

Where next for the curriculum in the sciences?

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Abstract The Royal Society of Biology, the Royal Society of Chemistry and the Institute of Physics are in the process of developing visions for the curriculum in their respective disciplines. This introductory article explains the main aims and motivations for their work. The articles that follow set out each society's considered positions to date, with a focus on the 11–16 age group. It is hoped this collection of articles will form the beginning of a wider conversation about what the curriculum in the sciences should look like up to 16, so as to further shape this work.

Over the past few years, the Royal Society of Chemistry, the Royal Society of Biology and the Institute of Physics have been developing proposals for what the school curriculum should look like for each of their respective disciplines. As champions of our disciplines, independent of governments and other agencies such as awarding organisations, our societies are well placed to think about what is central to each of the sciences and how this can be meaningfully conveyed through a curriculum. We have also been able to draw upon a broad range of expertise, both in teaching and curriculum development, but also from our wider communities.

We presented an overview of our work so far at a seminar hosted by the Salters' Institute on 27 February 2018. In this special edition of *School Science Review*, we describe our proposals in more detail. The seminar and the articles in this edition are primarily focused on our outputs for the 11–16 age range, although the work of all three societies goes further than that. We welcome feedback on our ideas, and hope that this issue will be the beginning of a wider discussion and debate about the curriculum in the sciences that will help to further shape these proposals.

The societies are not arguing for the curriculum in any country to be changed immediately in response to these proposals. However, we know that reforms periodically take place – and indeed it is right and proper that any curriculum is reviewed from time to time to make sure that it is still up to date and follows the recommendations on the best available evidence on good practice. The purpose of our exercise then, is to ensure that our organisations have clear visions for the curriculum in our disciplines so that we can rapidly respond in an informed manner when the next set of reforms are proposed. The vision will form the basis for discussions with governments, their agencies, and qualifications developers, for consultation responses, and so on. In the meantime, we

hope that debate and discussion about these ideas with teachers, curriculum experts, teacher trainers and other interested parties will help to lay the groundwork for a smooth adoption when the time comes.

In the first instance, each society has focused on their respective discipline, although we have kept one another up to date with progress. We believe that it is valuable to consider the core ideas within each of the sciences and to ensure that the identity of each discipline shines through. Having said that, it is also important to identify the commonalities. There are common practices used across the sciences, as well as concepts that overlap, and it is valuable for learners to understand the interconnections that exist. This will be addressed in our continued work. Our ultimate intention is to produce a coordinated set of outputs, aligned in terms of language and approach in common areas. It is not an aim of our committees to recommend how subjects are embedded in the curriculum – for example whether our disciplines are taught as a combined science subject or as individual subjects, and how this varies by educational stage. Rather, we aim for a flexible set of proposals that can be used to fit a range of systems.

The following articles set out in more detail how each committee or group has worked, and what we have developed so far. We have all approached our task in different ways, which means that our outputs look a little different at the moment. Pleasingly, however, there is already a lot of similarity at the core of our approaches. In particular, we have taken on board the need to have an overarching narrative, or framework, to support the curriculum. Whether this is called the big ideas, the big questions, or something else, it is about having a few central messages about what children should learn, and which can be developed at greater depth over time. This provides a clear guideline for progression through the curriculum, and, if used well in teaching, can combat

those questions of ‘*Why are we learning this?*’ Using a narrative to select and order content for a curriculum ensures that everything is part of a big picture.

Creating a vision for a curriculum is in itself an ambitious project. Having that vision adopted is no less challenging. While we will need to gain support for our ideas from those who set the curriculum at the

highest level, true change will not be possible without the hearts and minds of those who translate a specified curriculum into a classroom experience. We look forward to hearing your views on our work and how we can progress it further. You will find contact details and information on next steps for each society in each of the following articles.

Mike Edmunds is Emeritus Professor of Astrophysics at Cardiff University. He is Chair of the Institute of Physics’ Curriculum Committee and of their Welsh Education Committee.

Libby John is Pro Vice Chancellor and Head of College of Science and Engineering at the University of Lincoln. She chaired the Royal Society of Biology’s Curriculum Committee from its formation in 2014 and has recently handed over chairing duties to Jeremy Pritchard, Director of Education, College of Life and Environmental Sciences at the University of Birmingham.

Gareth Price is Professor of Chemistry at the University of Bath. He is Chair of the Royal Society of Chemistry’s 16–19 Curriculum and Assessment Working Group.

Simon Rees is Head of Scholarship at Durham University Foundation Centre. He is Chair of the Royal Society of Chemistry’s 11–16 Curriculum and Assessment Working Group.

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