

# Science for all

Adrian Fenton promotes inclusive science teaching through project-based learning and informal approaches



Kieran Ridley

Raising the topic of science with teachers with an interest in special educational needs can provoke a variety of reactions. Those in special schools are often from a non-science background, perhaps with a potential lack of confidence when working outside their comfort zone. Mainstream teachers may have the subject expertise but not the experience of working with students with specific needs. This is a generalisation, but illustrates the need to share good ideas and experiences from different areas of teaching. Science has something to offer all students.

My own interest in this area developed through project managing the development of Inclusive Science and Special Educational Needs (ISSEN, 2001–04) which bought together the expertise of Nasen and the Association for Science Education (ASE) with funding from the Department for Education and Skills (DfES) to explore support for teachers in both mainstream and special school environments. At the time inclusion was particularly emphasised through the educational agenda, with the revised National Curriculum in

England and Wales (implemented in 2000) underpinning this approach. Through facilitating the sharing of good practice, and highlighting 'hidden gems', outcomes from the ISSEN project included the ISSEN website ([www.isсен.org.uk](http://www.isсен.org.uk)), a CD-ROM of resources, and training events across the UK.

## Reshaping the curriculum

Subsequently a number of curriculum changes have contributed to shaping the direction of science in schools. The QCA Science Programme of Study (implemented in 2006) emphasised knowledge, skills and understanding of how science works in the world at large, further reinforced by the Key Stage 3 changes (2008) encouraging greater flexibility, with more of an emphasis on the scientific process.

When we also consider the introduction of the Personal, Learning and Thinking Skills (PLTS) framework this additionally supports a movement towards encouraging experiential learning through project-based (and other informal) approaches. Such curriculum changes do add to the pressure on teachers regarding preparation and implementation, but there are some schemes, structures and sources of inspiration that may support these underlying principles. Here are some ideas and examples.

## Project-based learning - CREST

CREST (CREativity in Science and Technology) is a UK-wide Science, Technology, Engineering and Maths (STEM) award scheme managed by the British Science Association. Through CREST, young people aged 11–19 explore the real nature of STEM by doing their own creative problem solving through mini-projects. With three levels – Bronze, Silver and Gold – there is opportunity for

students to develop their own interest through a science- or technology-based project. Particularly at Bronze, it's not just about high levels of understanding, but the 'distance travelled' in developing skills through carrying out their project (which would be ten hours' work at Bronze). The flexibility of the scheme, given its cross-curricular nature and project-based approach, has shown it to be effective with students of varying abilities, some in special schools.

It's not just about high levels of understanding, but the 'distance travelled'

Students' achievements are celebrated at regional fairs, with some going on to the national fair. But are these events truly inclusive? Julie Smith, AST (advanced skills teacher) for Science in Buckinghamshire, relates her experiences, 'I have accessed CREST since it started, while working at a series of three very different SEN schools. In all three cases, the senior management team was very sceptical that the pupils could access it and in all three cases, they were astounded at what the students could achieve.'

## Experiential informal learning - Visualise

Science Made Simple is an experienced science communication organisation that educates and inspires groups of young people through shows and workshops ([www.sciencemadesimple.co.uk](http://www.sciencemadesimple.co.uk)). Several years ago it developed a bold new project called Visualise. This show is a mix of physical theatre, live science demonstrations, projected images and music with no talk, focusing on less explanation and more exploration. The audience are invited to make their own observations and

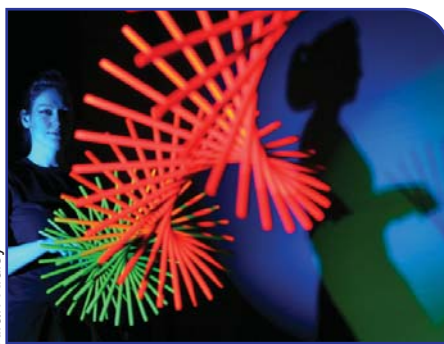
> discoveries, igniting their curiosity and ultimately motivating them to find out for themselves how the world works.

Kate Baldwin (Assistant Principal at Victoria Education Centre at the time) enthuses about the Visualise experience, 'I have seen Visualise twice and have also taken groups of students with autism and complex needs. The show uses no spoken language and without this distraction the students found it much easier to process the information presented, see the connection of patterns and focus on the scientific concepts. They were also able to understand and appreciate the visual slapstick nature of the humour in the show.' This is one example illustrative of those involved with science communication taking a more inclusive approach through shows, museums, school activities and visits. The accessibility of Visualise generated much interest and having toured 12 European countries recently, a Visualise: Reloaded tour in 2009 has begun. For further information visit [www.scienceadesimple.co.uk/page141g.html/](http://www.scienceadesimple.co.uk/page141g.html/)

### Primary science clubs and support

Inspiring students in science through relevant open-ended group work is also a very important part of a young person's experience at a primary age. The CREST Star Investigators scheme, redeveloped in 2007, offers children the opportunity to solve a relevant, science-based problem with a real context, working in small groups and taking part in practical, hands-on science activities. Thinking and talking about science are emphasised in all the activities. Feedback from the initial evaluation of the scheme has been very positive regarding accessibility and relevance to all.

Anyone can participate in the scheme, but the need to provide opportunities in hard-to-reach areas is being explored to a greater depth through a grant from the SHINE Trust enabling CREST Star Investigators science clubs to be set up in schools in inner-city Manchester, an area currently ranked as the third most deprived district in England. There is the potential for the scheme to



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continue to grow, reaching more students across the UK, with new activities already being added.

### Effective networking

We're all familiar with the phrase 'A problem shared is a problem halved'. The need to share ideas between schools has been taken one step further by a group of schools in Buckinghamshire. The Special Needs in Science Liaison Group was initiated by Julie Smith while at Stony Dean School some 14 years ago, providing the opportunity for 'lone workers' in science in all of the special schools across the county to meet and get to know one another, sharing good practice. The group continues to be very open to all teachers, sometimes focusing on CPD topics in response to requests from mainstream schools (such as science resources and dyslexia). The group is an example of highly effective localised networking.

Opportunities do exist for teachers to explore accessible new approaches to the curriculum and personalised

learning, though implementing any new developments does take time and may not be initially easy. But as Julie Smith illustrates, by finding support through others in similar situations and

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taking part in existing schemes, the results can be very rewarding. In his article in *Support for Learning* (November 2002) Derek Bell nicely sums up what science has to offer: 'Ultimately, for all children education should be a positive experience through which they are able to feel they have succeeded. The contribution that science makes can be significant for all children, not least because it provides opportunities for them to develop an understanding of the world around them, a sense of empowerment through choice, and a feeling of self-worth.'

If you are involved with localised networks or have good examples to share then I would be pleased to hear from you. By sharing good practice and supporting each other, we can achieve some very rewarding results.

Adrian Fenton is the Young People's Programme Manager with the British Science Association. He would like to thank Julie Smith, an advanced skills science and SEN teacher, for her contribution.

### Information and ideas

- > Inclusive Science – [www.issen.org.uk](http://www.issen.org.uk)
- > British Science Association CREST (CREativity in Science and Technology) Awards – [www.britishscienceassociation.org/CREST](http://www.britishscienceassociation.org/CREST)
- > National Science and Engineering Week 12–21 March 2010. The webpages have useful free resources all year around. Grants in the region of £250 will be available in autumn 2009. These are for schools meeting the selection criteria, supporting them to run events – [www.britishscienceassociation.org/nsew](http://www.britishscienceassociation.org/nsew)
- > Little Book of Experiments – a compilation of simple, safe, practical activities using everyday objectives aiming to get everyone involved with science – [www.planet-science.com/experiment](http://www.planet-science.com/experiment)
- > Science UPD8 – provides short, engaging and easy-to-use classroom activities based on up-to-the minute science in the news and popular culture – [www.upd8.org.uk](http://www.upd8.org.uk)
- > Inclusive Science online CD-ROM – resources collated as part of the ISSEN project (produced originally on a CD and circulated free to schools) – [www.ase.org.uk/sen/](http://www.ase.org.uk/sen/)