FOCUS ON...

The curriculum carousel

Curriculum change is back on the agenda in the UK, with the prospect of the Alexander Review, proposed changes to A-levels, a European-style baccalaureate approach, new GCSE syllabuses and who knows what else – perhaps even another 'back to basics' movement. In the case of science, this urge to change is often predicated on a single problem, namely that, in most countries, young people are turning away from studying science at a time when it has never seemed more important. Most newspapers regularly give space to informed opinion on this problem, its roots and how to solve it, via articles and copious correspondence. So why add to what has already been said?

Simply because in most of what is being said there is still a contradiction that at present is often being evaded. In our previous issue (page 3), we mentioned Peter Fensham's address on 'Policy issues for science education' at the World Conference on Science and Technology Education in July. His discussion paper stressed the *'irreconcilable aims'*, which he states as the wish to develop scientific literacy for all students as against the desire to select and prepare a small proportion of students to go on to advanced science study and careers. Policy-makers have to make their minds up.

Meanwhile, correspondents in the press rightly point to weaknesses in current science curricula, which often seem as watertight, sterile and scary as a pack of hypodermic needles. Underlying such packages of science knowledge and skills, in practice, is often the notion that we can 'inject' children with these big ideas, and then come back later with our tests to check if the 'treatment' has worked. This might be an appropriate strategy in medicine, but it has never worked for science education. Just as holistic medicine is now seen as the best way of treating the whole person, so a holistic curriculum (not simply a separate science curriculum) must look at the whole of learning, and say goodbye, once and for all, to the notion of science as somehow important enough to be kept apart from the rest of learning. And this is happening in some parts of the UK, as our discussion below indicates. The warden of a centre on the Jurassic Coast in Devon recently told me that schools now come not to study habitats, fossils, the tides, and so on, but to study 'The Coast' as a whole.

We have to choose

Which option should we take? In our view, primary schools have only one option: to sustain children's curiosity and excitement about learning in general, of which science ideas should always be a key part. We all build on what we know and can do already, from the earliest age. Very young children want to hold things, especially bright, shiny squeezable things; when they put them in their mouths, shake and drop them, they are experimenting with materials, colour, texture, shape and sound. Eventually, they like to take things apart, put them together, dress up, draw, build, and make new sounds. These are their first contact not only with ideas in science, technology and engineering, but also those underlying art, music, architecture and fashion. Why would we want to draw boundaries between these, when children find the whole experience fascinating?

In the same way, children love to be told stories. Primary schools are full of story-telling, but how much of it relates to stories that illuminate the lives and ideas of important scientists such as Galileo, Newton, Darwin, Fleming, the Curies and the rest, right through to Crick, Watson and Sir Alec Jeffreys' work that has resulted in the DNA fingerprinting techniques that are rarely out of the news? It is almost as if stories and science inhabit different curricular worlds in school.

Children also have natural instincts to eat, play, talk and be sociable. Food, games and sport, making 'dens', playing hide and seek, sledging in winter, collecting conkers, picking blackberries, scrumping, riding bicycles, all provide experiences that are a starting point for learning about nutrition, exercise and health, as well as their first contact with the connections between forces and motion, energy and fuels, and with travel, keeping warm and dressing for the weather. These lead on to deepening their understanding of forces, physiology and climate, for example, which in turn enhance satisfaction and success in many sports, from cricket, golf and soccer to climbing, sailing and surfing – if, of course, they are allowed to do these things. A recent piece in the *Times* newspaper points to research indicating that, in this age when children are rarely allowed to cross the road alone, the number of accidents involving them has increased, not decreased. Similarly, children take medicines and know about drugs, smoking and alcohol. They can see these affecting the lives of people close to them, and want to know about what they do. Their fascination with animals and the natural environment is self-evident. What we ask them to learn must therefore build on this fascination and wonder, not turn it into something as dry and desiccated as a stuffed parrot.

Wondering about the big questions

And children wonder about many things. They ask and ponder the really big questions, like where do we come from, what is the universe made of, how did we get here, what happens when we die. These are the key questions of cosmology and religion, not simply those of astronomy, biology and geology.

They too need to be opened up for discussion as children discover a desire to know. As they read, watch TV or use the Internet, they are picking up ideas from many quarters; but it has been pointed out that many people are more likely to know their star sign and read their horoscope than they are to know their blood group and read their pulse. So helping them to be sceptical about what they read and see is also part of building on this knowledge.

As you can see, we have already touched on virtually the whole of science. However, none of it is at present introduced to teachers and children in this way; instead, it is still presented to teachers largely as tables of facts, concepts and skills that children need to know, without any rationale for why, except perhaps that they will be tested on it later. If children are being turned off science, they are probably asking themselves, '*what's the point of it?*' and not finding a satisfactory answer. Ian Milne's piece in this issue, on 'children science', suggests some changes that might help sustain their interest, by focusing on real enquiry, as does Rachel Sparks-Linfield's short article on the importance of imagination in science.

But generating real enquiry has never been easy to achieve. In their recent survey summarised in this issue, Sharp and Hopkin found that teachers across England feel less well prepared to teach scientific enquiry than might have been predicted, and that only five per cent had made use of their nearest Science Learning Centre; this low uptake of in-service training is their biggest cause for concern.

Our 'best-ever activities'

So how can we generate confidence in enquiry, when only a minority of science coordinators have a science degree, and some schools have no scientist at all on the staff? All trainees in England now have GCSE science, and training programmes in science have improved hugely in recent years, yet the problem hasn't gone away. In this issue, therefore, members of the editorial board have selected some of their favourite science activities; all are exciting and lead to enquiry. Every activity uses something familiar – not something out of the science lab – and yet creates an unexpected outcome; and the unexpected always arouses children's curiosity, makes them ask questions. This is the start of all science; things are rarely as they seem, and science is one way to start solving the puzzle. What happens when you burn the candle at both ends? How did the wire get into the ice? How do you make the paper fly across the room?

We hope you will try these, and send us your own best ideas. Globally, as our last issue showed, there is an agreement that hands-on enquiry in science works better for young children; but it still doesn't happen in enough classrooms. What inhibits teachers, we suspect, is the feeling that diverging too far from orthodoxy is risky, especially when they are not too sure themselves about the underlying science ideas and how to fit them in to a holistic curriculum. Are teachers trying to move on, while policy makers are slow to budge?

A turning point for *PSR* too

And so, 21 years after it began, we reach issue 100 of *PSR*! In January, we will re-launch the journal under the title *Primary Science* with a new design. We feel sure that you will find its contents even more lively and valuable than before, especially as we will be focusing on the links between science and other areas of the curriculum, such as sport, the arts and ethics. And we always look forward to hearing from readers about what you would like to see in the journal. Here's to another 100 issues!

Future themes

Each issue of the journal focuses on a theme, but also includes other articles on a range of topics, so if you have something to write about that is not on a theme or deals with a theme already covered, don't be deterred. All contributions are very welcome.

Issue 101 (Jan/Feb 2008): Life processes
Bringing living things into the classroom, and using the environment to study the interdependence of people, plants and animals.

Issue 102 (March/April 2008): Science in sport
(copy deadline 16 Nov. 2007). In Olympic year, a focus on exercise, health, and the physical demands of different sports.

Issue 103 (May/June 2008) Science and the arts
(copy deadline 8 Feb. 2008).

Issue 104 (Sept/Oct 2008) Science and ethics
(copy deadline 23 May 2008).

Contributions should be sent as an email attachment to:
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The journal's role

Within the ASE's commitment to 'promoting excellence in science teaching and learning', the editorial board sees the aims of the journal as being to develop good practice in primary science teaching and to support primary educators by:

- challenging and developing educators' thinking about the what and how of children's science learning;
- helping teachers, trainers and trainees to share their science expertise with others;
- seeking out, supporting and disseminating good practice, from the early years through transition to the secondary phase;
- broadening and improving primary teachers' and trainees' background knowledge and understanding in science in order to enhance their teaching;
- disseminating and discussing the findings of relevant research in science education, by practitioners and others;
- keeping readers up to date with curriculum developments and new resources;
- providing an independent national and international perspective on the above, in recognition of our readership and the increasing importance of international links.