

# SciTalk

ISSN 1323-7667

Number 1 – February 2014

## 2014 is the Year of Family Farming

The UN has declared 2014 to be the International Year of Family Farming (IYFF). IYFF aims to raise the profile of family farming and smallholder farming by focusing world attention on its significant role in eradicating hunger and poverty, providing food security and nutrition, improving livelihoods, managing natural resources, protecting the environment, and achieving sustainable development, in particular in rural areas. As the population of older farmers in family farms increases, there is a strong need for youth involvement in agriculture across the world to achieve sustainable food production for future populations.

The goal of the 2014 IYFF is to reposition family farming at the centre of agricultural, environmental and social policies in national agendas by identifying gaps and opportunities to promote a shift towards a more equal and balanced development. The IYFF will promote discussion and cooperation at the national, regional and global levels to increase awareness and understanding of the challenges faced by smallholders and help identify efficient ways to support family farmers.

Family farming includes all family-based agricultural activities, and is linked to several areas of rural development, e.g. agricultural, forestry, fisheries, pastoral and aquaculture production. Family farming is important because it is linked to world food security and it preserves traditional food products, while contributing to a balanced diet and safeguarding the world's agro-biodiversity and the sustainable use of natural resources.

Family farming is the predominant form of agriculture both in developed and developing countries. There are over 500 million family farms in the world that are operated by a family and rely predominantly on family labour. In many regions, they are the main producers of the foodstuff consumed every day in our meals.

Facilitating access to land, water and other natural resources and implementing specific public policies for family farmers (credit, technical assistance, insurance, market access, public purchases, appropriate technologies) are key components for increasing agricultural productivity, eradicating poverty and achieving world food security.

For more information, go to: [www.fao.org/family-farming-2014/en/](http://www.fao.org/family-farming-2014/en/)

Inspired by IYFF, the theme for schools for National Science Week this year (16–24 August) is 'Food for our future: Science feeding the world'. Some of the topics that could be investigated include food security, agricultural sustainability and innovation.



### ★★ ATTENTION ★★

After you have read this, please write/tick your name below and pass it on.

- 1. ....
- 2. ....
- 3. ....
- 4. ....
- 5. ....

Please return to file or noticeboard.

### PRIZES TO WIN!

See pages 1, 9, 10 & 12  
Send in your entries now  
(ALL IN THE ONE ENVELOPE if you prefer!)

Past issues of SciTalk are available at  
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★ ★ ★

Winner for SciTalk 2/13

Margarita Ciampa, Hoxton Park HS, won Core Science Stage 4 (rrp \$79.95), published & donated by Jacaranda.

### ★ 2014 editions Past HSC Questions & Worked Solutions ... see p7 ★

#### INSIDE THIS ISSUE ▶▶▶▶

- 2014 International Year of Family Farming .....1
- Book Giveaway .....1
- Diary Dates / BOS Update .....2
- Out and About .....3
- Australian Museum School Programs .....4
- Nyholm Lecture 2014 .....4
- Cyanobacteria are saving deserts.....4
- NSW Titration Competition 2014.....5
- Discovery about axons / Neuroplasticity .....5
- Fun Park Excursions at Luna Park .....6
- Understanding Science: Yrs 7&8 / Yrs 9&10.....6
- Science Tests for Year 10.....6
- Past HSC Papers with Worked Solutions .....7
- HSC Statistics: Science entries in 2013 HSC.....8
- New island keeps growing - is it here to stay? ...8
- Black roses - myth or reality? / Prizes to win.....9
- Astronomy: Summer & Autumn skies.....10
- Astronomy book giveaway .....10
- Macq Uni Observatory Fri Night Observing.....10
- Exam Choice: Trial & Prelim Science Exams....11
- Competition Corner .....12
- Fizzics Education: Science Visits .....12
- NewScientist: Special Education Price .....12
- Lab Coats & more – from Ivy Industries .....12

# Diary Dates



## Update on BOS matters

Regularly check the BOS website to ensure you have the latest data – for syllabuses, past exam papers, news, Official Notices, Board Bulletins, statistics archive & more.

### Implementation of NSW syllabuses for the Australian curriculum

Implementation of the new Science syllabus starts this year and will occur as follows:

- Years 7 & 9 in 2014
- Years 8 & 10 in 2015 (BOS 24/12)

For Years 8 and 10 in 2014, schools are to continue using the existing *Science Years 7–10 Syllabus* (updated in 2009).

An interactive version of the new NSW K–10 Science syllabus for the Australian curriculum is available on the BOS website.

### Program builder - to program directly from the new NSW K–10 syllabuses

You can select outcomes and content from the new NSW K–10 syllabuses for the Australian curriculum to create scope and sequences and units instantly, using the Board's new online programming tool 'Program Builder'.

### Record of School Achievement (RoSA)

Remember, this is for eligible students who leave school before receiving their HSC. It is a cumulative credential in that it allows students to accumulate their academic results until they leave school. The RoSA records completed Stage 5 and Preliminary Stage 6 courses and grades, and participation in any uncompleted Preliminary Stage 6 courses. It is of specific use to students leaving school prior to the HSC.

### BOS enquiries

Ph: 9367 8111, fax: 9367 8484  
Website: [www.boardofstudies.nsw.edu.au/](http://www.boardofstudies.nsw.edu.au/)

BOS contacts for Science:

- Inspector Science, K–12 & Senior
- Assessment Officer – Science

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\*\*\*\*\*

**Thank you to all the teachers who support these projects.**

## 2014 – International Year for Family Farming

For Shell Questacon Science Circus 2014: [sciencecircus.questacon.edu.au/](http://sciencecircus.questacon.edu.au/)

### MARCH 2014

- 14, 17, 21, 24 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
- 21 Autumn Equinox (3:57 am AEDT)

### APRIL 2014

- 4, 7 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
- 22 International Earth Day. [www.earthday.net/](http://www.earthday.net/) & [www.earthsite.org/](http://www.earthsite.org/)

### MAY 2014

- tba Astronomy Open Night & Lectures: Macquarie Uni, [www.physics.mq.edu.au/astronomy](http://www.physics.mq.edu.au/astronomy)
- 2, 23, 26 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
- b/w 21–28 Big Science Competition: [www.asi.edu.au/bigscience/](http://www.asi.edu.au/bigscience/) Ph: 62012552

### JUNE 2014

- 2, 6, 13 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, [www.odlumgarner.com](http://www.odlumgarner.com)
- 5 World Environment Day
- various dates Nyholm Youth Lectures ... metro & country venues: [www.raci.org.au/branches/nsw-branch](http://www.raci.org.au/branches/nsw-branch) under 'Events'
- 19 National Chemistry Quiz. [www.raci.org.au/](http://www.raci.org.au/) in 'Events'. Details: ph (02) 6331 5125
- 20, 21 NSW Schools Titration Competition. [www.nswtitration.com/](http://www.nswtitration.com/) (see website for regional dates)
- 21 Winter Solstice (8:51 pm AEST)
- 27 Closing date Crystal Growing Comp: [www.raci.org.au/events/event/nsw-crystal-growing-competition-2014](http://www.raci.org.au/events/event/nsw-crystal-growing-competition-2014) Ph: (02) 9663 4960 (RACI)

### JULY 2014

- various dates Nyholm Youth Lectures ... metro & country venues: [www.raci.org.au/events/event/the-raci-nyholm-youth-lecture-series-2014](http://www.raci.org.au/events/event/the-raci-nyholm-youth-lecture-series-2014)
- 6–9 CONASTA 63 in Adelaide: 'The human faces of Science', [conasta.edu.au/](http://conasta.edu.au/)
- 19–26 National Chemistry Week. [www.raci.org.au/national/events/chemistryweek.html](http://www.raci.org.au/national/events/chemistryweek.html)

### AUGUST 2014

- 1 Jeans for Genes Day. [www.jeansforgenes.org.au/](http://www.jeansforgenes.org.au/)
- 6 Chemistry Olympiad Exam. [www.asi.edu.au/olympiads/](http://www.asi.edu.au/olympiads/) Close date: 6/7/14. Ph: 6201 2552
- 11 Biology Olympiad Exam. [www.asi.edu.au/olympiads/](http://www.asi.edu.au/olympiads/) Close date: 6/7/14. Ph: 6201 2552
- 13 Physics Olympiad Exam. [www.asi.edu.au/olympiads/](http://www.asi.edu.au/olympiads/) Close date: 6/7/14. Ph: 6201 2552
- 15, 18, 22 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105  
– come on one of these dates to celebrate National Science Week
- 16–24 National Science Week. Schools' theme: 'Food for our future: Science feeding the world'. [www.scienceweek.net.au](http://www.scienceweek.net.au)

### SEPTEMBER 2014

- 8, 12 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, [www.odlumgarner.com](http://www.odlumgarner.com)
- 13 (tbc) National Schools Titration Competition (Sydney): [www.nswtitration.com/](http://www.nswtitration.com/)
- 23 Spring Equinox (12:29 pm AEST)

### OCTOBER 2014

- 12–18 Earth Science Week. [www.earthsciweek.org](http://www.earthsciweek.org) & [www.ga.gov.au/education/public-events](http://www.ga.gov.au/education/public-events), ph 6249 9111
- 17, 20, 24, 27, 31 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, [www.odlumgarner.com](http://www.odlumgarner.com)

### NOVEMBER 2014

- 3, 10, 14 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, [www.odlumgarner.com](http://www.odlumgarner.com)
- 17, 21, 24, 28 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, [www.odlumgarner.com](http://www.odlumgarner.com)

### DECEMBER 2014

- 2–17 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, [www.odlumgarner.com](http://www.odlumgarner.com)
- 22 Summer Solstice (10:03 am AEDT)

**JANUARY 2015** National Youth Science Forum. Forms to local Rotary club by 31/5/14, interviews from July. Only for Yr 11 in 2014. Enquiries: 6125 2777, email: [nsss@anu.au](mailto:nsss@anu.au), [www.nysf.edu.au/](http://www.nysf.edu.au/)

*While all dates have been checked to ensure that information in DIARY DATES is correct, no responsibility will be accepted by the publisher or Editor for any omissions or inaccuracies in it.*



## Australian Museum School Programs 2014

### Special exhibitions 2014-2015

**Tyrannosaurs: Meet the Family** (until 27 July 2014). This innovative, highly interactive exhibition showcases fossils and the newly-revised tyrannosaur family tree.

**Aztecs:** Students can experience the fascinating and ultimately tragic story of the Aztec Empire - with over 200 cultural treasures from Mexico's major museums (13 September until 1 February 2015).



### Evolution of the Australian Biota Study Days

Check out 2014 dates and locations at: <http://australianmuseum.net.au/Evolution-of-Australian-Biota-Study-Days>

### Self-guided Activities

Visit our amazing permanent exhibitions: *Dinosaurs, Surviving Australia, Skeletons, Birds & Insects, Planet of Minerals, Search & Discover* and *Indigenous Australians*. These can be explored with curriculum-linked activities.

### Educator-led Sessions and Tours

The museum continues to integrate the latest technology into our learning programs. Many programs now involve the use of iPads as a learning tool.

### Museum in a Box®

If you can't come to us consider booking a Museum in a Box®. There are over 30 different boxes containing real museum specimens, casts, artefacts, dioramas, images, DVDs, CDs, games, books and web resources. Check our website for box topics.

### Australian Museum Science Festival

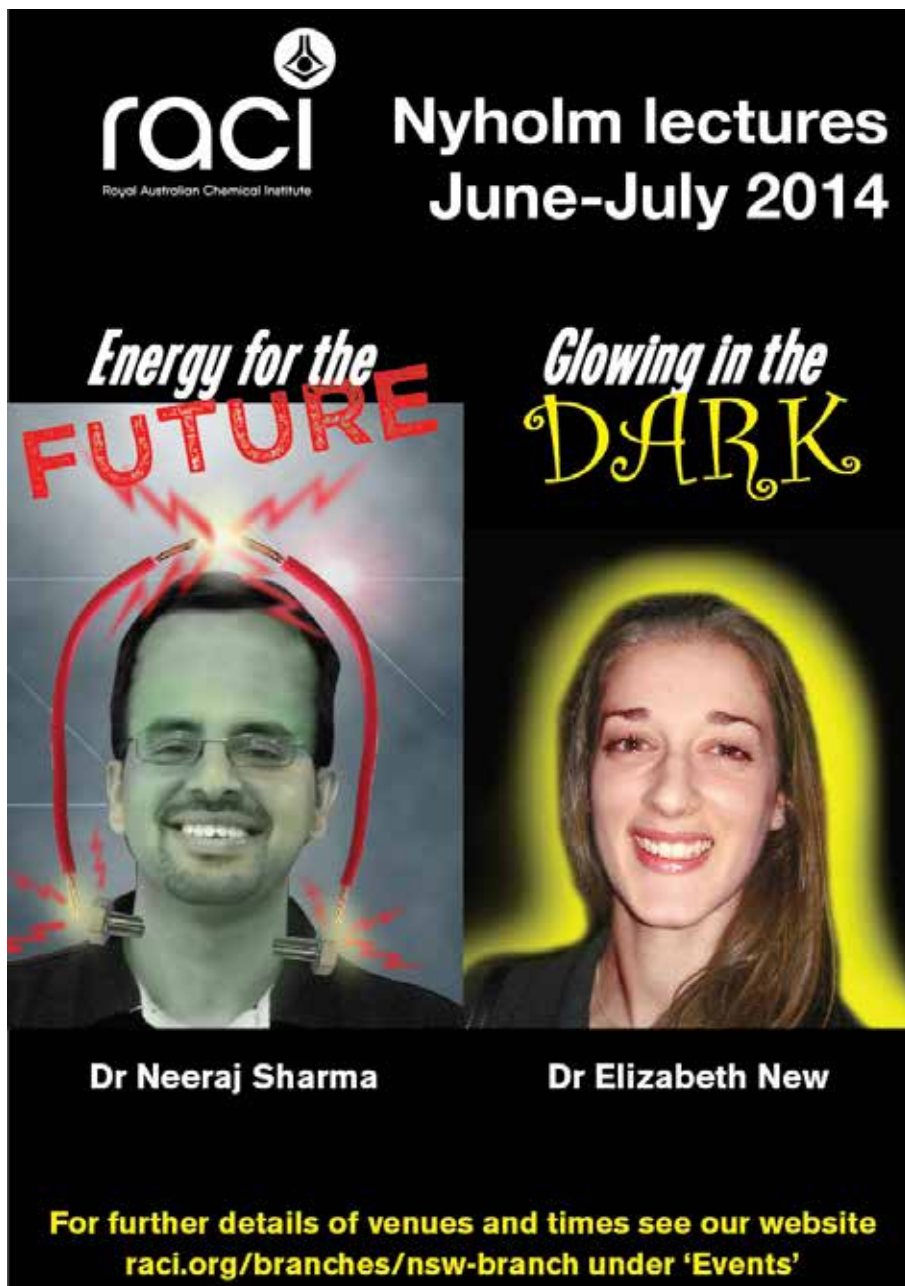
The Australian Museum Science Festival (AMSF) provides an opportunity for students to talk to scientists from leading institutions, and to discover the future that science can bring through expo booths, talks, shows and workshops. Check our website for 2014 dates.

**AUSTRALIAN MUSEUM**  
6 College Street, Sydney  
(opp. Hyde Park)  
open daily 9.30 am – 5 pm  
[www.australianmuseum.net.au](http://www.australianmuseum.net.au)



For visiting school group bookings and further information:

Ph 02 9320 6163 Fax 02 9320 6072 [www.australianmuseum.net.au/education-services](http://www.australianmuseum.net.au/education-services)



The poster features the RACI logo at the top left. The main title is 'Nyholm lectures June-July 2014'. Below this, two lecture topics are highlighted: 'Energy for the FUTURE' with a photo of Dr Neeraj Sharma wearing a futuristic head-mounted device, and 'Glowing in the DARK' with a photo of Dr Elizabeth New. At the bottom, there is a call to action: 'For further details of venues and times see our website [raci.org/branches/nsw-branch](http://raci.org/branches/nsw-branch) under 'Events''.

## Cyanobacteria saving deserts

Cyanobacteria have been shown to reduce the encroachment of deserts in northern China. Desertification is a big problem for China. Overgrazing by livestock has destroyed much of the fragile layer of lichen, algae and mosses – the cryptobiotic crust – that binds the sand and soil to the ground. If left unchecked, creeping sands can slowly engulf vital infrastructure such as roads and railways. Farmland and even major cities can be swamped by dust storms from the desert.

Planting hardy grasses helps keep sand in place, but the wind can still whip away particles between the grasses. Scientists have coated planted dunes with a mixture of photosynthesising cyanobacteria that can thrive in the semi-arid environment. These cyanobacteria are grown in nearby ponds and trucked into the desert every few days and sprayed over the dunes, where they form sticky filaments that hold soil particles in place and prevent them from being blown away.

After eight years, dunes treated with cyanobacteria developed a biological crust about one centimetre thick when on the shady side of dunes. On the sunny side, the crust was about half as thick. The topsoil improved where the crust developed, spurring plant growth.

Reference: Hal Hodson, *NewScientist* 4 Jan 2014.

Do not judge me by my successes. Judge me by how many times I fell down and got back up again.  
... Nelson Mandela (1918–2013)

## NSW Schools Titration Competition 2014

20 and 21 June – venues in Sydney; country venues (tba)



The NSW Schools Titration Competition is on again in 2014. It is a great way for Year 11/12 chemistry students to test their quantitative analytical skills.

Organised by the NSW Chemical Education Group of the Royal Australian Chemical Institute (RACI), students have 90 minutes to complete a set of acid-base titrations to determine the unknown concentration of a weak acid.

Competition entry can be used to satisfy 1.5 hours of practical experience and contribute to the Chemistry Syllabus outcomes: P2, P10, P12 & H12 [12.2(a), 12.2(b), 12.4(b)].

A team's score depends on the accuracy of each member. At each venue, each member of the winning team wins a trophy. Winning teams may then be invited to the National Competition (13 Sept, tbc).

**Closing date for 2014 entries:** 16 May 2014.

Congratulations to the 2013 winners.

- **2013 NSW Schools Titration Competition**  
1st: Evans River Community School; 2nd: Shore; 3rd: Girraween HS.
- **2013 National Titration Competition**  
NSW had 32 teams competing in 2013. Of the top 30 teams, 5 places were achieved by NSW, with the strongest result being James Ruse Ag HSc, who were 4th overall. The national winner was Marrara Christian College (NT).
- **2013 de Miklouho-Maclay Prize** for excellence in Chemistry went to the best overall National Competition result: Mahan Ghobadi from Georges River College (Oatley) with a perfect score.



**For more information:**

- [www.nswtitration.com](http://www.nswtitration.com)
- Email: [ajhey@nswtitration.com](mailto:ajhey@nswtitration.com)
- Ph: 0400 370 963
- PO Box 306, Camden 2570

## Axon discovery gives hope for neurodegenerative diseases

Scientists at the University of Queensland have identified a gene, *mec-17*, that normally functions to protect axons in the nervous system from damage. When this gene becomes inactive due to a genetic mutation, axonal degeneration can occur.

Understanding about axonal degeneration could open the door to a better understanding of the mechanisms of neuronal injury and neurodegenerative diseases. This will hopefully facilitate the development of therapies to prevent or halt diseases such

as Parkinson's, Alzheimer's Huntington's and motor neuron disease.

A tiny nematode worm, *Caenorhabditis elegans*, was the focus of this research. The scientists found that *mec-17* protects the neuron by stabilising its cytoskeletal structure, allowing proper transport of essential molecules and organelles, including mitochondria, throughout the axon.

Reference: [www.uq.edu.au/news/node/112812](http://www.uq.edu.au/news/node/112812) (27 Dec 2013),  
Fig 1: Benedict Campbell Wellcome Images]

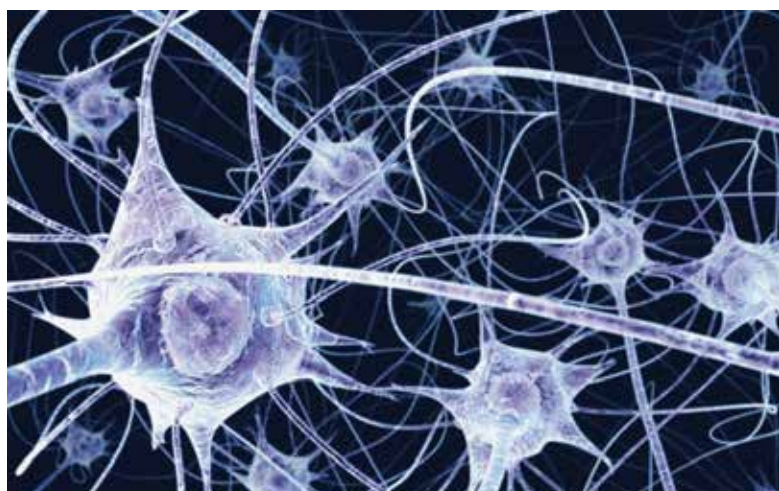


Figure 1 Network of neurons in the brain

## Neuroplasticity

An axon is a nerve fibre. It is a long, slender projection of a nerve cell, or neuron, that typically conducts electrical impulses away from the neuron's cell body. The function of the axon is to transmit information to different neurons, muscles and glands.

Axons make contact with other cells at junctions called synapses. At a synapse, the membrane of the axon closely adjoins the membrane of the target cell, and special molecular structures serve to transmit electrical or electrochemical signals across the gap.

Neurons are constantly building new connections. The building of new connections is what makes memories and learning possible. Learning is a combination of new connections being made and the strengthening of existing neuronal connections. This is known as neuroplasticity.

Axons can have connections to thousands of other neurons and can build new connections. There are almost no unconnected neurons in the adult brain.

In addition to the constant formatting of neuronal connections (some are gained and some are lost), there is also neurogenesis that can occur in the adult brain. These stem cells (progenitor cells) are found in the subventricular zone and the hippocampus of adult brains, where new neurons are made. So some of the new connections may in fact involve new neurons themselves. Everything is a connection, from memories, to restructuring after injury.

Each neuron in the brain makes on average 1000 synaptic connections with other neurons and one brain contains between one hundred trillion and one quadrillion synaptic connections. This number declines with age.

References & Fig 2: [www.quora.com](http://www.quora.com), [en.wikipedia.org](http://en.wikipedia.org) (7-1-14)

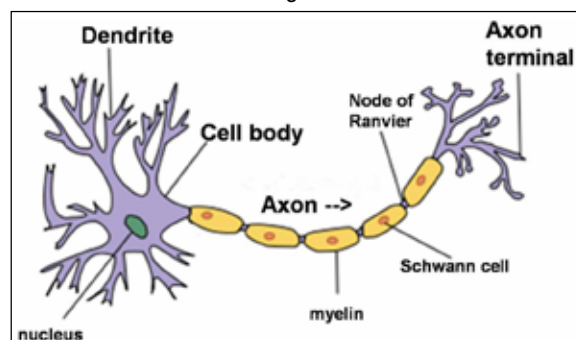


Figure 2 Structure of a neurone



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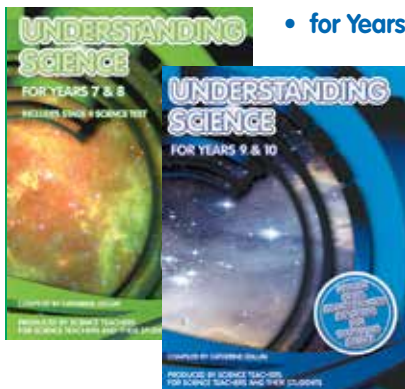
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	2001–2013 Chemistry Past HSC Papers with Worked Solutions ... <b>NEW</b>	978 1 921741 24 1	\$39.95	
	2001–2013 Physics Past HSC Papers with Worked Solutions ... <b>NEW</b>	978 1 921741 25 8	\$39.95	
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## HSC statistics: Science entries in the 2013 HSC

The total number of entries for HSC Science courses\* in 2013 was 45,398 and the total number of HSC entries for the 2013 HSC was 75,168. So Science entries were 61.1% of the total entries.

The number of HSC Science entries as a % of the total HSC entries from 1992–2013 is given in the bottom table below. This % has decreased significantly from a peak of 90.8% of the total

candidature in 1992# with 54,414 students doing a Science course to only 55.8% in 2002. Since 2004, it has hovered around 58–62%, which is still much lower than in past years.

The pattern of options in the various Science courses for the 2013 HSC has not varied greatly from year to year and is given as a percentage in the following tables.

Biology	
Total 2013 candidature	17,058 (♂ 6648 ♀ 10,410)
Communication	69.1%
Biotechnology	5.3%
Genetics: The Code Broken?	18.5%
The Human Story	6.9%
Biochemistry	0.2%
	100%

Earth & Environmental Science	
Total 2013 candidature	1418 (♂ 714 ♀ 704)
Introduced Species & the Australian Environment	78.0%
Organic Geology – A Non-renewable Resource	4.0%
Mining and the Australian Environment	0.8%
Oceanography	17.2%
	100% §

Chemistry	
Total 2013 candidature	11,189 (♂ 6126 ♀ 5063)
Industrial Chemistry	54.6%
Shipwrecks, Corrosion and Conservation	31.2%
The Biochemistry of Movement	1.3%
The Chemistry of Art	3.0%
Forensic Chemistry	9.9%
	100% §

Senior Science	
Total 2013 candidature	5553 (♂ 2977 ♀ 2576)
Polymers	4.0%
Preservatives and Additives	4.8%
Pharmaceuticals	23.7%
Disasters	58.9%
Space Science	8.6%
	100% §

Physics	
Total 2013 candidature	9672 (♂ 7520 ♀ 2152)
Geophysics	0.8%
Medical Physics	29.9%
Astrophysics	21.2%
From Quanta to Quarks	47.2%
The Age of Silicon	0.9%
	100% §

\* These are the total number of entries in Science courses, and not the actual number of students who study a Science course, since a fair percentage actually study 2 courses in the same year, and some students since Pathways do 3 science courses.

# The total number of entries prior to 1996 was based on the total English candidature. Since then, due to Pathways, the total figure each year is still based on English entries, but is slightly affected by acceleration students, Pathways students, etc.

§ The total number of students reflects the actual number of students who received a result for each subject. It can differ from the figures given in the media as their figures were the number of HSC entries for each subject as of October 2013]. There is usually a difference between these two sets of figures because some students have illness/misadventure and so do not sit for the examination.

[Note: Individual option percentages are rounded to the nearest 0.1%, thus totals are not exactly 100.0% for some courses.]

Entries for HSC Science courses 1992–2013 as a percentage of the total number of HSC entries#																						
YR	'92	'93	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13
%	90.8	87.7	80.1	72.0	73.8	72.3	70.2	69.9	64.1	58.0	55.8	56.5	58.3	58.4	59.4	57.9	60.5	59.8	59.9	62.1	60.8	61.1

Science Life Skills: Total 2013 Candidature was 508 (316 males, 192 females). (This course is part of the total science entries.)

These tables were prepared by Robert Garner using data from the NSW Board of Studies, Jan 2014.

## New island keeps growing – is it here to stay?

Volcanic activity along the western edge of the Pacific Ring of Fire gave rise to a new tiny island, in late November 2013. Located in the Volcano Islands arc, this island is about 1000 km south of Tokyo and 130 km from the nearest inhabited island.

'Niijima' (meaning 'new island' in Japanese) rose up out of the sea during a submarine volcanic eruption, first reported on 20 November 2013. It was originally about 500 m from Nishino-shima, a small uninhabited volcanic island that last erupted and expanded in 1973–74. By early December 2013, it had grown to 56,000 m<sup>2</sup>,



Figure 1 'Niijima' forming to right of Nishino-shima (early Dec 2013)

about three times its initial size and was 20–25 m above sea level. By early January 2014, 'Niijima' had joined up with nearby Nishino-shima. It was still shooting gases high into the sky and was eight times bigger than originally.

Shortly after the eruption, scientists speculated that the new island might not last. Such new islands can sink below the water line as they are eroded away by wave action that carries away loose sediment, mud, and volcanic rock fragments. Some subsidence can also occur due to gravity and the hot rock cooling.

But according to the latest news reports, the new island is still erupting and growing. Scientists are now thinking that the island is large enough to survive for at least several years, if not permanently.

There are some great video clips on YouTube and the National Geographic site to shows this 'geology in action' to your students.

Reference: [earthobservatory.nasa.gov](http://earthobservatory.nasa.gov) Images: Fig 1 Japanese Coast Guard & Fig 2 Asahi Shimbun



Figure 2 'Niijima' has grown and is joining up to Nishino-shima (January 2014)





Figure 1 'Black' Baccara roses



Figure 2 Red Baccara rose

References: [www.meilland.com/en/](http://www.meilland.com/en/), [www.wisegeek.com/what-are-baccara-roses.htm](http://www.wisegeek.com/what-are-baccara-roses.htm), [www.ncbi.nlm.nih.gov/pmc/articles/PMC3397129/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3397129/), [www.wikipedia.com](http://www.wikipedia.com)

Figure 1: Fabre Graines, [fr.wikipedia.org/](http://fr.wikipedia.org/), Figure 2: Florian Moeckel, [commons.wikipedia.org/](http://commons.wikipedia.org/)

## Black roses – myth or reality?

Black flowers have attracted people's attention throughout the ages. The very colour inspires a mystical or magical expectation or can even have evil connotations.

Of course a pure black rose does not exist. The flowers commonly called 'black' roses are actually a very dark shade of red, purple, or maroon. Some very dark red roses that have been cultivated in recent years have names like 'Black Baccara', 'Barkarole', 'Black Beauty' and 'Black Magic'.

Black Baccara roses (Figure 1) are a tetraploid hybrid tea rose (*Rosa hybrida*). While not technically black, this rose is probably the darkest of the 'black' roses cultivated so far. Black Baccara roses are naturally a 'black' colour, and have not been deepened by being placed in a vase of water mixed with black ink, as have some 'black' roses in some florist shops.

With its deep red colour and a black velvet tinge to the petals, Black Baccara roses have to be seen to fully appreciate how close they are to being black. Unlike other roses, the fragrance of the Black Baccara roses is very delicate.

The Black Baccara rose is a variety developed from the red Baccara rose (Figure 2) by rose researcher Jacques Mouchotte for the French horticultural business, Meilland International in France. It was first released for purchase around 2000.

Although Baccara roses were originally cultivated for cutting, avid rose gardeners use this plant in containers or as a border in a garden. These rose plants can grow as high as 1.8 m, although most only reach 0.9 to 1.2 m. The rose bush itself is typically 0.9 m wide. Baccara roses require a warm climate in order to do well in a garden, preferably in an area that does not typically get below -1°C during any time of the year.

'Black' roses are often used as sympathy flowers and are popular in floral arrangements for memorial services or funerals. As black roses are often associated with death, they are seldom used for festive events, although this varies with different cultures. In some areas, Baccara roses are popular in winter floral arrangements, especially at weddings.

Education is the most powerful  
weapon which you can use to  
change the world.

... Nelson Mandela (1918–2013)

### Are you interested in the history of Luna Park Sydney?

Sam Marshall's book *Luna Park Just for Fun* celebrates all the fun provided by Sydney's Luna Park since it opened in 1935. With many historical and colourful photos, this book follows the sometimes rocky history of Sydney's famous landmark amusement park – including the fire in the late seventies and the saga with the reopening in 2004.



**TO WIN A COPY OF THIS BOOK** (rrp \$17.95) donated by Physics is Fun, send your name and school address to:  
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**WINNER:** Dean Ward, Seven Hills High, won a *Luna Park Just for Fun* book by Sam Marshall from Physics is Fun for *SciTalk* No. 2–2013.

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\* This pass will be valid for any one film for any session, except public holidays/films advertised as 'no free list'. Details at: [www.imax.com.au](http://www.imax.com.au)

**WINNER:** Paulina Phillips, ASC – St Josephs Lochinvar, won an IMAX Sydney family pass for *SciTalk* No. 2–2013.



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**QUIZ QUESTION:** What are the 2 main factors that contribute to metamorphism?

*SciTalk 2/13 answer: Nebula*

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*SciTalk* aims to provide science teachers with up-to-date information, important dates, the latest products available, plus 'what's on' in various excursion venues, and more. Please pass *SciTalk* on to all Science teachers at your school so they can benefit from it – or put it up on your notice board for reference.

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