

22 March 2019

Submission to the Consultation on the Office for Standards in Education (Ofsted) draft Education Inspection Framework (EIF) 2019

The Royal Society welcomes Ofsted's new framework with its aspiration for Ofsted to be a force for improvement in schools. The focus on the curriculum is particularly welcome and aligns with the Society's belief that all pupils need a broad, balanced and connected curriculum, which can be difficult for schools to achieve due to the various accountability and assessment pressures schools face. Ofsted should place a priority on ensuring that schools are teaching all the core National Curriculum subjects to key stage 4, even when those subjects are not going to be assessed.

For Ofsted to look at the substance of education, it will need look at the different subjects within schools, recognising that there can be different needs and challenges between science, history and art. This will require inspection teams to have within them an inspector trained to assess the quality of education within the particular subject they are looking at. This is going to be difficult to achieve in the limited timescale between this consultation and the implementation of the framework.

Good school leaders encourage staff to participate in CPD, including developing skills within their subject specialism, and create an environment where teachers have the confidence to apply innovative evidence-informed practice. This is balanced with managing the workload and stress experienced by many teachers, particularly in light of the challenges with teacher retention. Ofsted should consider these elements as it considers the quality of a school's leadership.

Summary of recommendations

The Education Inspection Framework (EIF) and the School Inspection Handbooks (SIH) should be reviewed to include the following:

Role of Ofsted as a force for improvement

- 1) Ofsted should consider producing a 'myth buster' document to highlight specific practices that are not required by Ofsted and to be read alongside the School Inspection Handbook.
- 2) The EIF should consider the extent to which it is feasible to require inspectors to receive specific training in the core National Curriculum subjects.

Helping to protect learners

- 3) The framework should ask inspectors to make a judgement on the extent to which learners have an understanding of how to keep themselves safe from relevant risks such as abuse, sexual exploitation and extremism, including when using the internet and social media.

Quality of Education

- 4) The EIF should consider including a requirement for a broad and balanced curriculum. For example, the EIF should require that core National Curriculum subjects that are expected to be studied up to Key Stage 4 but are not externally assessed to be included in the learners' timetable.

Leadership and Management

- 5) The EIF should ask inspectors to make a judgement on the extent to which leaders engage effectively with learners and others in their community, including – where relevant – parents, carers, employers, local services and other education establishments.
- 6) The School Inspection Handbook should provide guidance to inspectors on how to recognise and acknowledge schools' efforts to share good practice with each other and promote horizontal, peer-to-peer accountability in their local communities

Staff's subject, pedagogical and pedagogical content knowledge

- 7) In the School Inspection Handbook on page 86, paragraph 280, inspectors should consider the extent to which the leadership meets the Continuous Professional Development (CPD) needs of staff, without creating unnecessary workload for teachers (EIF page 13; School Inspection Handbook, paragraphs 211, 280).
- 8) The School Inspection Handbook under the quality of leadership should also include the extent to which leaders develop an environment where the application of innovative evidence-informed practice is encouraged¹.

Workload

- 9) School Inspection Handbook should include further guidance to help inspectors recognise schools that are taking positive steps to manage and reduce staff workloads. For example, inspectors should consider whether:
 - 9.1) School timetabling matches a teacher's expertise to the subject they are teaching, so fewer teachers are teaching out of specialism;
 - 9.2) Additional training is provided for those teaching out of specialism as they will require more preparation time;
 - 9.3) Budget is made available (where possible) for technicians to support the sciences and computing curricula.
 - 9.4) High quality teaching and learning resources are available and shared within departments.

Retention

- 10) In making an assessment of the quality of leadership within a school, the EIF, paragraph 28, should consider asking inspectors to consider the extent to which school leaders manage staff including their workload and retention, such as how school leaders:
 - 10.1) Facilitate more flexible working arrangements for their teaching staff.
 - 10.2) Support alternative, 'braided' career pathways for their teaching staff.

Comments on the School Inspection Handbook

Mathematics

¹ <https://royalsociety.org/topics-policy/projects/royal-society-british-academy-educational-research/>

- 11) Ofsted should consider including sections on the teaching of mathematics in the Early Years and Further Education and Skills Handbooks to ensure consistency across different education providers and education phases.
- 12) Ofsted should consider the extent to which non-specialist inspectors will be able to reach inspection judgements in a way that is consistent with the guidance in the *Maintained Schools and Academies Inspection Handbook*, paragraphs 286-287.
- 13) Ofsted should consider revising the subject-specific guidance to ensure the guidance is accessible and suitable to non-specialist inspectors.
- 14) The Royal Society recommends the structuring of the criteria under the quality of education judgement (intent, implementation and impact). This structure would also be consistent with paragraph 285. This would also clarify where the responsibility for meeting the criteria lay – with curriculum planners and/or with those responsible for operationalising and evaluating its intentions. This structure would also clarify the sources from which inspectors would make judgements.
- 15) Ofsted should consider the extent to which inspectors can receive subject-specific training to ensure inspectors are able to accept a variety of teaching approaches, proven to be effective for the teaching of mathematics.
- 16) The Royal Society recommends the removal of wording that:
 - 16.1) Unnecessarily specifies the circumstances in which certain teacher approaches are to be used (e.g. new, introduce, small steps, lesson by lesson)
 - 16.2) Suggests some implications of meeting the criteria but does not contribute to making it observable (e.g. the second sentence of fifth bullet point: “this allows rapid and accurate recall and frees pupils’ attention so they can work with increasing independence, considering the application of their mathematical knowledge to more complex concepts and procedures, and gain enjoyment through a growing self-confidence in their ability”.)
- 17) Ofsted should consider clarifying in paragraph 287 that elaboration, reasoning, critical thinking and deep learning is preferable to memorisation. This would also be consistent with the definition of learning in paragraph 169.

Science

- 18) Ofsted should consider including sections on the teaching of all core National Curriculum subjects in the *School Inspection Handbooks for the Maintained Schools and Academies Inspection Handbook*, the *Early Years and Further Education and Skills*.
- 19) The Society will shortly be publishing a review of evidence on the impact of teaching experimental science which The Royal Society would be happy to discuss with the inspectorate.
- 20) The *School Inspection Handbook* should provide guidance to inspectors on how to consider a school's resourcing when making judgements on science, computing and mathematics education during an inspection.

Computing

- 21) The *School Inspection Handbook* should include a paragraph requiring inspectors to consider the extent to which the school fulfils the commitments of the National Curriculum for computing at KS4, for students who have chosen not to specialise in the subject.
- 22) The *School Inspection Handbook* should include sections on all core national curriculum subjects, including the sciences and computing, similar to the section “Applying the EIF to the teaching of mathematics”, paragraphs 286-287.

Subject specific school improvement through horizontal accountability and education research

- 23) Ofsted should consider using technological, database solutions to enable it to combine, analyse and evaluate subject or contextual data and evidence recorded by inspectors across the country in order to standardise its inspection decisions.
- 24) Ofsted should consider enabling researchers, independent of Ofsted as well as the Ofsted research division, to have appropriate access to such a database to stimulate new and much needed research on curriculum development and implementation.

Curriculum Narrowing

- 25) The Royal Society recommends that Ofsted should consider including guidance on how to recognise thematic connections within a school's curriculum, and how to include this in the inspector's judgement on the quality of education on offer.
- 26) Ofsted should consider commending schools that maintain some exposure to broad, balanced and connected curriculum that includes science and humanities subjects for all learners across Key Stages 1 to 4.

Gaming

- 27) The School Inspection Handbook should clarify for inspectors that consistently entering pupils for inappropriate tiers of assessment should be considered a form of gaming.
- 28) The School Inspection Handbook should clarify for inspectors the need to consider the advice teachers are giving to pupils about subject choices and whether this advice is intended to game the system.

Diversity

- 29) Ofsted should ensure that the Schools Inspection Handbook contains guidance for inspectors in evaluating the progression of girls and other minority groups

1. Introduction

- 1.1. Education matters because it provides young people with knowledge and understanding of how the world works and opportunities to live rewarding and worthwhile lives. Young people need the best possible education, particularly in STEM subjects, if they are to thrive in a rapidly changing and increasingly interconnected and technology rich world. Ofsted has an essential role in ensuring the education in schools prepares young people for this future.
- 1.2. The Royal Society welcomes the opportunity to submit evidence to Ofsted's consultation on its draft Education Inspection Framework 2019. The Royal Society is very supportive of the direction of travel Ofsted is taking with this proposed framework. The Society shares Ofsted's concerns that too much weight has been placed on test and exam results in relation to schools' effectiveness. As such, many schools were 'teaching to the test' and teaching a narrowed curriculum in pursuit of league table outcomes.
- 1.3. The Royal Society is a self-governing Fellowship of many of the world's most distinguished scientists working across a broad range of disciplines in academia and industry. The Society draws on the expertise of its Fellows and Foreign Members to provide independent and authoritative scientific advice to UK, European and international decision makers.
- 1.4. This response draws on the Society's extensive published work and expertise on a range of topics within science and education. The Society has also consulted widely with input from a range of education and scientific experts through surveys of our communities of interest and roundtable discussions.

2. Role of Ofsted as a force for improvement

- 2.1. The Royal Society strongly agrees that Ofsted should be a force for improvement in education provision. The Ofsted inspectorate has significant influence on the decisions school leaders and governors make. With this influence comes a risk: that the new EIF, with its broader criteria, will add to the already significant accountability pressures on schools. Ofsted may need to take measures to counter this perception, such as producing a new 'myth buster' document.

Recommendation 1. Ofsted should consider producing a 'myth buster' document to highlight specific practices that are not required by Ofsted and to be read alongside the School Inspection Handbook.

- 2.2. Training inspectors:

- 2.2.1. The Royal Society agrees that inspector training is essential for Ofsted's judgements to be valid. To assess whether students are experiencing a full and coherent curriculum will be challenging for inspectors.

A full and coherent curriculum should be broad and connected across national curriculum subjects and other activities that develop pupils' cultural capital. For example, Ofsted can play a role in protecting a broad, balanced and connected curriculum by enshrining in the EIF a commitment to ensure that core National Curriculum subjects that are expected to be studied at Key Stage 4 but are not externally assessed are included in the learners' timetable.

- 2.3. While an inspector does not need to have been a teacher in a given subject to inspect it, they need to have undertaken subject-specific training. This training should help inspectors to consider the quality of the curriculum but also the ways schools teach, resource and connect individual subjects. For example, inspectors with specialist training in inspecting science, would

be better equipped to comment on the experimental and investigative work that is a unique but essential element of science teaching.

Recommendation 2. The EIF should consider the extent to which it is feasible to require inspectors to receive specific training in the core National Curriculum subjects.

3. Helping to protect learners

- 3.1. The current inspection framework made particular reference to the internet media as an element of safeguarding. Specifically, it states under Personal Development that pupils needed an *“understanding of how to keep themselves safe from relevant risks such as abuse, sexual exploitation and extremism, including when using the internet and social media”*. The EIF should consider including a similar requirement in paragraph for learners to have an understanding of how to keep themselves safe when using the internet.
- 3.2. The Society has previously emphasised the importance of schools teaching about internet safety.² Young people are at risk of exploitation or exposure to harmful online content and as adults they will need to contend with online fraud. The national curriculum for computing emphasises the importance of using technology safely and respectfully through every key stage of schooling.³ This point should be restored to the new framework under ‘personal development’.

Recommendation 3. The framework should ask inspectors to make a judgement on the extent to which learners have an understanding of how to keep themselves safe from relevant risks such as abuse, sexual exploitation and extremism, including when using the internet and social media.

4. Quality of education

- 4.1. The Royal Society welcomes Ofsted’s focus on judging the quality of education by considering whether learners study the full curriculum, teaching a full range of subjects for as long as possible and ‘specialising’ (or narrowing) only when necessary.

Recommendation 4. The EIF should consider including a requirement for a broad and balanced curriculum. For example, the EIF should require that core National Curriculum subjects that are expected to be studied up to Key Stage 4 but are not externally assessed to be included in the learners’ timetable.

5. Leadership and management

- 5.1. An effective school leadership team creates a supportive environment enabling all their teachers to develop and apply the best possible practice in their classrooms.

² 2012 *Shut Down, Restart*, <https://royalsociety.org/~media/education/computing-in-schools/2012-01-12-computing-in-schools.pdf>

³ <https://www.gov.uk/government/publications/national-curriculum-in-england-computing-programmes-of-study/national-curriculum-in-england-computing-programmes-of-study>

- 5.2. The Royal Society welcomes the specific mention in the EIF, paragraph 28 that judgements on the effectiveness of leadership and management will include looking at how well leaders engage with learners and others in their community. In addition, school leaders should promote a culture of horizontal accountability to their peers in other establishments, in addition to vertical accountability from senior leaders.

Recommendation 5. The EIF should ask inspectors to make a judgement on the extent to which leaders engage effectively with learners and others in their community, including – where relevant – parents, carers, employers, local services and other education establishments.

Recommendation 6. The School Inspection Handbook should provide guidance to inspectors on how to recognise and acknowledge schools' efforts to share good practice with each other and promote horizontal, peer-to-peer accountability in their local communities.

6. Staff's subject, pedagogical and pedagogical content knowledge:

- 6.1. The Society agrees that the quality of leadership and management should include consideration of the leadership's focus on improving staff's subject, pedagogical and pedagogical content knowledge (EIF paragraph 28).
- 6.2. In all subjects, content and pedagogy content knowledge change over time. It is essential for subject specialist knowledge to be refreshed and reinforced through high quality professional development in order to keep up to date with this evolving evidence base and to have the confidence and ability to teach their subjects effectively. For example, this is especially true in computing or science, where the pace of technological and scientific advancements has implications for school curricula.
- 6.3. Teachers have to make daily decisions about how best to teach while taking into account emotional, behavioural and social factors that impact their pupils' ability and motivation to learn. They do this using a combination of experience, judgement and knowledge. Being research-informed gives teachers the capacity and capability to innovate and overcome barriers in progression and attainment⁴.
- 6.4. A recent report from the DfE concluded that "school leaders' support for engagement with research is the most important driver of evidence-informed practice⁵". The National College for Teaching and Leadership provided head teachers with synthesised evidence on school improvement and effectiveness in its training modules.

Recommendation 7. In the School Inspection Handbook on page 86, paragraph 280, inspectors should consider the extent to which the leadership meets the Continuous Professional Development (CPD) needs of staff, without creating unnecessary workload for teachers (EIF page 13; School Inspection Handbook, paragraphs 211, 280).

Recommendation 8. The School Inspection Handbook under the quality of leadership should also include the extent to which leaders develop an environment where

⁴ <https://royalsociety.org/topics-policy/projects/royal-society-british-academy-educational-research/>

⁵ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/625007/Evidence-informed_teaching_-_an_evaluation_of_progress_in_England.pdf

the application of innovative evidence-informed practice is encouraged⁶.

7. Workload

- 7.1. The Royal Society welcomes the proposal for inspectors to consider the way leaders are managing staff workload.
- 7.2. Since 2010, teacher numbers appear to be broadly stable overall, whilst pupil numbers have risen by about 10 per cent.⁷ However, in secondary schools the number of teachers is still falling.⁸ This challenge is at its most acute in STEM subjects. Secondary schools in England suffer from inadequate numbers of suitably qualified mathematics, computer science, chemistry and physics teachers.⁹ The most commonly attributed reason for this attrition is the high and increasing workload for teachers¹⁰.

Recommendation 9. School Inspection Handbook should include further guidance to help inspectors recognise schools that are taking positive steps to manage and reduce staff workloads. For example, inspectors should consider whether:

- 9.1. School timetabling matches a teacher's expertise to the subject they are teaching, so fewer teachers are teaching out of specialism¹¹;**
- 9.2. Additional training is provided for those teaching out of specialism as they will require more preparation time;**
- 9.3. Budget is made available (where possible) for technicians to support the sciences and computing curricula.**
- 9.4. High quality teaching and learning resources are available and shared within departments.**

8. Retention

- 8.1. The Department for Education has recently launched a teacher recruitment and retention strategy. There is potentially a large cohort of people who would like to teach part time, sometimes alongside other careers or commitments. There are already many teachers who are successfully creating and maintaining flexible and part-time roles in schools. While doing so can lead to short term inconveniences for timetabling or availability of full time teachers available, enabling greater flexibility may result in better teacher recruitment and retention

⁶ <https://royalsociety.org/topics-policy/projects/royal-society-british-academy-educational-research/>

⁷ EPI 2018 - https://epi.org.uk/wp-content/uploads/2018/08/EPI-Teacher-Labour-Market_2018.pdf

⁸ https://www.nfer.ac.uk/media/3344/teacher_labour_market_in_england_2019.pdf

⁹ School workforce census 2017

¹⁰ EPI 2018 - https://epi.org.uk/wp-content/uploads/2018/08/EPI-Teacher-Labour-Market_2018.pdf

¹¹ The Royal Society and other learned societies will be publishing research into science timetabling in schools in the coming months, and would be happy to share this and discuss with Ofsted

within a given school, and play an important part of the addressing the national challenge¹². The Royal Society has recently published a series of case studies on 'braided' careers in teaching, which help to explore this issue further¹³.

Recommendation 10. In making an assessment of the quality of leadership within a school, the EIF, paragraph 28, should consider asking inspectors to consider the extent to which school leaders manage staff including their workload and retention, such as how school leaders:

10.1. Facilitate more flexible working arrangements for their teaching staff.

10.2. Support alternative, 'braided' career pathways for their teaching staff.

Comments on the School Inspection Handbook

9. Mathematics

9.1. The Royal Society welcomes the attention given to mathematics, specifically within paragraphs 286-287 in the *Maintained Schools and Academies Inspection Handbook*.

Recommendation 11. Ofsted should consider including sections on the teaching of mathematics in the Early Years and Further Education and Skills Handbooks to ensure consistency across different education providers and education phases.

9.2. The Royal Society welcomes that there will be no grading of the teaching observed by inspectors and that what inspectors observe in lessons will contribute to an overall judgement. However, Ofsted should consider the extent to which non-specialist inspectors will be able to reach inspection judgements in a way that is consistent with the guidance in the *Maintained Schools and Academies Inspection Handbook*, paragraphs 286-287. For example, the criteria listed in paragraph 287 are not organised in a clear grouping or order.

Recommendation 12. Ofsted should consider the extent to which non-specialist inspectors will be able to reach inspection judgements in a way that is consistent with the guidance in the *Maintained Schools and Academies Inspection Handbook*, paragraphs 286-287.

Recommendation 13. Ofsted should consider revising the subject-specific guidance to ensure the guidance is accessible and suitable to non-specialist inspectors.

Recommendation 14. The Royal Society recommends the structuring of the criteria under the quality of education judgement (intent, implementation and impact). This structure would also be consistent with paragraph 285. This would also clarify where the responsibility for meeting the criteria lay – with curriculum planners and/or with those responsible for operationalising and evaluating its intentions. This structure would also clarify the sources from which inspectors would make judgements.

¹²

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/773930/Teacher_Retention_Strategy_Report.PDF.pdf

¹³ <https://royalsociety.org/-/media/policy/Publications/2018/07-09-18-braided-careers-teaching.pdf>

- 9.3. Non-specialist inspectors may be dependent on subject specialists to articulate how the mathematics lessons observed contribute to the inspection judgement about how well the curriculum is implemented. Ofsted should consider revising the subject-specific guidance to ensure the guidance is accessible and suitable to non-specialist inspectors. For example, Ofsted should also consider the extent to which inspectors can receive subject-specific training to ensure inspectors are able to accept a variety of teaching approaches, proven to be effective for the teaching of mathematics.

Recommendation 15. Ofsted should consider the extent to which inspectors can receive subject-specific training to ensure inspectors are able to accept a variety of teaching approaches, proven to be effective for the teaching of mathematics.

- 9.1. The Royal Society welcomes the publication of the research literature reviewed in preparation for the EIF and note the inclusion of studies on inducing changes in factual and procedural memory. These are of interest, but this literature is undeveloped in its application to classroom practice, notably there is no published examination of how using the recommended techniques as a sustained educational experience affects attitudes towards mathematics, or of how it is related to the ways that mathematics itself reduces demands on memory through symbolisation and chunking of procedures.
- 9.2. The criteria listed in paragraph 287 are not clearly linked with the recommendations in the National Curriculum for Key Stages 1 to 4 that must underpin most schools' curriculum design.

Recommendation 16. The Royal Society recommends the removal of wording that:

- 16.1. Unnecessarily specifies the circumstances in which certain teacher approaches are to be used (e.g. new, introduce, small steps, lesson by lesson)**
- 16.2. Suggests some implications of meeting the criteria but does not contribute to making it observable (e.g. the second sentence of fifth bullet point: “*this allows rapid and accurate recall and frees pupils’ attention so they can work with increasing independence, considering the application of their mathematical knowledge to more complex concepts and procedures, and gain enjoyment through a growing self-confidence in their ability*”.)**

- 9.3. The *Maintained Schools and Academies Inspection Handbook*, paragraph 287, suggests a focus on developing memorised skills and knowledge through the accumulation of small steps lesson by lesson. Memorisation may work with easy problems but it is unlikely to be effective with complex mathematics problems^[1]. In the *Maintained Schools and Academies Inspection Handbook*, paragraph 169, learning is not to be confused with ‘memorising facts’. Ofsted should consider clarifying in paragraph 287 that elaboration, reasoning, critical thinking and deep learning is preferable to memorisation. This would also be consistent with the definition of learning in paragraph 169.

[1] <https://www.oecd-ilibrary.org/docserver/5jm29kw38mlq-en.pdf?expires=1552579037&id=id&accname=guest&checksum=71421EBEA5236FB54CE0BD498428591C>

Recommendation 17. Ofsted should consider clarifying in paragraph 287 that elaboration, reasoning, critical thinking and deep learning is preferable to memorisation. This would also be consistent with the definition of learning in paragraph 169.

10. Science

- 10.1. The Royal Society welcomes Ofsted's focus on the application of the EIF to the teaching of mathematics and reading within the School Inspection Handbook [pg87, para 283]. However, mathematics and English are not the only core subjects that all schools are required to provide – science is also a compulsory subject.

Recommendation 18. Ofsted should consider including sections on the teaching of all core National Curriculum subjects in the School Inspection Handbooks for the *Maintained Schools and Academies Inspection Handbook*, the *Early Years* and *Further Education and Skills*.

- 10.2. Science is about more than just memorising a series of facts about the world. Experiment is at the heart of science, and scientific change. Those who learn about science, at school or later on, will not be able to do this without gaining a working knowledge of experimental science. Experimental Science should be in integral part of a broad, balanced and connected education, helping develop the experimental and investigative skills outlined in the national curriculum.

Recommendation 19. The Society will shortly be publishing a review of evidence on the impact of teaching experimental science which The Royal Society would be happy to discuss with the inspectorate.

- 10.3. For Ofsted to capture the quality of science education in its inspections, it needs to ensure providers are adequately resourcing experimental science and consider the impact this has on the quality of teaching and learning.

10.3.1. **Equipment:** For high quality science education at the secondary level every student needs access to the laboratories and equipment necessary to carry out a core set of practical activities in biology, chemistry and physics. Research by SCORE in 2013 showed that there is an acute shortage in schools and sixth form colleges of essential equipment and consumables for practical work in science.

10.3.2. **Technicians** are also in short supply, with over a quarter of respondents within state-funded schools reporting that they need at least one additional technician whilst existing, good technician support is being lost because of poor working conditions¹⁴. It would be helpful for Ofsted to speak to technicians as part of assessing science etc

Recommendation 20. The School Inspection Handbook should provide guidance to inspectors on how to consider a school's resourcing when making judgements on science, computing and mathematics education during an inspection.

¹⁴ http://www.score-education.org/media/11775/pyetait_under-the-microscope_secondary-report_final.pdf

11. Computing

- 11.1. The National Curriculum states clearly¹⁵ that at Key Stage 4 “*All pupils must have the opportunity to study aspects of information technology and computer science at sufficient depth to allow them to progress to higher levels of study or to a professional career.*” The Society’s 2017 report *After the reboot: computing education in UK schools* identified that not all schools were providing the new computing subject and that the quality of teaching could be highly variable. This is particularly important at Key Stage 4, where only a minority of students will take GCSE Computer Science. For the remainder, computing remains an important subject in developing digital skills and in ensuring young people are equipped for a digital future.

Recommendation 21. The School Inspection Handbook should include a paragraph requiring inspectors to consider the extent to which the school fulfils the commitments of the National Curriculum for computing at KS4, for students who have chosen not to specialise in the subject.

- 11.2. The Wellcome Trust review of Ofsted reports¹⁶ indicated that only 61% inspections of primary schools mention science and practical science in the report, compared to 100% mentioning mathematics and 87% in reports of secondary schools. This is a significant increase from just 32% in 2014/15, but there is still more room for improvement.

Recommendation 22. The School Inspection Handbook should include sections on all core national curriculum subjects, including the sciences and computing, similar to the section “Applying the EIF to the teaching of mathematics”, paragraphs 286-287.

12. Subject specific school improvement through horizontal accountability and education research

- 12.1. Ofsted previously placed a greater emphasis on subject specific inspections, which helped the inspected schools to improve in specific areas. These inspections also enabled Ofsted to write subject reports (such as the 2012 report *Mathematics: made to measure*), which provided a valuable insight as to whether the curriculum and its teaching is effective.
- 12.2. Subject-level inspections would require differently resourced and capable inspection teams. This level of resource may be beyond that currently available. However, there are other ways the education system can support school improvement in specific subjects:
- 12.2.1. Ofsted should consider providing an opportunity for subject specific accountability through the encouragement of horizontal accountability to peers in their community.
- 12.2.2. With horizontal accountability, teachers monitor and assess each other, learning from their peers both by the feedback but also observing the practice of others. This

¹⁵ <https://www.gov.uk/government/publications/national-curriculum-in-england-computing-programmes-of-study>

¹⁶ <https://wellcome.ac.uk/sites/default/files/review-of-ofsted-inspection-reports-2018.pdf>

culture can enable teachers to take collective responsibility for school improvement and raise the status of the profession.

- 12.2.3. Peer-to-peer review within schools, and potentially with regional groups of school subject heads would help provide subject-specific feedback. This is particularly relevant in mathematics, a high-stakes subject for schools, where there may only be one teacher with a mathematics specialism.¹⁷

Recommendation 23. Ofsted should consider using technological, database solutions to enable it to combine, analyse and evaluate subject or contextual data and evidence recorded by inspectors across the country in order to standardise its inspection decisions.

Recommendation 24. Ofsted should consider enabling researchers, independent of Ofsted as well as the Ofsted research division, to have appropriate access to such a database to stimulate new and much needed research on curriculum development and implementation.

13. Curriculum narrowing

13.1. The Royal Society welcomes Ofsted's commitment to ensuring that from key stage 2 onwards, inspectors will expect to see a broad, rich curriculum, as shown in paragraph 161 of the School Inspection Handbook. The Royal Society believes that a broad, balanced and connected curriculum to age 18, with strong links between disciplines and themes, best equips young people for their future of work and ensures that they have the opportunity to flourish.

- a. The Society believes that schools should provide a connected and coherent curriculum, including elements beyond those directly measured by the assessment system. The curriculum should include a wide range of subjects, with connecting themes across disciplines, meaning that the sciences, maths, languages, arts and humanities can be taught in a way that links the subjects together and draws on shared topics. In addition, skills such as problem solving, team work and communication should be taught both as part of the curriculum within other subjects, and explicitly as important life skills for the future.

Recommendation 25. The Royal Society recommends that Ofsted should consider including guidance on how to recognise thematic connections within a school's curriculum, and how to include this in the inspector's judgement on the quality of education on offer.

Recommendation 26. Ofsted should consider commending schools that maintain some exposure to broad, balanced and connected curriculum that includes science and humanities subjects for all learners across Key Stages 1 to 4.

14. Gaming

14.1. The Royal Society welcomes the proposal for inspectors to challenge leaders and managers about gaming in examination entry.

¹⁷ <https://royalsociety.org/~media/policy/Publications/2018/14-03-2018-maths-snapshot-teaching.pdf>

- 14.2. It would be helpful for the guidance in the School Inspection Handbook to consider decisions schools make on what tier to enter pupils for exams in qualifications with tiered assessment such as GCSE Mathematics¹⁸. In some schools, pupils may be entered for higher papers than appropriate with the school gambling the pupil will receive the bare minimum grade on the paper. If a school has a large number of pupils failing or receiving the minimum grade following entry to higher tiered papers, then the school may be attempting to game the assessments.

Recommendation 27. The School Inspection Handbook should clarify for inspectors that consistently entering pupils for inappropriate tiers of assessment should be considered a form of gaming.

- 14.3. There is a similar problem with the guidance given to pupils on which qualifications to take. An Ofqual policy paper published in 2018 recognised that there is a perception that pupils are more likely to obtain lower grades if entered for science and modern languages qualifications.¹⁹ As a consequence of this, some schools may be actively discouraging pupils from taking these subjects, even when it may otherwise be appropriate for that pupil.

Recommendation 28. The School Inspection Handbook should clarify for inspectors the need to consider the advice teachers are giving to pupils about subject choices and whether this advice is intended to game the system.

15. Diversity

- 15.1. Pursuing STEM subjects provides a strong foundation of quantitative, analytical and digital skills that are an essential part of a broad, balanced and connected education. At present, the gender imbalance in the number of students taking ST
- 15.2. The Royal Society believes that although recent years have shown an encouraging increase in the number of girls studying STEM subjects, there is much work to be done to close the gender gap. In particular, the Society would like to see an increase in the number of girls studying Computing at both GCSE and A level.

Recommendation 29. Ofsted should ensure that the Schools Inspection Handbook contains guidance for inspectors in evaluating the progression of girls and other minority groups.

¹⁸ [http://www.acme-uk.org/media/13569/august%202013%20acme%20gcse%20response%20final%20\(3\).pdf](http://www.acme-uk.org/media/13569/august%202013%20acme%20gcse%20response%20final%20(3).pdf)

¹⁹

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/757841/ISC_Decision_Document_20.11.18.pdf