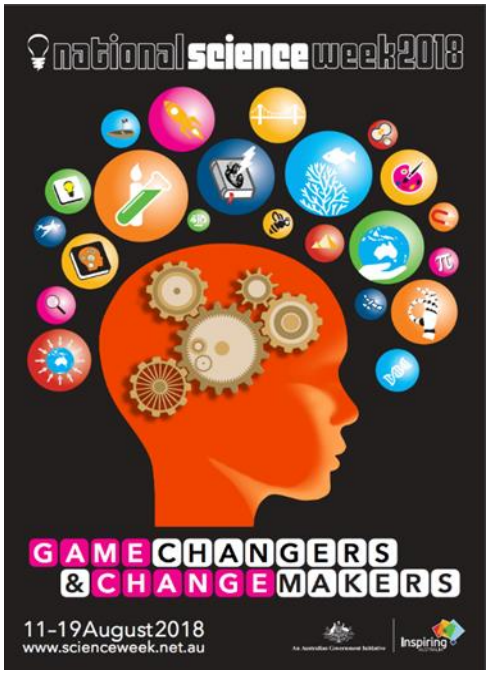
STATIC

The Newsletter of the Science Teachers Association of Tasmania.



August 2018, Volume 3

stat.
Science Teachers
Association of Tasmania Inc.

STAT on social media.

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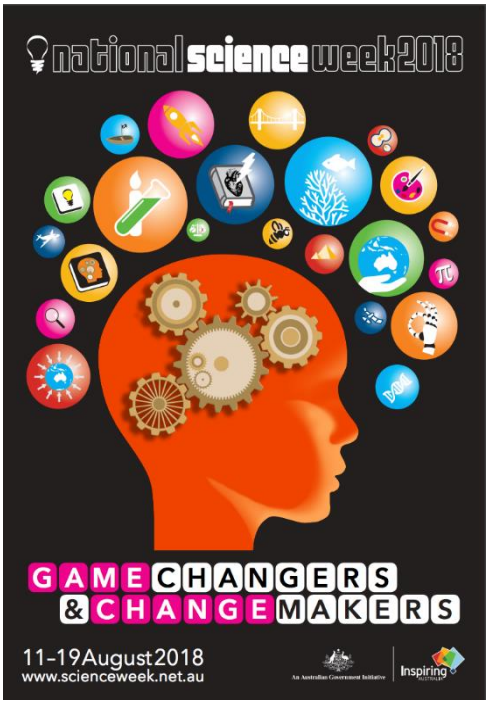
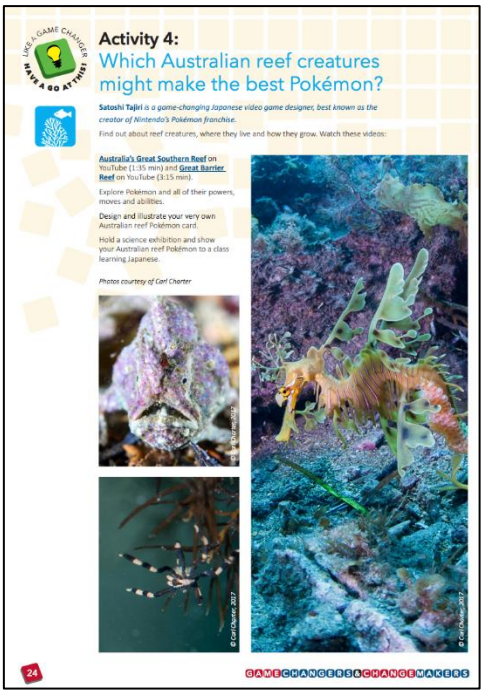




Science Week resources from ASTA, printable poster and curriculum linked activity booklet: http://asta.edu.au/programs/natscienceweek/resources/2018

A big thank you goes out to Joee Kelk for editing STATIC over the last few years. Joee worked tirelessly to bring this newsletter to members and made timely changes to its format and content. My aim as the new editor is to grow STATIC as a useful and relevant source of ideas and resources. To this end, I welcome any contributions or suggestions, ideas to share and ways of supporting members of STAT. Bob Fletcher

This issue of STATIC is largely supporting National Science Week, during which we launch a new initiative of STAT: a stand at the Festival of Bright Ideas on the 18th August. So, come and see what the STAT stand has to offer at FOBI!! Meet yours truly the STATIC editor and National Ruth Dirks scholarship recipient Amanda Hughes from St Mary's District High and other STAT council members, including Jenny Dudgeon from the Sustainability Learning Centre.

From the Editor…

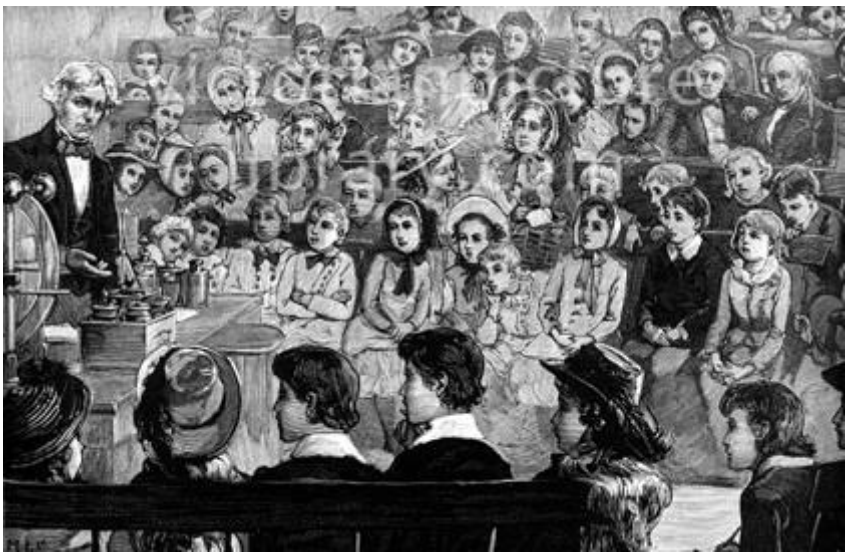
Game Changers and Change Makers

Science is the natural vehicle of change. In its endless and exciting journey of discovery, our perspective and understanding is shifted. Copernicus took away our human-centric view of the universe and placed us on a clearer road towards understanding how we came to be. Charles Darwin changed our perception of change on a grand scale, although his notes on transmutation, now central to our understanding of modern biology, were kept in 27 pages of closely guarded jottings, with Darwin shaken by the possible consequences of their publication. In the end truth will out, but not without questions being asked.

Whilst science thrives when questions are asked, education ponders change with far greater caution. A recent You Tube video 'The People Versus the School System' portrays the classroom as a unique example of the preservation of methods born of the Industrial Revolution.
https://www.youtube.com/watch?v=dqTTojTija8

Hospitals, transport, communication and energy resources have been changed almost beyond recognition, but what of our classrooms? Blackboards may have been switched to smart boards but to what effect? As science teachers, we have the potential to make effective changes by challenging students, allowing open-ended inquiry, integrating engineering and technology and arming students with the creative tools and knowledge to be future managers of our rapidly-changing world.

If we look back at the changing face of science education, beginning in 1825, it was largely conducted through private tutelage. To educate the public about the wonders of science, Michael Faraday initiated the annual series of Royal Institution Christmas Lectures. Faraday himself gave lectures, including on the chemistry of candles, still a source of fascination to students of all ages. The public, including many young people, began to harbour a thirst for science. This lecture series continues today.



Michael Faraday giving a Christmas Lecture c.1827 (The Victorian Picture Library)

Richard Owen, fuelled by this wind of change, opened up the Natural History Museum in London to public viewing, and began a practice we take for granted in museums today: labelling exhibits so that

people could learn. Previously the collection was for scientists and applicants' eyes only. The domain of knowledge was beginning to spread.

Much later, science spread to popular media, largely thanks to David Attenborough (who gave the Christmas Lectures in 1966), beginning with Zoo Quest, the first series to film animals in their natural environment. Few people have had the influence to change the public's view of science globally. The 'Life' series, beginning with Life on Earth, broadcast content including recent scientific discoveries and inspired young people worldwide. The likes of Carl Sagan and Brian Cox have further shown that science can be entertaining and fascinating, allowing television to reach an audience Faraday could only dream of.

David Attenborough turning a giant Anteater into a TV star

Students continue to learn online from sources as diverse as the Khan Academy and Bill Nye 'The Science Guy'. Digital technologies have now allowed the general public, including students, to actively contribute to research through citizen science projects. Students can be the very first people to view a particular shot of the surface of Mars and contact NASA scientists by commenting on what they have seen. They can upload wildlife sightings to projects like the Atlas of Living Australia and contribute to our knowledge of ecology. This constitutes a rapid change in the way we conduct science and education. A citizen science project is now a regular part of Science Week, with this years 'Virtual Reef Diver' offering a chance to deepen our understanding of decreasing coral cover on the Great Barrier Reef.

Citizen Science can engage the public directly in science, such as helping to understand the changing ecology of the Great Barrier Reef (sbs.com.au)

In today's classrooms, young people can use coding, build in makerspaces, contribute to research, link up with real scientists and begin to ask the kinds of questions that could change their future. We have come a long way since 1825 and our job as teachers is to continue along Faraday's road to educate and inspire change and the change makers of the future. This is why 'Game Changers and Change Makers' is such a fitting theme for this year's science week.

National Science Week Events

Thanks to Jenni Klaus from UTAS for compiling this comprehensive list of events surrounding Science Week.

Why in the world would a NASA Scientist fly to Tasmania, besides our crystal-clear skies and world-class radio telescope facility? National Science Week of course! Guests from all over the world are coming to the Apple Isle this August for a solid month of science events and festivals.

The Australian Antarctic Festival (2-5 August) celebrates Tasmania's close relationship with the driest continent on Earth and our work there including some truly world class science. Check out the research vessels Aurora Australis and the RV Investigator, a photography exhibition, take tours of IMAS and CSIRO at their open days, and enjoy a polar history walk plus much more. The Australian Antarctic Festival has a wonderful schools program as well.
antarcticfestival.com.au

In Ulverstone, **TastroFest** has gotten even bigger and is set to delight with night sky viewings, aurora photography, ask an astronomer and more. The force will be with you while you're surrounded by your favourite science fiction characters at this fun and family friendly astronomy festival.
tastrofest.com

In Launceston, QVMAG boasts yet another spectacular **Science Open Season** including Dr Karl's Real Moments in Science live show on 10 August! Go to the museum after hours and see if the displays really do come to life, meet the experts during Sunday Science or Change Your Game in a hands-on event run by QVMAG staff for families and students. QVMAG also boats a fantastic school program.
qvmag.tas.gov.au

Dr Karl will bring his show south as he performs live at City Hall on Saturday 11 August. Join in on the fun and get your tickets at TryBooking.com (search for Dr Karl).

Hobart's **Festival of Bright Ideas'** community day is happening on Saturday 18 August. Princes Wharf 1 opens up to welcome all and sundry who are a bit curious and want to see, hear and feel what's happening in science in Tasmania. Science shows include Questacon's Tasty Science and the science of Grossology – all about our bodily fluids – which is sure to get everyone giggling. Josh Richards is back from his world travels and still on his quest to go to Mars, and festival favourite Jeremy Just returns to blow stuff up. There will be around 40 amazing booths exploding with science to play with and several workshops for those who want to get their hands dirty. Schools who have booked in will be attending on Friday 17 August.
festivalofbrightideas.com.au

National Science Week is Australia's annual opportunity to meet scientists, discuss the hot topics, do science and celebrate its cultural and economic impact on society. Each year Tasmania boasts the most events per-capita across the state, including many in regional areas.

With state-wide festivals and exciting events for just about anyone, there's no excuse to miss National Science Week!

Visit scienceweek.net.au to see all the events or grab the full program in the Mercury on Saturday 28 July, or the Examiner and Advocate on Monday 30 July.

National Science Week Highlights for students

Dr Karl's Extreme Moments in Science live shows, Friday 10 August, Albert Hall, Launceston and Saturday 11 August, City Hall, Hobart
Australian Antarctic Festival 2-5 August, Hobart
TastroFest 2nd - 4th August, Ulverstone
Science Open Season 11th - 17th August, QVMAG Launceston
Festival of Bright Ideas 17th (schools) - 18th (public) August, Hobart

You can also find University of Tasmania science activities for students at Open Day 2018. utas.edu.au/openday

And something for teachers and parents:
The night life calls as BeakerStreet@TMAG (10-11 August) returns with Dr Karl, roving scientists, Tassie's own David Walsh speaking on probability, and shining stars of science communication. Of course, there will be tons of entertainment and drinks at this free pop-up science bar.

Dr Karl (Photo: Mel Koutchavlis)

Scientist in Focus

Elizabeth Blackburn

Tasmania's only Nobel Prize winner to date, Elizabeth Blackburn was born on the 26th November 1948. This is the same year the World Health Organisation was established and five years before the discovery of the structure of DNA, so no-one at that time would have envisaged the contribution her research would make to the future of health and genetics.

In Tasmania…

The second oldest of seven siblings, she lived in Snug, collecting ants and jellyfish, in the kind of idyllic childhood Tasmania has to offer for the curious mind. The family moved to 120 Abbott Street, Launceston, where she attended Broadland House Girls Grammar School. They then moved to Elphin House in Launceston, which they shared with a variety of pets to fuel Elizabeth's fondness of animals and nature in general. Her favourite book during this time was a biography of Marie Curie, a telling portal into scientific discovery. She had influential science and maths teachers, Nan Hughes, Jenny Phipps and Len Stuttard.

At school she was taught piano by Helen Roxburgh and enjoyed this so much she considered becoming a musician, although her love of science won out and she attended the University of Melbourne, majoring in biochemistry.

University and Early Research

In Melbourne, she worked with Frank Hird, whose poetic approach to research was each experiment should have the beauty and simplicity of a Mozart sonata. Her next big step was to move to Cambridge, working on a PhD, sequencing DNA from a bacteriophage.

John Sedat, another contributor to DNA sequencing at the time, met with Elizabeth and love blossomed, resulting in them both moving to Yale in the USA. They married in 1975 and moved to San Francisco, California in 1977. She was then able to continue her research, piecing together the DNA sequences of end chromosomes, like 'careful puzzle-solving'. She became a Professor, working at Berkeley and San Francisco Universities at different times. By 1980, she had noticed differences in the way the DNA itself was coiled at the ends of chromosomes, as opposed to the majority of the chromosomal DNA which is packaged as nucleosomes, allowing it to undergo complex folding.

Towards the Nobel Prize

Elizabeth had found repeated DNA sequences at the telomeric ends of chromosomes and evidence that some different protein was present. Her methods only led to more questions and few answers, the red rag to a bull for a research scientist, leading her down a determined road towards a solution. She eventually isolated telomerase, the enzyme responsible for the manufacture and protection of the telomeres, through painstaking biochemical techniques.

On the 10th of December 2009, in Stockholm, the Nobel Prize was given jointly along with Carol Greider and Jack Szostak for 'the discovery of how chromosomes are protected by telomeres and the enzyme telomerase.' Elizabeth Blackburn had received the highest of rewards, completing a scientific journey beginning with the search for ants in a Snug backyard. She attributes part of her success to working with people from diverse backgrounds to enhance creative scientific progress.

Chromosomes Explained

The DNA within the cells of all living things holds the genetic code, the instructions for building an organism. This DNA is coiled into chromosomes, which is handy given that each cell contains almost two metres of it. We have 23 pairs of chromosomes in each cell, averaging about 4 cm of DNA in each. Extrapolate that to all your cells and you have 20 million kilometres of coiled genetic instructions, held in 460 thousand trillion chromosomes. Since each cell must contain the complete set (except for the half set in gametes), this DNA is faithfully replicated during cell division.

We are used to a passive picture of cells from scanning electron micrographs and textbook diagrams, which belies the real picture of an active assemblage of twisting, zooming chemicals such as proteins, threatening to tear the whole thing apart with millions of collisions a second. A truer picture of the activity in cells can be gained from the work of Drew Berry, who many would remember from Conasta 66.

This clip shows the astonishing speed and precision of complex cellular activity:

https://www.youtube.com/watch?v=5MfSYnItYvg

The chromosomes are packed away in the nucleus, but require a protective cap, the telomere, to keep them in shape, undamaged and able to replicate. It is the DNA associated with this cap that Elizabeth Blackburn discovered in 1980. Two years later she proved the link between this DNA and the prevention of the breakdown of chromosomes. Two years on once again and she discovered the enzyme telomerase that helps produce the DNA for the telomeres.

The Implications

Amongst the signs of ageing, our telomeres grow shorter, rather like the ends of shoelaces fraying. This leads to a greater chance of chromosomal damage and a lack of accuracy in their copying and

reproduction. Cells could be damaged or die as a result, or this could trigger the onset of inherited disease. It has been suggested that allowing telomerase to continue to protect chromosomes artificially would prevent cell death and damage, thus increasing life expectancy by 10 to 30 years. Coupled with healthier lifestyle choices associated with diet and exercise, we could expect an increase in the ageing population. This has implications for how society manages this shift in demographics and how we can begin to view older people as a resource.

'I'm at an age where my back goes out more than I do,' Phyllis Diller.

Elizabeth Backburn was invited to be a part of the US President's Council on Bioethics in 2001, where she hoped to provide a sound scientific voice in the politically charged debate on US science policy. In her Nobel biography, Elizabeth said, 'I felt that a strong base of scientific fact and evidence would be particularly important, and useful advice in this vein was something that I could in fact offer to this advisory body'. However, after two years, it became clear that her views did not reflect those of the Bush administration and she was asked to leave, despite receiving much public support. This reinforces the need for greater scientific literacy amongst policy makers and the wider general-public.

For further information and resources:

https://www.nobelprize.org/nobel_prizes/medicine/laureates/2009/blackburn-facts.html

Curriculum Links and Teaching Ideas

STEM challenges could centre around the need to develop resources to accommodate an ageing population, such as designing public spaces or housing, including building prototype models from recycled materials or presenting information using interactive ICT such as Glogs https://edu.glogster.com/

This content is directly related to the following ACARA content descriptions:

Transmission of heritable characteristics from one generation to the next involves DNA and genes (ACSSU184)

Scientific understanding, including models and theories, is contestable and is refined over time through a process of review by the scientific community (ACSHE191)

Advances in scientific understanding often rely on technological advances and are often linked to scientific discoveries (ACSHE192)

People use scientific knowledge to evaluate whether they accept claims, explanations or predictions, and advances in science can affect people's lives, including generating new career opportunities (ACSHE194)

Values and needs of contemporary society can influence the focus of scientific research (ACSHE230)

Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations (ACSIS208)

References:

https://www.nobelprize.org/nobel_prizes/medicine/laureates/2009/blackburn-facts.html

https://en.wikipedia.org/wiki/Elizabeth_Blackburn

Tasmanian Science Talent Search - Themed Section

Entries in the themed sections of this year's Tasmanian Science Talent Search closed on Friday 15th June. This year marked a significant development with online registrations being used for the first time. STAT would like to thank all teachers for their enthusiastic support of the process, which ran smoothly with less than 2% of entries requiring any follow-up. Numerous trials were performed beforehand with a variety of web-browsers. Most of the problems encountered this year appear to have been problems with browser settings. If you have any feedback (positive, negative or further advice) please get in contact so that the system can be further streamlined.

Entries were slightly down on last year but it is still very pleasing to announce there was a total of 486 entries which represented the work of 679 students from around the state. We are always looking to grow the competition and hope that teachers can encourage colleagues in their own schools, and at other schools, to participate in the future.

Looking more closely, Posters continue to be the most popular entries (293) followed by Creative Writing (89). Entries in the Photographic Essays divisions doubled (80) and Scientific Videos had reasonable numbers of entries for its first year (24).

Entries are being judged and results should be known early in Term 3. With the Themed Sections closed, attention now turns to open sections: the Technology Challenge; Engineering Section; and Research Investigations.

If you would like help engaging in any of these upcoming sections of the TSTS please contact the TSTS Director, Doug Grubert, dgrubert@lcgs.tas.edu.au

STEM Professionals in Schools: A CSIRO Initiative

Bring your STEM subjects to life – Join STEM Professionals in Schools

Learn new skills, and gain confidence and knowledge in science, technology, engineering and mathematics (STEM) by partnering with a STEM professional - and bring your school curriculum to life!

CSIRO's STEM Professionals in Schools program connects STEM experts from a variety of organisations with teachers across Australia. They provide expertise in a diverse range of disciplines, insights into current industry practices, and showcase potential study options or career paths for your students.

Partnership activities can include presentations, hands-on activities, mentoring, and much more. In Tasmania alone some examples include: a sea bird ecologist mapping a circumnavigation of Antarctica by albatross with primary students; Year 5 and 6 students taking on a design engineering challenge with STEM Professionals from the local TasNetworks power distribution company; and Year 10 students assisting benthic ecologists to identify species in an underwater transect.

"Working with the STEM professional introduced me and my students to knowledge far and above what I could ever expose them to" – STEM Professionals in Schools teacher

It's free to join the program, and each unique partnership is ongoing and flexible to suit both partners, and supported by a local project officer. Learn more and apply today via our website: www.csiro.au/STEM-Professionals-in-Schools

Caption: A surveyor shows a student how to use surveying equipment on school grounds.

Professional Development opportunity - Earthwatch's Daintree Expedition

Earthwatch Australia's TeachLive program is seeking interest from primary and secondary teacher-participants, for the upcoming *Daintree's Hidden Coastline* expedition as a unique Professional Development opportunity!

On this expedition, you will have a unique opportunity to assist scientists as they assess and protect the mangroves fringing Daintree's rainforests and Australia's Great Barrier Reef – generating scientific data which will be used to develop a national strategy for more effective management of valuable coastal tidal wetlands faced with climate change and local human pressures.

On this expedition, teachers have the option to use the TeachLive website www.teachlive.org.au) to enhance the experience, for both themselves and their students, *if they wish*. The expedition location can experience low internet capabilities, and so uploading to the website has proved challenging in the past, but not impossible.

Participating teachers will receive an outstanding Professional Development experience, as they will:

- Spend a week learning, researching and collecting data in tropical mangrove ecosystems with scientist Jock Mackenzie (from the Centre for Tropical Water and Aquatic Ecosystem Research at James Cook University, and the Mangrove Watch network);

- Learn field research techniques, some of which you can use with your students when you return to your school;
- Be upskilled on how to incorporate STEM in an exciting way in your classrooms;
- Have the potential to Skype your students while on the Daintree River (where a stronger data signal is found!) and bring the field to your students;
- Be provided with information and tools on other citizen science programs, and how you can use these to better engage your students on an ongoing basis after the expedition.

Please note: You do not have to have a science background or science training to participate. Training in research techniques will be provided on the expedition, so you just need to be passionate about science and geography – and about sharing this passion with your students, colleagues and education networks!

WHERE: Daintree River, North Queensland

WHEN: 15 – 21 November 2018 (Arriving Thursday 15th and departing Wednesday 21st November)

DURATION: 7 days (5 school days)

WHO: Science and geography teachers from around Australia are encouraged to participate, but all teachers (primary and secondary) are welcome.

COST: $1095

To **book** onto this trip, and to find out more about the *Daintree's Hidden Coastline* Earthwatch expedition, go to http://au.earthwatch.org/Expeditions/Daintrees-Hidden-Coastline.

What is TeachLive?

Teachlive is an innovative professional development program for Australian science, technology, engineering and mathematics (STEM) and geography school teachers; but also a unique opportunity for school students to be inspired by real STEM research, motivating them to pursue further studies in these subjects.

In this program, primary, secondary and specialist school teachers will work as research assistants on Earthwatch expeditions, helping scientists with vital research and data collection, while communicating their experience live back to their students in the classroom via the TeachLive website. Students will take a virtual scientific expedition with their teachers, providing inspiration, motivation and an opportunity to view their teachers as science role models.

By immersing teachers in a genuine scientific research expedition, they are able to learn about science from world-class scientists, improve their research skills to a scientific standard and gain knowledge about Australia's unique plants, animals and ecosystems.

Following their participation in TeachLive, many teachers have harnessed their new knowledge, skills and enthusiasm to create a range of innovative projects, which engage students for years after their participation in the program.

Go to www.teachlive.org.au for more information; including a summary of the previous Daintree expedition and examples of teacher blogs and their lesson plans. To find out more about the *Daintree's Hidden Coastline* Earthwatch expedition, go to http://au.earthwatch.org/Expeditions/Daintrees-Hidden-Coastline.

Please call Earthwatch on (03) 9016 7590 or email earth@earthwatch.org.au if you have any questions or you would like book a place on the expedition!

If you are still undecided, here are some more photos taken by recent participants in *Daintree's Hidden Coastline*:

Scientific Snippets and Discoveries

Recent advances in knowledge worth sharing…

Mosquito Management

In an attempt to manage the health risks associated with diseases spread in mozzie bites, CSIRO, James Cook University and QIMR Berghofer are breeding 20 million mosquitos. These are then sorted into males and females by a company called Verily and the males are infected by the Wolbachia bacteria, rendering any eggs laid by a female they have mated with unviable. These have been released on the Cassowary Coast, North Queensland and trials have revealed an 80% drop in mosquito populations.

https://blog.doublehelix.csiro.au/why-is-csiro-releasing-mosquitoes/

Dogs are Good for Your Heart

A twelve-year study in Sweden, looking into the effects of dog ownership on cardio-vascular diseases has found that owning a dog reduces the risk of the onset of disease, especially in single-person households with a pure-bred hunting dog. Owning a dog usually means someone is better able to recover from or manage stress and this is perhaps associated with living in lower density housing and getting out for walks more often. This also explains the weighting towards single people who walk their dogs more often than in multiple person households. The benefits of having a pure-breed dog maybe associated with higher socio-economic factors, although this was inconclusive

https://www.nature.com/articles/s41598-017-16118-6

Health and Tattoos

Using skin and other tissues from corpses, compounds associated with tattoos were traced using mass spectrometry and microscopy. It was found that organic pigments and metal oxides end up in the lymph nodes. This is either through the blood or lymph fluids, or they are transported there by the immune system. This can lead to chronic enlargement of the lymph nodes affected and a build-up of toxic nickel and chromium. Further migration of compounds into other organs needs further investigation to build a clearer picture of what could be a future health issue given the current trend of tattooing.

https://www.ncbi.nlm.nih.gov/pubmedhealth/behindtheheadlines/news/2017-09-14-tattoo-ink-particles-can-spread-into-lymph-nodes/

We are Now Even More lucky to be Here…

The asteroid which hit the Yucatan peninsula 66 million years ago was roughly 9km in diameter and triggered mass extinction leading to the evolution of mammals. Kaiho and Oshima looked at the chemical make-up of the impact site that would be needed to create sufficient hydrocarbon and sulphur heating to produce atmospheric soot and found only 13% of the Earth's surface has such geology. These chemicals are necessary to produce long-term climate change, the temperature drop of 8-10 degrees Celsius, required to wipe

out 75% of species on the planet. So even given the impact, there was still only a low probability that mass extinction would occur.

https://phys.org/news/2017-11-analysis-chicxulub-asteroid-struck-vulnerable.html

Gravitational Redshift at the Centre of the Milky Way

The numbers are mind-bending. The star known as S2 spends 16 years whizzing around 20 billion kilometres away from the black hole at the centre of our galaxy, which is four million times the mass of our sun, reaching speeds up to 7,600 km per second. For thirty years this star has been tracked and now, using telescopes at the European Southern Observatory in Chile, a team led by Reinhard Genzel from the Max Planck Institute has found an amazing effect. Einstein's General Theory of Relativity predicts gravitational redshift as the black hole stretches the wavelength of light emitted from the orbiting star. This is the light equivalent of the Doppler Effect, caused by intense gravitational fields. At such extremes, Newtonian explanations are no longer valid, and Einstein's theories are left to explain this redshift, detected for the first time this year.

https://www.nature.com/articles/d41586-018-05825-3

New Snake Species Discovered

Bryan Fry, a University of Queensland Biologist, came across a Bandy-Bandy on a loading wharf at Weipa, Cape York from habitat being mined by Rio Tinto for bauxite. Six specimens were subsequently found and with a distinctive appearance, this has been described as a new species, Vermicella parscauda. This is the fifth member of the genus, endemic to Australia, although it is clearly under threat from the rapid re-shaping of its habitat.

https://www.uq.edu.au/news/article/2018/07/australia-has-new-venomous-snake-%E2%80%93-and-it-may-already-be-threatened

The new species of Bandy-Bandy, Vermicella parscauda

STATIC QUIZ

Easier:

1 What is the largest species of lizard in the world?
2 How many seabirds are estimated to be killed by plastic each year?
3 Name four materials that can be put into a recycling bin.
4 What two elements are found in common table salt?
5 If you are looking at a rainbow, what is always behind you?
6 Which electronic circuit component temporarily stores and releases charge?
7 What is the botanical emblem of Tasmania?
8 Which two planets orbit closer to the Sun than Earth?
9 How much water is in the Sea of Tranquillity?
10 How many atoms are there in a molecule of Oxygen?

Harder:

1 What is Deuterium?
2 Who has the equation for entropy etched on his grave?
3 Why is the Moon orange during a lunar eclipse?
4 What is the most common state of matter in the Universe?
5 To which family of birds do Noisy Miners belong?
6 What are the three main types of crystal found in granite?
7 What is the chemical you can sometimes smell at an ants nest?
8 In which year was Newton's Principia Mathematica first published?
9 What has been the coldest recorded temperature on Earth?
10 What is the herpetological claim to fame of Mount Chappell Island?

And for those thinking completely sideways…

1. 74 1 85 53 16 One-Hundred and One?
2 If the First Fleet is BHII then who is BJAF and BJBF?
3 A famous scientist dropped a bucket list of places to visit. Whose list could it have been?

Ulm,
Sinai,
Eastern Czech Republic,
Lenah,
Armenia,
Singapore,
Tolmans Hill,
Lower Kingscliff,
Eritrea,
Timor,
Tunisia,
England,
Russia,
South Bruny.

Answers:

Easier:

1 Komodo Dragon
2 1 million
3 Plastic bottles, paper, cardboard, glass jars, steel cans, aluminium cans, milk containers and juice containers etc.
4 Sodium and chlorine
5 The Sun
6 Capacitor
7 Tasmanian Blue Gum
8 Mercury and Venus
9 None (It is on the Moon)
10 Two

Harder:

1 Isotope of Hydrogen with a proton and neutron in the nucleus
2 Ludwig Boltzmann
3 Light is reflected from the sun having passed through the Earth's atmosphere, scattering the longer wavelengths of visible light.
4 Plasma
5 Honeyeaters
6 Feldspar, Mica and Quartz
7 Formic Acid
8 1687
9 -89.2 Celsius or 184 Kelvin, Vostok Station in 1983. (Satellite data suggests colder sights elsewhere in the Antarctic)
10 Home to the Chappell Island Tiger Snake

Cryptic sideways thinking clues only!

1 Use the Periodic Table
2 A=1
3 Look at the first letters