

September 2013

# Heads Up



for Teachers of Science, Technology and Mathematics

the ROYAL  
SOCIETY of  
NEW ZEALAND  
TE APĀRANGI

- **The WOW Factor: 25 years in the making:** The World of WearableArt™ has enchanted thousands of spectators for the past 25 years. It has launched and enriched the careers of numerous designers, nationally and internationally. [The WOW Factor](#) unlocks some of the magic of WOW®, on stage and behind the scenes. It showcases more than 25 garments from 25 years of the WearableArt Awards™, and features design sketches, drawings, and models relating to the 2012 show. Te Papa now until 17 Aug 14. [Events at The WOW Factor](#)
- **RSNZ Branch Event :** [‘What place does kauri have in New Zealand’s future?’](#), **1 October**, Rotorua
- **Realise the Dream:** [Realise the Dream](#) is for secondary school students who have undertaken an excellent piece of scientific research, technological development or electrical/computer science/engineering project. This piece of work needs to be nominated by a teacher or by a regional science or technology fair, [CREST](#) or Brightsparks programme. Nominations close **4 October**.
- **2013 Beatrice Hill Tinsley Lectures:** [A zoo of Galaxies](#) **4-9 October**, multiple centres.
- **Leonard Cockayne Memorial Lecture:** Commemorating the life and work of [Leonard Cockayne by the encouragement of botanical research in New Zealand](#) . 4th November but numbers for the seminar are limited. To reserve your place, and for catering purposes, please [RSVP](#) no later than **11 October**. There is no need to register for the afternoon event. [View flier](#).
- **Neighbourhood Engineers Awards:** [Transpower Neighbourhood Engineers Awards](#) give prizes to the best and most innovative collaboration between students, teachers and volunteer engineers. Entries for the awards close at **5pm, Wednesday 16th October 2013**
- **Lecture: ‘People and the planet’:** Hear Nobel Prize winner Sir John Sulston FRS give the 2013 Rutherford Memorial Lecture entitled [‘People and the planet – how we can all live and flourish on a finite Earth?’](#) Auckland **8 October** ;Wellington **9 October**; Dunedin **10 October**
- **10×10:1 ‘The Queen of Planet Earth’, 15 October**, Dunedin Professor James Sneyd will show that mathematics can give insight into how human cells work and how chemical networks inside human cells are regulated.
- **10×10:8 ‘The power of nature’, 16 October**, Christchurch: The eighth lecture in the 10×10 series is on why the [power law](#) appears so commonly in nature with Dr Boris Baeumer, senior lecturer in mathematics at the University of Otago.
- **Hands-on Science Week:** Hands-On Science will run from Sunday the 12th to Friday the 17th of January 2014. The goal of [Hands-On Science](#) is to demonstrate, in a friendly and interactive environment, some of the activities that scientists are involved in and to encourage talented young New Zealanders to consider science as a career. The last date for enrolment is **18th October**.

- **The Science Teller festival** is in Dunedin **25-27 October**. If a teacher registers then they can bring a whole class of students to Baba Brinkman's *Rap Guide to Evolution* at the Regent Theatre on 25th Oct for free. [International speakers on dung beetles, frogs, storytelling, scepticism and truth, natural history and science films and workshops.](#)
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- **LEARNZ virtual field trips:** LEARNZ now has a new look website. Find out about the free [LEARNZ field trips](#) for New Zealand teachers and their classes. Register now for field trips in Term 4, 2013: [Takahē – building on 60 years of conservation](#) ( **22-24 October** );[Rakiura Stewart Island – putting people in touch with kiwi](#) ( **5-7 November** )
- **PATT27** in Christchurch 2013: 2 - 6 December 2013. Hosted by College of Education, University of Canterbury, Christchurch. Conference theme: Technology Education for the Future- A Play on Sustainability. Programme details and registration information are on the [PATT27 webpage](#). Registrations close **1 November**.
- **Teaching, Science and Society Conference:** The University of Otago, **22-23 January 2014**. [Registrations](#) now open. Go [here](#) for more information about the conference.
- **Real Life Food science and Technology:** Congratulations to all of the participating students, teachers, mentors and sponsors in the [2013 NZIFST/CREST Student Product Development Challenge](#). Ranging from panna cotta to spicy meatballs; salad to chocolate and gluten free to chicken curry pies, the 2013 teams have developed some technically complex and excellently flavoured products. [Find out more.....](#)
- **GPS.** The method of finding a point is called 'trilateration', and is the same basic method that the Global Positioning System (GPS) uses to locate points on Earth. Here is [an activity to show how it works](#).
- **Secondary curriculum Guides:** Updates and new content have recently been added to: [Technology](#) ;[Mathematics and statistics senior secondary curriculum guide](#)
- **Frogs that hear with their mouth:** Gardiner's frogs from the Seychelles islands, one of the smallest frogs in the world, do not possess a middle ear with an eardrum yet can croak themselves, and hear other frogs. An international team of scientists using X-rays has now solved this mystery and established that these frogs are using their [mouth cavity and tissue to transmit sound to their inner ears](#). Check out this RSNZ resource about [New Zealand Frogs](#).
- **Science 101:** Understanding Science: [An overview](#). To understand what [science](#) is, just look around you. This website will help you learn more about science as a process of learning about the natural world and access the parts of science that affect your life. Check out the interactive representation of the science process.
- **ARBS:** There is chance to explore the new prototype interactive ARBs. The ARB team are ready to trial some of their new ARBs [They are looking for schools to help them](#). If you are interested in trialling any test set please contact [chris.joyce@nzcer.org.nz](mailto:chris.joyce@nzcer.org.nz) Schools that trial resources need to have sufficient technology for students to complete the tasks online. This might include computers, laptops, ipads, notebooks, interactive whiteboards, etc., or a combination of these.
- **Evolution of Flight:** Paleontologists have used a wind tunnel and a dinosaur model to study the [evolution of flight](#).
- **Megafauna Skeletons:** Imagine how hard it is to reconstruct animals from fossil bones where many of the pieces are broken up or lost. This is what it is like for real scientists where a 50% complete fossil is exceptional. Can you put the [megafauna skeletons](#) back together?

- **Sharks increase reef resilience:** A recent study suggests that [sharks are important](#) for maintaining the health of coral reefs.
- **Hydrocarbons from Crude Oil:** This resource, designed for 11 to 16 year olds is a great way to bring real-world science expertise into the classroom. It includes: videos on the uses of [crude oil](#) and derivatives, how crude oil is refined, cracking and a fractional distillation animations.
- **Polymerisation: Short,** engaging multimedia resources on the topic of [polymerisation](#) .
- **Water:'Changing state - transforming water'** This ELI involves a series of three activities for pupils to encounter and discuss the changing states of water, from ice to water to water vapour and back again – giving opportunities to develop a range of observation and description skills.
- **Beat the Flood:** This resource from the UK could easily be adapted for a RSNZ [First](#) or [Bronze CREST](#) award; [to design and build flood-resistant homes](#). Flooding due to climate change can have a devastating effect on people's lives. Set on the fictitious island of Watt, pupils explore how STEM skills can be used to help communities be better prepared for flooding.
- **Oxygen:** Learn a little bit of basic chemistry while watching [Oxygen](#) try to make friends in Element-ary school.
- **Harpooning a Comet:** [Harpooning a comet and riding it into the sun!](#)
- **Rhino Facts:** Have you ever wondered why rhinos love wallowing in mud or how to tell the difference between a white and a black rhino? [Top Ten Rhino Facts](#).
- **Technology on Line:** There are a number of new and interesting case studies, teacher snapshots and student showcases on [Technology Online](#).
- **Light Waves:** Each kind of [light](#) has a unique wavelength, but human eyes can only perceive a tiny slice of the full spectrum -- the very narrow range from red to violet. Microwaves, radio waves, x-rays and more are hiding, invisible, just beyond our perception. This TEDEd video shows us the waves we can't see.
- **Bee flight secrets revealed:** Bees use what they see and feel in order to [position their bodies for more efficient flight](#).
- **Call Me Migaloo:** [The Story Behind Real-Life White Whales](#)
- **The sun's older twin: HIP 102152:** 250 light-years away and [almost twice as ancient, this star gives glimpse of sun's future](#).
- **Babies learn words before birth:** [Brain responses suggest infants can distinguish distinct sounds from altered versions](#).
- **Learn Genetics:** [educational materials on genetics, bioscience and health topics](#). They are designed to be used by students, teachers and members of the public.
- **Teach Genetics** provides [resources for teachers](#), higher education faculty, and public educators. These include PDF-based Print-and-Go™ activities, unit plans and other supporting resources. The materials are designed to support and extend the materials on [Learn Genetics](#).

- **Mineral expert - identifying minerals using 'action' tests** : In '[Be a mineral expert - 2](#)', students are asked to use the 'action' tests of streak, density, hardness and the acid test to further identify unknown minerals.
- **DIRT**: or the [equation Distance = Rate x Time](#) -- we can calculate rates, using the distance traveled and the time taken. This TEDEd video explains how to use this helpful equation to determine which is truly faster.
- **Old Face**: A homely fish fossil, the 419-million-year old *Entelognathus primordialis*, was recently discovered in China and described for the first time in [an article published in Nature](#). What makes it remarkable is everything that's come after it: It's the [oldest known creature with a face](#), and may have given rise to virtually all the faces that have followed in the hundreds of millions of years since, including our own.
- **Ideas for Teaching with QR codes**: [QR codes](#) are a great arsenal for the teacher tool belt. Just remember, this technology is a tool and needs to fit a purpose. It can help create engagement in a lesson, manage your classroom, be part of student work or facilitate inquiry in a project. (*There are some interesting ideas in the comments below the blog too*).
- **Why are some People Left Handed?** in [a paper](#) a group of researchers have identified a network of genes that relate to handedness in humans. What's more, they've linked this preference to the development of asymmetry in the body and the brain.
- **Hang Son Doong**: The [world's largest known cave](#). Learn more about this natural wonder in this article.
- **Unravelling the secrets of maleness**: In terms of anatomy, human embryos start out as female. Researchers have announced that the [key to male development](#) is an enzyme that activates a gene on the Y-chromosome.
- **M-EOL: an app available on iTunes and Google Play**. Become an explorer, discovering different plant and animal species by travelling around the world. Learn about species through descriptions, images, distribution information, and conservation status from the Encyclopedia of Life website. Explore how organisms in each game collection are related to each other by browsing a dynamic, interactive graph. [M-EOL App on iTunes](#); [M-EOL App on Google Play](#)
- **Why do igneous rocks have different crystal sizes?** : [This activity](#) simulates crystallisation from a melt at different rates of cooling of Salol (phenyl salicylate). It can be included in lessons on the rock cycle to model the cooling and crystallisation of magma to form igneous rocks. Watch [video clips](#) which show crystallisation on room temperature, cold and warm microscope slides are also available.
- **Behind the Scenes at MIT**: A [collection of short videos that feature MIT researchers explaining how a textbook chemistry topic is essential to their research and to an inspiring real-world application](#). There are currently twelve science videos, which can be searched by chemistry topic (i.e. atomic theory, bonding, acid-base equilibrium) or by research application.
- **Cicadas: The dormant army beneath your Feet: Every 13 or 17 years**, billions of cicadas emerge from the ground to moult, mate and die. Adult cicadas only live a few weeks above ground, but you'd be hard pressed to ignore them — they are extremely loud! This [TEDEd video](#) explains everything you need to know about these noisy insects, admitting that there are still some things we just don't understand. Find out about [cicadas in New Zealand](#).



- **Underwater Astonishments:** David Gallo shows jaw-dropping footage of [amazing sea creatures](#), including a colour-shifting cuttlefish, a perfectly camouflaged octopus, and a Times Square's worth of neon light displays from fish that live in the blackest depths of the ocean.
- **From the Biotechnology Learning Hub:** The showcases some of the people currently working in biotechnology in New Zealand who also feature in the content on the [Biotechnology Learning Hub site](#). These profiles help to highlight the range of cutting-edge developments in this sector and provide insight into the variety of career opportunities they generate; [Drug shows potential to treat Parkinson's](#); [Bioactive milk proteins attack acne](#); [Sequencing Phar Lap's winning genome](#) ; [Food for the aged](#) ; [National New Zealand Flax Collection](#) ; [Wool in wound dressings](#); [Complex sugars could treat Alzheimer's disease](#)
- **The role of evidence in policy formation and implementation:** Sir Peter Gluckman says New Zealand could be making much better use of science and evidence in informing policy development and implementation and he has suggested some actions that could help to achieve this. In [The role of evidence in policy formation and implementation](#), Sir Peter presents the results of a survey of government agencies that he conducted.
- **Darfield 3 years on:** GNS Scientists have been very busy with a number of responses to hazardous geological events over the three years since the [Darfield Earthquake](#). You can now download a photo essay of images by GNS scientists showing them at work out and about in New Zealand in response to geological hazards. Free for educational use.
- **Serpent locomotion:** Meeting a snake in the wild might cause you to turn and run, but if you're brave enough to stay put you might get a maths lesson in how they move. A new study published today has identified the most [energy-efficient way snakes move](#), and could help in the development of serpent-like robots.
- **Colour. Habit. Lustre. Cleavage:** ['Be a mineral expert – 1; beginning to identify minerals'](#). This is the first of a series of mineral identification ELI activities. In this first activity pupils base their identification just on the properties they can see, i.e. colour, crystal habit (shape and proportion), lustre (reflection of light) and cleavage (regular breakage pattern). This series of activities can be used in a variety of lessons, ranging from the nature of minerals as the 'building blocks' of rocks to the origins and recycling of useful elements in the Earth. Search the ELI [website](#) for similar activities.
- **40 Maps That Will Help You Make Sense of the World:** [Maps, charts and info graphics can really help bring data and information to life](#). Maps can make a point resonate with readers and this collection aims to do just that. Check out these maps. Hopefully, some of these will surprise you and you'll learn something new. A few are important to know, some interpret and display data in a beautiful or creative way, and a few may even make you chuckle or shake your head.
- **Science News by Beagle Science:** A blog. The writer promises that Posts will be short, easy to read and will include a variety of links for teachers.
- **Perfection:** This [game](#) for iPhone, Android, Mac and PC users and challenges players to take convex and concave polygonal shapes, and cut them into the outlines indicated. There is a cost for this app.
- **Spray-On Solar Cells?** New nanoparticles make solar cells cheaper to manufacture. Researchers have found that abundant materials in Earth's crust can be used to make inexpensive and easily manufactured [nanoparticle-based solar cells](#).