

## Why teach nanotechnology?

Recent statistics have painted a grim picture for the future of science study in Australian high schools, with the Australian Council for Educational Research reporting that participation in science has almost halved since the mid 1970s

In 1976, 55% of Year 12 students studied biology, 29% chemistry and 28% physics, while today only around 25% study biology, 18% chemistry and 15% physics. The lack of interest in science study foreshadows skills deficits in science, engineering and technology professions and is a critical issue our communities.

One way of addressing this problem is to update school science with cutting edge technologies and recent examples of Australian research. Nanotechnology is one new and cross-disciplinary area of science able to generate excitement and interest about science for students.

Nanotechnology is technology distinguished primarily by the scale at which it acts: a nanometre is one billionth of a metre. Nanoscale activities generally occur in the range of less than 100 nm, or less than one thousandth the width of a human hair. At this size range, nanotechnology is the artificial manipulation of molecular objects or processes.

There are many provoking questions being addressed in nanotechnology research that could be used to excite and interest students about science.

*What if – you never had to have another needle?*

Using nanotechnology Australian scientists have developed small adhesive transdermal patches containing micro-sized needles that painlessly penetrate the skin to deliver nano-formulated drugs including vaccines.

*What if – you could get a lift to the moon?*

The 'Space elevator', a cable-like structure linking earth with space, is a concept that could be made possible through nanotechnology. It could be made from very strong, light and flexible material, such as carbon nanotubes. Carbon nanotubes are composed of interlocking carbon atoms and are 1000 times thinner than a strand of human hair but 200 times stronger than steel.

AccessNano ([www.accessnano.org](http://www.accessnano.org)) is an Australian government initiative funded through the Australian Office of Nanotechnology, under the Department of Innovation, Industry, Science and Research, and produced by foresight and science communications consultancy Bridge8 Pty Ltd ([www.bridge8.com.au](http://www.bridge8.com.au)). It is an innovative and cutting-edge nanotechnology teaching package that can be used to introduce nanotechnology into schools and get students interested in science.

AccessNano provides an accessible, self-contained and standardised modular approach to teaching nanotechnology. It has a national focus and is curriculum-matched across the states and territories, and includes scope for regular web-based upgrades and teacher support.

While AccessNano has been developed through close collaboration of the development team with nanotechnology experts, it's the involvement of science teachers such as Dr

Amanda Clarke and Mrs Francesca Calati that makes it so relevant to the classroom environment. Renowned in Australian science teaching circles through her initiation of the SHINE nanotechnology teaching program, and officially recognised through winning the 2007 Prime Minister's Prize for Excellence in Teaching Science in Secondary Schools, Francesca offers enthusiasm, experience and practical guidance for using AccessNano in your classroom.



“AccessNano modules provide accessible, cutting-edge nanotechnology content which is self-contained and ready-to-use in Australian classrooms for Years 7–11. AccessNano Teacher Professional workshops will provide teachers with the background, confidence and tools to ensure that each module can be easily incorporated into the current science curriculum.”

*Francesca Calati, La Trobe University*

Beginning in April, Francesca will be running a combination of Teacher Professional Development one-day workshops and 2-3 hour seminar sessions in each state that will provide theory, practical advice, hands-on demonstrations and integrated approaches to assist teachers in implementing AccessNano to boost the teaching of science and technology.

AccessNano Teacher Professional Development will offer the following components:

- Introductory session on nanotechnology, its uses, principles and social issues
- Guest speakers from nanotechnology academia and industry
- Introductory session on AccessNano
  - what is AccessNano?
  - what is the pedagogy behind AccessNano?
- Run through and demonstration of AccessNano modules, including PowerPoint presentation, experiments and activities
- Discussion of where to source and how best to use laboratory materials and web-based resources for AccessNano

Teachers will be provided with a folder containing modules, lists of resources and other printed notes as well as a certificate confirming their attendance at the session.

For further information about participating in Teacher Professional Development for AccessNano, visit [www.accessnano.org](http://www.accessnano.org).