timetable than other subjects, making science seem more difficult, and making it almost impossible to cover the content of each science fully, supported by practical science. This further exacerbates the issue of the separate sciences being seen as the more difficult option.
- Science teaching is becoming less specialist. At 48% of responding schools, teachers report that they were required to teach outside of their main field of teaching at Key Stage 4; in schools that only offer Combined Science this was 80%. 76% stated that colleagues were required to do so. Furthermore, 51% of schools that responded to the survey had employed teachers of sciences as 'science teachers' within the last two years. Just 29% reported employing 'teachers of a specific discipline, eg biology, chemistry or physics', with the remainder responding 'it varies'. Employment as 'science teachers' is more likely to occur in schools that offer Combined Science only.
- The foundational knowledge and experience of Science at Key Stage 3 is being rushed in order to allocate this missing time for the GCSE courses. We regularly hear from teachers that both Combined Science and Separate Sciences are overburdened specifications, with Biology frequently cited as being the most overburdened in terms of content.

#### *Natural history GCSE*

12. RSB welcomes the initiatives the Natural history GCSE aims to cover, and encouraging enthusiasm for the natural world, however the Society is concerned about the potential for overlap with the existing suite of qualifications and National Curriculum and the access students will have to the qualification.

13. All students should have access to observation and investigation of the natural world and understanding how humans have and continue to impact the natural world. It is not expected that many students would take this qualification in addition to those that are already on offer, which would limit access to this knowledge to a small group of students. There is a proposed element of field work, which will have financial and resource implications for schools who offer the Natural History GCSE. This may include the time taken to travel to an appropriate field site, impacting on the time allocated to other option subjects, or the cost of the trips being passed on to parents, furthering the gap between disadvantaged pupils and their peers. It could also be the case that pupil premium funding is used to support the activities, when it may be required at another time in the year for other resources. Independent schools are likely to be best placed to offer these fieldwork experiences to their students, which could further narrow the demographic.
14. Whilst the proposed definition given by OCR is broad, the content they have defined is much narrower, with a focus on ecology, environmental management and the impact of human intervention. The aims of the proposed GCSE could be achieved through strengthening natural history themes in existing specifications, national curriculum and future curricula reforms.
15. RSB has previously mapped the proposed themes in the Natural History GCSE proposal against the current specifications available for GCSE and A Level, which identified significant overlap. This has the potential to detract from the Biology GCSE, Combined Science GCSE and KS3 Biology specifications. For example, if concepts, practical skills and techniques are removed from Biology to avoid the duplication of content, this could create challenges with sequencing content in the current qualifications on offer. We would prefer the needs that influenced the proposal of the qualification were addressed in the existing Biology and Combined Science GCSEs, in partnership with Chemistry, Geography and Physics to improve interdisciplinary and cross-curricular aspects.
- 16. To increase focus on sustainability, climate change and environmental science, the Royal Society of Biology recommends resources are dedicated to increase awareness of these topics and interdisciplinary learning opportunities as part of the existing Combined Science and Separate Sciences GCSE pathways, and any future science qualifications that may be developed.**

### **The effectiveness of the 11-16 curriculum in equipping young people with the skills they need to progress into post-16 education and employment in a future digital and green economy**

17. By 2025, The World Economic Forum have found that around 40% of employees will require reskilling, 85 million jobs may be displaced by a shift in the division of labour between humans and machines and that around 50% of the time spent on tasks will be completed by machines, splitting the labour equally between humans and machines<sup>15</sup>. The education system must adapt to reflect the labour market and prepare students for the world of work.

#### *Post-16 Entry Requirements*

18. In September 2021, the Science Education Policy Alliance – the Association for Science Education, Institute of Physics, Royal Society, Royal Society of Biology and Royal Society of Chemistry commissioned research on entry requirements for post-16 study, and the differences between the requirements for academic and technical/vocational qualifications for the sciences within the UK.
19. The systematic desk-based review was based on a sample of 258 settings, by creating a longlist of post-16 courses from all four nations, using data from the Department for Education websites. The data

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<sup>15</sup> <https://www.weforum.org/reports/the-future-of-jobs-report-2020/>

gathered is representative of what is published on the provider's website at the time of the research being conducted.

20. The disparity of entry requirements for post-16 study were most prominent between areas of least and greatest deprivation, with the highest entry requirements found at independent schools in the least deprived postcodes, and the lowest entry requirements found in schools in the most deprived areas, and in colleges.

#### *Progressing to T level routes post-16*

21. Evidence demonstrates that applied qualifications such as BTECs are highly valued by students at level 3, HE and employers. There are close to 60,000 students who complete such qualifications annually in science and engineering, with progression to successful outcomes. RSB doubts that all of these students will be catered for if alternative qualifications in the sciences disappear. Neither A Levels nor T Levels will be fully accessible to all. Given the characteristics of the students who typically study applied routes, this outcome would disproportionately affect students from disadvantaged backgrounds and potentially other underrepresented groups.
22. Data supplied during the Science T Level Action Group showed that in the 2023/24 academic year, there are going to be 93 providers who are intending to run a version of the Science T Level, with this increasing to 168 providers in the 2024/25 academic year. This data is only based on the intention to provide, with no confirmation of the specialism within the T Level which will be offered. The industry placement requirement could limit the number of places available at these providers, and access in some areas will be poor due to this availability. If a student is unable to access a T Level course within their local area, and is unable to access an A Level course due to achieved grades, access to a science course at post-16 will be removed for them. RSB are also concerned that this will disproportionately affect those from underrepresented groups, worsening equity, diversity and inclusion in the sciences and losing talent from these groups.

#### **The effectiveness of GCSEs as a means of assessing the achievements of all pupils at the end of the 11-16 phase**

23. Our organisations support the Department for Education's aims for a qualifications landscape that is easy to navigate, in which qualifications are understood and have a purpose, and in which the development of technical skills and progression to technical occupations are valued and supported. In principle, we welcome the introduction of T Levels as a progression route directly into specialised STEM occupations and wish to see them succeed.

#### *Grading severity in the sciences*

24. Ofqual have previously acknowledged that they would act to adjust grading standards in particular subjects in 2018. This programme of work began by looking at A Level Biology, Chemistry and Physics, alongside modern foreign languages. In Ofqual's technical report<sup>16</sup> the potential for grading severity to undermine public confidence in the qualifications is recognised. The analysis carried out ranked subjects by difficulty using statistical measures and found that Biology was the fifth most severely graded subject. The steep awarding curve apparent at A level can exacerbate the perception that the sciences are only

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<sup>16</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/757839/Inter-subject\\_comparability\\_-\\_technical\\_report\\_science\\_.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/757839/Inter-subject_comparability_-_technical_report_science_.pdf)



for the most able students, with the highest of grades, further impacting student choice and progression to A level.

25. The Royal Society of Biology, along with other organisations, worked closely with Ofqual to inform the research conducted into grading severity and inter-subject-comparability in the sciences and is disappointed that despite Ofqual recognising grading severity as an issue at both GCSE and A level for the sciences, no action was taken beyond making sure the problem didn't get any worse in future years.
26. With disruption to exams and awarding processes since 2020, we do not know whether this has improved or worsened.
- 27. The Royal Society of Biology recommends that, alongside inter-year comparability within a subject, inter-subject comparability is applied as a principle of 14-16 qualifications and grading.**

### **Lessons for improving education for the 11-16 phase from educational policy and practice from overseas, or from the devolved administrations**

#### *Evolving 5-19 Biology: recommendations and framework for 5-19 biology curricula*

28. Following the last national curriculum review in England, RSB's Education Policy team and their Curriculum Committee brought together members of the bioscience and education communities to map existing biology curriculum, apply principles and best evidence in biology education, identify gaps in existing curricula and create a cohesive and coherent framework for the study of biology through compulsory education.
29. The Evolving 5-19 Biology<sup>17</sup> was published in 2021, and aims to inform bioscience curriculum development across the UK, including: biological concepts; practical competencies in biology; mathematical skills in biology; ideas about the processes of scientific enquiry; development of scientific explanations; and ideas about the impacts of biological science on society and the natural world.
30. The RSB's recommendations and framework frames bioscience studies in seven questions, across three dimensions: Practices of Biology – Biology as a Science, Concepts of Biology – Core concepts of Biology, Applications of Biology – Biology in the world
31. The recommendations included:
- The biology curriculum content that is set out in policy and guidance documents should enable coherent learning progression from age 5 to 19
  - The biology curriculum should provide pupils of all ages with ample opportunities to engage in practical and investigative work, including in the field.
  - 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.
  - The development of biology curriculum policy, guidance and content should draw upon previous curriculum development work and evidence from research, where appropriate.
  - The biology curriculum should be contemporary yet durable.

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<sup>17</sup> <https://www.rsb.org.uk/policy/education-policy/school-policy/curriculum>

32. Practical work and developing practical skills is an essential part of all biology that should be taught in schools. Practical work is essential in order to bring concepts to life, strengthen both knowledge retention and comprehension, and it allows pupils to develop vital skills in observation, planning and mathematical based data<sup>18</sup>. It should be treated as an integral part of answering biological questions, such as 'How do we study the biological world?'. All learners should have the opportunity to encounter a range of practical skills that are appropriate to their stage of education and enhance their understanding of biological concepts. RSB's Curriculum Committee are currently creating policy advice based on practical skills and the value of practical work in the classroom
33. The Royal Society of Biology has worked closely with the Welsh government in the development of proposals for a new suite of GCSEs to sit alongside the new Curriculum for Wales, informed by the principles and recommendations set out in *Evolving 5-19 Biology*.
- 34. The Royal Society of Biology calls for national curriculum reform, and for subject organisations to play a key part in informing the new curriculum in their subject.**

#### **How the 11-16 system could be adapted to improve the attractiveness of the teaching profession, and the recruitment, training and retention of teachers**

35. Teacher workload in schools is a driver for recruitment and retention of subject specialists. In an unpublished report from the DfE, many teachers cite untenable workloads and difficult working conditions, such as poor behaviour, as the reason they are leaving the profession<sup>19</sup> 22% of teachers indicated that they were working 60 hour weeks, nearly double the contracted hours. In order to reduce workload, the RSB advocates for teachers being deployed more frequently to their subject specialism. The impact of deployment of teachers to multiple year groups, specifications and science specialisms should be considered by senior leaders when creating the timetable allocation in schools.
36. Timetabling research<sup>20</sup> commissioned by the Association of Science Education, Institute of Physics, Royal Society, Royal Society of Biology and Royal Society of Chemistry showed that 78% of schools reported that teachers are required to teach outside of their science specialism at GCSE, which rose to 85% in schools who only offered Combined Science as their science provision. 67% of teachers who indicated that their specialism was biology indicated that they were employed as teachers of science, rather than a teacher of biology. Teachers deployed within their specialism bring extensive knowledge beyond the specification of qualifications and are able to demonstrate thought processes specific to the discipline. Passion for a subject from a specialist teacher can influence a student's enjoyment of a subject<sup>21</sup> and can provide a captivating learning experience for those students. **The Royal Society of Biology recommends that, where possible, teachers are employed within their specialism, rather than as a teacher of science.**
37. Only 85% of the number of trainee biology teachers were recruited for the 2022/23 academic year<sup>22</sup>. For the 2023/24 academic year, the target for biology ITT recruitment is 780 trainees<sup>23</sup> of which, 12 have been

<sup>18</sup><https://rse.org.uk/expert-advice/advice-paper/learned-societies-group-response-to-professor-ken-muir-education-reform-consultation/>

<sup>19</sup><https://www.bbc.co.uk/news/education-65138300>

<sup>20</sup>[https://www.rsb.org.uk/images/science\\_timetable\\_models\\_report\\_ASE.pdf](https://www.rsb.org.uk/images/science_timetable_models_report_ASE.pdf)

<sup>21</sup><https://discovery.ucl.ac.uk/id/eprint/10157406/2/9872%20UCL%20Young%20People%20Report%20AW2.pdf>

<sup>22</sup><https://www.nfer.ac.uk/teacher-labour-market-in-england-annual-report-2023/>

<sup>23</sup><https://explore-education-statistics.service.gov.uk/find-statistics/postgraduate-initial-teacher-training-targets/2022-23#releaseHeadlines-charts>

recruited, 359 have conditions pending their offer, 3 have deferred, 57 have received an offer. There are currently 552 applications that are awaiting a decision from a provider<sup>24</sup>. The Royal Society of Biology has previously highlighted concerns over reductions in the biology specific teacher training bursary, leading to the reduction of trainees, and this may have been impacted by the fluctuation of the bursary available to trainees, which reduced from £25,000 to £7,000 for 2020/21<sup>25</sup>, and then to £10,000<sup>26</sup>. **The Royal Society of Biology recommends a long-term commitment to an ITT of at least £20,000 for biology specialists to aid the recruitment of biology trainees.**

### **How spending for this phase of education should be prioritised, in the context of the current fiscal climate**

38. There is a shortage of high-quality specialist teachers within the sciences. Recruitment of new staff and recruitment into initial teacher training is below target figures, and has been for a number of years, creating a chronic shortage of qualified staff. Systemic issues in science teaching are holding back educational outcomes, especially within under-represented groups.
39. There is currently no central approval process that qualifies a CPD course as being of good quality. High quality CPD for teachers has a significant effect on pupils' learning outcomes, and it can have a greater effect on pupil attainment than other interventions, such as the lengthening of the school day<sup>27</sup>. High quality CPD has also been shown to improve retention within early-career teachers and is therefore a valuable tool in both improving retention and pupil outcomes in school. **The Royal Society of Biology recommends that the government establish close links with professional bodies and subject associations<sup>28</sup> to drive innovation in professional development and support teachers' professional learning.** Research conducted by the Wellcome Trust<sup>29</sup> has indicated that when subject specific CPD accounts for more than 50% of a teacher's CPD time, all outcome measures improved, such as more school based, collegiate, enquiry-based projects, and greater teacher participation in professional learning.
40. In 2020, the Institute of Physics produced Subjects Matter<sup>30</sup>, setting out the argument for systemic changes in funding, entitlement and the quality of subject specific continuous professional development for teachers. Investment in teachers, initial teacher training and teacher CPD in the short/mid-term will result in more efficient teachers who are more likely to stay in post, which will reduce the long term cost involved in training and recruiting new teachers. Research conducted by The Gatsby Foundation and Sam Sims at University College London<sup>31</sup> (UCL) found that teachers were 23% less likely to leave if they were paid a salary supplement and that the cost per additional teacher retained would be 32% lower than the cost of training an equivalent replacement teacher. It will also improve student outcomes in the

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<sup>24</sup>[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1148972/Initial\\_teacher\\_training\\_recruitment\\_candidate\\_applications\\_and\\_numbers\\_March\\_2023.zip](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1148972/Initial_teacher_training_recruitment_candidate_applications_and_numbers_March_2023.zip)

<sup>25</sup><https://www.gov.uk/government/publications/funding-initial-teacher-training-itt/funding-initial-teacher-training-itt-academic-year-2021-to-2022>

<sup>26</sup><https://www.gov.uk/government/publications/funding-initial-teacher-training-itt/funding-initial-teacher-training-itt-academic-year-2022-to-2023>

<sup>27</sup><https://epi.org.uk/publications-and-research/effects-high-quality-professional-development/>

<sup>28</sup><https://www.iop.org/sites/default/files/2020-12/Subjects-Matter-IOP-December-2020.pdf>

<sup>29</sup><https://cms.wellcome.org/sites/default/files/2022-02/final-cpd-challenge-evaluation-report.pdf>

<sup>30</sup><https://www.iop.org/sites/default/files/2020-12/Subjects-Matter-IOP-December-2020.pdf>

<sup>31</sup><https://www.gatsby.org.uk/uploads/education/reports/pdf/the-effect-of-financial-incentives-on-the-retention-of-shortage-subject-teachers-evidence-from-england.pdf>

sciences as more highly skilled teachers are being retained. This will also help to reduce the skills shortage in the sciences that the UK is facing.

- 41. Along with other science organisations, the Royal Society of Biology is calling for an investment of up to £100m over three years to develop and deliver a systematic approach to subject-specific CPD and retraining in the sciences as part of the STEM education strategy, representing an additional £44m investment from the existing spending.**