SCORE Response to the Qualifications and Curriculum Authority's Secondary Curriculum Review
April 2007

This response to the Qualifications and Curriculum Authority Secondary Curriculum Review has been prepared by the SCORE partnership and therefore represents the combined views of the following organisations: Association for Science Education, Biosciences Federation, Institute of Biology, Institute of Physics, Royal Society, Royal Society of Chemistry, and the Science Council.

The SCORE partnership aims to bring collective action and a strategic approach to strengthening science education, and believes that the key to maximising the impact of its efforts, especially their influence on government, lies in a greater degree of collaboration and in having a sense of common purpose. Through this collective action, the partnership aims to increase its influence over the direction of science education in the years to come, in particular over teacher supply and retention, curriculum development, assessment, delivery of support to teachers and students, and strategies for reaching all young people regardless of age, background, level of ability, gender, ethnic origin and geographical location.

Association for Science Education www.ase.org.uk
Biosciences Federation www.bsf.ac.uk
Institute of Biology www.iob.org
Institute of Physics www.iop.org
Royal Society www.royalsoc.ac.uk
Royal Society of Chemistry www.rsc.org
Science Council www.sciencecouncil.org

Introduction

The proposed secondary curriculum is impressive in the extent of its ambition to transform teaching and learning in schools. The reduced prescription and flexibility this entails has the potential to enable schools to provide a curriculum that is more enriching, engaging and stimulating. This would be particularly welcome in science.

However, if these ambitions are to be realised there needs to be a clear understanding of the reforms and sufficient time and support for teachers to make these ambitions a reality in their own schools. We are not convinced that this is the case.

Content and progression

Superficially the changes to the KS3 programme of study (PoS) for science increase flexibility by reducing the level of detail about what is to be included within the curriculum. This follows a similar reduction in

the level of detail that has taken place at KS4. However, at KS4 the PoS is interpreted through subject criteria which lead to GCSE specifications developed by awarding bodies; this is not the case at KS3 where teachers have to use the PoS to develop schemes of work. We believe that the proposed PoS is not clear enough to enable teachers to easily develop schemes of work that will deliver the ambitions of these reforms.

There is a lack of clarity about the expected learning outcomes within KS3 and about progression from KS2 and to KS3. For example, progression in electricity is currently proposed to be as follows:

> ***KS2*** *to construct circuits, incorporating a battery or power supply and a range of switches, to make electrical devices work [for example, buzzers, motors], how changing the number or type of components [for example, batteries, bulbs, wires] in a series circuit can make bulbs brighter or dimmer, how to represent series circuits by drawings and conventional symbols, and how to construct series circuits on the basis of drawings and diagrams using conventional symbols.*
> ***KS3*** *electricity (this includes current and voltage in series and parallel circuits) in circuits can produce a variety of effects (this includes energy transfer in a variety of electrical devices, and magnetic effects)*
> ***KS4 (Core)*** *electrical power is readily transferred and controlled, and can be used in a range of different situations*

There seems to be some confusion between using ideas or theories as a context for delivering the concepts outlined in the PoS and teaching the theories in their own right. This lack of clarity means that there is considerable danger of repeating content that has been covered at an earlier key stage with the effect of demotivating students.

The level descriptors could help to clarify the situation, but looking at the statements where there is a reference to electricity in the examples used shows that the progression is not clearly defined:

> *Level 4: They recognise some applications and implications of science, such as the use of electrical components to make electrical devices.*
> *Level 5: They describe applications and implications of science, such as the ways sound can be produced and controlled, for example in musical instruments.*
> *Level 6: They explain the importance of some applications and implications of science, such as the use of unsustainable sources of energy.*
> *Level 7: They explain, using abstract ideas where appropriate, the importance of some applications and implications of science, such as the uses of electromagnets.*
> *Level 8: They describe and explain the importance of a wide range of applications and implications of science.*

An additional concern is that the much of the science teaching at KS3 in any one science (particularly physics but also, to a significant extent, in chemistry and biology) is undertaken by non-specialists (e.g. a biology specialist teaching chemistry) who will all too often have insufficient subject knowledge and background to ensure a stimulating variety in the contexts are used. It seems likely that these teachers will typically resort to the use of published schemes which are unlikely to fulfil the broader ambitions of the review.

The lack of clarity for teachers regarding the knowledge and skills students are expected to have at the end of KS3 may work against the intention of reducing prescription. Uncertainty regarding the content of KS3 tests may lead to teachers feeling obliged to include more rather than less content in their teaching in order to cover all eventualities. This uncertainty and inconsistency may also cause both gaps and duplications during progression to Key Stage 4.

It is obvious that if the secondary curriculum were not split into two key stages by national tests, smoother progression, and curriculum development to support that progression, would be much more straightforward. If the current situation remains, at the very least we should ensure that curriculum development of KS3 and KS4 occurs concurrently in the future.

Timing

It is disappointing that the government still does not seem to have accepted the fact that proper piloting and evaluation is essential for effective curriculum change. It would be much more cost efficient and beneficial for teachers and students to allow sufficient time for curriculum change.

We note that, in 2007/8, science teachers will be attempting to implement some or all of the following changes:

- Teaching the second year of new GCSEs
- Preparing to deliver separate award sciences from 2008
- Preparing for the new A level courses to be taught from 2008
- Preparing to deliver some science elements in the new diplomas

We do not believe that teachers will have sufficient time to deliver the outcomes that this review is intended to deliver; planning for cross-curricular links and providing different pathways through the curriculum requires time and coordination. The phased implementation does not really help here as the whole KS3 curriculum will have to be mapped out in at least broad outline before it can start to be taught.

Resources

We believe that publishers and others will not be able to provide high quality resources in the suggested timescale. The only option seems to be to repackage existing resources – again this is hardly like to lead the kind of personalised learning suggested in the ambitions for these revisions.

We are also concerned about the number of errors that are creeping into resources – the rush to have material available before teaching starts in September 2008 can only exacerbate this situation.

Assessment

We believe that teaching and learning in schools is driven strongly by the summative assessment at the end of key stages. We welcome moves to make greater use of formative assessment and staged assessments. However, for this to be successful there needs to be a shared agreement about attainment. At KS3 this shared agreement should be driven by the level descriptors; as noted above, we do not believe that the descriptors achieve this task.

We note that statutory assessment material for the new KS3 PoS may not be ready until 2011. It is not clear how schools that currently teach KS3 in two years (to allow more time for KS4) will manage the assessment of their students. We also note that DfES has just announced a pilot to trial changes to assessment, allowing students to take national key stage tests as soon as they are ready, rather than only at the end of the key stage.

Conclusion

We believe that there are considerable advantages in allowing schools to decide whether to pilot the KS3 changes from 2008 but not in insisting that all schools change KS3 until adequate specimen assessment material is available in 2011.

In addition, we believe that additional documentation needs to be produced giving guidance on curriculum content, level and progression paths. This must be clearly identified as non-statutory and not be as prescriptive as the current QCA scheme of work for Key Stage 3 Science.

We would also recommend that the Department for Education and Skills (DfES) and the Qualifications and Curriculum Authority (QCA) agree and publicise a best practice model of curriculum development - from initial research and consultation through to implementation and evaluating impact - which could be used as a quality standard for future change.