

Response from the Royal Society of Biology to the Department for Education's consultation on 'Schools that work for everyone'

November 2016

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 others with an interest in biology.

The Society welcomes the Department for Education consultation on 'Schools that work for everyone.' We have received contributions to this response from our committees and special interest groups, including the Heads of University Biosciences (HUBS), the Education Policy Advisory Group (EPAG) and the Biology Education Research Group (BERG).

Q: How can the academic expertise of universities be brought to bear on our schools system, to improve school-level attainment and in doing so widen access?

1. As the most recent Ofsted annual review¹ notes we now have 90% of primary schools and 78% of secondary schools rated as good or outstanding. Our best schools often have excellent links with higher education and local industry, offering students a wide variety of positive learning experiences. These partnerships can be highly successful and offer a broad range of learning opportunities, however, there is scope to develop and broaden these initiatives, to enable a wider audience of schools and students to be reached. By building new and strengthening existing partnerships between schools, colleges and universities we hope that these institutions will continue to learn from each other and that the pathways into higher education will become more accessible for all students.
2. UK universities currently engage in a wide variety of initiatives with schools. In order to increase participation and widen access of these initiatives to students, universities must receive adequate funding from the Government to ensure initiatives between universities and schools are properly resourced. The workload of academics in higher education institutions and teachers in schools and colleges is high, time and support must be available to enable university and school partnerships to work. Universities should be encouraged to build positive relationships with their local schools, however, in some areas of the country schools do not have a nearby university and it must be considered how these schools can be supported.

¹ Ofsted annual review 2015/2016

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/574186/Ofsted_annual_report_education_and_skills_201516_web-ready.pdf

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3. Within the biosciences we have many superb examples of universities engaging with and supporting schools independently and facilitated through professional bodies, charities and other organisations. We are keen that these successful initiatives continue to be resourced and are maintained.
4. Biology is an inherently practical subject and developing practical skills is key for understanding scientific principles and knowledge. Good quality practical work also promotes engagement and interest of students, which is likely to have a positive impact on learner progression in the sciences, both into higher education and careers. Many schools, particularly primary schools, lack sufficient appropriate resources to teach practical science effectively.² Universities can offer access to laboratory and fieldwork opportunities, otherwise not available to schools. More effective links between universities and schools should be encouraged to maximise schools access to expertise and facilities. For instance:
 - The Faculty of Biomedical Sciences at the University of Bristol ³ runs a range of laboratory day packages, where pupils can conduct university-level experiments in interactive teaching sessions.
 - The Bioscience Department at the University of Birmingham run Masterclasses, offer evening biology lectures for A level students, talks in schools and at the university and professional development opportunities for teachers.⁴
 - King's College London run an outreach for medicine programme with opportunities for students in key stages 3, 4 and 5 to undertake practical activities at the university.⁵
5. Much of the RSB's membership is composed of teachers and researchers in higher education, many of them will engage with schools through their university outreach projects but also through national initiatives such as the Science Technology Engineering and Maths (STEM) Ambassador scheme⁶ run by STEM Learning. STEM Ambassadors aim to inspire young people to engage with STEM subjects and showcase the range of opportunities available to students if they decide to continue with the study of STEM subjects. STEM Ambassadors are given training before undertaking activities and it is important that all university staff that undertake outreach activities are suitably trained.
6. Many universities have ongoing engagement programmes with schools built into their strategy, an example of this is the Authentic Biology⁷ scheme, a national initiative which is supported by Wellcome, aimed at raising student attainment with ongoing engagement activities covering areas of the science curriculum. University academics and undergraduate students go into schools to assist sixth form students to design and conduct novel research. The universities also offer professional development opportunities for teachers and technical staff within the schools to support the projects. The University of Bristol, the University of Kent, Queen Mary University London and University of Southampton are part of the scheme working with their local schools. Authentic Biology is now part of a larger initiative, the Institute for Research in Schools⁸ encouraging partnerships between universities and schools, supporting school students to contribute to and conduct their own new research.
7. Science and Plants for Schools (SAPS) run a Student Engagement Project in collaboration with the University of Cambridge. The project engages students aged 14-21 with the plant sciences and includes:

² Science Community Representing Education – Resourcing Practical Work in Primary Schools Report <http://www.score-education.org/media/11808/score%20resourcing%20primary.pdf>

³ Outreach opportunities at the university of Bristol <http://www.bristol.ac.uk/biomedical-sciences/outreach/schools-information/>

⁴ Outreach opportunities at the University of Birmingham <http://www.birmingham.ac.uk/schools/biosciences/outreach/index.aspx>

⁵ Outreach for medicine <http://www.kcl.ac.uk/lsm/study/outreach/about/index.aspx>

⁶ STEM Ambassadors <http://www.stemnet.org.uk/ambassadors/>

⁷ The Authentic Biology Project www.authentic-biology.org/

⁸Institute for Research in Schools <http://researchinschools.org/Biology/home.html>

- running 'masterclasses,' introducing A-level students to plant science research, with the aim of increasing interest in plant science at university.⁹
 - facilitating careers days for pre GCSE students, showcasing the possible careers in plant science¹⁰
 - supporting students to engage in extended project work and explore the breadth of careers in biosciences through the intobiology portal.¹¹
8. The Microbiology Society facilitate interactions between schools and universities through their Antibiotics Unearthed¹² programme where groups of students do real research, hoping to find the next new antibiotic. University partners will provide support for the school students and invite the students and relevant staff into their department to do further, more detailed analysis on any compounds isolated. This experience gives students the opportunity to familiarise themselves with a university or professional environment and engage with researchers.
9. Large venture research projects, like the Imperial Open Air Laboratory (OPAL) Project¹³ which is a UK-wide citizen science initiative that schools can participate in, provides students with the opportunity to take part in active research and make a tangible contribution to scientific research. These programmes tend to reach a large number of people and offer focus for discussion and communication of the topic in question.
10. Professional bodies can help to facilitate the dialogue between higher education and schools. In July 2016 the RSB Curriculum Committee hosted an event at the University of Birmingham to discuss the transition from school to higher education.¹⁴ Teachers from schools and teaching academics at universities met to discuss the skills that students develop and how to support them from school into university.

Q: Are there other ways in which universities could be asked to contribute to raising school-level attainment?

11. Many universities offer Continuing Professional Development (CPD) opportunities for teachers and other education practitioners, enabling teachers to access professional support and up-to-date resources. These opportunities should be expanded, particularly for subject-specific professional development. CPD should be made available for specialist and non-specialist teachers who are teaching outside of their subject. There is a particular need to build teacher confidence using practical activities for learning within the classroom.
12. Mentoring is a valuable way of supporting trainee teachers by strengthening the quality of their teaching.¹⁵ The Government should support schools to establish subject-level mentoring programmes, with external support from universities, to enable science teachers to develop their skills and share best practice.¹⁶
13. Initiatives have been developed to support teachers in gaining a wider understanding into STEM career opportunities for their students. The STEM Insight schemes¹⁷, with Insight into University and Insight Into

⁹ SAPS A level Masterclasses <https://www.publicengagement.ac.uk/case-studies/level-science-masterclasses>

¹⁰ SAPS Careers days <https://www.publicengagement.ac.uk/case-studies/careers-with-plants-day>

¹¹ SAPS IntoBiology <http://intobiology.org.uk/> and <https://www.publicengagement.ac.uk/case-studies/intobiology-website>

¹² Antibiotics Unearthed <http://www.microbiologysociety.org/outreach/antibiotics-uneearthed/>

¹³ Imperial OPAL project <https://www.opalexplorenature.org/>

¹⁴ Transition from school to higher education event <https://www.rsb.org.uk/about-us/committees/biology-curriculum-committee/curriculum-committee-supporting-transition-from-school-to-higher-education>

¹⁵ Mentor Standards Report

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/536891/Mentor_standards_report_Final.pdf

¹⁶ Teacher Supply response https://www.rsb.org.uk/images/ASE_IOP_RSB_RSC_RS_Teacher_Supply_Response.pdf

¹⁷ STEM Insight schemes <https://www.stem.org.uk/stem-insight>

Industry, offers teachers placements in universities and industry. Insight into University aims to provide teachers with a better understanding of the skills that undergraduates need and the breadth of research that is taking place in universities as well as the range of careers in STEM that their students can enter.

14. School governing boards typically operate to help lead on a school's strategy and performance, as well as other budgetary management tasks. Schools could co-opt experienced members of university staff, such as Head of Departments or Admissions, to provide strategic guidance, focus on attainment and assistance with student access to higher education. These university staff would provide representation for higher education on primary or secondary school boards of governors and directly link schools to universities.
15. Academics can play a role in helping to shape and develop bioscience curriculum, ensuring that it is up-to-date and relevant. The University of York Science Education Group work with university academics and awarding bodies to produce high-quality GCSE and A-level courses. Professional bodies also work with academics to develop and advise on curriculum, qualifications and assessment. The Royal Society of Biology has a curriculum committee¹⁸ which is working on the development of a curriculum framework for school biology. In the autumn term the RSB surveyed undergraduate students about their experience of school biology to establish students self confidence in a variety of practical and transferable skills. The information gathered will be used to inform the curriculum committee as they develop their recommendations.
16. The Government recently proposed their commitment to educational excellence, through a high quality teaching profession which uses evidence-based practice to increase school standards.¹⁹ Included in this proposal is a commitment to move towards an increasingly school-led Initial Teacher Training (ITT) system. Education departments within universities could be linked to school-led ITT programmes, supporting teachers in carrying out education research, as well as disseminating high-quality evidence-based education research. The Biology Education Research Group (BERG)²⁰ a special interest group of the RSB provides a network for biology education researchers. These researchers are based in university education departments as well as being active teachers in schools and lecturers at universities.
17. There is great potential for universities to impact positively on the school system, making higher education more accessible for students and bringing a wide range of contacts and experience to assist schools. We have seen positive examples of universities setting up free schools across the country as well as supporting struggling schools to improve, however to be successful considerable resources are required, along with collaboration and expertise from both the higher education and school communities.

¹⁸Royal Society of Biology Curriculum Committee <https://www.rsb.org.uk/about-us/committees/biology-curriculum-committee>

¹⁹ Education Excellence Everywhere

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/508447/Educational_Excellence_Everywhere.pdf

²⁰ Biology Education Research Group <https://www.rsb.org.uk/education/berg>