

House of Commons Education Select Committee inquiry: The impact of COVID-19 on education and children's services

<https://committees.parliament.uk/work/202/the-impact-of-covid19-on-education-and-childrens-services/>

The inquiry will look at how the outbreak of COVID-19 is affecting all aspects of the education sector and children's social care system and will scrutinise how the Department for Education is dealing with the situation.

It will examine both short term impacts, such as the effects of school closures and exam cancellations, as well as longer-term implications particularly for the most vulnerable children.

Terms of reference:

- The implementation of the critical workers policy, including how consistently the definition of 'critical' work is being applied across the country and how schools are supported to remain open for children of critical workers
- The capacity of children's services to support vulnerable children and young people
- The effect of provider closure on the early years sector, including reference to:
 - Children's early development
 - The early years funded entitlement and the childcare market
- The effect of cancelling formal exams, including the fairness of qualifications awarded and pupils' progression to the next stage of education or employment
- Support for pupils and families during closures, including:
 - The consistency of messaging from schools and further and higher education providers on remote learning
 - Children's and young people's mental health and safety outside of the structure and oversight of in-person education
 - The effect on apprenticeships and other workplace-based education courses
- The financial implications of closures for providers (including higher education and independent training providers), pupils and families
- The effect on disadvantaged groups, including the Department's approach to free school meals and the long-term impact on the most vulnerable groups (such as pupils with special educational needs and disabilities and children in need)
- What contingency planning can be done to ensure the resilience of the sector in case of any future national emergency

Introduction

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, secondary and tertiary levels across the UK, working in coordination with our member organisation and with the broader scientific community. Steered by our Education and Science Policy Committee, we aim to do this through bringing together the education and science communities, informing policymakers, providing impartial, evidence-based advice and being seen as the leading voice for biology. Our education priorities 2017-2022¹ underpin our policy work, and outline important factors that contribute to an excellent biology education for all students.

To inform this response we sought specific views through a survey open 5 – 13 May 2020, on the areas detailed below, from primary and secondary teachers, initial teacher training providers, and those involved with undergraduate teaching and learning via a survey distributed via our BioEd newsletter for teachers and technicians of 5 – 19 biology, and through RSB groups and committees. Of the 47 respondents, just less than half were heads of bioscience departments in university, and one fifth were secondary teachers. We do not suggest that the survey responses of our small sample reflect all schools, ITE providers, or university bioscience departments, but due to consistency of responses, other evidence from members, and other reported research and guidance, we are confident that the breadth of responses in our sample is indicative of the wide range of support currently experienced by pupils, students, trainee teachers and Newly Qualified Teachers and the variety of approaches and concerns of their institutions in handling disruptions due to Covid-19. Our response is also informed by wider conversation before and since the survey with individuals from these groups, colleagues, existing policy positions and discussions with other learned societies in the sciences.

In drafting this response, the Society has consulted with members of our Council, Education and Science Policy Committee, Membership and Professional Affairs Committee, Accreditation Committee, Biology Education Research Group, Curriculum Committee, Diversity and Inclusion Working Group, Education Policy Advisory Group, Heads of University Biosciences and Member Organisations.

Our submission to the select committee is divided into six sections highlighting impact across primary, secondary, technical, vocational and undergraduate education, initial teacher training, and covers the following areas of the terms of reference:

- The effects of school closures in the short and long term
- The effect of cancelling formal exams, including the fairness of qualifications awarded and pupils' progression to the next stage of education or employment
- Support for pupils and families during closures, including:
 - The consistency of messaging from schools and further and higher education providers on remote learning
 - The effect on apprenticeships and other workplace-based education courses
- The financial implications of closures for providers (including higher education and independent training providers), pupils and families
- The effect on disadvantaged groups
- What contingency planning can be done to ensure the resilience of the sector in case of any future national emergency
- Longer term implications

A summary of the Societies recommendations can be found on page 19.

The Royal Society of Biology's response is over 3000 words, and as such we provide an overview of the sections that follow:

Impact on primary science education (page 4)

- Science education during school closures
- Practical activities
- Science curriculum time in 2020/21

Impact on secondary science and biology education (page 5)

- Science education during school closures
- Practical activities
- Reduced teaching and learning time and impact on Year 9 and 10
- Remedial programmes and possible approaches to support students and teachers next year
- Peculiarities in the sciences at GCSE and A level regarding exceptional arrangements for 2020 (Combined Science GCSE, typical teacher allocation for a Year 11 Combined Science GCSE class, Grande comparisons with previous Biology A level cohorts, Practical endorsements in A level sciences)
- An autumn exam series

Impact on practical activities in primary and secondary (page 9)

- Practical activities for primary aged children attending school during extended periods of closure
- Practical activities in secondary schools during periods of extended closure
- practical activities intended for use in primary schools
- Return to schools

Impact on degree apprenticeships (page 11)

- Loss of work experience or learning or learning as result of the pandemic
- Practical or laboratory-based training
- Financial concerns
- End point assessment processes

Impact on undergraduate bioscience students (page 12)

- Adoption of no detriment policies
- Laboratory skills opportunities for current undergraduate students
- Capstone experiences
- Teaching of technical laboratory and fieldwork skills in 2020/21 and beyond
- Laboratory skills opportunities for current undergraduate students
- Students entering universities in 2020/21 academic year and beyond

Impact on trainee teachers and Newly Qualified Teachers in the sciences (page 15)

- 2019/20 cohort of trainee teachers (NQTs in 2020/21)
- 2020/21 cohort of trainee teachers

Long term impact on primary, secondary and tertiary bioscience education and educators (page 17)

- Disproportionate impact of COVID-19 on those from BAME communities
- Variation in remote support for students, and need to re-engage students with the sciences
- Clear and concise statements to parents and students, and universities and future employers, on the arrangements for this year
- Unconscious bias and barriers to progression in formal education
- Role of supply teachers
- Teachers' professional judgements

Summary of Royal Society of Biology recommendations (page 19)

RSB support and engagement for the bioscience and education communities during COVID-19 (page 20)

Numbered references in the text are included as endnotes (page 20)

Impact on primary science education

Evidence from our members points to a varied pupil experience of **science education during school closures** dependent on school and local authority or academy chain. In some cases, there is a lack of science support for primary students and parents, with some schools providing no ongoing support, and others providing support for other subjects but not science.

We do not yet have a sense of the impact of disruptions this year on next school year's planning. The Wellcome Trust's 2017 State of the Nation² report of UK science education found that on average UK primary schools teach science for 1 hour and 24 minutes a week, and only 42% teach science for the recommended two or more hours a week.

The Royal Society of Biology is concerned that some schools may further reduce **science curriculum time in 2020/21** to catch up on missed teaching and learning in other subjects due to 2019/20 disruptions. We would urge primary leaders to ring-fence the time usually allocated to science in a given school year and encourage primary science subject leaders to spend time re-engaging their pupils with the sciences. The consequences of several primary cohorts disengaging with the sciences due to lack of access could have significant impact on future progression to A level, further and higher education in the sciences.

Practical activities are an integral part of primary science education. It is important that pupils and teachers are supported in providing alternative activities to experience these skills during times of disruption and school closures, and that a return to full practical activity in school, or field work outside the classroom, is phased in as soon as is safe to do so. This should include consideration of: health and safety of teachers and pupils, availability of personal protective equipment, social distancing requirements, suitability of individual activities, level of student competence, and teacher expertise, as detailed below in "Impact on practical activities in primary and secondary"

Impact on secondary science and biology education

Evidence from our members points to a varied student experience of **science education during school closures** dependent on school and local authority or academy chain. Ten respondents “secondary science or biology department, head of department or similar” in Royal Society of Biology’s survey reported regular online science support has been provided for students by email, video chat or school website and newsletters. One respondent added that they are adhering to the timetable as much as possible for all lessons, including science. However, it has been reported that digital poverty and limited or no broadband access, or lack of a place to comfortably study at home is common in disadvantaged areas. Teacher Tapp reported 28% of teachers responding to their survey felt that more than half of their students did not complete any science work in the last week (excluding years 11 and 13). Ad hoc provision of support for students has been necessary for short term remote study, however best practice should be sought if remote learning continues in 2020/21 school year – online provision is different and should be built around asynchronous delivery.

Practical activities are an integral part of secondary education in the sciences both for students progressing from school into higher education in the sciences, and for students that finish their science education at the end of the compulsory stage as citizens and as they become members of the workforce. It is important that students and teachers are supported in providing alternative activities to experience these skills during times of disruption and school closures, and that a return to full practical activity in school is, or field work outside the classroom, is phased in as soon as is safe to do so. This should include consideration of: technical support, health and safety of teachers and students, availability of personal protective equipment, social distancing requirements, suitability of individual activities and level of student competence, as detailed below in “Impact on practical activities in primary and secondary”

A further concern in the sciences is **reduced teaching and learning time** during this year and possible continued reduction next year. The Royal Society of Biology is aware that teachers already report difficulties in squeezing the vast Biology GCSE specification into two years of teaching time, the Society is concerned that there will be an increase in the perceived difficulty of the sciences in the next two years of GCSE cohorts, due to the need to cover more of the curriculum in less time, subsequently leading to a reduction in numbers progressing to A level. Teachers responding to our survey on the impact of Covid-19 disruptions on bioscience education were supportive of a slimming down of examinable content in 2020/21, or a similar approach to this year with students awarded calculated grades in GCSE and A level qualifications 2020/21.

For the sciences, this problem extends to current Year 9 students as well as current Year 10 - research on timetabling of the sciences at GCSE commissioned by the Royal Society of Biology, Institute of Physics, Association for Science Education, Royal Society and Royal Society of Chemistry³ found that 78% of schools reported beginning GCSE teaching in year 9 (despite it being a statutory requirement to teach a three year programme at Key Stage 3).

Publication of this research and an accompanying commentary from the Royal Society of Biology, Institute of Physics, Association for Science Education and Royal Society of Chemistry is due later this year. The Royal Society of Biology would be happy to provide further detail from this unpublished research to the Education Select Committee and Department for Education.

Teachers have further concerns about insecure content knowledge due to lack of access during this period, reduced motivation to study, uncertainty about whether another lockdown will occur and whether qualifications will be awarded as normal in 2020/21. By 15th June 2020, year 10 and 12 students will have already missed nine weeks of face-to-face teaching, which is around one eighth of a regular two-year programme of study (assuming a two week Easter break and one week May half term). As a return to full

time teaching is unlikely by summer, this will rise to one fifth of a GCSE or A level course by the end of this school year and we expect further disruption in the autumn term. The Royal Society of Biology encourages the Department for Education to consider either

- A reduction in examinable content to be assessed in summer 2021 exams, with recommendations to awarding bodies developed with support from subject organisations.
- A commitment to calculated grade awards in place of summer 2021 GCSE and A level exams, recognising that students have missed a significant portion of teaching time in the first year of their qualification studies.

The Royal Society of Biology has been engaging with the Department for Education during this period, and would be happy to further discuss approaches for next year.

To recognise the ongoing disruption to learning has not only reduced the effectiveness of teaching and learning for pupils during 2019/20, but also for the start of 2020/21 as GCSE and A level option courses often begin teaching before summer breaks. Along with other scientific learned societies, the Royal Society of Biology has supported consideration of such an approach in Scotland, as stated in a letter⁴ to the Scottish Government COVID-19 Education Recovery Group in May.

Remedial programmes should be considered, as students return to schools, these will need to be developed on a local level, with a particular focus on students due to sit qualification exams next academic year (current Year 10 and 12), students who have not been able to engage with any available remote teaching at their school, and schools that have been unable to provide any support beyond initial school closure announcements. Support for non-specialists teaching the sciences will be critical in ensuring remedial curriculum approaches are informed by depth of knowledge and disciplinary expertise.

The Royal Society of Biology supports recommendations made by the Education Policy Institute in their proposals for preventing the disadvantage gap from increasing during and after the Covid-19 pandemic⁵, and including the suggestion that summer holiday provision for all children, should not necessarily be focussed on academic catch-up. Subject focussed remedial projects will be best led by teachers with disciplinary expertise, familiar with specific students within the regular school year.

The Department for Education could consider the following **approaches to support students and teachers next year**:

- A framework or guidance for remedial programmes developed by the Department for Education in consultation with awarding bodies and subject organisations.
- Guidance on returning to school practical and laboratory work, including increased health and safety and prioritisation of topics and skills in coordination with subject organisations and CLEAPSS.

It is vital for our disciplines that any recommendations or resources including subject-specific advice or content are developed or quality assured by those with disciplinary and pedagogical expertise in that subject area.

The Royal Society of Biology responded to Ofqual's consultations on exceptional arrangements for awarding GCSEs and A levels in 2020⁶, and an extraordinary framework for technical and vocational qualifications in 2020⁷. In those responses we emphasise **peculiarities in the sciences at GCSE and A level**, further detail is provided here for the Education Select Committee's consideration:

Combined Science GCSE is the only GCSE graded on a 17-point scale, the current GCSE cohort are only the third to be awarded grades on this scale. The granularity of possible grades, tiered entry and nature of the combined biology, chemistry and physics grade create additional challenges

for teachers providing centre assessed grades. In addition, teachers of GCSE cohorts are likely to have to liaise with at least one other teacher of that class.

Grade comparisons with previous Biology A level cohorts – the current A level cohort are the first to have progressed to A level from the new Combined Science and Biology GCSE specifications. Their GCSE experience is significantly different to the cohorts that preceded them, and as a result a statistical approach comparing this year's calculated grade awards with previous years' is not comparing like with like. The statistical model applied for A level sciences in 2020/21 should therefore be conducted similarly to the first year of award qualification in a new specification or exam format. Until the statistical model approach is published in full, it will be difficult to know if this has been considered in the sciences.

Practical endorsements in A level sciences – Biology, Chemistry, Physics and Geology A levels include an award of a practical endorsement, in addition to the regular A* – E scale. The Royal Society of Biology welcomes a no detriment policy i.e. if there is evidence students were on track against the Common Practical Assessment Criteria until schools closed, they should be awarded a pass for the practical endorsement award, regardless of the number of specified practical activities completed. A cross board statement has been published on Practical endorsement monitoring⁸, however the Society has received reports from members that this has been interpreted by schools as students that have not completed the required number of practical should receive a "Not Classified" for their practical endorsement. The Royal Society of Biology recommends that the Department for Education and Ofqual urgently provide consistent messaging for these endorsements, ensuring that A level students are not unfairly treated compared to previous and future cohorts as it may impact future progression to higher education. It should be reasonably assumed that students would have continued on track if they had been able to complete all activities. And that this messaging is also disseminated for a university audience, particularly directors of teaching and learning, admissions staff and first year undergraduate lecturers.

The Royal Society of Biology notes that an **autumn exam series** has been proposed to meet the Secretary of State's statement that an option will be available to allow students who do not feel their awarded grade reflects their performance, to sit an exam at the earliest reasonable opportunity once schools are open again.

The Royal Society of Biology has responded⁹ to Ofqual's consultation on the proposed additional exam series in autumn, and feels careful consideration is required on this unprecedented change to our school examination system. Inclusion of a new autumn exam series will impact current Year 11 and 13 students directly, but will also have an impact on teachers and students in other year groups.

If schools return to full teaching in September, current Year 11 students choosing to sit autumn exams will not be able to start their Year 12 studies until later in the term, leading either to individuals missing further teaching time in their studies for an A level qualification, or teaching of all A levels postponed until after the autumn exam series subsequently requiring all students to work through the A level on a reduced timescale compared with previous and future cohorts.

Current Year 13 A level students not attaining the grades they require to progress to Higher Education will either have to defer entry to 2021/22 in order to sit an autumn exam, or will require Universities to agree to accept late admissions or delay clearing processes. Such a decision by Universities is very likely to be uniform across the sector and may be impossible in the current structure and timeframe. Exams in October with results in December will be too late for progression into higher education courses that begin in Autumn 2020. Students who intend to progress to A levels will either be unable to start their course, or will begin A level studies only to have them interrupted in order to revise and sit exams. Evidence from the Royal

Society of Biology's members suggests that HEIs are unlikely to be able to make this accommodation for individual students. The existence of an autumn exam series would therefore further increase the chances of large numbers of deferrals to 2020/21, and increased competition for places in 2020/21 as the next cohort also looks to progress into higher education.

There is no guarantee schools will be able to return as normal in autumn, and further delay of an autumn exam series will have a detrimental impact on the mental health and progression of students that are hoping to improve their grade and progress on to the next stage of their education.

Inclusion of an autumn exam series will place an additional burden on teachers, who may now have to plan revision sessions and additional teaching time for current Year 11 and 13 students due to missed teaching time at the end of this school term, in order to cover all examinable content. Combined Science and Biology GCSE and Biology A level are rarely taught in the topic order provided in a given specification, so it would not be possible to simply remove content of a particular topic for examination in autumn. Schools will need time to arrange the logistics of assessments in the autumn.

The May 2020 Sutton Trust Covid-19 impact brief on University Access and Student Finance¹⁰ suggests that over half of university applicants would be likely to take a replacement exam in the autumn if they don't get the grades they hope for.

Examination marking relies on current teachers or those who have recently taught a specification, these teachers will be dealing with additional burdens of planning and possibly continuing to provide remote support for some students in autumn 2020/21 – the pool of possible exam markers and moderators may be much smaller than would usually be the case.

Impact on practical activities in primary and secondary school

It is clear that all students have experienced, and will continue to experience, significant disruption to their education. Schools are expected to be open for some students, currently children of keyworkers and vulnerable students, and an increasing number of year 1 and 6 since 1 June. CLEAPSS, who support practical science, D&T and art in primary and secondary schools and colleges, have produced some guidance to help teachers and technicians during this period of partial school closure.

CLEAPSS advice P104 Organising and managing hands on activities in science¹¹, D&T and art in a partially reopened primary school suggests additional considerations in choosing activities, planning for activities and risk assessment, and in advice P097 suggest **practical activities for primary aged children attending school during extended periods of closure**¹².

CLEAPSS advise that **standard practical activities in secondary schools during periods of extended closure** are not appropriate activity – particularly if groups of children supervised are of mixed age groups or from different schools. In their GL338 advice on practical activities for pupils attending school during extended periods of closure¹³, CLEAPSS state in these situations it is likely that there will be:

- No technical support – teachers must not help themselves to chemicals from the chemical store
- Limited knowledge of the practical skills of the individual students
- No access to immediate remedial measures or First Aid
- No suitable disposal route for surplus chemicals and/or the products of reactions.

However, **practical activities intended for use in primary schools** are intrinsically safer, use resources available from around the home or readily available from high street stores, and do not require specialist disposal arrangements. In their GL338 advice CLEAPSS suggest that these resources could be used by an appropriately qualified member of staff to explore complex underlying scientific ideas with secondary students, beyond the primary level they are intended for. CLEAPSS also list unsuitable activities – those that would require more technical support or equipment, or raise health and safety concerns.

When students **return to schools**, the sciences will be further affected if social distancing requirements are still in place as practical activities in the classroom generally involves pair or group work. Engaging with practical activities and developing laboratory skills are vital parts of our discipline, but should only be reintroduced into the classroom when it is safe for teachers and pupils to work in close proximity. It has been reported by schools that they have donated protective eyewear to front line staff, this piece of equipment is critical to health and safety in the school laboratory and schools may now struggle to replace at short notice.

Where individual equipment is available for every student, the Royal Society of Biology hopes that some practical science can be reintroduced via Biology fieldwork outdoors earlier than laboratory work. For example in school grounds, playing fields, a local park, where the risks of infection are substantially lower and social distancing may be easier to achieve.

Guidance for working safely during COVID-19 in labs and research facilities¹⁴ has recently been published for employers, the Royal Society of Biology recommends that the Department for Education develops a similar framework for teachers of the sciences and school technicians in coordination with CLEAPSS who have already published advice GL343 – Guide to doing practical work in a partially reopened school¹⁵ and GL345 Guidance for science departments returning to school after an extended period of closure¹⁶. Guidance should be accessible to all schools, teachers and technicians detailing clear recommendations and requirements, including:

- Entry into the lab, maximum number of pupils per lab and per laboratory work station – dependent on social distancing requirements during any given phase of the UK’s pandemic response.
- Managing practical activities, Heads of department in coordination with senior technicians must ensure there is adequate staff coverage and expertise to ensure suitable preparation, lab scheduling and social distancing.
- Length of lessons – practical activities are likely to take longer to complete as students will be working individually.
- Equipment – schools should only carry out laboratory work where there is enough equipment for one set per student. This should be set up in advance, requiring more lab time to be used for set up, clearing and cleaning by socially distanced staff members.
- Health and Safety of students – socially distanced teachers may not be able to supervise individual activity as normal. Teachers, Technicians and Heads of Department must take this into health and safety and student competency into consideration via a risk assessment.
- Where there are any doubt new rules, cleaning procedures, social distancing can be observed, practical activity should be halted and an alternative sought to experience these skills in the short term.
- Availability of Personal Protective Equipment, and sanitisation or disposal of this equipment after each use, and personal bottle of hand sanitiser allocated to every student and teacher carrying out practical work.
- Risk assessment of individual vulnerabilities of staff and students e.g. risk factors and demographic of the community.

Many of these recommendations will entail increased expenditure by schools for the sciences. The Royal Society of Biology recommends that the Department for Education considers making available additional funds to ensure that students are able to safely access laboratory and field work activities as part of their compulsory science education.

Impact on degree apprenticeships

Research from the Sutton Trust suggests that up to three-fifths of apprentices have lost out on **work experience or learning as a result of the pandemic**. This will have a significant impact on STEM degree apprenticeships, in which students work towards attaining professional competencies in practical skills before moving into the workplace.

Many STEM apprentices will be unable to work from home due to lack of equipment, and some will not be able to access learning from home due to a lack of internet or suitable devices. Where possible, institutions have moved to virtual learning programmes however security issues and difficulties interacting with company firewalls are prevalent. **Practical or lab-based training** is difficult or impossible under such circumstances, and lack of access to distance learning will have a knock on effect of completion time for apprenticeships. Some providers are already pushing back start dates for 2020/21 timetables, the availability of laboratory space and equipment will be further impacted if social distancing requirements remain in place. Such delays in apprenticeship completion can mean that the fixed term contracts set by employers will no longer cover the full length of the apprenticeship and may impact the financial viability of apprenticeships going forward.

Students, academic provider and employers are facing additional **financial concerns** associated with apprenticeships. For students and providers, completion payments may be held longer as completion date is pushed back, and providers not receiving payment while breaks of learning are in place. The Sutton Trust's Covid-19 impact brief on apprenticeships¹⁷ further notes that furloughing and redundancies are disrupting off the job learning and apprentices are facing additional financial strains. As of early April the employers surveyed by the Sutton Trust reported that on average just 39% of apprenticeships were continuing as normal and 17% felt that fewer than half of their apprentices would return to their courses once economic restrictions were relaxed.

The Royal Society of Biology welcomed Ofqual's consultation on the extraordinary framework to be put in place for technical and vocational qualifications at level 6 and below. The Society responded to this consultation in May and recognises that qualifications level 7 and above will face similar issues in **end point assessment processes** with workplace restrictions in place. The Society is pleased that the Institute of Apprenticeships and Technical Education have provided guidance¹⁸ regarding External Quality Assurance and End Point Assessment during this time. For many STEM degree apprenticeships, threshold competencies are required for completion of a course and completion of these apprenticeships is likely to be delayed until social distancing requirements are relaxed.

Impact on undergraduate bioscience students

The Royal Society of Biology supports the **adoption of no detriment policies** by Higher Education Institutions. In March, a statement¹⁹ was shared with all institutions with degrees accredited by the Society to reassure life science departments that changes to teaching and assessment that prove necessary due to COVID-10 disruptions should not impact on the accreditation of their degrees. Universities and life science departments are responsible for ensuring that their approach to this situation upholds overall standards and mitigates impact on their students and overall learning outcomes of their programmes.

The Royal Society of Biology's survey on bioscience education impacts due to COVID-19 disruptions received 23 responses from those involved in undergraduate teaching and learning. Some individuals reported they expect significant reduction in **laboratory skills opportunities for current undergraduate students** next semester and beyond. Where institutions were confident that most hands-on practical classes had been completed ahead of closures, it was noted that some students will have missed specific skills that they would not normally not have an opportunity to experience again during their degree. Available laboratory space will be a concern if social distancing requirements further impact current undergraduates, and some institutions are already planning for lab closures and delivery of virtual laboratory practicals for at least the first semester of 2020/21. This may include novel approaches, such as moving practical modules into later years of an undergraduate course, use of a pyramid system that prioritises labs that cannot be delivered online and for students who are closest to the end of their degree.

The Royal Society of Biology recommends that Higher Education Institutions review the time left in an undergraduate degree programme and seek novel approaches so that students are given the opportunity to experience and achieve competence in any laboratory skills that have been missed due to physical building closures. The Society is working with accredited institutions to ensure that any adjustments made to accredited programmes remain in line with the overall learning outcomes and experience expected for bioscience graduates.

The 2020 graduating cohorts are likely to have experienced a normal **capstone experience** at the end of their bioscience degree, with Universities reporting that those that delivered to deadline were able to complete independently as planned. Some students who sought extensions have been unable to complete. Closure of buildings and laboratories in higher education institutions has a significant impact on students about to commence their capstone experience with institutions reporting:

- Summer field work has been cancelled or postponed to autumn, or beyond
- Dissertation deadlines may need to be extended to allow for spring time sampling
- Some projects not yet commenced have been converted to database projects, literature reviews, or online field courses.
- Some projects are unaffected as they already consisted of database projects, literature reviews or online field work.

The Royal Society of Biology considers the delivery of practical skills an essential element of a biosciences degree and recognises that the COVID-19 crisis presents significant challenges for the **teaching of technical laboratory and fieldwork skills in 2020/21 and beyond**. Some of these skills can be successfully experienced via online or virtual activities, with some institutions already excelling at such delivery in their normal modules. The Society's Accreditation Committee have produced discussion paper²⁰ for HEIs on this topic to provide clarity on the importance and practicalities of technical skills teaching. At the time of submission to the Education Select Committee, RSB's Accreditation Committee were awaiting feedback from bioscience departments on how they intend to meet this challenge. The Royal Society may provide further advice in this area as it expects, for the next two years at least, health and safety in laboratories, laboratory teaching and field work may be very different to pre-Covid-19 arrangements.

The Society's Accreditation Committee has considered the education purpose of practical classes and field work, including:

- Learning by doing, not just listening and watching
- Providing students with an experience of being a practical scientist
- Giving a context to the theoretical understanding of the subject
- Generation of original data that can be processed and interpreted by the students, including pooling of individual student results to increase sample size
- Some experience of experimental design and testing of a hypothesis
- Practical understanding of the requirements of health and safety
- Experience and understanding of team-working, including strengthening cohort identity and forging of friendships
- Enhancement of transferable skills such as time-keeping, self-management and problem solving
- Close collaboration between students and staff
- An introduction to some of the job opportunities to graduates
- Competence in technical skills

The Royal Society of Biology aims to support life science departments in meeting the above purposes, and supports increased use of theoretical approaches, virtual methods and simulations while students are unable to safely travel or work in close proximity. HEIs may choose to increase the use of such approaches longer term, beyond restrictions caused by the COVID-19 pandemic. The Royal Society of Biology supports the use of approaches that benefit student experience and augment access to and engagement with the purposes listed above. Experience of being practical scientist, practical understanding of the requirements of health and safety, an introduction to job opportunities and competence in technical skills will be the most challenging aspects to achieve while disruptions to regular laboratory sessions and field work remain.

A return to laboratory sessions and field work should be supported by HEIs and government. Recently published Government advice¹⁴ regarding working safely during coronavirus in labs and research facilities would be welcomed in planning a return to teaching and learning in laboratories. The Royal Society of Biology would encourage the Government to produce guidance for Universities specifically considering learning and teaching in a laboratory and its alignment with other advice e.g. reopening of Halls of Residence.

Evidence from our members points to a wide variety of approaches being considered by Universities for **adjustments to the 2020/21 academic year or admissions processes**, following cancellation of spring open days and summer exam series, and student and parent uncertainties as to whether another lockdown will occur in autumn. This is likely to cause significant anxiety for students and teaching-focussed staff, and may have knock on consequences for student deferrals and staff retention. The May 2020 Sutton Trust Covid-19 impact brief on University Access and Student Finance¹⁰ suggests that a fifth of university applicants have changed their mind about university attendance this autumn, or have yet to decide, and almost half of applicants feel the current crisis will have a negative impact on their chances of getting into their first-choice university. For this year at least, this may not be the case, as the expected reduction in international student places will create more room for UK domiciled student entry in autumn 2020. However, in 2021/22 competition for university places is likely to be increased due to increased deferrals. The UK could look to good practice in Hong Kong and Germany, both of which underwent periods of double cohort entry to University due to changes in the length of schooling pre-higher education in the last ten years.

An April House of Commons briefing paper on coronavirus implications for the further and higher education sectors in England²¹ states that Universities are already concerned about an increased number of students deferring their places in 2020/21, and suggest that alterations to the timing of admission cycles may be

required. The Royal Society of Biology would further add that inclusion of an autumn exam series in 2020 would require Universities to either accept late admissions, delay clearing processes or accept increased deferrals to 2021/22; such an approach is unlikely to be uniform across the sector. A London Economics survey of students in May 2020²² suggests that approximately 17% of prospective UK domiciled students will not enrol in higher education in September 2020, should higher education institutions not be operating as normal in autumn 2020 as a result of the pandemic.

Universities have reported admissions cycles are likely to be impacted, with some institutions already delaying entry and considering multiple start points. The Royal Society of Biology notes that increased deferrals to 2021/22 may have a disproportionate effect on student places in the sciences next year, due to limited laboratory space unless alternative online provision can be facilitated.

The Royal Society of Biology has encouraged Heads of University Biosciences to provide data on their expected admissions numbers and increased deferrals to 2020/21, considering the financial implications of reduced income due to the expected reduction in international students next year. A large reduction in a given institutions' student fee income will have disproportionate consequences for STEM subjects due to cross-subsiding of these high cost, high value degrees, and associated research activity.

The Royal Society of Biology expects to see online teaching in all universities for at least the first semester, delays to the start of the academic year, blended approaches, and significantly different laboratory and field work experiences.

Students who have experienced significant disruption to teaching and learning this year will be **entering universities in 2020/21 academic year and beyond**. Universities concerned about the security of knowledge given disruptions and cancellation of exams and revisions periods have reported considering the following approaches to support these students:

- Using existing online modules to support the transition to HE for A level students, with a focus on both subject knowledge and confidence.
- Essential skills check list for each module taught for teachers to present essential content at a pass level before moving on to usual course content.
- Focussing on maintaining rigour of core content in courses, while reducing breadth of content to provide space for ensuring pre-requisite knowledge is secure.
- "Attendance" monitoring online for supporting student progression, welfare and retention.
- Refresher modules on study skills and returning to an education environment after an unusually long gap in formal education
- Additional priming on practical skills, including use of laboratory simulation software, given the long gap between incoming students' last in classroom/laboratory practical session and the start of laboratory classes in an undergraduate course.
- Student retention and social transition into Higher Education may be impacted by the loss of social events in the early weeks of the academic term. Student unions and student-led welcome events are crucial in making transition to HE successful. Universities should carefully consider how Freshers' events can be made effective and inclusive in a blended environment.

Impact on trainee teachers and Newly Qualified Teachers (NQTs) in the sciences

School closures have had a huge **impact on the 2019/20 cohort of trainee teachers (NQTs in 2020/21)** – trainees have missed a significant portion of their second placement, or main teaching practice during March – June. During this period of their training trainees are expected to progress to a fuller timetable, taking on additional responsibilities with the support of their training provider. This second placement normally provides an opportunity for trainees to further develop their practical skills, and subject specific pedagogy, including for example, teaching laboratory skills and behaviour management in practical lessons. New teachers in September 2020 may experience a drop in confidence after an unusually long period between their last placement in a science classroom and their first day as a new teacher. As such, the second placement, or second half of a school direct programme, are vital in preparing our next cohort of teachers.

2020/21 NQTs will also be expected to take on an 80% timetable with reduced support from mentors. Where possible, the Royal Society of Biology would recommend that head teachers consider allocating NQTs a reduced 70% timetable for at least the first term, and ensure that NQT timetables are sympathetic to their existing skills base and to pair classes – for example, three Year 7 classes in the area of their disciplinary expertise, rather than a Year 7, 8, 9 class across the three science disciplines. This will allow NQTs time to further develop their planning, subject pedagogical and practical skills. Without a reduction in timetable for at least the first term in 2020/21 and increased mentoring support, the Royal Society of Biology is concerned that attrition rates will increase further next year.

The Royal Society of Biology recognises that this may be a challenge for some schools, and could be impossible for others within their current budgets. We would encourage the Department for Education to consider whether funds may be made available in the form of a grant to schools that could commit to a 70% timetable and increased mentor support for 2020/21 NQTs, allowing schools to hire additional NQT staff or retain those who may have intended to retire at the end of this year in addition to the new NQT hires. Buying out 10% of an NQTs timetabled workload costs around £3000 per year, however the actual time benefit to the NQT would be more than this 10%, as the associated planning, marking and administrative time for those classes would also be gained. The cost of this could be weighed against the cost of another round of recruitment, or training another teacher, should an NQT leave the profession earlier than expected due to this unusual start to their teaching career.

The Royal Society of Biology is concerned that reduced confidence of 2020/21 NQTs and NQT+1s, and reluctance of school leadership to hire from this cohort, may lead to further recruitment and retention issues in the sciences. Increased mentoring and additional financial support to maintain links with previous training providers may be key to ensuring good teachers are not lost from this cohort due to the disruptions in 2020. Training providers themselves will not have capacity to support NQTs and their new cohort of trainee teachers without additional funding.

We also expect that there will be fewer recruitment opportunities for this cohort; with the uncertainties around lockdown and school closures during a time schools may be interviewing new staff it is likely fewer staff will move to a new school after summer. SchoolDash have reported²³ a rapid year-on-year decline of teacher recruitment advertisements since March.

The impact **on 2020/21 cohort of trainee teachers** remains to be seen and will be dependent on whether school placements can resume in autumn 2020. Social distancing in schools and phased return of students may limit the number of placements on offer through ITE providers and schools direct. Institutions providing teacher training must be supported to return to a full initial teacher education programme as soon as it is safe for them to do so. Where adjustments are made in 2020/21 each school and institution should consider how best to support trainees through both placements. A reduction in Subject Knowledge

Enhancement course availability ahead of ITE programmes in September may have an effect on trainee teacher's confidence in their subject knowledge.

The Royal Society of Biology acknowledges that there is no simple solution to the issues outlined above, but encourages the Department for Education to consider how this cohort of NQTs can best be supported to progress and thrive as teachers, and suggests there is an increased need for subject specific content knowledge and subject pedagogy to be folded into the Early Career Framework to support this cohort.

Long term impact on primary, secondary and tertiary bioscience education and educators

It has been reported that **COVID-19 has a disproportionate impact on those from BAME communities**²⁴. In May NHS released a call to action to support BAME NHS staff and their communities during and beyond COVID-19 given the very different outcomes for BAME people regarding COVID-19. BAMEed has further developed the NHS guidance to apply in the education sector, including guidance, risk assessment and risk mitigation for schools²⁵. BAMEed highlights that the duty of care owed by a school to their staff, is extended to pupils and visitors such as parents. No one should be expected to work or study in an environment where foreseeable risk has not been mitigated or removed as far as is reasonably practicable. The Royal Society of Biology agrees that testing for COVID-19 should be available for all teaching staff, and priority should be given to BAME staff and their families, to enable healthy staff to attend work.

It is clear that across all education stages and settings, there is a wide **variation in the support** being provided for pupils and students home learning, and access to and engagement with remote teaching is equally diverse. In the sciences, an added loss due to cancellation of face to face teaching and learning is in laboratory skills and practical activity. Primary, secondary and tertiary education providers and the institutions that support them, must take action to ensure that these cohorts are re-engaged with the sciences and particularly the practical component of our disciplines, next year and beyond. For degree apprenticeship students, this may lead to students not returning to courses when furlough assistance ends and employers may be unlikely to recruit apprentices, resulting in fewer apprenticeship vacancies for young people to access. The Sutton Trust's Covid-19 impact brief on apprenticeships¹⁷ gives more information on the expectations of employers of apprentices.

The longitudinal ASPIRES and ASPIRES2 research projects²⁶ investigated what shapes young people's desire to continue with science qualifications and career ambitions and the factors that influence how young people identify as being "good at science". These projects tracked a cohort of young people from age 10 to 19 through over 40,000 surveys and 660 interviews with young people and parents/carers. This research suggests that science capital is a key factor in shaping young people's science identities and aspirations, and that building science capital as early as possible and challenging dominant representations and notions of STEM as being "hard", "difficult" or for the clever, and the idea of there being a "science brain". Many of these notions may have been reinforced during a period of school closures due to a lack of science capital at home. Combined with the variation in support for pupils, this may have an impact on progression to the sciences as primary and Key Stage 3 cohorts move through formal education and into the workforce.

In our response to Ofqual's consultations^{6,7}, The Royal Society of Biology also highlighted the importance of **clear and concise statements to parents and students, and universities and future employers, on the arrangements for this year**. Detailed memory of the arrangements will be short-lived, and the current cohorts will use GCSE and A level awards for entry to further and higher education and the workforce at different points over the next few years. This should include details of practical endorsement awards. The Royal Society of Biology notes that an interactive tool²⁷ has been produced for technical and vocational qualifications, but that the attached note states "all GCSE, AS, A level and Project qualifications will be graded using calculated results this summer" – we do not think this level of detail shows the robustness of decisions made or ensures the processes followed are transparent.

The Royal Society of Biology is aware that the sciences are particularly affected by **unconscious bias and barriers to progression in formal education** for certain groups of students, including gender, disability, race and socio-economic status. Gil Wyness' 2017 report²⁸ "Rules of the Game" highlights the disadvantages already faced by students belonging to particular groups. Digital poverty is prevalent across primary, secondary and tertiary students. Universities are currently reviewing the extent of this while they consider move to online teaching for the foreseeable future, and as they do so the risk of widening

attainment gaps at all levels. We must do everything we can to ensure that pupils and students are not further disadvantaged by the impact of school closures and calculated grades this year, including equality impact analysis of calculated grade awards and progression and attainment data for these cohorts in the next few years. Education institutions must be supported to safeguard disadvantaged students to ensure they are still able to learn in an online environment and progress as expected through their formal education.

The Royal Society of Biology welcomes evidence from the Education Endowment Foundation's rapid evidence assessment on the impact of school closures on the attainment gap²⁹, which echoes the Society's concerns that current school closures may reverse or slow progress made to narrow the attainment gap in the last decade, and that support is needed to ensure effective remote teaching, based on best evidence, can mitigate the extent to which the gap widens.

As schools return to full capacity, the **role of supply teachers** must be considered. Many schools rely on agency staff, to support a policy of "rarely cover" for their teachers as detailed in School Teachers' Pay and Conditions Document³⁰. While we are in a period of many unforeseeable circumstances additional care needs to be taken not to overburden teachers with cover, and to protect supply teachers, regular teaching staff, and children.

The Royal Society of Biology welcomes the confidence that the Department for Education and Ofqual have placed in **teachers' professional judgements** to ensure that students in England receive the grades they deserve and can progress as planned to the next stage of education or employment. This must be communicated to students, parents and universities; the process for awarding calculated grades in 2020/21 must be seen as transparent and robust. The Society would also welcome a long term approach to solving some of the issues outlined above, with an aim of improving and building more resilience into student and teacher subject knowledge and experience of the sciences, while supporting education institutions in a phased approach in returning to and revitalising practical activities in the science - a vital part of student learning.

During a pandemic, the **need for good science education** of all students is thrown into sharp relief. We must ensure that short term solutions, necessary due to disruptions caused by the pandemic, do not lead to longer term adjustments that detriment education in the sciences and subsequent science skills and literacy of our citizens and workforce.

Summary of Royal Society of Biology recommendations

1. Primary and secondary schools are supported to provide alternative activities that allow students to experience practical skills, and that a return to full practical activity or outdoor field work is phased in as soon as it is safe to do so.
 - a. Development of a framework for teachers of the sciences and school technicians in coordination with CLEAPSS providing guidance for working safely in school science laboratories and field work, and prioritisation of topics and skills in coordination with subject organisations and CLEAPSS.
 - b. Additional funding in 2020/21 for school science departments to ensure students are able to safely access laboratory and field work activities as part of their compulsory science education.
2. A framework or guidance for remedial programmes and qualifications in 2020/21, developed by the Department for Education in consultation with awarding bodies and subject organisations. Including urgent commitment to either:
 - a. Reduction in examinable content to be assessed in summer 2021 exams, with recommendations to awarding bodies developed with support from subject organisations.
 - b. A commitment to calculated grade awards in place of summer 2021 GCSE and A level exams, recognising that students have missed a significant portion of teaching time in the first year of their qualification studies.
3. Urgent instruction to all exam boards that a no detriment policy to for practical endorsements in A level sciences, with the Department for Education and Ofqual urgently provide consistent messaging for these endorsements, ensuring that A level students are not unfairly treated compared to previous and future cohorts as it may impact future progression to higher education.
4. An Ofqual commitment to an equality impact analysis of calculated grade awards, progression and attainment data for cohorts affected by the disruptions this year and as they progress.
5. As part of Ofqual's process in responding to the consultation, it should be considered whether an Autumn exam series is the best approach for ensuring student progression to the next stage of their education given the significant impact on teaching in 2020/21 and the likelihood that students entering HE will not be able to do so until 2021/22.
6. Higher Education Institutions should review time left in an undergraduate degree programme and seek novel approaches so that students are given the opportunity to experience and achieve competence in any laboratory skills that have been missed due to physical building closures
7. Development of Government guidance for Universities regarding learning and teaching in a laboratory in 2020/21
8. Additional support for NQTs in 2020/21
 - a. Head teachers should consider allocating NQTs in 2020/21 a reduced 70% timetable for at least the first term, and ensure that NQT timetables are sympathetic to their existing skills base and to pair classes within that timetable to reduce planning workload and increase confidence in disciplinary knowledge and pedagogical skills.
 - b. The Department for Education should secure funds to establish a grant for schools that commit to a 70% (or less) timetable and increased mentor support for NQTs in 2020/21.

RSB support and engagement for the bioscience and education communities during COVID-19

Bioscience education during COVID-19 webpages:

Royal Society of Biology - Education during COVID-19

<https://www.rsb.org.uk/education/education-during-covid-19>

Royal Society of Biology - Advice for students and parents during COVID-19 pandemic

<https://www.rsb.org.uk/education/education-during-covid-19/advice-for-students-and-parents>

Royal Society of Biology- Education announcements during COVID-19 pandemic

<https://www.rsb.org.uk/education/education-during-covid-19/education-announcements>

Other Covid-19 webpages:

Royal Society of Biology COVID-19 bulletin

<https://www.rsb.org.uk/about-us/covid-19/covid-19-bulletin>

Royal Society of Biology COVID-19 resources from the community

<https://www.rsb.org.uk/about-us/covid-19/covid-19-resources-from-our-partners>

All references below accessed on 8 June 2020

¹ https://www.rsb.org.uk/images/RSB_Education_Priorities_2017_20.06.pdf

² <https://wellcome.ac.uk/sites/default/files/state-of-the-nation-report-of-uk-science-education.pdf>

³ <https://blogs.royalsociety.org/in-verba/2019/02/11/the-complexities-of-timetabling-science-lessons-in-secondary-schools/>

⁴ <http://www.rse.org.uk/wp-content/uploads/2020/05/LSG-letter-COVID-19-and-examinable-content.pdf>

⁵ https://epi.org.uk/wp-content/uploads/2020/05/EPI-Policy-paper-Impact-of-Covid-19_docx.pdf

⁶ http://www.rsb.org.uk/images/RSB_Ofqual_response_A_level_and_GCSE_exceptional_arrangements.pdf

⁷ http://www.rsb.org.uk/images/Ofqual_consultation_on_extraordinary_arrangements_technical_and_vocational_qualifications_2020.pdf

⁸ <https://store.aqa.org.uk/resources/science/AQA-CROSS-BOARD-MESSAGING-SCIENCE-COVID-2020.pdf>

⁹ https://rsb.org.uk/images/RSB_response_Ofqual_autumn_exam_series_8_June.pdf

¹⁰ <https://www.suttontrust.com/wp-content/uploads/2020/05/COVID-19-and-Social-Mobility-Impact-Brief-2.pdf>

¹¹ <http://primary.cleapss.org.uk/Resource-File/P104-Managing-hands-on-activities-in-a-partially-reopened-school.pdf>

¹² <http://primary.cleapss.org.uk/Resource-File/P097-Practical-activities-for-children-attending-school-during-a-closure.pdf>

¹³ <http://science.cleapss.org.uk/Resource/GL338-Practical-activities-for-pupils-attending-school-during-extended-periods-of-closure.pdf>

¹⁴ <https://www.gov.uk/guidance/working-safely-during-coronavirus-covid-19/labs-and-research-facilities>

¹⁵ <http://science.cleapss.org.uk/Resource/GL343-Guide-to-doing-practical-work-in-a-partially-reopened-school-Science.pdf>

¹⁶ <http://science.cleapss.org.uk/Resource/GL345-Guidance-for-science-departments-returning-to-school-after-an-extended-period-of-closure.pdf>

¹⁷ <https://www.suttontrust.com/our-research/covid-19-impacts-apprenticeships>

¹⁸ <https://www.suttontrust.com/wp-content/uploads/2020/05/Covid-19-Impacts-Apprenticeships.pdf>

¹⁹ http://rsb.org.uk/images/RSB_accreditation_no_detrimnet.pdf

²⁰ http://rsb.org.uk/images/TL_lab_and_field_during_COVID-19_May_2020.pdf

²¹ <http://researchbriefings.files.parliament.uk/documents/CBP-8893/CBP-8893.pdf>

²² <https://londonconomics.co.uk/wp-content/uploads/2020/05/LE-UCU-Deferral-Analysis-20-05-2020-FINAL-ABB.pdf>

²³ <https://www.schools.org.uk/blog.html#20200506>

²⁴ <https://www.schooled.org/resources/2020/04/the-impact-of-covid19-on-bme-communities-and-staff>

²⁵ <https://www.bameednetwork.com/wp-content/uploads/2020/05/BAMEed-Network-Schools-and-Covid-19-guidance-for-BAME-staff-and-their-employers-2.pdf>

²⁶ <https://www.ucl.ac.uk/ioe/departments-and-centres/departments/education-practice-and-society/aspires-research>

²⁷ <https://analytics.ofqual.gov.uk/apps/AllQualifications/summer2020tool/>

²⁸ <https://www.suttontrust.com/wp-content/uploads/2017/12/Rules-of-the-Game.pdf>

²⁹ https://educationendowmentfoundation.org.uk/covid-19-resources/best-evidence-on-impact-of-school-closures-on-the-attainment-gap/?mc_cid=8e315f749b&mc_eid=fcdce31fc

³⁰ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/832634/School_teachers_pay_and_conditions_2019.pdf