



VisChem: Building mental models of the molecular world using interactive multimedia

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Understanding chemistry involves being able to link what one sees substances doing in the laboratory, to what one imagines is happening within these substances at the invisible molecular level. Only then can these ideas be communicated using abstract symbolism (e.g. chemical formulas), terminology and mathematics. The *VisChem* multimedia resources (*QuickTime* animations and video) explicitly link these three levels – the molecular, laboratory and symbolic.

Research in chemical education over the last 20 years has revealed that many students have unacceptable, incomplete or non-existent mental models of chemical substances and processes at the molecular level. This problem is considered a major cause of misconceptions in chemistry, and is one reason why many students do not engage with the subject.

In this poster session we will demonstrate some of the *VisChem* molecular-level animations (see <http://vischem.cadre.com.au/>). However, multimedia resources that promote meaningful learning should require ‘cognitive struggle’, facilitated through engagement, rather than by passive reception. We will describe how the animations are presented in live teaching contexts, and incorporated into interactive multimedia resources, to build mental models of the molecular world through meaningful ‘cognitive struggle’.

Animal use in teaching: Implementation of alternatives

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The use of animals as teaching tools has come under increasing scrutiny. Expanding technology has greatly increased the range of teaching tools available and these are being used to replace animals and increase the breadth of teaching/learning methods. The paper considers the implementation of a computer simulation to replace an animal-based practical in an undergraduate unit on animal behaviour. Staff and students involved in the animal behaviour unit were interviewed with the goal of qualitatively evaluating the unit with reference to the changes to the educational outcomes, including animal welfare issues and student motivation. The introduction of computer simulations, to replace animals, requires a clear understanding of the educational outcomes desired and a high level of planning, designed to motivate the students.