



# Science is Primary

## A Review of *Primary Connections* Stage 3 2006 – 2008

### Executive summary

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[www.science.org.au/primaryconnections](http://www.science.org.au/primaryconnections)

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### **Disclaimers**

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## Executive Summary

### Background to the Study

Primary**Connections** is an initiative of the Australian Academy of Science (AAS) that links the teaching of science with the teaching of literacy in the primary years of schooling. It is an innovative approach to teaching and learning which aims to improve the quality and quantity of science teaching and learning in primary schools, through enhancing teachers' confidence and competence. This is achieved by developing teachers' pedagogical content knowledge in teaching science and literacy through an innovative program of professional learning supported by rich curriculum resources (Peers, 2006).

This report provides a review of Primary**Connections**: Linking science with literacy Stage 3 (2006-2008). The purpose of this review is to assess the progress and impact of the Project and to make recommendations for Stage 4. Primary**Connections** Stage 3 was funded by the Department of Education, Employment and Workplace Relations (DEEWR) and led to the publication of 19 curriculum units and the training of 383 professional learning facilitators, approximately 900 school based curriculum leaders and 120 university science educators involved in primary science education. There were five objectives for Stage 3. They were:

1. improved student learning outcomes in science
2. improved student learning outcomes in the literacies of science
3. enhanced teacher self-efficacy and confidence in teaching science and literacy
4. increased teaching time for science
5. an enhanced profile for the teaching of science in Australian primary schools

Literacies of science are the particular practices, processes and products that are used to represent and communicate understanding of science concepts, processes and skills. These include factual texts, data tables, labeled diagrams, graphs, models, drawings and embodied forms such as gesture and role play. Literacies of science are used to reason with and develop science understandings, and to represent science data in the conventional forms used to communicate science information.

### Research Method

A qualitative research method was used in this study. Data sources included an analysis of Academy publications related to Primary**Connections**, a written survey of a sample of trial school teachers and principals from Stage 3 (n=52), structured telephone interviews with 10 Australian Academy of Science staff, 12 pre-service science educators and 16 reference group members (n=38), and informal discussions with Primary**Connections** project staff. The

use of multiple data sources enabled triangulation of the findings and contributed to the credibility and trustworthiness of the results.

### **Key Research Findings**

There is strong evidence that Primary**Connections** Stage 3 achieved its stated objectives. Multiple instances of anecdotal and indirect evidence coupled with Primary**Connections** research provide strong evidence that Primary**Connections** has had a positive impact on student learning outcomes in science and the literacies of science. There were multiple sources of evidence from direct observations of teachers and pre-service teachers by stakeholders (i.e., pre-service science educators, Academy staff and reference group members) and statements from trial school principals that self-efficacy and confidence has increased. There is also evidence from Primary**Connections** research and the trial school teachers and principals that in some schools, the time spent on science increased because of the introduction of Primary**Connections**. There is also evidence that the profile of science in schools and in the community has increased .

The most important factors contributing to the success of Primary**Connections** Stage 3 were relatively inexpensive and high quality curriculum resources that were combined with a high quality professional learning program that was flexible enough to be used with both pre-service and in-service teachers regardless of science background, teaching experience and school culture.

For example:

- *the combination of the PL (professional learning) and the curriculum resources. That is the winner. We've got PL first and foremost supported by quality curriculum resources. We know from the research that it works. The support of teachers with good pedagogical resources with which to teach ensures good outcomes (Academy Staff).*
- *it is a good starting point for beginning teachers to give them confidence and for those teachers who don't have a lot of experience teaching science (Pre-service Science Educator).*
- *it is also the fact that PC did not require a strictly lock step program. We can take aspects of the program and we can tailor it to suit a context. That is part of the strength of the program (Reference Group).*

The curriculum materials were also mapped against state and territory curricula to ensure that they aligned as much as possible. A substantial amount of national funding enabled the development and implementation of the professional learning program and curriculum resources. In addition, the leadership and dedication from the Primary**Connections** staff at the Australian Academy of Science was considered to be exceptional and ensured that the initial impetus from Stages 1 and 2 was maintained. The success of Stage 3 was also

facilitated by active support (both human and financial) from the states and territories. The support of school principals and teachers was also considered to be essential for whole school implementation of **PrimaryConnections**.

Although **PrimaryConnections** did achieve its stated objectives, there were several factors that caused achievement to vary across schools. The amount of support (human and financial) from states and territories was variable and this impacted on access to professional learning for teachers. In some schools, science was perceived to be competing with literacy and numeracy for importance and time. School based factors such as teacher confidence and background in teaching science, level of principal support and availability of equipment affected uptake. A small proportion of stakeholders perceived that the curriculum resources should be more flexible in their design, expand the area of literacy and promote a broader view of science.

During Stage 4 it is essential that Professional Learning Facilitator (PLF) training continue and it is recommended that preference be given to non-classroom based teachers. Professional learning needs to be readily available for pre-service teachers and in-service teachers. There is a need for more units and for existing units to be revised. In particular, new units will need to take account of developments in the national curriculum. The **PrimaryConnections** website should be updated to include material to extend experienced users and provide case studies of successful implementation. An important challenge during Stage 4 is complacency. It is important to maintain the momentum of the project by continuing to produce and revise existing units and continue access to professional learning by pre-service teachers and in-service teachers. In addition, the **PrimaryConnections** staff need to continue to lobby state and territory stakeholders to maintain and build science as a priority in primary schools.

## **Recommendations**

Based on the research findings in this study, seven recommendations are made for Stage 4. They are listed below.

1. it is recommended that whole school implementation of **PrimaryConnections** be facilitated by providing additional curriculum support to schools.
2. it is recommended that the **PrimaryConnections** team works with jurisdictions to train local, state based master facilitators.
3. it is recommended that the **PrimaryConnections** team continues to monitor and evaluate the progress of **PrimaryConnections** during Stage 4.
4. it is recommended that the reference group consider strengthening the relationship between **PrimaryConnections** and early childhood education.

5. it is recommended that the reference group consider strengthening the relationship between **PrimaryConnections** and indigenous education.
6. it is recommended that **PrimaryConnections** endeavours to align itself with the national science curriculum.
7. it is recommended that **PrimaryConnections** supports state and territory stakeholders to accept responsibility for **PrimaryConnections** activities in state and territory jurisdictions.

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