

EXPLICIT TEACHING OF MODELS TO ENRICH PHYSICAL SCIENCE LEARNING

Barbara McKinnon^a, Neil Champion^a, John Cripps Clark^b, Colin Hopkins^a, and Dan O’Keeffe^a

Presenting Author: Dr Barbara McKinnon (pres@vicphysics.org)

^aVicphysics Teachers’ Network Inc, Victoria, Australia

^bSchool of Education, Deakin University, Burwood 3125 Victoria, Australia

KEYWORDS: models, metacognition

Good teaching inducts students into science as a human endeavour and demonstrates that scientific knowledge arises from a process of model construction, testing and review. The historical evolution of scientific knowledge is the development and refinement of models to explain scientific observations. The explicit use of models in teaching facilitates metacognitive engagement, which can lead to improved conceptual understanding (Kenyon et al., 2008).

The Science curriculum in Victoria, Australia is modelled on the Australian national curriculum and begins with an explicit aim of students developing an understanding of “the nature of scientific inquiry and the ability to use a range of scientific inquiry methods.” Models are mentioned frequently in the more detailed curriculum statements. For example, the curriculum strand “Science as a human endeavour” includes the following statement: “Scientific understanding, including models and theories, are contestable and are refined over time through a process of review by the scientific community.”

In this work we present examples of the representation of models in the secondary physical science curriculum and highlight opportunities for enriching the teaching of science through the explicit introduction of the history and nature of the model, with an emphasis on linking to metacognition (Avargil et al., 2017).

REFERENCES

- Avargil, S., Lavi, R., & Dori, Y. (2017). Students’ Metacognition and Metacognitive Strategies in Science Education, in Y.J. Dori, Z.R. Mevarech, & D.R. Baker (ed.). *Cognition, metacognition, and culture in STEM education: Learning, teaching and assessment*, Springer International Publishing AG, 33-64.
- Kenyon, L., Schwarz, C. & Hug, B. (2008), The Benefits of Scientific Modeling. *Science and Children*, 46(2), 40-44.

Proceedings of the IUPAP International Conference on Physics Education, ICPE 2022 5-9 December 2022, page 122, ISBN: 978-1-74210-532-1.