

**Russell Tytler & Peta White**

Deakin University  
[russell.tytler@deakin.edu.au](mailto:russell.tytler@deakin.edu.au)

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## Supporting Learning Across the Multimodal Languages of Science

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It is increasingly being accepted that learning in science can be productively viewed as a process of induction into the multimodal languages of the discipline. Science concepts are expressed not only through verbal accounts, but through a range of representations including visual diagrams, graphs and tables, 3D models and simulations.

A key, but problematic aspect of learning is the 'transduction' of meaning across these multiple modes. How do students align the meanings available in different modes, such as text to image, and 3D models, and how can they be supported to reason through these multimodal resources?

Often, the capacity of students to align these different modal representations is assumed, since for teachers this alignment has been understood and is intuitive.

In this presentation I will draw on two Australian Research Council projects, one exploring the languages of senior secondary science, and one generating interdisciplinary science and mathematics sequence involving cross-modal generation, to show how this cross-modal transduction is pervasive, and fundamental to learning science.

We will draw on different topics to explore the nature of the challenge for students, and present and discuss examples of how teachers can explicitly support students in reasoning across modes.