



e-news for schools

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Having fun with science

The first components of Futureintech's Primary Science Strategy are ready to go, with a variety of resources, materials, and games that will help students have fun with science.

A GREAT WAY TO GET PRIMARY SCHOOL STUDENTS interested in science is to give them hands-on learning experiences that spark their imaginations, encourage curiosity, and show the relevance of science in their daily lives. Futureintech is promoting this approach with our new Primary Science Strategy, a series of activities that are designed to fit the science curriculum, with support from our Ambassadors. These materials are now available from the Facilitator in your area.

The first is the Bridge Science Unit, which uses bridges as an illustration of physics and maths. Through simple models and group experiments, your class will learn about basic concepts like force, load, compression, and tension, and see how these laws of physics affect their daily lives.

The unit includes a unit plan containing lesson outlines, a set of wooden blocks for constructing model bridges, and links to fun websites and online video games. It provides suggestions on how you might fit the unit into your

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Identifying Bugs

Living World: Grouping
Junior

**Futureintech Ambassadors
in Primary Science**

Technologists, engineers & scientists supporting
science programmes

Description

Students collect a variety of bugs and consider criteria for grouping them. They classify and identify them using a photographic web-based key.
Acknowledgement: Landscape Research (see process step 4).

Materials (per group)

- 2 wide mouthed plastic jars
- Computer with internet access

Process

Term 1 is an excellent time for this activity. Include a wide variety of habitats and encourage children to bring bugs from home. Consider sampling by twilight.


1. Define collection areas, time allowed and catching procedures.
2. As a group, children collect two different types of bugs for each person in the group.
3. As a class, consider ways of grouping bugs = e.g. colour, size, with or without wings, with or without legs, sliders or wrigglers, non-movers (e.g. pupae, eggs).
4. In groups, access the Landscape Research website <http://www.landscape-research.co.nz/research/bioinformatics/assess/biobas/index.aspx> and follow the steps to identify the bugs.
5. As a class, tally the numbers of each type caught and develop a bar chart to show this.
6. Release bugs back to their original or similar location.

Want More?

- How does a monarch butterfly change during its life cycle?
- What are some of the good and bad things that bugs do?
- How many species of insects are there in New Zealand?

Vocabulary

arthropod, classify, invertebrate, pupae




Big Ideas

- There are many different types of bugs and they can be classified or grouped in different ways.
- Grouping by number of legs leads to the scientific classifications of insects (6) and spiders (8).
- Insects have six legs, three body parts and often have wings.
- All bugs are classified as invertebrates (no internal skeleton).
- Bugs with jointed legs are classified as arthropods (including insects, spiders, centipedes).
- Insects are classified into ants, bees, butterflies, beetles etc.

Ambassador Careers

environmental engineer, environmental planner, environmental scientist



www.futureintech.org.nz

science programme and how Ambassadors from fields such as surveying or structural engineering can support your students' learning.

Also ready for the classroom is our Science Action Pack, which was launched at the NZASE Primary Science conferences throughout the country in April. The Action

Pack is a selection of curriculum-linked activities for each World of science. This includes sorting rocks, playing with static electricity, catching and identifying bugs, and making green slime, all using inexpensive materials that you can find around the house or school. The actions provide lists of instructions, vocabulary, important ideas, and suggestions for Ambassador support.

Wellington Facilitator Susan Weekes got the chance to try the "Making Slime" activity when a group of her newest Ambassadors came to the IPENZ office for a training session. Once the introductions were over, they divided into groups and made two batches of slime to see how different blends of ingredients affected the slime's consistency.



"We wanted to prepare the Ambassadors for what could happen in the classroom, and explore the possibilities of using practical hands-on activities with students," says Susan. "It was interesting that they all approached the experiments slightly differently. They were having fun as you could imagine students having fun. It was definitely user-friendly and non-toxic, and there was no need to worry about a sticky mess or stains to clean up."

To request the Bridge Science Unit or the Science Action Pack, contact your local Facilitator - see page 7. We're keen to hear how these activities go, so send us your feedback at enquiries@futureintech.org.nz.

‘People who are passionate about science’

Futureintech Ambassadors are enjoying sharing their scientific knowledge with primary school students.

WHEN MECHANICAL ENGINEER MARLON GERBES was asked to give a presentation on the science of sound to junior students at St Clair Primary School, he knew that working with this age group would have some unique challenges.

“Understanding noise is cool, but it’s a hard concept to cover,” he says. “So when I thought about how sound works, I thought I could show it in pictures. I wanted to keep it really simple without missing the core understanding, and explain how noise moves from the source to the ear and into the brain.”

Marlon explained that rather than being empty space, air is made up of millions of tiny particles – balls, as he described them – that are always bumping into each other. He kept coming back to this basic idea, using plenty of pictures, to show how air particles transfer sound vibrations to each other and eventually to someone’s eardrum.



“I soon learned that if you’re talking about sound, make sure to use pictures that are about sound, or the kids might get distracted. I had a really good picture of an eardrum, and the kids started asking me questions like ‘What if the eardrum pops?’ or ‘What if water gets in?’ and I had to get them back on topic.”

Another challenge was keeping the kids from getting bored. “My presentation is a basic template, and I’d improvise based on how they reacted. If they started losing interest, I’d twist it a bit get their attention and keep it going. You have to prompt them, get them thinking, and do it in a really fun way. They like things they’re involved with in everyday life. And if you’re explaining a concept, you’ve got to put quite a few steps in between, and gradually get them to that last concept.”

Forensic scientist Dr Sarah Kenworthy used similar tactics during her Ambassador visit to a combined group of Year 7 and 8 science students at Wadestown School. She showed the students how to do forensic tests on unlabelled white powders like salt and sugar. By doing things like examining the crystals through a magnifying glass and putting them in water to see if



they would form a solution, the students tried to figure out which powder was which. “The kids got a lot out of it,” says Dr. Kenworthy. “Once you show them the basic principles, they can explore how that works and test it for themselves. It gets them making inferences and teaches them analytical thinking skills.”

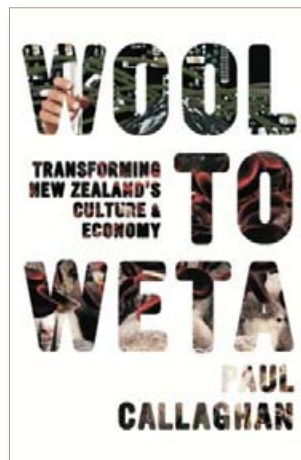
The project raised the students’ awareness of a career path while giving them a direct understanding of basic chemistry. Their teacher Nick Julian thought Dr. Kenworthy’s approach was very effective. “It created a hands-on situation that Sarah could quite easily be doing at work, like testing powders for anthrax. The kids felt like they were forensic scientists. It was fun and exciting and they really enjoyed the investigation.”

Nick feels that this strategy can be very useful for teachers. “Primary teaching needs people who are passionate about science,” he says.

Storytelling for science and technology

As a boy growing up in Wanganui in the Sixties, Paul Callaghan saw physics everywhere.

“Physics is beautiful – it was always a part of my life. I got switched on in a big way. I built my first crystal radio set when I was ten or eleven, and I was able to pick up two radio stations. It’s life-changing for any young boy.”



DR CALLAGHAN IS NOW ONE OF THE LEADING physicists in New Zealand, founding director of his own company and co-author of three books and over 200 scientific articles. In his latest book, *Wool to Weta: Transforming New Zealand’s Culture & Economy*, Paul Callaghan makes the case that New Zealand needs to shift from its overreliance on tourism and agriculture, and invest in a new economy based on science, technology, and intellectual property.

As he notes in the book’s preface, “David Lange once said, cheekily, that New Zealand’s destiny was to be a theme park, while Australia’s destiny was to be a quarry. This book tells the story of how we must move beyond the farm and the theme park if we are to build sustainable prosperity in New Zealand, protecting our natural environment in the process.”

Compiled from interviews during his public lecture tour on the subject, *Wool to Weta* includes conversations with leading New Zealanders in science and business. It explores Kiwi business strategies from our world-class industries through to up-and-coming entrepreneurs. Other chapters focus on education and social awareness, Maori perspectives, and economic insight. The overall goal is to put a much-needed emphasis on New Zealand’s possibilities for cutting-edge careers in the technology sector.

“The reason I’ve been writing the book, speaking to audiences, making the documentaries, is because it’s about storytelling,” says Paul. “We all know the story of Peter Jackson and Weta, for instance. Any kid can see that there’s great scope for working in the creative

sector and movies. But we have wonderful stories to tell about businesses in science and technology, and they’re relatively unknown.”

By promoting examples like Fisher & Paykel Healthcare, Untouched World, and Australo Ltd, he hopes to encourage young people to experience the excitement about science that he felt as a child. In his interview with Royal Society CEO Di McCarthy, Paul remarks, “I think the world of science and technology is often a rather foreign and strange one for kids growing up in this country. Enabling kids to see a different possibility for themselves in terms of their employment in the future is very, very empowering.”

“The point about it for kids is not that you make a lot of money,” he says. “It’s the kids who want an exciting job and a fulfilling life. Revenues in science and technology industries are very good, but what’s really important is that they’re exciting places to work. The experience I had interviewing these businesses was fabulous. That’s the motivation that really matters – the prospect of an exciting job, competing with the world, being the best at what you do.”



Tools and training for careers advisers

With careers season in full swing, there are many ways for careers advisers to find up-to-date information, resources, and best-practice ideas. Here are a few good opportunities.

International Careers Conference in Wellington in November



The International Careers Conference “Transforming careers, unleashing potential”, on 19-21 November 2009 at the Wellington Convention Centre, gives careers advisers a great opportunity for networking and professional development. The conference will showcase the latest in career development practice and policy, with discussions about innovative techniques, the value of life-long learning and development, and current trends in the global labour market. Early-bird registration closes at the end of July. To find out more, visit www.careers.govt.nz/conference2009.

Organisations and online resources



The Educators and Practitioners section of the Career Services website contains resources, useful links, research, articles, career management tools and information on career events, best practice and professional development. www2.careers.govt.nz/educators_and_practitioners.html



Career Practitioners Association of New Zealand (CPANZ) supports career development in education, industry, commerce, government, and the

professions. They promote professional standards and best practice in career development. www.cpanz.org.nz



Careers and Transition Education Association (CATE) provides a resource network

for the dissemination and exchange of ideas, courses, programmes, and information. Their website includes an events calendar for careers expos and update days around the country, as well as schools information and professional development opportunities. www.cate.co.nz.

Futureintech support

Futureintech has a number of useful resources geared towards careers advisers. We can provide a stand for your careers expo, with information and brochures on a wide range of technology, engineering, and science-related careers. Our Ambassadors are available to answer questions or give presentations at these events.

The Ambassadors are also a great source of advice on how to best promote their jobs. They can answer questions about the technical details of the work and talk about the subjects they studied in school, giving careers advisers a better idea of different career paths.

To find out how Futureintech can support your careers programme, contact the Facilitator in your area – see page 7 or visit our website at www.futureintech.org.nz.

NZASE conferences



The New Zealand Association of Science Educators (NZASE) hosted its primary science conferences around the country last month, with a theme of “Active Learning: Science talk from the classroom to the dinner table”.

The conferences took place in Dunedin, Christchurch, Wellington, and Auckland, with sponsors including the Ministry of Education and the Royal Society of New Zealand. Their goal was to help educators develop active learning strategies, explore the relevance of science, and identify links between teaching and learning in science education.

RSNZ Executive Officer Richard Meylan spoke at all of these events, emphasising the importance of primary science. “Many commentators recognise that using our science and technology knowledge is vital to improving New Zealand’s prosperity,” he said. “Central to this is the ability of the next generation to contribute. The RSNZ’s commitment to raising the profile of primary science is because it’s at this stage that students develop their interest and passion for science.”

The Royal Society is starting a new initiative called Advancing Primary Science. It’s designed to support the introduction of the new curriculum, the production of

resources, and training and professional development for teachers.

Richard Meylan hopes that this programme, along with similar efforts from Futureintech and the Ministry of Research Science and Technology, will “nudge the pendulum” back towards science education in our schools.

TENZ Conference 2009

The biennial Technology Education New Zealand (TENZ) conference is taking place on 6-8 October 2009 in Hawke’s Bay, at Napier’s War Memorial Conference Centre. The event offers a number of not-to-be-missed opportunities for primary, secondary, and tertiary educators to share the newest ideas about technology teaching and learning.

This year’s conference will include networking events and visits to local industries like Heinz Wattie’s, Furnware,



and local wineries. Participants are encouraged to share their experiences through a paper, workshop, or teaching presentation, and the conference will feature a Questions-and-Answers Forum on Technology Education where teachers can send in questions on any technology



Napier’s War Memorial Conference Centre – the venue for TENZ 2009 Conference in October

education matter in advance, which will be considered and discussed by an expert panel.

On the day before the conference begins an HOD Day will be held at the venue. Open to curriculum leaders from all school levels, HOD days have proved very popular with primary and secondary teachers alike. Registration for the day is free to those attending TENZ 2009.

The TENZ 2009 Conference also features a greatly enhanced Partners Programme, which includes a guided tour of Hawke’s Bay and the chance for partners to attend the conference dinner.

Find out more and register for the event at the TENZ website, www.tenz.org.nz.

About Futureintech

Funded by NZ Trade and Enterprise, Futureintech is an initiative of the Institution of Professional Engineers New Zealand (IPENZ). Established in 2003, Futureintech is a practical attempt to increase the number of young New Zealanders choosing careers in technology, engineering and science – crucial sectors for the infrastructure and social and economic growth of the country.

Futureintech Ambassadors

Futureintech Facilitators around New Zealand work to develop links between schools and local industries. Central to this work is the recruitment of Ambassadors – young people working in technology, engineering and science who are trained by Facilitators to volunteer in schools. Their contribution includes giving presentations, explaining their work, supporting projects, providing a real-world perspective and demonstrating the practical applications of the curriculum. There are currently 350 trained Ambassadors working with Futureintech, representing a wide variety of industries. Their support and that of their employers is greatly appreciated.

Futureintech partnerships

Futureintech maintains partnerships with over 200 companies, representing a diverse cross-section of New Zealand industry. Partners work with Futureintech in a variety of ways, from encouraging staff members to become Ambassadors to providing expert information for publications or promoting Futureintech to a wider audience. Futureintech's work would not be possible without their generosity and commitment.

Futureintech publications

Futureintech produces an ever-increasing range of print resources for teachers, students, careers advisors, caregivers and industry, all of which are available free of charge by request from head office.

Futureintech's website www.futureintech.org.nz is another key component of the initiative. It offers profiles of Ambassadors and their employers, a database of relevant tertiary courses and monthly regional news, and is regularly updated.

Futureintech's monthly newsletter **enews** is distributed in alternate months to schools and industries, and aims to ensure that all stakeholders are kept fully informed of Futureintech's activities and of the resources we provide.

Futureintech Facilitators

Futureintech's regional Facilitators promote and maintain relationships with schools and industry employers. This involves recruiting and training Ambassadors, advising teachers on how Futureintech can best support their programmes, arranging, planning and supervising Ambassador visits and distributing resource materials.

Facilitators are supported by Host Partners, who provide the office space which enables them to work remotely from the Wellington head office. Host partnerships ensure that Facilitators not only benefit from a collegial atmosphere but also have daily exposure to an industry-related workplace.

If you have a class that might benefit from contact with a Futureintech Ambassador, or to discuss other ways Futureintech may be able to help, please contact your local Facilitator to discuss how we can work together.



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