

Communicating Science through Children's Literature – Part One

by Dr Gina M Newton [article based on MSc Science Communication Thesis (2004, Australian National University) and published in the Women in Science Enquiry Network Journal in 2005 (J66: 5-6)]

The children's book is an extremely important (though sadly often overlooked) science communication tool. In this respect there awaits a golden opportunity for scientists. The opportunity to increase the richness of scientific material available to our children, which in turn increases the standing and understanding of science in the wider community. There is also the opportunity, albeit indirectly, through raising the awareness of science and scientific content, to improve the political and policy process through having better informed citizens and debate. Taking a leap even further – this may also lead to increased funding for science, and who knows – perhaps even improve the future prospects for us and our world!

Dreaming aside, science is important. Interestingly, the word 'science' derives originally from the Latin word *scientia* meaning knowledge. One of the most influential barriers to overcoming the great challenges of the 21st Century, such as easing poverty, improving health and achieving ecological and social sustainability, is access to and the understanding of knowledge¹. According to the Prime Minister's Science, Engineering and Innovation Council (PMSEIC) Working Group on Science Engagement and Education², Australia's success as a 21st century knowledge society will depend on having a technologically-skilled workforce and a science-literate community.

However we live in times of some concerning global trends. Knowledge is expanding more rapidly today than at any period in history, with an estimated doubling every seven years¹. However [at a global level] our ability to share and disseminate new knowledge swiftly and effectively in forms that people can use, remains limited. We are now in the throws of what has been called 'the Information Age' or 'Knowledge Economy', largely spurred on by the wide adoption of the Internet and World Wide Web but also fuelled by the various guises of the mass media. This has led to widespread concern globally of a 'Digital Divide' phenomenon. The Digital Divide relates to those with ready access to knowledge and its benefits as provided via the Internet and media, and those without. There is also a concern that science and science policy are driven by those in the field to the exclusion of the rest of society¹.

To circumvent this 'disenfranchisement' regarding science it seems logical and critical to engage tomorrow's citizens whilst they are children. Unfortunately, a concerning trend of the past decade or so has been the dramatic decline (or rejection) of science as a pursuit at both secondary and tertiary level education in Australia - including amongst the brightest and highest achieving students. Increasingly students are opting out of science - by 2001, 45% of Year 12 students were not enrolled in any science subject². In addition, in many Australian primary schools, there is little or no science taught and many primary teachers do not feel confident about their ability to teach it². Although the reasons for these trends are likely to be complex, one of the important factors in this decline has been identified as the failure of curriculum to capture the interest of students.

The goal of the recent report by the PMSEIC Working Group on Science Engagement and Education² was stated as:

A science-literate society, through the engagement of young Australians in science, from primary school right through their educational years to their careers and lives.

At a society level, science literacy doesn't require people to know a lot of science. It means equipping them with the ability to think clearly about issues, know where and how to find accurate information, solve problems logically and make sound, evidence-based decisions. Some believe that this is also fundamental to achieving a successful democratic society. While there are no statistics available for Australia, long-term surveys in the USA have found that less than one in five adults meets a minimal standard of civic science literacy.³

Fortunately, most children are curious and innately interested in the world around them; they are keen observers and askers of questions! There are many benefits of good science education/communication for children:

- When children explore and learn about the world around them and how it works, they gain a better understanding and appreciation of nature and the interdependence of living things and their environments.
- When kids think as scientists do, by questioning things and considering new approaches, they gain independent thinking skills that can help them develop into savvy and wise consumers, voters, and citizens who can make their own informed decisions.
- By working on independent science projects that require written or oral reports, or through group experiments that involve discussion and debate, cooperation and consensus, students must employ effective communication skills – these can foster creativity and translate into effective personal relations and business presentation skills.
- Through science, students learn about coming up with hypotheses, collecting data, testing assumptions, reading about prior research, looking for patterns, writing up results, communicating findings to colleagues, and conducting further testing – all skills crucial for later success in school and working life.

The task of science education for social responsibility rests with educators, which for children are teachers and parents (carers). In fact it can be said that the parent is often the first and most influential of teachers. Research on families and student learning has shown that students at all grade levels do better work, are more confident learners and set higher goals when their parents are knowledgeable, supporting, encouraging and involved with their education. It is poignant that all children's books are first read by adults, e.g. editors, librarians, teachers, parents, etc. – and a good children's book can offer both adult and child equal (if different) rewards. Sharing a book with a child is something that both may remember for life. Importantly, for a child the task of learning to read is extended to reading to learn – a transition that has distinct importance for the rest of schooling.

An essential element and reinforcement to the interaction of parents (or teachers) and children reading together is the ensuing discussion. Discussion is a powerful tool for making children think and refocus their ideas. Through the effort to communicate, children are forced to construct thoughts, form concepts and examine interrelationships among ideas. In fact, it has been reported in the USA that a powerful predictor for determining whether a child will attend college is whether or not the family eats dinner together in a setting that promotes discussion!⁴

Literacy is already a priority in Australian primary schools and has a specific allocation of time and funding. One of the major recommendations of the PMSEIC Working Group on Science Engagement and Education² was that:

“A collaborative national program be introduced in primary schools that links the teaching of science with the teaching of literacy.”

Linking science to literacy will enable a more efficient use of resources, allowing students to develop skills in science and literacy simultaneously – and this is learning that can take place in the school and in the home.

This article was developed from a 2004 dissertation for a Masters of Science Communication with the Centre for the Public Awareness of Science at the Australian National University. In Part Two, Dr Gina Newton will discuss the power of story, the fact to fiction continuum, what makes a good children’s science book and the skills needed to write one.

1. Cribb, J. and T. S. Hartomo (2002) *Sharing Knowledge: a guide to effective science communication*. CSIRO Publishing, Melbourne. 208pp.
2. PMSEIC Working Group on Science Engagement and Education (2003). *Science Engagement and Education: Equipping young Australians to lead us to the future*. Independent report to the Prime Minister’s Science Engineering and Innovation Council, November 2003, Canberra. 42pp.
3. Miller, J.D. (2000) *The Development of Civic Scientific Literacy in the United States*. In: Kumar, D.D. and Chubin, D. (Eds.), *Science, Technology, and Society: A Sourcebook on Research and Practice* (pp. 21-47), Plenum Press, New York.
4. Rillero, P. (1996) *Doing Science with Your Children*.
http://www.kidsource.com/kidsource/content2/doing_science.with.child.html