
Helping science teachers to challenge gifted students

A new resource pack, entitled *Enriching School Science for the Gifted Learner*, has been published by the Science Enhancement Programme (SEP), to support secondary science teachers in their work with their highest achieving students. The pack comprises a booklet explaining the ideas behind the enrichment activities, and a CD-ROM that includes teaching materials and more detailed discussions about each of the activities. The booklet contains useful background reading for teachers who may wish to adopt or adapt any of the activities, including: material on interpreting the notion of 'gifted'; approaches to teaching the most able in science; an introduction to ideas about teaching the nature of science; and introductory material on the role of metacognition in learning. These chapters are intended to inform teachers who feel that they have had little specific support in developing their work with gifted students in science, and they will also be a useful source of information and ideas for trainees in initial teacher education.

The pack derives from a SEP-supported project called ASCEND – 'Able Scientists Collectively Exploring New Demands' – a collaborative initiative in Cambridge, where the Faculty of Education worked with the federation of secondary schools in the city to develop an enrichment programme for upper secondary (Key Stage 4) students. The science teachers from four of the city comprehensives identified Year 10 students (14–15 year olds) who they felt would benefit from working with like-minded peers in tackling challenging science activities, something that seemed to be especially valued by the students (Taber & Riga, 2006). The University's Faculty of Education hosted the programme (Taber & Riga, 2007).

One of the ideas behind the project was to develop a programme of activities that could be used by groups of schools working together. All schools are now expected to identify, and demonstrate that they are catering for, those students who are considered 'gifted and talented', and this could

mean providing enrichment for a relatively modest number of students in any one school. This may also mean that a science teacher designated the department's gifted 'expert' could feel quite isolated. However, if groups of schools work together, then there is likely to be a better use of limited staffing resources, and the possibility of mutual support and sharing of ideas and good practice. The programme could be rotated around a group of schools that are in easy travelling distance of each other.

The ASCEND programme was staffed by volunteer graduate students from the Faculty, most of whom were undertaking the University's PostGraduate Certificate in Education. Working on the project as assistants, these new teachers had the opportunity to work with a group of gifted science students in a context seldom available in initial teacher education. The graduate assistants were briefed on the nature and rationale of the activities before each session. They were also charged with observing and recording the way the students responded to the activities, so working as teaching/research assistants.

The cohort of secondary students attending the sessions numbered about thirty, and most activities were organised in groups of around four, usually with a science graduate available to their group throughout the session. This provided each group with the valuable resource of their own science expert 'on tap'. However, part of the purpose of the activities was to challenge the groups to work through the set tasks as a team, and so the graduates were instructed not to volunteer help unless their group was making little or no progress. This meant that the graduates followed largely a watching brief, giving them the opportunity to monitor the progress of one group of gifted science students through a ninety-minute session.

The main theme used to plan the activities was that of the *Nature of Science*, an area where teachers have asked for more advice and resources to support their teaching. This was also considered to be a suitable area in

which challenging activities could be devised, relating to such themes as scientific method, models and analogies in science, laws and explanations in science, and what actually counts as 'science'. The integration of ideas from the different science disciplines, and the ways in which science may link to controversial issues are also included, so that the activities support learning about 'How Science Works' in the new Key Stage 4 programme of study.

The activities in *Enriching School Science for the Gifted Learner* complement the ideas and activities in a previous SEP publication, *Teaching Ideas and Evidence in Science at KS3*. The new publication is specially designed for enrichment programmes for the highest achieving Key Stage 4 students but, as with the earlier SEP resource, gives teachers the option of modifying materials from the CD-ROM to meet their own specific needs.

Like other SEP resources, *Enriching School Science for the Gifted Learner* is being offered free of charge to school teachers who register as Associates through the SEP website (http://www.sep.org.uk/about_join.html). The pack can also be obtained from Middlesex University Teaching Resources: www.mutr.co.uk; sales@muventures.co.uk; 01992 716052

References

- Taber, K. S. & Riga, F. (2006) Lessons from the ASCEND project: able pupils' responses to an enrichment programme exploring the nature of science, *School Science Review*, **87** (321) 97–106.
- Taber, K. S. & Riga, F. (2007) Working together to provide enrichment for able science learners, in K. S. Taber, *Science Education for Gifted Learners*, London: Routledge.

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