



The framework for the National Curriculum

A SCORE response to the report by the Expert Panel for the National Curriculum Review

29 February 2012

1. SCORE is a partnership of organisations, which aims to improve science education in UK schools and colleges by supporting the development and implementation of effective education policy. The partnership is currently chaired by Professor Graham Hutchings FRS and comprises the Association for Science Education, Institute of Physics, Royal Society, Royal Society of Chemistry and Society of Biology.
2. In summary, the SCORE response:
 - Supports the Expert Panel's view that clear purposes for the National Curriculum will support the best possible selection of content;
 - Supports the panel's recommendation to split primary Key Stage 2 into upper and lower parts;
 - Questions the panel's proposed 2+3 key stage model at secondary. SCORE strongly recommends the risks and unintended consequences of any change to the duration of secondary key stages are fully explored;
 - Supports the removal of the Levels associated with Attainment Targets but recommends that it must be made explicit that teachers should continue to use and develop appropriate ways of assessing and supporting their pupils' progress.

Aims and purposes of the curriculum

3. SCORE welcomes the Expert Panel's view that clear purposes for the National Curriculum will support the best possible selection of content. We agree the aims should be expressed in the Levels described in the report. In particular we support the aims of the school curriculum (of which the National Curriculum is a part): to develop pupils' knowledge, understanding, skills and attributes to satisfy economic, cultural, social, personal and environmental goals. We would, however, reverse the ordering of domains in paragraph 2.12 to place the personal development of the individual at the forefront.
4. In drafting the science Programme of Study we urge the Department for Education to take into consideration that the different aims of the school curriculum (and indeed the National Curriculum) will take prominence at different key stages. For the primary science National Curriculum, there should be an emphasis on 'authentic experiences' which provide opportunities for pupils to begin to progress towards scientific ideas. We wholly agree that primary science education should focus on personal development, extend and deepen it. It should bridge the orientation of pupils towards subject knowledge in the sciences at secondary education.
5. Based on evidence from high performing jurisdictions, the Expert Panel recommends the National Curriculum covers less content but in greater depth and, for the sciences, we agree to this approach. At primary especially, the Department for Education should be cautious of introducing too much specific science content without accompanying it with deep and secure knowledge. Content should be included only if it is intrinsically useful in enabling pupils to develop their understanding of one or more fundamental ideas in the sciences.

The Structure of the Key Stages

6. SCORE supports the Expert Panel's recommendation that Key Stage 2 is split into two parts (upper and lower – each of 2 years), creating a 2+2+2 model in primary schools. This will allow for greater coherence between the sciences and mathematics. A four year key stage is too long a duration to ensure suitable pace and ambition.
7. The 2+2+2 model proposed by the Expert Panel would support the use of more subject specialists in Upper Key Stage 2. SCORE seeks further clarification into what the term 'specialist' refers to in this context. SCORE is in favour of increasing the number of in-service primary workforce holding a first degree and initial teacher training qualifications in the sciences. However, SCORE is not in favour of a 'specialist' who is responsible for teaching the science National Curriculum in isolation. We remain supportive of generalist 'whole child' teaching in primary schools and the focus should instead be on supporting the science teaching within this structure; i.e. through a Continuing Professional Development (CPD) programme similar to the Mathematics Specialist Teacher (MAST) programme.
8. The rationale put forward by the Expert Panel for extending Key Stage 4 to three years has some merit. However, SCORE is concerned about risks and potential unintended consequences within and beyond those mentioned in figure 6b on page 34:
 - As is mentioned, pupils should experience a broad range of subjects to the end of Key Stage 4 and not be made to specialise too early. The existing English system already specialises earlier than many high performing jurisdictions. We are very concerned that the three-year Key Stage 4 would move this specialisation earlier, to the end of Year 8.
 - SCORE would argue that a three year key stage for the sciences, as with the four year duration of any key stage, is too long and can result in a lack of pace and ambition.
 - It is not clear whether GCSEs would take up the whole of Key Stage 4; however, it is likely that schools would start teaching GCSE at the beginning of Year 9. This may contribute to inappropriate early entry and it is possible schools will interpret this as endorsement of acceleration over enrichment. Additional measures would need to be introduced to prevent this acceleration; for example performance tables including only the results obtained in Year 11.
 - If GCSE courses were designed to run over the three-year course, there is an issue with students being examined on content that was taught a full three years before the terminal exam.
 - The proposed (and indeed the current) model impose a coherency issue for the sciences and mathematics. Teachers can only assume pupils have acquired the learning outcomes from the mathematics Programme of Study in the previous key stage. A three year Key Stage 4 in the sciences is then restricted by the reduced mathematics knowledge acquired by pupils by the end of Year 8 rather than the end of Year 9. So Year 11 sciences can only rely on Year 8 mathematics.

- The 2+3 model may also result in inappropriate deployment of specialist teachers in the sciences - with schools choosing to deploy specialist teachers at Key Stage 4 due to the emphasis on assessment. SCORE sees it as crucial that specialist teachers in the sciences are deployed across all the key stages at secondary schools. Indeed the presence of a good specialist teacher in the sciences at lower secondary is likely to be essential in nurturing pupils' imagination and embedding long term interest in the sciences¹.
 - Furthermore, the arguments set out in the report 2+3 secondary model focus solely on the impact at GCSE. GCSE qualifications are not the only route to obtaining science qualifications pre-16. Pupils should have access to valuable vocational qualifications in the sciences, where appropriate, at the age of 14 that promote successful progression into the labour market and into higher level education and training routes. The proposed three-year Key Stage 4 would further inhibit access to these qualifications.
9. Given the rationale for changing key stages (addressing the dip in achievement at key stage 3), SCORE recommends there is instead a focus on Year 9 to ensure student engagement in the sciences, through formal and informal enrichment activities. In particular, Year 9 should provide pupils with the opportunity to explore the three sciences so that pupils can make informed GCSE subject choices. A 2+1+2 model at secondary could allow for this and should be further explored by the Department for Education.
 10. A 1+2+2 model would also be preferable to the 2+3 model. However, it should support a natural and planned transition from primary to secondary rather than support the assumption that a 'catch-up' year is required in year 7 to bring pupils from different primary schools up to the same standard.
 11. Whatever model is adopted for the sciences at secondary (the advantages/disadvantages of a 2+3 model may vary in other subjects) it is important that the notion of curriculum coherence is maintained.

Year by Year Approach

12. We support the recommendation that Programme of Study should not be in the form of year-by-year delivery. A two-year key stage approach will provide guidance to teachers on appropriate subject coverage and expectations, whilst ensuring that there is sufficient flexibility so that pupil needs can be matched.
13. We support the Advisory Committee on Mathematical Education (ACME) position, referred to in the Expert Panel Report that mathematics, as with other subjects, should not be in the form of year-by-year delivery.

¹ SCORE briefing paper [Subject specialist teaching in the sciences; Definitions, targets and data](#) July 2011

The Form of Programmes of Study and Attainment Targets

14. SCORE supports the removal of the Level Descriptors and agrees that the proposed two-column model in paragraph 7.8 is appropriate for communicating the 'narrative' and connections between topics in the sciences.
15. SCORE also agrees with the criticism of the current Attainment Targets; Attainment Targets should be more closely linked to the content of a succinct and focused Programme of Study. We would particularly welcome statements in the Programme of Study similar to Professor Paul Black's examples in Paragraph 7.7.
16. However, given a substantial proportion of the workforce have only ever worked within the current Level/Attainment Target structure, teachers will require support in adapting to a new structure. We strongly recommend that the move away from Levels is gradual and that it is made explicit that teachers should continue to use and develop appropriate ways of assessing and supporting their pupils' progress.
17. The evidence from high performing jurisdictions suggests that the 'Ready to Progress' notion works well at primary education. The notion has been extended to secondary schools without any direct evidence; only an extrapolation of evidence at primary. We think that there is a need for more evidence before a structure of 'ready to progress' is introduced to secondary schools, as well as to primary schools.
18. SCORE is concerned by the implication that students might be held back a year with the 'Ready to Progress' model – especially at secondary schools. This would be a very major change to the way that schools operate and needs further discussion and consultation.
19. Should a 'Ready to Progress' model be introduced, the idea of encouraging all pupils to achieve a threshold of understanding (whilst providing greater depth of understanding to the more able students) before moving on to the next topic or area will require substantial resourcing, particularly in terms of staffing and professional development.
20. SCORE supports the notion of helping students to an in-depth understanding of a few areas of content at primary school as opposed to a rush to acquire as much knowledge as possible. And we strongly support the statement on page 17 that primary education should 'bridge the orientation of pupils towards subject knowledge'; we prefer this to the notion that they are drilled with as much subject knowledge as possible – an approach which we think is ineffective and counterproductive as it introduces children too early to ideas which are beyond their comprehension and results in rote learning rather than a proper understanding of those ideas, potentially putting them off science rather than switching them on through rewarding, challenging and authentic experiences.
21. It is worth noting, from the international comparisons, that most high-performing jurisdictions start teaching science later than is currently the case in England.

Risks

22. SCORE welcomes the Panel's recognition of the risks arising from the pace of the National Curriculum Review and shares the Panel's concerns. We also welcome the attention given by the Panel to curriculum coherence – it is crucial that assessment,

accountability, inspection, workforce capacity, teacher training and professional development, with support focused at local and regional levels, are considered alongside the curriculum.

23. The National Curriculum should be written to be appropriate for all schools and all pupils, with adequate provision for the full ability range. SCORE continues to be concerned that the National Curriculum will not be a requirement for all schools; Free Schools and Academies should not be exempt from teaching the sciences outlined in the National Curriculum.