

## Education Select Committee inquiry: Teacher recruitment, training and retention

*April 2023*

<https://committees.parliament.uk/work/7357/teacher-recruitment-training-and-retention/>

The Royal Society of Biology responded to the House of Commons Education Committee inquiry into teacher recruitment, training and retention. This submission draws on the Society's policy positions set out in the [RSB's Education Policy Priorities 2023-28](#), [RSB's general election manifesto](#), and input from RSB's Biology Education Research Group, RSB member organisations through its Education Policy Advisory Group, 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, commissioning research 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 existing shortages of teachers in certain subjects at state-funded schools pose significant challenges in delivering high-quality education nationwide. It is crucial that we thoroughly analyse the complexities associated with attracting and retaining qualified teachers. Immediate attention is required to identify effective solutions that guarantee students receive consistent and excellent instruction while ensuring teachers feel adequately supported in their roles.

The Committee plans to assess the present state of recruitment and retention, along with the measures implemented by the Government thus far. Our examination will encompass a comparison of recruitment, training, and retention challenges in various sectors of the economy, with a particular focus on how these issues affect different demographic backgrounds. Adopting the appropriate approach to support teachers during their training and early careers, alleviating unnecessary workloads, and investing in professional development are all pivotal aspects to ensure schools have access to the highly skilled and motivated workforce they require.

The Committee invited written submissions on any or all of the following five areas:

- The current situation regarding teacher recruitment and retention
- What action should the Department take to address the challenges in teacher recruitment and retention?
- How well does the current teacher training framework work to prepare new teachers and how could it be improved?
- How do challenges in teacher recruitment, training and retention compare to those being faced in other professions/ sectors of the economy, and is there anything that can be learned from other professions/ sectors of the economy?
- What particular challenges exist in teacher recruitment, training and retention for teachers from different demographic backgrounds?

## **Royal Society of Biology response to the Education Select Committee inquiry: Teacher recruitment, training and retention.**

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 sciences. The Society represents a diverse membership of individuals, learned societies and other organisations. Individual members include practising scientists, students at all levels, professionals in academia, industry and education, and non-professionals with an interest in biology.

The Royal Society of Biology is committed to supporting and encouraging the study of biology at primary and secondary level, including policy related to teacher training, recruitment and subject-specific continuous professional development. The Society brings together education and science communities to inform policy makers and provide impartial, evidence-based advice. RSB welcomes this Education Committee inquiry into teacher recruitment, training and retention and has focussed on the following themes as part of this submission:

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The Royal Society of Biology makes the following recommendations to the Education Committee, focussing on improved data collection and increased investment in subject-specific support for teacher training, recruitment and retention:

- 1. The Royal Society of Biology recommends that the DfE collects more rigorous data on teacher specialism and deployment (page 6)**
- 2. The Royal Society of Biology recommends that, wherever possible, teachers are employed as a teacher of biology, chemistry or physics, rather than a teacher of science (page 7)**
- 3. The Royal Society of Biology recommends that the DfE publish the actual number of SKE students who go on to join an ITT programmes (page 7)**
- 4. The Royal Society of Biology recommends a long-term commitment to ITT bursary of at least £20,000 for biology specialists (page 9)**
- 5. The Royal Society of Biology recommends DfE invests in subject specific support across a wider range of subjects, including expanding the teacher training scholarship scheme to biology (page 9)**
- 6. The Royal Society of Biology recommends that DfE should analyse and publish retention figures and evaluations of the schemes they enact for recruitment and retention (page 10)**
- 7. The Royal Society of Biology recommends that the government establish close links with subject associations and professional bodies, to support teachers' professional learning and drive innovation in professional development (page 10)**
- 8. The Royal Society of Biology recommends that any new or redeveloped policies related to teaching and learning should include strong subject emphasis, including subject-specific mentoring and training entitlements (page 11)**
- 9. The Royal Society of Biology recommends additional investment of £44m over three years to provide subject-specific professional development and retraining in the sciences for primary and secondary teachers, as part of a STEM education strategy (page 11)**

## The current situation regarding teacher recruitment and retention

There has been a growing teacher supply challenge over the past few years, and the challenges post pandemic are more than before. The Department for Education's Teacher Recruitment and Retention Strategy<sup>1</sup> aimed to deal with some of these challenges, however the problems with teacher recruitment and supply have intensified and urgent policy action is needed to make teaching more attractive, both financially and non-financially.

The new Science and Technology Framework<sup>2</sup> aims to establish the UK as a global science superpower. These plans require an increasing pipeline of scientists, which in turn depends on a skilled and sustainable teaching workforce. The Royal society of Biology support the vision to increase the skill base, respond to the needs of industry, academia and government, and the emphasis on high quality FE and careers. To truly support STEM related teaching and learning we need to invest in teachers subject-specific expertise, deployment and CPD, and develop STEM curricula based on research and best evidence i.e. informed by recommendations in Evolving 5-19 Biology<sup>3</sup>.

### *Main factors leading to difficulties recruiting and retaining qualified teachers*

Over the past decade, the pupil to teacher ratio in state-funded schools in the UK has increased from 17.6 to 18.5<sup>4</sup>, and the teacher vacancy rate has also risen. However, in recent years, these measures have either improved or remained stable, likely due to the impact of the COVID-19 pandemic on the labour market. Despite this, the postgraduate teacher recruitment rate was below target in 2022/23<sup>5</sup>, with a significant shortfall in recruitment for secondary teachers, particularly in STEM subjects.

Workload is key long-term driver of teacher recruitment and retention. Many teachers are leaving the profession because of untenable workloads<sup>6</sup> and difficult working conditions - 92% of teachers and leaders cited high workload as a reason for considering leaving the state sector in the next 12 months. School funding and infrastructure is a systemic issue that underpins the teacher recruitment and retention challenge.

Teachers of the sciences are frequently expected to teach outside of their specialism, with many employed as teachers of science rather than as a teacher of biology, chemistry or physics. This disproportionately increases their workload and contributes to high attrition rates, particularly amongst science teachers<sup>7</sup>. Workload burden of deploying new teachers to multiple year groups, specifications and science subjects should be considered by senior leaders when timetabling<sup>8</sup>. It is more likely that teachers will be expected to teach outside their specialism in deprived areas due to

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<sup>1</sup> <https://www.gov.uk/government/publications/teacher-recruitment-and-retention-strategy>

<sup>2</sup> <https://www.gov.uk/government/publications/uk-science-and-technology-framework>

<sup>3</sup> [https://www.rsb.org.uk/images/Evolving\\_5-19\\_Biology.pdf](https://www.rsb.org.uk/images/Evolving_5-19_Biology.pdf)

<sup>4</sup> <https://www.gov.uk/government/statistics/school-workforce-in-england-november-2021>

<sup>5</sup> <https://explore-education-statistics.service.gov.uk/find-statistics/initial-teacher-training-census>

<sup>6</sup> <https://www.gov.uk/government/publications/working-lives-of-teachers-and-leaders-wave-1>

<sup>7</sup> <https://www.gatsby.org.uk/education/latest/itt-reform-more-reflection-needed>

<sup>8</sup> [https://www.rsb.org.uk/images/RSB\\_Education\\_Priorities\\_2023-2028\\_Final.pdf](https://www.rsb.org.uk/images/RSB_Education_Priorities_2023-2028_Final.pdf)

a lack of specialist teachers<sup>9</sup>. Currently, there is no clear picture of how many schools in England do not have a specialist teacher in all three sciences, and as a result, how many students actually have an unbroken chain of specialist teachers in the sciences. **The Royal Society of Biology recommends that the DfE collects more rigorous data on teacher specialism and deployment.**

### *Subjects most affected by issues in recruitment and retention*

A lack of specialist science teachers is a significant issue, with over a quarter of teaching hours in physics being taught by teachers with no relevant post-A-level qualifications<sup>10</sup> - the figure was 16.7% and 6.6% for chemistry and biology respectively. It is apparent that, mainly for timetabling reasons, it is becoming the expectation that all teachers of science subjects teach all three sciences. Research commissioned by the Association of Science Education (ASE), Institute of Physics (IOP), Royal Society (RS), Royal Society of Biology (RSB) and Royal Society of Chemistry (RSC) showed that 78% of schools reported that teachers are required to teach outside of their main field at GCSE; this rose to 85% in schools that only offered Combined Science<sup>11</sup>.

Research indicates that a key characteristic of the most successful educational systems worldwide is the provision of significant and ongoing funding for teachers' professional development<sup>12</sup>. Furthermore, continued professional development (CPD) has been shown to have a substantial impact on teacher retention, especially among those in the early stages of their careers<sup>13</sup>.

Schools with higher levels of pupil deprivation struggle to attract teachers of sciences with relevant degrees, leading to a higher percentage of non-expert teachers teaching science classes<sup>14</sup>. In terms of teacher recruitment, there was a significant shortfall in physics teachers, with only 17% of the target of 2,610 trainees achieved in 2022.

The rate of early-career teachers leaving in biology has increased from 9.7% in 2019 to 11.6%, and the overall rate of biology teachers leaving their school was 13.8% in 2020. In contrast, the average for all subjects was 12.9%. The proportion of science hours taught by teachers with different degree specialisms was 46.7% for biology, and 7.2% of science hours were taught by a teacher with a non-science degree<sup>15</sup>. Research commissioned by ASE, IOP, RS, RSB and RSC<sup>16</sup>, showed that most teachers are expected to teach all three sciences at GCSE - 21% of physics teachers said that they were required to teach other sciences at GCSE, the figure was 16% and 15% for chemistry and biology teachers respectively. 38% of schools offering GCSE Combined Science deployed fewer than three teachers to a class, increasing the likelihood that the individual disciplines are not all taught by subject specialists. The research also showed that 67% of biology specialists (main field of teaching) were employed as a teacher of science rather than a teacher of biology - 50% and 48%

<sup>9</sup> <https://www.suttontrust.com/our-research/teacher-recruitment-gap/>

<sup>10</sup> <https://www.gov.uk/government/statistics/school-workforce-in-england-november-2021>

<sup>11</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>12</sup> <https://www.iop.org/sites/default/files/2020-12/Subjects-Matter-IOP-December-2020.pdf>

<sup>13</sup> <https://epi.org.uk/publications-and-research/effects-high-quality-professional-development/>

<sup>14</sup> <https://www.nfer.ac.uk/key-topics-expertise/school-workforce/teacher-recruitment-and-retention-in-england-data-dashboard/>

<sup>15</sup> <https://www.nfer.ac.uk/key-topics-expertise/school-workforce/teacher-recruitment-and-retention-in-england-data-dashboard/>

<sup>16</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)

for physics specialists and chemistry specialists respectively. Survey data provided to the Society by RSC and IOP showed that 78% of biology and 54% of chemistry early career teachers (ECTs) taught physics within combined or single subject GCSE<sup>17</sup>. Furthermore, a survey by Teacher Tapp found that teachers thought it was very important that they could arrange timetabling so that specialist biology, chemistry and physics teachers could deliver their parts of the curriculum<sup>18</sup>. **The Royal Society of Biology recommends that, wherever possible, teachers are employed as a teacher of biology, chemistry or physics, rather than a teacher of science**<sup>19</sup>. Teachers deployed to teach within their area of expertise bring confidence, extensive knowledge beyond the fundamental syllabus, and the capacity to demonstrate the thought processes inherent to that subject, which are more likely to lead to a genuine, gratifying, and captivating learning experience for students<sup>20</sup>. The enthusiasm, conceptual understanding and passion of a specialist teacher significantly influences positive outcomes for their students<sup>21</sup>. The Royal Society of Biology is keen to support the National Institute of Teaching's intention to gather further data in this area.

Subject Knowledge Enhancement (SKE) courses can play an important role in helping to recruit and train teachers, particularly in subjects where there are shortages. The ability for ITT candidates to make multiple applications and hold several offers at once has led to a highly competitive market between providers, with increased time spent on interviewing potential candidates. This competition has caused some providers to lower the conditions of their offers, such as reducing the length of SKE courses, to attract candidates<sup>22, 23, 24, 25, 26</sup>. However, this puts candidates at risk of entering training without the necessary specialist knowledge. The trend towards later applications in STEM subjects has also reduced the uptake of SKE - last year there was a considerable reduction in the number of people taking SKE courses in biology - impacting teacher recruitment. Earlier promotion of SKE courses in the recruitment cycle may help address this. The methodology for data collection and varying definition of a specialism make it difficult to assess the situation accurately – if someone does an SKE they aren't necessarily considered a specialist. **The Royal Society of Biology recommends that the DfE publish the actual number of SKE students who go on to join an ITT programme.**

*How does the situation differ across the country and across different types of schools and colleges?*

The problem of recruiting STEM teachers may also be exacerbated by the Initial Teacher Training (ITT) market review and the recent reaccreditation process<sup>27</sup>. The number of providers accredited to offer ITT courses has decreased, with 68 providers losing their accreditation. These providers trained 16% of all trainees in 2022/23, and their loss could lead to a reduction in the number of

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<sup>17</sup> <https://www.rsc.org/new-perspectives/talent/the-science-teaching-survey/>

<sup>18</sup> <https://teachertapp.co.uk/articles/triple-science-teaching-arrangements-in-schools/>

<sup>19</sup> [https://www.rsb.org.uk/images/RSB\\_Education\\_Priorities\\_2023-2028\\_Final.pdf](https://www.rsb.org.uk/images/RSB_Education_Priorities_2023-2028_Final.pdf)

<sup>20</sup> <https://wellcome.org/reports/science-education-tracker-2019>

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

<sup>22</sup> [https://www.whatdotheyknow.com/request/ske\\_numbers\\_by\\_provider\\_3](https://www.whatdotheyknow.com/request/ske_numbers_by_provider_3)

<sup>23</sup> [https://www.whatdotheyknow.com/request/ske\\_numbers\\_by\\_provider\\_5](https://www.whatdotheyknow.com/request/ske_numbers_by_provider_5)

<sup>24</sup> [https://www.whatdotheyknow.com/request/ske\\_numbers\\_by\\_provider\\_6](https://www.whatdotheyknow.com/request/ske_numbers_by_provider_6)

<sup>25</sup> [https://www.whatdotheyknow.com/request/ske\\_numbers\\_by\\_provider\\_2021](https://www.whatdotheyknow.com/request/ske_numbers_by_provider_2021)

<sup>26</sup> [https://www.whatdotheyknow.com/request/ske\\_numbers\\_by\\_provider\\_2122](https://www.whatdotheyknow.com/request/ske_numbers_by_provider_2122)

<sup>27</sup> <https://www.gov.uk/government/publications/initial-teacher-training-itt-market-review-report>

trainees able to gain a place in ITT<sup>28</sup>. The loss of accreditation for some providers that specialise in STEM subjects could make the situation worse if those places are not available at other providers. Large university providers that have not gained accreditation will lead to a disproportionate effect of the accreditation process in the regions in which they are based. For example, the North East and East of England are set to lose a significant number of STEM ITT places. It is probable that the market review conducted by the DfE will result in the redistribution of approximately 16% of teacher training positions away from providers who will no longer hold accreditation<sup>29</sup>.

In April 2023, the Association for Science Education conducted a rapid survey on behalf of the Science Education Policy Alliance to inform submissions to this inquiry. They surveyed 46 course leaders, tutors, mentors and others working in science ITT in England. Of those that responded, 44% reported an increase in workload brought about by the reaccreditation process and the new quality requirements. Many respondents reported considering early retirement or leaving their career due to the strains of the increased workload and changes in their jobs. This potential loss of expertise from the teacher education sector is a concerning consequence of the ITT reaccreditation process.

*What impact does this have on pupils, particularly disadvantaged pupils and those with SEND?*

Children who come from disadvantaged families or backgrounds may have limited access to opportunities and have different aspirations and self-identity in science, which can hinder their exposure to science<sup>30</sup>. Consequently, being taught by a specialised science teacher in school becomes even more critical for them, as it may be their only opportunity to engage with the subject<sup>31</sup>. This is essential for ensuring a population equipped for life in the modern world, as well as for ensuring that students from all backgrounds have the opportunity progress through the sciences post-16, to pursue science-based careers and contribute to the workforce needed to drive economic growth, resolve some of the greatest challenges facing society and support the UK's science superpower ambition.

### **What action should the Department take to address the challenges in teacher recruitment and retention?**

*What has been the impact of the new bursaries and scholarships announced in October?*

The Royal Society of Biology has previously highlighted to the Department concerns over reduction of biology bursaries leading to a significant reduction in trainees. The Royal Society of Biology is concerned that the incoming cohort for trainee teachers in 2023/24 has not met the target for biology places again for the second year running, estimating that biology is recruiting at around 85% of the level required to meet its target<sup>32</sup>. The reduction of the bursary available to biology trainees from

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<sup>28</sup> <https://epi.org.uk/publications-and-research/the-reaccreditation-of-itt-providers-implications-for-stem-subjects/>

<sup>29</sup> <https://epi.org.uk/publications-and-research/the-reaccreditation-of-itt-providers-implications-for-stem-subjects/>

<sup>30</sup> [https://discovery.ucl.ac.uk/id/eprint/10092041/6/Moote\\_9538%20UCL%20Aspires%202%20report%20online%20version.pdf](https://discovery.ucl.ac.uk/id/eprint/10092041/6/Moote_9538%20UCL%20Aspires%202%20report%20online%20version.pdf)

<sup>31</sup> <https://cms.wellcome.org/sites/default/files/science-education-tracker-2019-calls-to-action.pdf>

<sup>32</sup> <https://www.nfer.ac.uk/teacher-labour-market-in-england-annual-report-2023/>



£26,000 to £7,000 for 2020/21<sup>33</sup> and then to £10,000<sup>34</sup> for the following year may have contributed to the under-recruitment of biology trainees - the Society had previously cautioned the Department that this approach could have unintended consequences of driving biology trainees into another sector, rather than the intended outcome of prospective biology trainees being converted to physics or chemistry trainees. This has further exacerbated the shortages across the sciences.

**The Royal Society of Biology recommends a long-term commitment to ITT bursary of at least £20,000 for biology specialists** to avoid a cycle of bursary dropping, recruitment dropping, bursary increasing, recruiting over target, and then the bursary being dropped again, with the subsequent impact this has on recruitment and retention of teachers of science overall. Evidence shows that training bursaries are associated with increases in ITT recruitment<sup>35</sup>. **The Royal Society of Biology recommends DfE invests in subject specific support across a wider range of subjects, including expanding the teacher training scholarship scheme to biology<sup>36</sup>**, and targeting investment in teachers' professional learning to ensure all students have access to high-quality subject teachers. The education system should place the needs of the trainee teacher at the heart of any reforms<sup>37</sup>, because this will ultimately benefit the whole system and students in particular, and establish an entitlement for teachers to ensure that at least half of their professional development and learning is subject-specific<sup>38</sup>. All young people should have an unbroken chain of experts teaching the science disciplines<sup>39</sup>. Disciplinary expertise can be developed by teachers throughout their career, and they should be supported to so.

The Royal Society of Biology advocates for subject-specific mentoring for teachers - it is essential for teachers to have access to people with expertise and knowledge in their discipline<sup>40</sup> - and investing in the existing workforce through high quality support for teachers within their subjects, in the form of effective subject-specific continued professional learning<sup>41</sup>, especially early in their career, and ensuring all students have access to high-quality subject teachers will strengthen the education system and improve educational outcomes<sup>42</sup>.

The retention of experienced teachers is an issue due to low pay and negative perceptions of the profession. Focussing on retention is important as we need to keep the experienced teachers, so that they are available to mentor ITTs and ECTs. An increasingly leaky pipeline requires new investment in teacher training to sustain the numbers. Research carried out by the Gatsby Foundation and Sam Sims at University College London (UCL) showed that paying a 5% salary supplement to shortage teachers not only would have alleviated the shortage of teachers had it been applied between 2010 and 2015 but would have been cheaper than simply recruiting new teachers,

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<sup>33</sup> <https://www.gov.uk/government/publications/funding-initial-teacher-training-itt/funding-initial-teacher-training-itt-academic-year-2021-to-2022>

<sup>34</sup> <https://www.gov.uk/government/publications/funding-initial-teacher-training-itt/funding-initial-teacher-training-itt-academic-year-2022-to-2023>

<sup>35</sup> <https://www.nfer.ac.uk/the-impact-of-pay-and-financial-incentives-on-teacher-supply>

<sup>36</sup> [https://www.rsb.org.uk/images/doc/RSB\\_manifesto\\_2023.pdf](https://www.rsb.org.uk/images/doc/RSB_manifesto_2023.pdf)

<sup>37</sup> <https://www.gatsby.org.uk/education/latest/itt-reform-more-reflection-needed>

<sup>38</sup> <https://www.iop.org/sites/default/files/2020-12/Subjects-Matter-IOP-December-2020.pdf>

<sup>39</sup> [https://www.rsb.org.uk/images/RSB\\_Education\\_Priorities\\_2023-2028\\_Final.pdf](https://www.rsb.org.uk/images/RSB_Education_Priorities_2023-2028_Final.pdf)

<sup>40</sup> <https://www.gatsby.org.uk/education/latest/itt-reform-more-reflection-needed>

<sup>41</sup> <https://cms.wellcome.org/sites/default/files/science-education-tracker-2019-calls-to-action.pdf>

<sup>42</sup> <https://www.iop.org/sites/default/files/2020-12/Subjects-Matter-IOP-December-2020.pdf>

even if it had been possible to recruit them in the first place<sup>43</sup>. The government has since introduced a similar scheme for teachers in shortage subjects (retention payment policy), which has shown positive results in retaining teachers - teachers were 23% less likely to leave if they were paid a salary supplement<sup>44</sup>. The cost per additional teacher retained by the policy also showed that it is 32% lower than the cost of training an equivalent replacement teacher. Furthermore, the research carried out by UCL also suggests that targeted pay supplements are likely to be more cost-effective than alternative policy options when it comes to reducing subject-specific shortages of teachers. **The Royal Society of Biology recommends that DfE should, analyse and publish retention figures and evaluations of the schemes they enact for recruitment and retention.**

The Royal Society of Biology recognises that the education sector is facing a recruitment and retention crisis, particularly in the shortage of specialist teachers<sup>45</sup>. As noted above, research commissioned by Association of Science Education (ASE), Institute of Physics (IOP), Royal Society (RS), Royal Society of Biology (RSB) and Royal Society of Chemistry (RSC) showed that 78% of schools reported that teachers are required to teach outside of their main field at GCSE, this was 85% in schools that only offered Combined Science. To address this, the **Royal Society of Biology recommends that the government establish close links with subject associations<sup>46</sup> and professional bodies to support teachers' professional learning and drive innovation in professional development.** All trainees should be entitled to access subject-specific support and teachers could be incentivised to stay in the classroom through CPD<sup>47</sup> - CPD has been shown to have a significant impact on retention of teachers, particularly those in their first few years of teaching<sup>48</sup>. A survey conducted by RSC and IOP recently showed that teaching staff who reported inadequate CPD were more likely to consider leaving the profession in the next five years (not due to retiring)<sup>49</sup>. Crucially, respondents who had not received adequate CPD in biology in the last 3 years were significantly more likely to say they were leaving due to stress/exhaustion/burnout (17%) and workload (13%). It also showed that respondents would value more subject specific CPD, CPD that was directly linked to the content of the curriculum and subject specific CPD for out-of-specialism.

Financial incentives alone cannot solve the teacher supply crisis, and policymakers should address other factors such as working conditions and job satisfaction<sup>50</sup>. MPs have stated that current bursaries are insufficient to address the recruitment crisis for physics and computer science teachers, and a systemic solution is needed<sup>51</sup>. It is also crucial to support experienced teachers, not just those in initial training, and to address the "squeezed middle" phenomenon where experienced teachers are not receiving the same pay increases as lower grades, leading to less of an impetus to stay in teaching<sup>52</sup>.

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<sup>43</sup> <https://www.gatsby.org.uk/uploads/education/datalab-simulating-the-effect-of-early-career-salary-supplements-on-teacher-supply-in-england.pdf>

<sup>44</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>

<sup>45</sup> <https://www.schools.org.uk/blog-2206.html#20220614>

<sup>46</sup> <https://www.iop.org/sites/default/files/2020-12/Subjects-Matter-IOP-December-2020.pdf>

<sup>47</sup> <https://www.tes.com/magazine/analysis/general/why-it-may-take-recession-halt-teacher-recruitment-crisis>

<sup>48</sup> <https://epi.org.uk/publications-and-research/effects-high-quality-professional-development>

<sup>49</sup> <https://www.rsc.org/new-perspectives/talent/the-science-teaching-survey/>

<sup>50</sup> <https://www.nfer.ac.uk/the-impact-of-pay-and-financial-incentives-on-teacher-supply>

<sup>51</sup> <https://publications.parliament.uk/pa/cm5803/cmselect/cmsctech/95/report.html>

<sup>52</sup> [https://www.rsb.org.uk/images/RSB\\_Education\\_Priorities\\_2023-2028\\_Final.pdf](https://www.rsb.org.uk/images/RSB_Education_Priorities_2023-2028_Final.pdf)

## **How well does the current teacher training framework work to prepare new teachers and how could it be improved?**

*What has been the impact of the Early Career Framework implemented in September 2021?*

Although the Early Career Framework (ECF) was implemented in September 2021, there are concerns about its impact. The framework aims to address systemic issues in science teaching by providing subject-specific professional development for early career teachers, but this is difficult to find and of variable quality. The framework is creating a high workload for both early career teachers and mentors, and there are concerns that it may have a negative impact on recruitment<sup>53</sup>. A survey by Teacher Tapp found that 57% of ECTs agreed that ECF adds a lot to their workload, with 65% of mentors saying the programme adds too much to their workload<sup>54</sup>. More than half of mentors also believe that a weakness of the framework is that it is not subject- or phase-specific enough<sup>55</sup>. The Royal Society of Biology is concerned that none of the elements of the ECF are subject specific and would like to see changes if the framework is reviewed in the future. A survey conducted by Teacher Tapp and the Gatsby Foundation found that only 2% of mentors and 4% of ECTs said that the self-study material they have used has been specialised to their subject or phase<sup>56</sup>.

**The Royal Society of Biology recommends that any new or redeveloped policies related to teaching and learning should include strong subject emphasis, including subject-specific mentoring and training entitlements.**

*Are there ways in which teacher training could be improved to address the challenges in recruitment and retention?*

**The Royal Society of Biology recommends additional investment of £44m over three years to provide subject-specific professional development and retraining in the sciences for primary and secondary teachers, as part of a STEM education strategy.** The government should also support primary teachers to enhance their STEM subject knowledge and confidence through professional development opportunities and ITT. Additionally, the IOP<sup>57</sup> and RSC<sup>58</sup> have conducted analyses of STEM workforce and skills in their respective disciplines.

*How does teacher training in England compare internationally, and what are the benefits and disadvantages of the English system?*

Due to timetabling decisions in schools, there is an increasing expectation for science teachers in the UK to teach all three sciences<sup>59</sup>, which is different from many other international models that specialise in a specific subject, e.g., in the US, a teacher will usually teach a specific grade and subject, or sub-set of a subject for example as a “grade 8 algebra teacher”. Specialisation in science

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<sup>53</sup> <https://www.tes.com/magazine/news/general/third-heads-fear-new-teachers-will-quit-over-ecf>

<sup>54</sup> <https://teachertapp.co.uk/articles/early-career-teachers-the-story-so-far/>

<sup>55</sup> <https://www.tes.com/magazine/news/general/early-career-framework-has-no-impact-retention>

<sup>56</sup> <https://teachertapp.co.uk/articles/where-next-for-the-early-career-framework/>

<sup>57</sup> <https://www.iop.org/strategy/productivity-programme/workforce-skills-project#gref>

<sup>58</sup> <https://www.rsc.org/new-perspectives/talent/chemistrys-contribution-workforce-trends-and-economic-impact/>

<sup>59</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)

teaching has advantages such as repeat classes, expertise, and faster skill development. Generalisation of science teaching has negative effects on teacher retention, learning quality, progression rates, teacher development, ITT, and recruitment. Some teachers may not wish to teach outside their specialism, particularly early-career teachers, while others may excel at and enjoy teaching a broad range of science topics at different levels. Informal discussions with Teacher Tapp showed that 40% of science teachers would prefer to teach just one subject and around 30% prefer to teach all three.

The Association of Science Education (ASE), Institute of Physics (IOP), Royal Society (RS), Royal Society of Biology (RSB) and Royal Society of Chemistry (RSC) commissioned not for publication case studies, with the aim of reviewing science and mathematics teacher training in an international context and informing the work of the learned societies on subject specialist qualifications. The case studies showed that in some countries, such as China and Finland, out-of-subject teaching is not permitted except in rare occasions and is based on a competence to teach, unlike England. The vast majority of trained teachers in Finland stay in teaching for the duration of their careers, with a 2013 survey showing that about 90% of trained teachers remain in the profession for the duration of their careers<sup>60</sup>- this is most likely due to the fact that the profession is more highly regarded, teachers are given more autonomy and working conditions are better compared with England.

Teacher training in England is often compared to other countries, especially those with highly successful education systems such as Finland and Singapore. The case studies showed that one of the key differences was the amount of time spent on training. In England, the standard initial teacher training course is typically one year, whereas in some other countries, such as Finland, Japan, Netherlands, Spain and Germany it can be up to five years. This means that teachers in those countries have more time to develop their skills and knowledge before entering the classroom. There are concerns about the level of teacher preparation, as some critics argue that the one-year PGCE course is not long enough to fully prepare teachers for the classroom. However, England is moving in the right direction with the extended early career training increasing from 1 to 2 years, but the subject element of the training still needs to be built upon and strengthened. There are also examples of novel international approaches such as Japan's renewal of teaching licenses every 10 years, where there is intense competition to become a teacher.

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<sup>60</sup> <http://ncee.org/what-we-do/center-on-international-education-benchmarking/top-performing-countries/finland-overview/finland-teacher-and-principal-quality/>