

Underpinning research

Three key sources were used to provide the background, content and structure for the Getting Practical programme and provide recommended additional reading:

- SCORE: Practical Work in Science: A report and proposal for a strategic framework (2008)
- Robin Millar's (University of York) work on the role of practical work on the teaching and learning of science (1997-2009)
- The National Strategies' Science Study Guide: Interactive practicals (2008)

SCORE report

The 'Improving Practical Work in Science' project stems from recommendations in the SCORE report: *Practical Work in Science: A Report and Proposal for a Strategic Framework* (2008). SCORE is a partnership of seven organisations, which aims to improve science education in UK schools and colleges by influencing government and policy-makers and supporting the development and implementation of effective education policy and projects.

Evidence was drawn from four main sources: a literature review undertaken by Justin Dillon (King's College), an open call for evidence, online surveys of teachers and technicians and a series of stakeholder workshops. Key themes addressed throughout the report include the definition, purpose and impact of practical work in schools as well as a thorough exploration of the 'enablers and barriers' to practical work in science. Usefully, throughout the document, 'Key Findings' are highlighted. The report concludes with a review of the evidence and clear recommendations for further work.

Robin Millar

Robin Millar (York University) has produced a number of papers over the past ten years on the role and effectiveness of practical work in science. Most recently, Millar's *Analysing practical activities to assess and improve effectiveness: The Practical Activity Analysis Inventory (PAAI)* (2009) has been written specifically to support this project but draws widely on previous research evidence. The analysis framework described in Millar's booklet is based on an instrument originally developed for use in the European *Labwork in Science Education (LSE)* Project in the late 1990s. In turn, the 'Improving Practical Work in Science' project has adapted these tools for use in its professional development strand.

National Strategies: Interactive practical work

This is a practical study guide designed for use in the classroom which allows teachers to consider how 'purposeful' their practical work is. The guide contains tasks, case studies and questions inviting teachers to reflect on their practice. The issues explored in the guide complement and support the professional development programme within the 'Improving Practical Work in Science' project.

References

Abrahams, I., & Millar, R. (2008). Does Practical Work Really Work? A study of the effectiveness of practical work as a teaching and learning method in school science. *International Journal of Science Education* 30(14), 1945-1969

Lunetta, V. N., Hofstein, A. and Clough, M. P. (2007) Teaching and learning in the school science laborator. An analysis of research, theory and practice. In *Handbook of research on science education* (ed. S K Abell and N G Lederman), pp. 393-431. Mahwah, NJ: Lawrence Erlbaum Associates.

Millar, R. (2009). Analysing practical activities to assess and improve effectiveness: The Practical Activity Analysis Inventory (PAAI). York: Centre for Innovation and Research in Science Education, University of York.
(available from: <http://www.york.ac.uk/depts/educ/research/ResearchPaperSeries/index.htm>)

SCORE (Science Community Representing Education). (2008). Practical Work in Science: A report and proposal for a strategic framework. Gatsby Technical Education Projects.
(available from www.score-education.org)

The National Strategies (2008). Interactive Practicals: Science Study Guide. HMSO.

Tiberghien, A., Veillard, L., Le Marechal, J-F., Buty, C., Millar, R. (2001). An Analysis of Labwork Tasks Used in Science Teaching at Upper Secondary School and University Levels in Several European Countries. *Science Education*, 85 (5), 483-508.