Draft National Curriculum for science

SCORE response to the Department for Education’s revised draft science curriculum for Key Stages 1–3.

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Introduction

1. SCORE is a partnership of organisations, which aims to improve science education in schools and colleges in England by supporting the development and implementation of effective education policy. The partnership is chaired by Professor Julia Buckingham and comprises the Association for Science Education, the Institute of Physics, the Royal Society, the Royal Society of Chemistry and the Society of Biology.

2. In April 2013 SCORE submitted a response to the consultation on the first drafts of the National Curriculum, and has since communicated with the Department of Education regarding drafts of the national curriculum on a number of occasions.

3. Many stakeholders responded to the consultation and in light of their comments the documents have been redrafted. It is likely that in trying to accommodate different comments from varied sources, new problems in consistency, sequencing and coherence have been introduced to the drafts. SCORE has offered to check the new drafts and raise matters of particular concern.

4. Content-specific responses to the drafts for each of the three sciences are attached; however there are a number of points that SCORE feels it is important to highlight more broadly.

The process of review

5. In the April 2013 consultation response overview SCORE emphasised the importance of defining the content contained at each key stage by taking as its starting point the learning outcomes for pupils. SCORE is concerned that this process has not been put into practice and that as a result, statements of content exist in place of a sequenced structure.

6. This structural issue may largely be due to the process used to develop the new curriculum. The statements of content that have been selected and applied to each key stage by writers and editors do consist of important items to learn in science; however, the underlying rationale for why these statements have been chosen over others is not clear.

7. SCORE has recommended on several occasions, that the drafts be ‘audited for the amount of content and how their content contributes to the development of ideas through the key stages’. As far as SCORE is aware such an audit has not taken place and it is therefore not certain that the drafts are as fit for progression and learning outcomes as SCORE would expect.

8. SCORE reiterates concerns surrounding the way in which it is envisaged that a new curriculum will be implemented alongside reforms to GCSEs and A-levels, which are occurring at the same time. It can be assumed that any changes to Key Stage 4 and 5 will have an impact on teaching and learning at lower key stages.

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1 SCORE response to the National Curriculum consultation – Overview
**Consistency, coherence and sequencing**

9. There is no introduction to the Key Stage 3 National Curriculum draft. This means that there is no general introduction to the broad aims of the curriculum; nor an introduction to the need for teachers and schools to integrate practical work, mathematics and critical reasoning, throughout the content. The lack of an introduction also allows the three sciences to be perceived independently of each other and ignores the importance of the three sciences being taught together as a basis of fundamental knowledge and skill.

10. SCORE reiterates the concern that the style used in the drafts is inconsistent. In particular, the level of detail across the three sciences at Key Stage 3 continues to vary and this is not helpful when interpreting the statements.

11. There is a concern that, at Key Stages 1 and 2, teachers who may not have a science background could have difficulties interpreting guidance and following the content. The inclusion of a glossary would mitigate difficulties in interpretation, ensure consistency and assist less confident teachers.

12. The way in which the expectations of pupil progression and level of appropriate subject knowledge at each key stage have been defined is unclear. SCORE emphasised in its consultation response that content should be included at an educationally appropriate point, rather than introduced in order to ‘achieve an impression of balance’ between the sciences at each key stage. SCORE reiterates this point.

13. SCORE welcomes the inclusion of mathematics in the Science Programme of Study, but would like clarification of the process of audit by which the sequencing of mathematics across the sciences and key stages was decided, as well as an assurance that an attempt has been made to ensure coherence with the mathematics Programmes of Study at each key stage.

14. Certain aspects of the mathematics included in the Working Scientifically section appear to have been decided without considering appropriate contexts and applications for learning and teaching mathematics in science.

15. It is unclear why certain biographies have been chosen for inclusion in the notes and guidance. In particular, the biographies contained in the Key Stage 1 and 2 notes and guidance are over-specific and therefore risk being too narrowly interpreted by teachers.

16. Given this opportunity to bring the national curriculum up to date with twenty-first century developments and contemporary contexts, SCORE recommends, as it has done previously in the SCORE consultation response, that biographies ‘reflect a wider variety and span of scientific achievement’ and that the notes and guidance ‘reflect the impact that science has on everyday lives.’ This will also allow teachers to provide a range of experiences through greater flexibility.

**Working Scientifically**

17. SCORE welcomes the prominence that Working Scientifically has been given in the drafts. However, SCORE is concerned by a lack of cohesion between the Key Stage 2 and Key Stage 3 guidance on Working Scientifically. The Key Stage 3 Science
Programme of Study is in need of an introductory statement identifying the areas of scientific enquiry that pupils have been introduced to at primary. Without such an introduction at Key Stage 3, secondary teachers may assume that pupils entering the school have no experience of working scientifically. An introduction would also ensure that progression in scientific enquiry is clearly demarcated in both the primary and secondary Programmes of Study.

18. This concern about cohesion in Working Scientifically across key stages applies also to the need for clarity on ways in which pupils should be progressing in scientific enquiry skills through from Key Stage 3 to 4.

19. However, in the non-statutory guidance there are a number of instances in which an experiment or hands-on activity requires equipment and consumables to which many schools and teachers may not have access (detailed in the subject-specific documents attached). SCORE has highlighted the problem of inadequately and inappropriately resourced practical science in schools in the Resourcing School Science in primary and secondary reports (enclosed).²

20. In order to ensure that pupils are given the optimum practical science experience SCORE suggests that the Department for Education highlights the SCORE equipment and consumables benchmarks to primary and secondary schools. This will ensure that senior leadership and teachers have a reliable reference for resources used in practical science when planning and budgeting for practical work contained in the Science Programme of Study. SCORE recommends that the Department for Education use the SCORE practical work benchmarks for primary and secondary schools³ (enclosed), as a reference guide to setting standards in science resourcing in schools.

² Both The Resourcing School Science reports and the concurrent SCORE benchmarks are available on this page: [http://score-education.org/policy/curriculum/practical-work-in-science](http://score-education.org/policy/curriculum/practical-work-in-science)

³ The SCORE practical work benchmarks are available on this page: [http://score-education.org/policy/curriculum/practical-work-in-science/benchmarks](http://score-education.org/policy/curriculum/practical-work-in-science/benchmarks)