

SciTalk

ISSN 1323-7667

Number 1 – March 2013

2013 is the Year of Water Cooperation

The UN has declared 2013 to be the International Year of Water Cooperation (IYWC), with the slogan 'Water, water everywhere, only if we share'. This year, World Water Day, which is always on 22 March, is dedicated to the same theme of water cooperation as IYWC and the development of programs for the sustainable management of the world's freshwater resources. The success of IYWC and World Water Day will depend on the involvement of everyone.

Water, a vital resource for all ecosystems on Earth, knows no borders. For instance, 148 countries share at least one transboundary river basin. Water availability is pivotal for human development and necessary to keep our environment healthy. Yet there is a fixed amount of water on the planet. So sustainable management and equitable distribution of water resources are needed if our world is to cope with increased competition for water due to food demands from increased population numbers putting pressures on agriculture and irrigation. Competition for water will also result from pollution, global warming causing a drop in water flows and changes in food consumption patterns from being predominantly starch-based to meat and dairy, which requires much more water in its production.

Sharing water is a potential source of conflict in regions or countries that share water resources, especially when the building of a dam is proposed, illegal well digging has occurred, or one of the regions or countries involved has scarce water supplies. However, contrary to common belief, good examples of water cooperation greatly outshine water-related conflicts. For example, the Indus Waters Treaty signed by India and Pakistan in 1960 survived three major conflicts and is still in force today. Cooperation and access to water resources needs to be monitored and implemented, not only within communities, but also at government and international levels to ensure that it happens without conflict.

With ever-increasing pressures on the world's limited water resources, the objective of IYWC is to draw attention to the benefits of cooperation in water management. When water resources are cooperatively shared and managed equitably, peace, prosperity and sustainable development are more likely to be achieved. Water cooperation is crucial to preserving water resources and protecting the environment. It requires sharing knowledge about the scientific aspects of water and management strategies and best practices, as well as sharing knowledge about the role of water in preserving ecosystems.

Water cooperation will also help to overcome inequity in access to water, enhance water security and overcome water scarcity and so it will also contribute to poverty eradication and to improving living conditions and educational opportunities, especially for women and children.

For more information, go to the official website for 2013 IYWC at:

www.watercooperation2013.org



★★ 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 & 12 ★★
Send in your entries now
(ALL IN THE ONE ENVELOPE if you prefer!)

Past issues of SciTalk are available at
www.odlumgarner.com

Book Giveaway

WIN a copy of:

2001–2011

**Earth & Environmental
Science**

Past HSC Papers & Worked Solutions



Also available as
2009–2011 book
(see page 7)

Published by Odlum & Garner

This has a **Past HSC Questions by Topic Guide** for ALL questions in all papers, so students can revise topic by topic or use the actual exam papers. It also has a guide on *How to Achieve Success in the HSC*. The answers have been prepared by Science teachers experienced in HSC marking and in advising students on exam preparation and technique. The answers would score full marks and are an appropriate length.

TO WIN: Send your name, school & school address (& subject) on an envelope by **12 April 2013** to:
Book Giveaway, PO Box 442, Freshwater 2096

★★★

Winner for SciTalk 4/12

Vicki Lovell, Murrumburrah High, won 2001–2011 Senior Science Past HSC Papers & Worked Solutions (rrp \$39), published & donated by Odlum & Garner.

★ 2013 editions Past HSC Questions & Worked Solutions ... see p7 ★

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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.

ATTENTION CHEMISTRY TEACHERS:

Clarification of Naming Organic Compounds in Chemistry Stage 6 Syllabus (BOS 12/13)

The Chemistry Stage 6 Syllabus (Minor amendments for the 2010 HSC) requires the use of correct nomenclature for organic compounds based on the rules put forward by the International Union of Pure and Applied Chemistry (IUPAC). *Organic Nomenclature for the NSW HSC*, a summary of the IUPAC rules for naming the organic compounds specified in the Chemistry Stage 6 Syllabus, is available on the Royal Australian Chemical Institute website: www.raci.org.au/education/secondary

Implementation of new NSW syllabuses for the Australian curriculum

Implementation of the new Science syllabus will occur as follows:

- Years 7 & 9 in 2014
 - Years 8 & 10 in 2015 (BOS 24/12)
- Schools are to use the existing *Science Years 7–10 Syllabus* (updated in 2009) in 2013 (BOS 37/11).

New Work Health and Safety legislation & syllabus references

Don't forget to amend syllabuses and support materials regarding the new work health and safety (WHS) laws that replaced the occupational health and safety (OHS) laws in NSW on 1 January 2012.

HSC–Uni Pathways for Talented Students

Talented students who have completed an HSC course early or who have demonstrated outstanding academic ability in another way can apply to begin their university studies and fast-track their first university degrees.

Record of School Achievement (RoSA)

RoSA is for students who leave school after Year 10 and before they receive their HSC.

BOS enquiries

Ph: 9367 8111, fax: 9367 8484
 Website: www.boardofstudies.nsw.edu.au/
 BOS contacts for Science:
 • Inspector Science, K–12 & Senior
 • Assessment Officer – Science

NOTE: When you purchase Odlum & Garner's Past HSC Questions & Worked Solutions books for Biology, Chemistry and Physics, you are helping to support the production of their Past HSC books for Earth & Environmental Science and Senior Science. Thank you to all the teachers who support these projects.

2013 – International Year of Water Cooperation

For Shell Questacon Science Circus 2013: sciencecircus.questacon.edu.au/on_the_road.html

MARCH 2013

15, 18, 22, 25 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
 20 Autumn Equinox (10.02 pm AEDT)

APRIL 2013

5, 12 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
 22 International Earth Day. www.earthday.net/ & www.earthsite.org/

MAY 2013

18 Astronomy Open Night & Lectures: Macquarie Uni, www.physics.mq.edu.au/astronomy
 29–31 Science at the Shine Dome teachers' program, Australian Academy of Science: Theme: 'Power to the people: the science behind the debate'. Details: www.science.org.au/events/sats
 3, 24, 31 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
 b/w 22–29 Big Science Competition: www.asi.edu.au/bigscience/ Ph: 62012552

JUNE 2013

3, 7, 14 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
 5 World Environment Day
 various dates Nyholm Youth Lectures: Energy for the Future ... at metro & country venues – www.raci.org.au/events/event/the-raci-nyholm-youth-lecture-series-2013
 14, 15 NSW Schools Titration Competition. www.nswtitration.com/ (see website for regional dates)
 21 Winter Solstice (3:04 pm EST)
 28 Closing date Crystal Growing Comp: www.raci.org.au/events/event/nsw-crystal-growing-competition-2013 Ph: (02) 9663 4960 (RACI)

JULY 2013

various dates Nyholm Youth Lectures: Energy for the Future ... at metro & country venues – www.raci.org.au/events/event/the-raci-nyholm-youth-lecture-series-2013
 7–10 CONASTA 62 in Melbourne: 'Transforming the future through Science Innovation', conasta.edu.au/
 20–27 National Chemistry Week. www.raci.org.au/national/events/chemistryweek.html
 25 National Chemistry Quiz. www.raci.org.au/in/Events. Details: ph (02) 6331 5125

AUGUST 2013

2 Jeans for Genes Day. www.jeansforgenes.org.au/
 7 Chemistry Olympiad Exam. www.asi.edu.au/olympiads/ Close date: 17/7/13. Ph: 6201 2552
 9, 12, 16 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
 10–18 National Science Week. School theme: 'A Century of Australian Science' www.scienceweek.net.au
 12 Biology Olympiad Exam. www.asi.edu.au/olympiads/ Close date: 17/7/13. Ph: 6201 2552
 14 Physics Olympiad Exam. www.asi.edu.au/olympiads/ Close date: 17/7/13. Ph: 6201 2552

SEPTEMBER 2013

13, 16 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
 14 (tbc) National Schools Titration Competition (Sydney): www.nswtitration.com/
 23 Spring Equinox (6:44 am EST)

OCTOBER 2013

13–19 Earth Science Week. www.earthsciweek.org & www.ga.gov.au/education/public-events, ph 6249 9111
 14, 18, 21, 25, 28 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

NOVEMBER 2013

1, 11, 15 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
 18, 22, 25, 29 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

DECEMBER 2013

2–18 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
 22 Summer Solstice (4.11 pm AEDT)

JANUARY 2014 National Youth Science Forum. Forms to local Rotary club by 31/5/14, interviews from July. Only for Yr 11 in 2013. Enquiries: 6125 2777, email: nss@anu.au, 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.

Politicians control education on a puppet string, pulling it this way and that to sway budgets and voters.

... Anon

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SHIPWRECKS, CORROSION & CONSERVATION
STAGE 6 CHEMISTRY

This program relates to the *Shipwrecks, Corrosion and Conservation* option. Students attend an AV presentation on conservation and restoration, including footage taken during the recovery of material from HMS *Bounty*. Students then participate in a hands-on workshop focusing on desalination of metal objects, metal and corrosion product identification, methods of protecting metals and rates of corrosion.

This is followed by a guided tour of shipwreck material in the museum. Students may also visit the destroyer HMAS *Vampire* and submarine HMAS *Onslow*.

The program is 4 hours, at a cost of \$22.00 per student (teachers free).

Bookings & Information:

Phone: 02 9298 3655 Fax: 02 9298 3660
Email: bookings@anmm.gov.au
Location: 2 Murray Street, Darling Harbour



MUSEUM OF HUMAN DISEASE
2013 EDUCATION PROGRAMS & EVENTS

The Museum of Human Disease is Australia’s only publicly accessible medical Pathology collection and offers a unique opportunity for Biology, Senior Science and junior Science students to gain a deep understanding of body and disease elements in the curriculum.

We offer visits for The Search for Better Health, Communications, Bionics and Junior Science, as well as online resources, Video Conference sessions, regional tours and Teacher Professional Development Days.

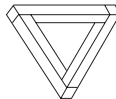
Further information and bookings:

T 02 9385 1522
E diseasemuseum@unsw.edu.au
W www.diseasemuseum.unsw.edu.au



Science Centre & Planetarium

University of Wollongong
Squires Way, North Wollongong
Only 45 mins from southern Sydney.



- ★ **Taking bookings for 2013**
- ★ **Star Trails Outreach Program** – visiting schools with Planetarium Shows and interactive Science Shows.
- ★ We have an extensive range of *shows & exhibits*, including:
 - **The Machine**
 - **Stellar Evolution** – planetarium program for HSC Physics
 - **Superconductors & Liquid Nitrogen** – live science show
 - **Energy and Motion**
 - **Changing Worlds and Visions**
 - **Dinosaurs, Fossils & Coal**
- ★ School entry includes two floors of hands-on exhibits, a science show, plus a *planetarium / laser show*.
- ★ **Also available:** environmental field trips, science shop, kiosk, science fun bags, membership programs.
- ★ **Book now** for an excursion. Information/bookings: 02 4286 5000
Website: <http://sciencecentre.uow.edu.au>

IMAX THEATRE SYDNEY

31 Wheat Rd, Darling Harbour, Sydney 2000



New Films in 2013

★ **TITANS OF THE ICE AGE 3D** ... starts 7 March

This film transports viewers to the beautiful and ‘otherworldly’ frozen landscapes of North America, Europe and Asia 10,000 years before modern civilisation. Dazzling computer-generated imagery brings this mysterious era to life – from saber-toothed cats and cave bears to dire wolves and woolly mammoths.

★ **FLIGHT OF THE BUTTERFLIES 3D** ... starts 21 March

This film is a scientific adventure story spanning thousands of kilometres and generations. It’s about the remarkable Monarch butterfly migration, the most incredible migration on Earth, and the determined scientist who spent 40 years trying to discover exactly where the butterflies mysteriously disappeared when they flew south for winter.

★ **HIDDEN UNIVERSE 3D** ... starts 21 September

This film takes audiences on a breathtaking tour of deep space to gain a whole new insight into how the universe was formed. Through real images captured by Hubble and the world’s most powerful telescopes you will explore galaxies and nebulae, travel the terrain of Mars, witness images of distant celestial structures including our Sun, and more.

For bookings call 02 9213 1600 or email: education@imax.com.au
Visit our website for a list of films available: www.imax.com.au/schools

WHY NOT COMBINE
A FUN PARK EXCURSION
BOOKED THROUGH PHYSICS IS FUN
WITH A SEEING A FILM AT IMAX?

Combine your Fun Park Excursion at Luna Park Sydney booked through **PHYSICS IS FUN** with a visit to IMAX for a great action-packed, fun time of interactive learning.

- **DETAILS:**
IMAX: www.imax.com.au/schools
FUN PARK EXCURSION (through Physics is Fun): www.odlumgarner.com
- **WHAT TO DO:** Allow 1 hr for IMAX (any film), then 2–3 hours for Physics is Fun at Luna Park (rides open at 11 am, Mon/Fri + any school day in December)

BOOK & PAY SEPARATELY FOR EACH EXCURSION

National Science Week
10–18 August 2013

This is an annual celebration of Science in Australia. Join in to enjoy and explore the wonders and benefits of Science.

There will be many Science Week happenings. For more details, go to:

www.scienceweek.net.au

Why not celebrate this year’s National Science Week by going on an Science excursion? You could go a fun park excursion through *Physics is Fun* to Luna Park Sydney on 9, 12 or 16 August 2013, or visit one of the other excursion venues on this page for National Science Week.



Australian Museum School Programs 2013

Programs for 2013 include:

Evolution of the Australian Biota Study Days

Check out 2013 dates and locations at:
<http://australianmuseum.net.au/Evolution-of-Australian-Biota-Study-Days>



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For Museum in a Box® bookings and enquiries, phone (02) 9320 6197 or fax (02) 9320 6072.

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Schools can now access the Australian Museum's collections and staff via virtual excursions through an amazing selection of video conferences.

For more details visit:
<http://australianmuseum.net.au/Video-Conferencing>

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(opp. Hyde Park)
open daily 9.30 am – 5 pm
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

★ ATTENTION CHEMISTRY TEACHERS ★

Using correct IUPAC nomenclature for naming chemicals

The Royal Australian Chemical Institute (RACI) have re-issued an IUPAC nomenclature document due to growing concerns that teachers of Chemistry are not using these rules correctly when teaching HSC Chemistry.

This document, *Organic Nomenclature for the NSW HSC*, is available to download from the RACI website at www.raci.org.au/education/secondary. It provides a summary of the IUPAC rules for naming the organic compounds specified in the Chemistry Stage 6 Syllabus.

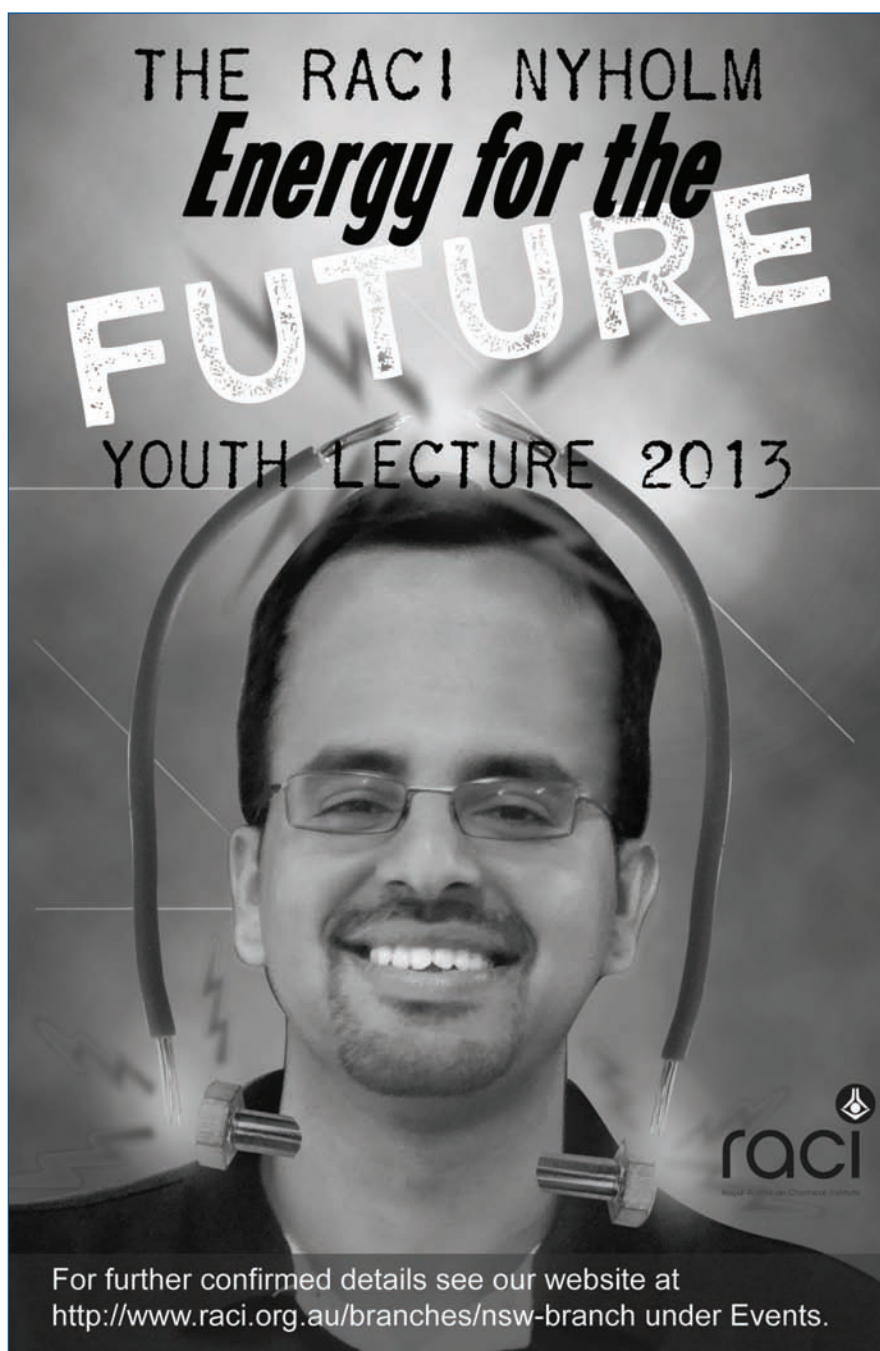
In particular, the rules regarding haloalkane nomenclature need to be closely studied by all chemistry teachers, as some textbooks and resources have not followed these rules. IUPAC uses the alphanumeric nomenclature system. Older methods using electronegativity differences between substituent groups are no longer valid.

HSC Chemistry Option: *Chemistry of Art*

If teaching this option, make sure that you are using the correct names for the ligands that surround a metal ion in complex ions. Some texts/resources do not use correct names for these.

When naming an anionic ligand, if the anion name ends in -ide, then as a ligand its name is changed to end in -o, e.g. the chloride anion (Cl^-) becomes chlorido (not chloro as in organic compounds), the fluoride ion (F^-) becomes fluorido, the cyanide ion (CN^-) becomes cyanido, the hydride ion (H^-) becomes hydrido, and so on. Similarly, if the anion name ends in -ite or -ate, the ligand name ends in -ito and -ato.

Neutral ligands do not change name, with the exception of the following: water is 'aqua' (old name 'aquo'), ammonia is 'ammine' (old name 'ammino'), hydroxide ion (OH^-) is 'hydroxo' (old name 'hydroxy'), carbon monoxide bonded via carbon is 'carbonyl' and nitrogen monoxide bonded via nitrogen is 'nitrosyl'.



For further confirmed details see our website at
<http://www.raci.org.au/branches/nsw-branch> under Events.

RACI NSW SCHOOLS TITRATION COMPETITION 2013

14 and 15 June – venues in Sydney and country venues (tba)

The NSW Schools Titration Competition is on again in 2013. It is a great way for Year 11/12 chemistry students to test their quantitative analytical skills.

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)].

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.

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 (14 September, tba). The closing date for entries is 17 May 2013.



Congratulations to the following 2012 competitors:


★ **2012 NSW Schools Titration Competition:** From the 425 teams who entered, 46 received Certificates of Excellence and 35 received Merit Certificates. Congratulations especially goes to: *1st:* St Mary Star of the Sea College, *2nd:* Hunters Hill High, *3rd:* Illawarra Grammar School.

★ **2012 National Titration Competition:** Of the top 36 teams out of 156 teams, 7 places were achieved by NSW. Our strongest results were: Shore School (*4th*) and Strathfield GHS (*7th*). Other strong results were: Shore School (*11th*), St Mary Star of the Sea College (*19th*) and GRC Oatley Senior Campus (*23rd & 24th*).

★ **2012 de Miklouho-Maclay Prize** for excellence in Chemistry with the best overall result in the National Competition went to Nicolle Davis, St Mary's Senior High (with a Perfect Score).

For details, costs, entry forms, hints & tips:

- www.nswtitration.com
- Email: ajhey@nswtitration.com
- Ph: 4655 2961
- PO Box 306 Camden 2750

 **ASELL** Advancing Science by Enhancing Learning in the Laboratory

ASELL Schools Workshop

Are you interested in improving practicals? Come along to the next ASELL Schools Workshop.

These Workshops are designed to help teachers improve experiments in their classrooms and to improve students' experiences. This workshop will include a mixture of discussions and laboratory-based activities. It will help to create a repository of practicals with all associated documentation – from notes on health and safety, equipment, the science, and notes for teachers and technical staff.

We invite interested teachers to attend and/or submit an experiment for evaluation. You are also invited to bring two students. Come and view a range of practicals in a 'hands on' format that your colleagues use in their teaching. ASELL and the workshop will be a way that teachers and academics can work together in improving science experiments and experiences for high school students.

For more information, contact Alexandra Yeung at The University of Sydney:

T: 9351 8715 E: alexandra.yeung@sydney.edu.au W: www.asell.org

Event details for ASELL Schools workshop:

- 26 April, 8.30am–4pm
- Shore School, North Sydney
- Register online by 5 April 2013
- Cost is free
- Workshop will count towards NSW Institute of Teachers PD.

Work Health and Safety Mandatory Training

What do these pictograms mean?



If you know 2 or 3 you are doing well. These are some of the new pictograms for the Globally Harmonized System (GHS).

The GHS came in with the new Federal WH & S legislation in 2012. Global Harmony sounds good! But what are its implications?

Firstly, the distinction between Hazardous Substances (problem for the health of people) and Dangerous Goods (immediate issue for the health and safety of people or property) has been removed. Basically, anything with a dangerous goods sticker must have a new label and a new GHS diamond. You have until 2016 to redo all the labels, but you could start now to understand how the system works and avoid a last minute panic.

Another aspect of the new WH & S legislation is that every site where hazardous substances are used or stored must have chemical safety awareness training. This training should be repeated every 5 years or more frequently if there has been a large turnover of staff. When was your last school chemical safety awareness training conducted?

The training done by the Royal Australian Chemical Institute (RACI) Chemical Education Group is registered with the NSW Institute of Teachers as an accredited in-service for 2½ hours.

For more details, prices and availability, contact Margaret Lindsay, secretary of the NSW Chemical Education Group, at:

margaret.lindsay@nowt.com.au



Fun Park Excursions

conducted by **Physics is Fun**
at **Luna Park Sydney**

'Physics is Fun' provides fun park excursions at Luna Park Sydney for any size school group from any school faculty at the lowest prices!

Students are provided with discounted Unlimited Rides Passes for Luna Park Sydney, as well as curriculum-based worksheets (if required) for secondary or primary school excursions.

You can book for just a fun day or for a fun-filled educational excursion on any Monday or Friday during the school term (or any school day in December).

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Only \$20 booking fee per school (plus GST)

(GST can be claimed back if you choose to do one of our curriculum specific excursions, but not when coming for just a fun day)

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www.odlumgarner.com/lunaparkexcursions

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E: robertgarner@mac.com

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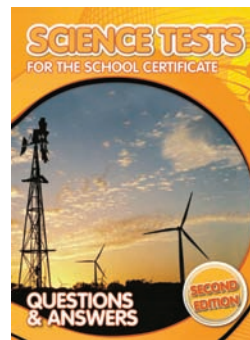


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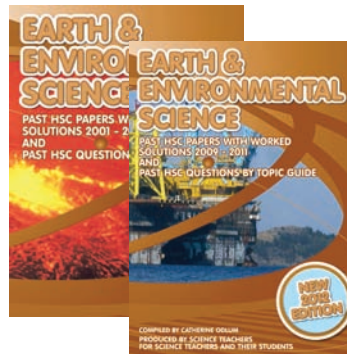
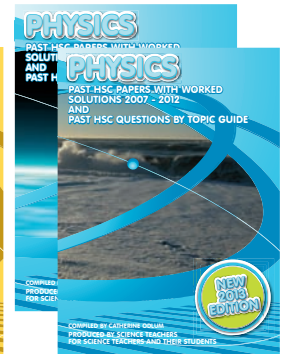
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20% discount for bulk orders*

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- Periodic Table, Data Sheet (Phys/Chem), Formulae Sheet (Phys), Geological Time Scale (EES)



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	2001–2012 Chemistry Past HSC Papers with Worked Solutions ... NEW	978 1 921741 14 2	\$39	
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Science Snippets

● Men contribute more to pregnancy than sperm

Men may contribute far more to a successful pregnancy than just sperm, with evidence suggesting seminal fluid primes a woman's immune system to be more receptive to the foetus. Researchers from the University of Adelaide have found a mechanism that may explain why women who have repeated exposure to their partner's seminal fluid in the 3–6 months before conception have a much lower likelihood of pregnancy complications such as pre-eclampsia and foetal growth restriction. The foetus, from an immunological perspective, is similar to a transplanted organ. So regular exposure to the father-to-be's seminal fluid appears to contribute a more immune tolerant environment in two ways. One component primes the female immune system to recognise the father's unique immunological signature, called the major histocompatibility complex, while another component encourages a more tolerant immune environment.

[Source: ABC Science Online, 27 November 2012]

● A bowl of cereal a day may keep the doctor away

Whole grain foods are those that have the bran, germ and starch present in the proportions that occur in the naturally harvested grain. They include oats and other whole grain breakfast cereals, brown rice and bread made from wholemeal flour.

Researchers claim that whole grain foods are underappreciated as a source of antioxidants, and from their work have concluded that

a bowl of cereal a day could lower the risk of chronic diseases such as type 2 diabetes, coronary heart disease and hypertension. They researched how much whole grain needs to be eaten daily to achieve these benefits, and what exactly gives whole grain food these benefits. Their studies involved hundreds of thousands of people in the US, followed for more than a decade.

They found that those who consumed the maximum amount of whole grains – between 40–50 grams a day – got the maximum protective effect from chronic diseases. This equates to having a large bowl of cereal, around 45 grams [dry-weight] of whole grains each day. They claim the benefits of whole grains might be even higher if people consume greater amounts of them.

This new study also highlights what researchers have said is an overlooked beneficial component of whole grains. There is a 'massive drop' in nutrients when the germ and bran are removed from grains, but the literature to date has been unclear as to why this is the case. The lion's share of these discarded parts of the whole grain is the bran, which is known to be beneficial because it contains indigestible fibre, or roughage, which is good for the colon. Although bran is about 50% woody, the rest is made up of the nutrient-rich aleurone. This layer of cells contains all the critical ingredients to get the grain embryo going by dissolving the starch. It is like a storage layer, as it contains vitamins, minerals, proteins and the antioxidant ferulic acid, which is thought to perhaps play a role in preventing the development of chronic disease. So bran is actually as good an antioxidant food as fruit and vegetables.

[Source: ABC Science Online, 1 March 2013]

HSC statistics: Science entries in the 2012 HSC

The total number of entries for HSC Science courses* in 2012 was 44,059 and the total number of HSC entries for the 2012 HSC was 72,473. So Science entries were 60.8% of the total entries.

The number of HSC Science entries as a % of the total HSC entries from 1992–2012 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 58–60%, which is still much lower than in past years.

The pattern of options in the various Science courses for the 2012 HSC has not varied greatly from year to year and is given as a percentage in the following tables.

Biology	
Total 2012 candidature	16,570 (♂ 6411 ♀ 10,159)
Communication	68.7%
Biotechnology	5.9%
Genetics: The Code Broken?	18.4%
The Human Story	6.8%
Biochemistry	0.2%
	100% §

Chemistry	
Total 2012 candidature	10,838 (♂ 5989 ♀ 4849)
Industrial Chemistry	51.7%
Shipwrecks, Corrosion and Conservation	30.6%
The Biochemistry of Movement	1.1%
The Chemistry of Art	4.3%
Forensic Chemistry	12.3%
	100% §

Physics	
Total 2012 candidature	9469 (♂ 7349 ♀ 2120)
Geophysics	1.4%
Medical Physics	31.2%
Astrophysics	22.8%
From Quanta to Quarks	43.9%
The Age of Silicon	0.7%
	100% §

Earth & Environmental Science	
Total 2012 candidature	1497 (♂ 808 ♀ 689)
Introduced Species & the Australian Environment	82.7%
Organic Geology – A Non-renewable Resource	5.5%
Mining and the Australian Environment	2.5%
Oceanography	9.4%
	100.1% §

Senior Science	
Total 2012 candidature	5235 (♂ 2901 ♀ 2334)
Polymers	4.8%
Preservatives and Additives	4.8%
Pharmaceuticals	22.2%
Disasters	60.4%
Space Science	7.8%
	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 2012. 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 1992–2012 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
%	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

Science Life Skills: Total 2012 Candidature was 450 (299 males, 151 females). (This course is part of the total science entries.)

These tables were prepared by Robert Garner using data provided by the NSW Board of Studies, Feb 2013.

Drink tap water for thirst ... and environmental sustainability

A great website to help you teach about sustainability in relation to drinking water can be found at www.tapsydney.com.au. On this site, Sydney Water explains how by drinking tap™ – Sydney’s original eco-water – you are doing your bit for the environment, and it only costs less than one cent per litre. It is a natural product and is readily available across the Sydney region. It’s the most sustainable choice when it comes to quenching your thirst and is piped directly to just about everywhere for your convenience.

Because tap™ comes directly from the source right to your tap it doesn’t require any packaging or shipping – so it is much better for the environment. This means tap™ helps keep our waterways free from litter caused by plastic bottles and does not require fossil fuels. tap™ was launched by Sydney Water to help reverse the current trend of paying way too much for drinking water – not only with our money – but also with our environment. And in terms of quality, this water is world-class. In fact tap™ is subjected to 70 different tests and also has the added benefit of fluoride for healthy teeth. Of course, the same logic applies to most other water supplies in Australia.

The website has some interesting short video clips that are excellent for promoting discussion. They will help your students realise the damage being done to our environment by people drinking bottled water, when there is nothing wrong with our tap water. Some questions for discussion could be:

- What is the real cost of drinking bottled water when you consider the effect on our environment?
- Is it worth the convenience when it is having such an effect on our environment?
- What should we be doing to ensure a sustainable future?



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Science Snippets ... continued

● Getting the buzz on the value of bees

Australian agriculture has been getting a free ride from honeybees for nearly 200 years. Their pollination services are worth several billion dollars a year, but Australia’s honeybees are under increasing threat, including from a mite, *Varroa destructor*.

In many parts of the world the honeybee has been losing its buzz. Unusually high bee mortality has been reported in most of Western Europe. In the US, the number of honey-producing colonies has declined from about 5.5 million in 1950 to 2.5 million in 2007, and there have been sudden colony losses in Japan, China and elsewhere.

Australia’s honeybees have so far been spared. But scientists and beekeepers are worried that some of the destructive agents suspected of causing the world’s big bee bust have already arrived on Australia’s shores and will soon devastate the bee industry here.

This excerpt is from the Australian Academy of Science’s ‘Nova: Science in the News’. To read more about this threat to Australian honeybees, go to: www.science.org.au/nova/129/129key.html You will find many other useful Science articles on this website.

[Source: NOVA: Science in the News, August 2012]

● Wild pollinators play role in feeding the world

Wild insects are crucial for crop pollination, but their numbers are declining, and their role cannot be compensated for by managed honeybees, say experts. It has been suggested that honeybees cannot do the job on their own and that wild insects play an important and vital role in pollination. A large proportion of the world’s crops rely on insects for production, but removal of native vegetation and use of pesticides kills off many wild insects, which could act as pollinators. Farmers pay millions of dollars to import hives to do the job, but the question is, can honeybees do the job of wild pollinators?

Scientists have studied nearly 40 different crops in 20 countries, including Australia. The crops studied included almonds, coffee, tomato, kiwifruit, pumpkin and cotton. They looked at how often flowers were visited by managed honeybees and wild pollinators - including wild bees, butterflies, flies and beetles - and then they looked at how many flowers yielded fruit in each of the crops. On average, wild pollinators increased the fruit yield in all the crops, while honeybees increased the fruit yield in only 14% of the crops. So to maximise our food production, scientists claim we need to incorporate wild pollinators. Interestingly, while the managed honeybees transferred a lot more pollen than the wild pollinators, scientists have found this did not translate into more fruit production.

[Source: ABC Science Online, 1 March 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

WINNER: Melanie Holmes, Airs High, won an IMAX Sydney family pass for SciTalk No. 4–2012.



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www.odlumgarner.com

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Physics is Fun - Luna Park Sydney Teacher Offer
PO Box 442, Freshwater NSW 2096

WINNER: Belinda Clarke, Port Macquarie High, won a Luna Park Sydney family pass for SciTalk No. 4–2012.

DID YOU KNOW?

When using Google as a search engine, you can refine your search to find useful lesson material (if it is available), e.g. PowerPoints by other teachers or lesson pages which are usually available as pdf files. You will of course have to check their reliability, but why re-invent the wheel? To do this, you just type in file:ppt or file:pdf along with the topic of interest, e.g. kidney dissection file:ppt



Autumn going on to Winter skies

... Robert Garner

The cooler months of Autumn going on to Winter should provide some great observing opportunities of celestial objects in the night sky.

Another solar eclipse

On the morning of 10 May 2013, Australia will experience a solar eclipse. Unlike last November's eclipse, the Moon will be close to apogee (greatest distance from Earth) in its elliptical orbit at the time and so its angular diameter will appear to be less than that of the Sun. The Moon will not therefore completely block out the Sun this time. Hence the eclipse will be an annular eclipse with the Moon blocking 90% of the Sun's disc. Thus it will appear as a 'ring of fire'. The midline of the eclipse will be across NW Western Australia, the middle of the Northern Territory and across Cape York.

As we are well away from the midline of the eclipse, those of us in NSW will observe a partial eclipse blocking about 40% of the Sun's disc at mid-eclipse just before 9 am.

Note: Any solar eclipse should only be observed indirectly. The remaining light from the Sun is still blinding! To protect your vision, you can view an eclipse safely at an observatory using a solar filter, or by using a pinhole camera (see Box 2 on page 11 in *SciTalk No 4-2012*).

Constellations

The Southern Cross constellation can be found high in the south-east with the Pointers trailing behind. To the right of Crux, in the south-western sky, is the star Canopus, the second brightest star in the night sky. Low in the south is the star Achernar. This star never sets for us and so, along with the Southern Cross and the two Pointers (Alpha and Beta Centauri), is described as 'circumpolar'.

In April you will still be able to see both the summer constellation Orion (the hunter), as well as the winter constellation Scorpius (the scorpion) for a brief time after sunset. Orion can be seen lying on its side low in the west below Sirius, the brightest star in the night sky. Scorpius can be found rising in the east with the red star Antares marking the scorpion's heart.

The Planets: April to June

At the start of April, Mercury is easy to see in the dawn sky, as it is at its greatest separation from the Sun (28°). These months are generally poor for viewing the planets, as both Venus and Mars are near conjunction (in the same direction as the Sun) and are therefore hidden in the Sun's glare. Jupiter is headed for conjunction in late June and so will gradually disappear into the twilight after sunset. Saturn is ideal for viewing at this time as it is close to opposition (on the opposite side of Earth to the Sun). It therefore rises around sunset and is high in the sky during the night.

Meteors

The theta-Ophiuchids can be observed from late May to mid-June, with best viewing in the northwest pre-dawn sky around 10–11 June when it will be a Moonless sky. The name given to meteors indicates their location in the sky, so you need to get out your star map and locate the Ophiuchus constellation to look for these meteors.

Using a Sky Chart / Planisphere

Remember, viewing the night skies is much simpler if you have a Sky Chart / Planisphere. See Box 1 about easily obtaining one of these.

Box 1: Sky Charts & Planispheres

- You can download free sky charts each month to explore the night sky (planets, stars & constellations) from: <http://skymaps.com/downloads.html> Make sure you scroll to 'Southern Hemisphere Edition'.
- A planisphere (star wheel) helps to find stars and locate constellations. These are inexpensive and available from astronomy shops, or you can download one from the internet – make sure it is for the Southern Hemisphere. There is a planisphere (star wheel) to print and use at: <http://members.ozemail.com.au/~starrylady/resources.html>

MACQUARIE UNI OBSERVATORY & PLANETARIUM PUBLIC FRIDAY NIGHT OBSERVING

The Macquarie University Observatory (access via Gymnasium Rd) is open to the public every Friday night (March–Nov inclusive). It opens 8–9.30pm (in AEDT) or 7–8.30pm (in non-AEDT).

Bookings are essential and must be done online at: physics.mq.edu.au/community/observatory/ If doubtful weather, check online after 5pm.

You will be guided through the night sky by professional astronomy staff, who will show you planets, binary stars, nebulae, star clusters, and even bright galaxies through their 16" and 12" professional in-dome telescopes. Even with the light pollution of the city, you can easily see such features of the night sky. The Moon and planets, when in suitable positions, are easily viewed with any of their instruments. On dark, moonless nights with good seeing, you may also observe the brightest galaxies.

There are two planetarium sessions per semester on Friday nights from 6–7pm ... in the E7B Courtyard at Macquarie Uni. Tickets must be booked online at: physics.mq.edu.au/community/planetarium/

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When I was 5 years old, my mother always told me that happiness was the key to life. When I went to school, they asked me what I wanted to be when I grew up. I wrote down 'happy'. They told me I didn't understand the assignment, and I told them they didn't understand life.

... Anon

Editor's note: This quote I was sent is often attributed to John Lennon. However, it apparently did not first appear until some time after John Lennon's death. Also, John was not with his mother at five years old. Despite my searching, I could not find who did in fact say this! If any of you know who said this, please let me know. Nevertheless, the sentiments expressed are interesting. As we tell our students, you need to check things for reliability.

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HOW TO ENTER: Send an answer to the Quiz Question, your name, school and school address on an envelope to: Competition Corner, PO Box 442 Freshwater 2096 – by 12 April 2013.

SciTalk 4/12 answer: Northern

QUIZ QUESTION: Which organisation determines correct chemical nomenclature?

[Hint: see pages 3 & 4]

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SciTalk

SciTalk is a newsletter for secondary Science educators. Now in its 19th year, it has been produced quarterly by Odum & Garner as a service to Science teachers since 1995. It is sent FREE-of-charge to all secondary Science faculties in schools and TAFEs throughout NSW and the ACT.

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.

Contributions, advertising and inserts are welcome.

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- *SciTalk* No. 1–January 2013 ... Dec 21
- *SciTalk* No. 2–May 2013 ... April 12
- *SciTalk* No. 3–August 2013 ... June 28
- *SciTalk* No. 4–October 2013 ... Sept 20

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