



National Curriculum reform in key stage 4 science

A SCORE response to the Department for Education's consultation on the draft programme of study for key stage 4 in science.

25 July 2014

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. SCORE has been involved in the review and reform of the National Curriculum key stage 1-4 since it was first launched in 2011. This response on the draft of the key stage 4 programme of study for science adds to the comments and suggestions SCORE has previously submitted to the Department for Education and Ofqual.¹

Summary

- SCORE partners have worked directly with drafters employed by the Department for Education throughout the review process in order to offer subject specialist support and expert guidance on the drafting of the programme of study, within the limitations imposed by timescale and policy procedure.
- While SCORE member organisations are largely pleased with changes made to the draft programme of study through this engagement with drafters, there are still fundamental concerns about the purpose, implementation and content of the Programme of Study.
- The process for the review of the National Curriculum key stages 1-4 has been conducted in a piecemeal manner. As a result it has not addressed the aim of improving science education across all educational stages in a coherent manner.

Purpose of the National Curriculum

- Increased rigour and higher standards in education are not achieved merely by the introduction of new content.
- Content should be increased in the National Curriculum only where it is deemed that it will enhance and support educational aims. At present, student ability to internalise and apply knowledge is compromised by the need to learn increased content. Stronger emphasis is needed on what students should be able to do rather than increasing the content of what they are taught.
- The programme of study should be drafted to balance expectations for subject knowledge with guidance on the application of that knowledge by students.
- The National Curriculum at key stage 4 should prepare students for further study at key stage 5, including the transition to A-level sciences. Given that the reformed science A-levels will be introduced in schools before the reformed GCSEs, we are not convinced that adequate effort has been made to consider progression to key stage 5. The opportunity to support the wider educational purposes of the curriculum has been lost.

¹ Past SCORE responses to consultations on assessment, curriculum and qualifications can be found here: <http://www.score-education.org/news/consultation-responses>

Implementation of the National Curriculum

- The increasing diversification of the school system in England means that many schools are no longer statutorily obliged to cover the National Curriculum.² SCORE continues to question the rationale behind a National Curriculum that potentially many schools may opt out of.

Content in the sciences

- In response to the National Curriculum consultation 2013³, SCORE recommended that the curriculum should be drafted in such a way as to ensure that links between the sciences are enhanced in order to ensure that the subjects are taught in a coordinated and coherent manner.
- Progress has been made to do this, for example the topic of energy now appears across the three sciences in a way that reduces confusion surrounding its use within each discipline. However more could be done to link topics in the programme of study across the three sciences consistently.
- The question of coherence between key stages 3 and 4 was also raised in the last SCORE consultation response. Transition between the key stages should be managed in order to ensure that the order in which content is introduced and developed across the sciences supports progression effectively. This coherence has not been achieved.

For example:

- i. in biology, similar statements on photosynthesis currently exist across key stage 3 and 4 programmes of study. Though worded differently, the main emphasis is on word summaries for photosynthesis and explanation of photosynthesis as a process for food production.
- ii. in chemistry, there appears to be repetition surrounding pure and impure substances, where at key stage 3 pupils are taught to understand the concept and identification of pure substances; and at key stage 4 they must distinguish between pure and impure substances.

Working scientifically

- Although the content in the working scientifically section is acceptable, there is an issue surrounding the language used to explain how teachers are expected to convey working scientifically through content.
- SCORE is concerned that teachers will not be confident to do this as it presents various teaching and learning challenges. SCORE recommends that language in this section is redrafted in order to assist teachers' understanding of what they are expected to do.
- This section would be improved by rephrasing the introductory statement to stress that the purpose behind experiencing working scientifically firsthand is to ensure that students are able to apply their learning, thereby deepening their understanding of the subject knowledge, and learning how scientists develop knowledge and understanding.

² National Curriculum guidance <https://www.gov.uk/national-curriculum>

³ SCORE response to the Department for Education's revised draft curriculum for key stage 1-3, August 2013; <http://www.score-education.org/media/13171/201308%20score%20covering%20response%20to%20nc%20final.pdf>