

SciTalk

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Number 1 – February 2009

Plan to celebrate 2009 International Year of Astronomy

Astronomy is the oldest fundamental science. It continues to make a profound impact on our culture and is a powerful expression of the human intellect. Huge progress has been made in the last few decades. One hundred years ago we barely knew of the existence of our own Milky Way or whether there were other solar systems in the Universe. Today we know that many billions of galaxies make up our Universe and that 228 planets have been identified around other stars in our galaxy so far.

One hundred years ago we studied the sky using only optical telescopes and photographic plates. Today we observe the Universe from Earth and from space, using electromagnetic radiation from radio waves to gamma rays. Media and public interest in astronomy have never been higher and major discoveries are frontpage news throughout the world.

With the theme of *The Universe, Yours to Discover*, IYA 2009 hopes to reconnect people with the night sky so that they gain a deeper insight into astronomy's role in enriching all human cultures, and learn more about the latest astronomy discoveries and essential role of astronomy in Science education. IYA2009 is an initiative of the International Astronomical Union and UNESCO. There will be IYA2009 activities taking place locally, regionally and nationally. For more information go to: www.astronomy2009.org.au/ and www.astronomy2009.org

* * * * *

'Luna' means 'moon' in Latin – why not visit Sydney Observatory before or after a visit to Luna Park Sydney for a Science excursion this year to celebrate the 2009 International Year of Astronomy?



★★ 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, 11 & 12
Send in your entries now
(ALL IN THE ONE ENVELOPE if you prefer!)

This SciTalk & past issues are available at www.odlumgarner.com

Book Giveaway

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2001-2008 Past HSC Papers with Worked Solutions



From \$20 ea with discount
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These books include complete copies of ALL the 2001-2008 exams with ALL questions, diagrams, etc, plus worked answers that are an appropriate length and would score fullmarks, PLUS: *Past HSC Questions by Topic Guide* for ALL questions from 2001-2008, a guide on *How to Achieve Success in the HSC*, and more.

TO WIN: Send in your name, school & school address, on the back of an envelope

by 9 April 2009 to:

Book Giveaway, PO Box 442, Freshwater 2096

★ ★ ★

Winner for SciTalk 4/08

Congratulations to Martin Schmidt, Keira High, who won *Understanding Science for Years 9 & 10* (\$26.95) published by Odium & Garner.

2009 editions of Past HSC Papers with Worked Solutions 2001–2008

Biology, Chemistry, Physics available NOW; Earth & Environmental Science, & Senior Science available in Term 2 – see p 7 for special prices and how to order these books.

ALL books include: Past HSC Questions by Topic Guide (2001–2008)

so students can choose to complete either whole exams or do questions in topics.

Top students and Science teachers use and recommend Odium & Garner books which are produced by Science teachers for Science teachers & their students

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... see page 6 for full details

www.odlumgarner.com

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Start planning now to celebrate
National Science Week
15–23 August 2009

Diary Dates 2009



Update on BOS matters

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

2008 Notes from the Marking Centre

These will go up on the BOS internet site during Term 1: www.boardofstudies.nsw.edu.au

2009 School Certificate Tests

The School Certificate test period will be 9–13 November 2009.

2009 HSC examinations

The HSC examinations period will commence 20 October 2009.

Official Notices are now online

Official Notices will be effective from the date they are on the BOS website. They can now be found on the BOS website prior to the Board Bulletin reaching schools.

BOS enquiries:

Ph: (02) 9367 8111, fax: (02) 9367 8484
Website: www.boardofstudies.nsw.edu.au/

BOS contacts for Science:

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

The only thing that interferes
with my learning is
my education.
... Albert Einstein

NOTE: Your purchase of the Odlum & Garner Past HSC Biology, Chemistry and Physics books helps to support the production of Past HSC books for Earth & Environmental Science and Senior Science. Thank you to all the teachers who support these projects.

Fun Park Excursions

to Luna Park Sydney

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The original and best

Details at: www.odlumgarner.com

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only through Physics is Fun!**

**WHY PAY MORE? SAVE \$\$\$
ANY FACULTY CAN COME ... see p6**

★ ◆ ★ ◆ ★

Come for just a **FUN DAY** or **EDUCATIONAL DAY!**

These days are held throughout the year and are a great way to have FUN learning.

Worksheets if needed are available for:

- Primary Science & Technology, English, Maths
- Science 7-10 • Technology • Mathematics • Art
- Physics • Senior Science • Biology • Photography
- Peer Support • Commerce/Bus. Studies/Tourism

Book your date now by ph (02) 9939 6107
** Includes complete Risk Assessment package **

2009 – International Year of Astronomy

FEBRUARY 2009

27 Schools' Clean Up Australia Day. Ph: 1800 282 329. Details. www.cleanup.com.au

MARCH 2009

2–8 Seaweeek 2009: www.mesa.edu.au Some resources will also be at: www.ausmepa.org.au

13, 16, 30 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

20 Autumn Equinox. **ALSO:** International Earth Day. www.earthsite.org/
[Note: 20 March is the original day, but it is celebrated on 22 April in some places: www.earthday.net/]

MAY 2009

4 May–5 June Shell Questacon Science Circus at Gosford, Woy Woy, Wyong, Newcastle, Maitland, Scone, Cessnock, Singleton, Muswellbrook, Quirindi, Mudgee: www.questacon.edu.au/html/on_the_road.html

6–8 Science at the Shine Dome conference, Australian Academy of Science: Applications close 9 March. Details on Teacher Awards to attend, at: www.science.org.au/sats2009/ta.htm

9 Astronomy Open Night & Lecture. Macquarie Uni E7B. 6–10pm, lecture 7.45pm. Cost: Adult \$10/Child \$5/Family \$25, (02) 9850 7111, www.physics.mq.edu.au/astronomy/news/calendar.html

25 Science Teachers' Forum. Children's Medical Research Institute. www.cmri.com.au

27–31 Australian Science Festival, ACT. School Activities: 27–29/5. www.sciencefestival.com.au

8, 29 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

JUNE 2009

1, 5 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

tba Closing date Crystal Growing Comp. www.chem.unsw.edu.au/RACI/ Ph: (02) 9663 4960

19, 20 NSW Schools Titration Competition. www.nswtitration.com/

JULY 2009

4–7 CONASTA 58: *Science Education – a Bridge to the Future*. Ph (07) 3861 5444.

Fax (07) 3861 5701. Launceston, TAS. www.cdesign.com.au/conasta58/

25 July–1 Aug National Chemistry Week. www.raci.org.au/national/events/chemistryweek.html

30 National Chemistry Quiz. www.raci.org.au/national/events/nationalchemistryquiz.html

12–25 35th International Science School: Held by The Science Foundation for Physics. See pp4

AUGUST 2009

7 Jeans for Genes Day. www.jeansforgenes.org.au/

15–23 National Science Week. *Astronomy: Science Without Limits*. www.asta.edu.au/nscwk

14, 17, 21 National Science Week events: Physics is Fun at Luna Park. www.odlumgarner.com

19 Physics Olympiad Nat. Qualifying Exam. www.aso.edu.au/ Close date: 27 June. 6125 9645

26 Biology Olympiad Nat. Qualifying Exam. www.aso.edu.au/ Close date: 27 June. 6125 9645

29 Astronomy Open Night & Lecture. Macquarie Uni E7B. 6–10pm, lecture 7.45pm. Cost: Adult \$10/Child \$5/Family \$25, (02) 9850 7111, www.physics.mq.edu.au/astronomy/news/calendar.html

SEPTEMBER 2009

2 Chemistry Olympiad Nat. Qualifying Exam. www.aso.edu.au/ Closedate: 27 June. 6125 9645

18, 21 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

22 Spring equinox

OCTOBER 2009

11–17 Earth Science Week. www.ga.gov.au/education/events/, 6249 9859 (www.earthsciweek.org)

23, 26, 30 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

NOVEMBER 2009

tba Science Teachers' Forum. Children's Medical Research Institute. www.cmri.com.au

2, 16, 20 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

23, 27, 30 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

DECEMBER 2009

4, 11 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

JANUARY 2010 National Youth Science Forum. Forms to local Rotary club by 15/5/09, interviews in July.

Only for Yr 11 in 2008. Enquiries: 6125 2777, fax 6125 8015, email: nsss@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.



The 2009 Australian Science Festival will be held from 27–31 May and will celebrate the International Year of Astronomy with big bangs, shooting stars and soaring rockets!

The *Amazing World of Science* will be held

from 27–30 May, with the *School Program* running from 27–29 May.

The program consists of hands-on workshops and shows, covering many areas of the science curricula. Ticket prices start at \$4 for students with supervising teachers free.

Details at: www.sciencefestival.com.au
email: info@asflimited.com.au, ph: 6207 5901.

▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶ **OUT AND ABOUT**

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 \$20.00 per student (teachers free).

Bookings & Information:

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



MUSEUM OF HUMAN DISEASE

2009 EXCURSION OPTIONS & TEACHERS DAY

The Museum of Human Disease is a pathology museum at UNSW offering interactive programs with amazing insights into the nature and progression of disease in its many forms. We offer 2 hour curriculum-based programs in the following areas:

- HSC Biology – *The Search for Better Health***
- HSC Senior Science – *Bionics***
- Junior Science – *Infectious & Non-infectious diseases, microorganisms***

The 2009 Professional Development Day for teachers of Senior Biology will be held on Friday 3 July. Information and registration forms will be distributed to schools at the beginning of Term 2.

Further information and bookings:

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



SYDNEY AQUARIUM

Aquarium Pier, Darling Harbour, Sydney



Sydney Aquarium is proud to announce the launch of its brand new exhibit *Mermaid Lagoon* which features 2 of only 5 captive dugongs in the world and the only opportunity in Australia to study these mystical mammals closely.

Orphaned at a young age, these 2 cows of the sea have settled in to their new environment and munch their way through 100 kgs of cos lettuce a day. Discover through interactive fun graphics where dugongs live, their closest relatives, their biology and adaptations and the threats to their populations and habitats.

Educational resources have been upgraded with information about these fascinating creatures. Go to www.sydneyaquarium.com.au and click on *Aqua School*.

Combine your visit to Sydney Aquarium with a screening of 'Under the Sea' 3D at the Imax Theatre Sydney and make 'Marine Magic'.

For enquiries or bookings:

Phone (02) 8251 7811
 Email: education@sydneyattractions.com.au
 Website: www.sydneyaquarium.com.au ... and go to *Aqua School*

LG IMAX THEATRE SYDNEY

31 Wheat Rd, Darling Harbour, Sydney 2000



NEW IN 2009

Under the Sea 3D ... starts Term 1

UNDER THE SEA 3D, the newest IMAX 3D underwater adventure from the award-winning filmmakers behind *Deep Sea 3D*, will transport audiences to uniquely exotic locations in the Asia-Pacific region, including The Great Barrier Reef, Southern Australia, Papua New Guinea and Indonesia, to experience face-to-face encounters with some of the ocean's most mysterious and unusual creatures. UNDER THE SEA 3D will also offer an inspirational and entertaining way to explore the impact that global climate change has had on our ocean wilderness.



For School Bookings:

Ph: (02) 9213 1600 Fax: (02) 9281 3833
 Email: education@imax.com.au
www.imax.com.au/schooltimetables

Science Teachers' Forum

To be held at the
Children's Medical Research Institute
 Westmead, Sydney
Monday 25 May 2009
 9.45 am–4.30 pm



This one-day forum will focus on the science of genetics and disease, concentrating on topics relevant to the HSC Biology syllabus.

It will include an introduction to the use of **Gene Technology** in medical research, followed by captivating presentations from two prominent CMRI scientists. There will also be an informative session devoted to the topic of **Genetics and Ethical Issues** followed by interactive hands-on practical lab demonstrations of simple DNA-based techniques.

Places will be limited, so please book by **Friday 24 April 2009**.

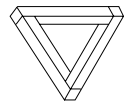
Contact: Debbie Brewer (02) 9687 2800
 email: dbrewer@cmri.usyd.edu.au

Cost: \$55 to cover cost of refreshments and lecture notes.

* An additional Forum will be held in November *

Science Centre & Planetarium

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



★ **Taking bookings for 2009**

★ **Star Trails Outreach Program** – visiting schools with interactive Science Shows.

★ We have an extensive range of **shows & exhibits**, including:

- **Stellar Evolution** – planetarium program for HSC Physics
- **Superconductors & Liquid Nitrogen** – live science show
- **Zap! Understanding Electricity**
- **Energy and Motion**
- **The Changing Earth**
- **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>



The University of Sydney

35th Professor Harry Messel International Science School (ISS) for year 11 & 12 Science students

12–25 July 2009 at The University of Sydney
Application forms will be available from mid-February 2009 at:
www.physics.usyd.edu.au/foundation/

In July 2009, 140 students from across Australia and nine other countries will be hosted by the School of Physics at The University of Sydney, for two weeks of cutting-edge science. *Genes to Galaxies* will feature leading researchers speaking on subjects including biological evolution and the life and death of galaxies. The theme ties in with celebrations for the International Year of Astronomy and the sesqui-centenary (150th) of Darwin's publication of *On the Origin of Species*.

Beyond the lecture theatres, ISS scholars participate in diverse activities — experiments, museum visits, lab tours, and social events such as an evening harbour cruise. These two weeks are often described by the scholars as “the best two weeks of my life”.

All scholars are competitively selected at State level, and attendance is by scholarship only. The scholarships are valued at approximately \$3 000 and cover return travel within Australia, full board at Women's College, all events and activities organised by the Science Foundation for Physics and a copy of the official ISS book of lectures.

For more information contact:

Adam Selinger, Science Foundation for Physics
ph (02) 9351 3622, fax (02) 9351 7726,
email adam@physics.usyd.edu.au
or visit www.physics.usyd.edu.au/foundation/



COMBINE A FUN PARK EXCURSION BOOKED THROUGH PHYSICS IS FUN WITH IMAX OR SYDNEY AQUARIUM

Combine your Fun Park Excursion at Luna Park Sydney booked through **PHYSICS IS FUN** with a visit (before or afterwards) to either **IMAX** or **SYDNEY AQUARIUM** for a great action-packed, fun time of interactive learning. These excursions are a great way to demonstrate learning in action.

● **COSTS, BOOKING DETAILS & WORKSHEETS:**

IMAX: www.imax.com.au/schools
SYDNEY AQUARIUM:
www.sydneyaquarium.com.au
PHYSICS IS FUN (Luna Park):
www.odlumgarner.com

● **PLANNING YOUR DAY:**

Allow 1 hr for IMAX (any film),
or 2 hrs for a Sydney Aquarium excursion.
Allow 2–3+ hours for Physics is Fun at
Luna Park (open 11 am–6 pm)

**BOOK & PAY SEPARATELY
FOR EACH EXCURSION**

AUSTRALIAN MUSEUM SCHOOLS PROGRAMS 2009

Involve your students in exciting exhibitions and stimulating curriculum-linked programs exploring nature and culture.

FOR SECONDARY SCHOOLS

Hands-on sessions with a Museum educator are included with:

- Evolution of Australian Biota (Yr 11–12)
- Human Story (Yr 11–12)
- Fossils (Yr 11–12)
- Earth & Environmental Science Sessions (Yr 11–12)
- Evolution Trail Combo (Yr 9–10)
- Aboriginal studies talks (Yr 7–12)
- Site Study for History students (Yr 7–10)

K–12 self-guided activities are also available for exhibitions on: *Skeletons, Birds and Insects, Planet of Minerals, Indigenous Australians, PLUS*

NEW PERMANENT EXHIBITIONS

- ❖ **Surviving Australia:** Discover surprising animal secrets in this new exhibition showcasing stories of Australian wildlife and tales of their adaptation and survival over millions of years of changing climate and landscape.
- ❖ **Dinosaurs:** Encounter dinosaurs as you've never seen before in this exciting new immersive exhibition at the Australian Museum.

INTERACTIVE TEMPORARY EXHIBITIONS FOR 2009

- ❖ **Climate change: our future, our choice** (Term 2)
- ❖ **When mammoths roamed** (Term 2)

FREE Teachers' Preview Night on 6 May 2009, 5.15–7.30 pm

RSVP by email: learning.services@austmus.gov.au

Teacher resource packs available.

Biota bookings now available for 2009.

For bookings and further information

Ph (02) 9320 6163 Fax (02) 9320 6072 www.australianmuseum.net.au/visiting/education

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



Science on the Web

● **The 15 Coolest Cases of Biomimicry**

<http://brainz.org/15-coolest-cases-biomimicry/>
Biomimicry is the practice of developing sustainable human technologies inspired by nature – it is biologically inspired engineering. This site describes some great research and possibilities – from velcro based on plant burrs, passive cooling based on termite mounds, the concept of ‘gecko

tape’, turbine blades based on whale flippers, self-healing plastics, streamlining recurring natural designs such as the Fibonacci sequence, artificial photosynthesis for fuel production, and many more.

● **Topics on NOVA: Science in the News**

www.science.org.au/nova
New topics are added regularly to the Australian Academy of Science's NOVA site which is updated regularly. Latest topics are:

- * *Flying beyond our means – air travel and the environment*
- * *A sense of things to come – smart sensors and the environment*
About monitoring reef systems or catchments for environmental change.
- * *Clean speed ahead with catalysts*
Catalysts could help solve some of the world's biggest pollution problems.
- * *Cancer immunotherapy – redefining vaccines*

HSC statistics: Science entries in the 2008 HSC

The total number of entries for the HSC Science courses* in 2008 was 40 723 and the total number of HSC entries for the 2008 HSC was 67 324. So Science entries were 60.5% of the total entries.

The number of HSC Science entries as a percentage of the total HSC entries from 1992–2008 is shown in the table below. This percentage has decreased significantly from the peak of 90.8% of the total candidature in 1992[#] with 54 414 students doing a Science course to only 58.0% in 2001. Since 2001, the percentage of Science entries has not varied greatly from around 58.0%, although it increased to 60.5% in 2008. This is still much lower than in past years.

Entries for HSC Science courses 1992–2008 as a percentage of the total number of HSC entries [#]																	
YR	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
%	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

The pattern of options presented at the 2008 HSC for each Science course is given as a percentage in the following tables.

Biology	
Total 2008 candidature 15 254 (♂ 5 816 ♀ 9 438)	
Q28. Communication	62.7%
Q29. Biotechnology	7.1%
Q30. Genetics: The Code Broken?	19.2%
Q31. The Human Story	10.6%
Q32. Biochemistry	0.3%
	99.9% [§]

Physics	
Total 2008 candidature 9 029 (♂ 6 876 ♀ 2 153)	
Q28. Geophysics	1.3%
Q29. Medical Physics	29.2%
Q30. Astrophysics	22.1%
Q31. From Quanta to Quarks	45.8%
Q32. The Age of Silicon	1.7%
	100.1% [§]

Chemistry	
Total 2008 candidature 10 154 (♂ 5 583 ♀ 4 571)	
Q28. Industrial Chemistry	43.7%
Q29. Shipwrecks, Corrosion and Conservation	37.7%
Q30. The Biochemistry of Movement	1.4%
Q31. The Chemistry of Art	3.1%
Q32. Forensic Chemistry	13.7%
	99.6% [§]

Earth & Environmental Science	
Total 2008 candidature 1 258 (♂ 688 ♀ 570)	
Q28. Introduced Species & the Australian Environment	79.9%
Q29. Organic Geology – A Non-renewable Resource	7.8%
Q30. Mining and the Australian Environment	4.5%
Q31. Oceanography	7.9%
	100.1% [§]

Senior Science	
Total 2008 candidature 4 592 (♂ 2 523 ♀ 2 069)	
Q28. Polymers	2.4%
Q29. Preservatives and Additives	4.9%
Q30. Pharmaceuticals	18.0%
Q31. Disasters	63.9%
Q32. Space Science	10.4%
	99.6% [§]

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

* 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 below reflects the actual number of students who received a result for each subject. It differs from the figures given in the media as their figures are the number of HSC entries for each subject as of September 2008. There is usually a difference between these two sets of figures because some students

Distinction Cosmology: Total 2008 Candidature was 30 (24 males, 6 females).
Science Life: Total 2008 Candidature was 406 (234 males, 172 females).
(These courses are part of the total science entries.)

These tables were prepared by Robert Garner using data provided by Board of Studies, Feb 2009.

A man should look for what is,
and not for what he thinks should be.
Information is not knowledge.

... Albert Einstein

RACI NSW SCHOOLS TITRATION COMPETITION 2009

19 June (UNSW, St John Bosco College);
20 June (other Sydney venues, Wollongong Uni); tba – regional venues

The 2009 NSW Schools Titration Competition is a great way for Year 11/12 chemistry students to test their quantitative analytical skills. It is 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. Entry costs \$33/team of 3 students – with a max of 8 teams/school.



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 around mid-September 2009. All students receive a Certificate of Excellence or Merit or Participation. The **de Miklouho-Maclay Prize** (certificate & \$100) is awarded to the NSW student with the best overall results.

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)].

- ★ **For details, entry forms, hints & tips:** www.nswtitration.com
 - email: ajhey@nswtitration.com • ph: 4655 2961
 - postal: POB 282 Georges Hall 2198 • Closing date: 8 May 2009
- ★ **2008 NSW Schools Titration Competition:** 49 schools achieved an Excellent award, 41 achieved a Merit award. Congratulations to: *1st:* Girraween HS, *2nd:* Coffs Harbour HS, *3rd:* Rosebank College
- ★ **2008 National Competition:** Of the top 25 scores, 2 were achieved by NSW teams: 14th place (Shore) and 15th place (Fort Street HS). 1st Place in Australia – Pulteney Grammar from Adelaide.
- ★ **2008 de Miklouho-Maclay Prize** for excellence in Chemistry with the best overall result in the National Titration Competition went to Liam Gray of Shore with a perfect score of zero!
- ★ Congratulations to all these competitors!
- ★ **Looking for another new venue in 2009** – does your school have what it takes to be a venue? In 2008 we welcomed St George Girls' High. Contact Alasdair: 0400 370 963



FUN PARK EXCURSIONS

2009 DATES

March 13, 16, 30. May 8, 29.
June 1, 5. Aug 14, 17, 21.
Sept 18, 21. Oct 23, 26, 30. Nov
2, 16, 20, 23, 27, 30. Dec 4, 11.

PLUS: OTHER SCHOOL DAYS
are also available

[Note: Luna Park only open on Mondays & Fridays]

TIME 11 am–6 pm

COST Only \$23*/student
plus \$25* booking fee/school
[Non-scheduled days: from \$24*/student]

Teachers **FREE:** 1/8 primary or
1/15 secondary students.

Entry to Luna Park is **FREE**. Extra
teacher ride tickets are \$26* ea.

*plus 10% GST (schools can claim this back,
only if doing a curriculum-specific excursion).

SPECIAL SCHOOL PRICES
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DISCOUNT SCHOOL PRICES
for **FUN DAYS**
or **EDUCATIONAL DAYS**

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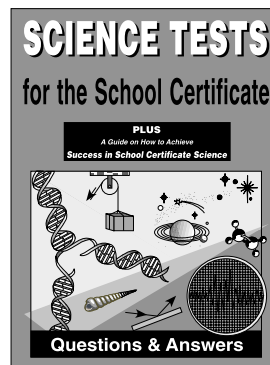
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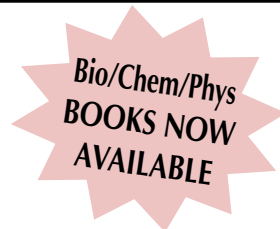
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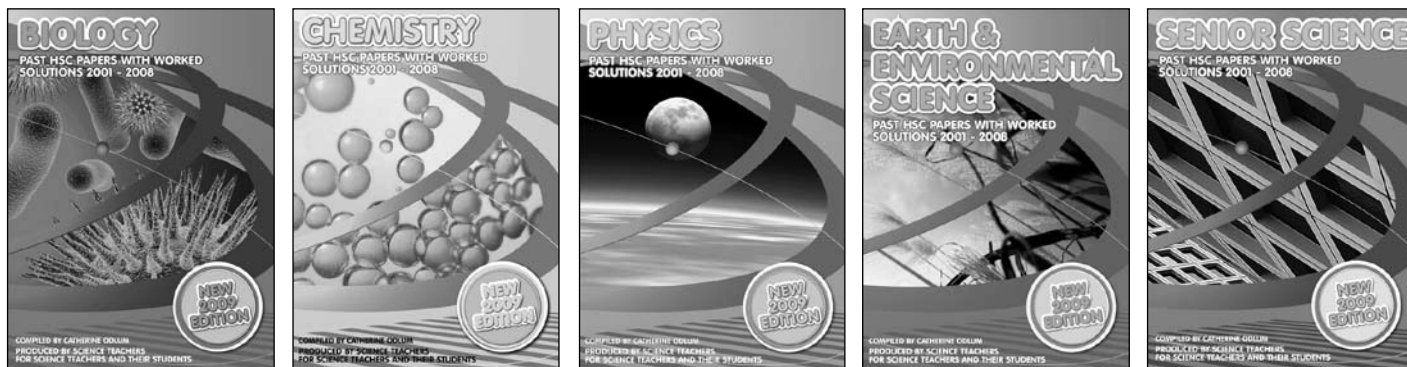


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Photo Spot

Silica spheres – a technology for controlled release

Silica particles, as shown in Figure 1, are spherical in shape. Scientists at ANSTO have developed the technology to encapsulate (enclose) a wide range of active chemical molecules within hollow silica spheres, and to control their release over a period of time.

Controlled release is achieved by restricting diffusion of encapsulated molecules out of the particles, by tailoring the internal pore structure of the spheres. The pores range from <2 nm to much larger pores. Controlled release has been demonstrated for species ranging in size from small drug molecules to large proteins.

Silica spheres are sub-microscopic in size and can be synthesised over an extensive size range from 10 nm–50 µm, thus enabling the design of release systems suitable for a wide range of uses. Silica has a number of accompanying attractive properties, including biocompatibility, chemical inertness and optical transparency. These properties mean that silica spheres are suitable for use in many applications, e.g. in chemical, biocide, pesticide, food, cosmetic and pharmaceutical markets.

Medical use

One potentially interesting application of this technology is in medicine for the controlled release of drugs. Drug delivery systems can improve how a drug works in a person by maintaining a desired concentration profile in the blood. To achieve stability in the bloodstream, the silica particles are ideally in the size range 50–300 nm. Smaller particles can diffuse through blood capillary walls, leading to nonspecific distribution in the body, whereas larger particles become trapped in the lungs and the liver. Clearly, it is important that the nanoparticles remain non-aggregated, which presents a challenge. Another possible use is the delivery of active agents, such as enzymes associated with oral hygiene.

Industrial use

The slow release characteristic of silica spheres has possible industrial uses. For

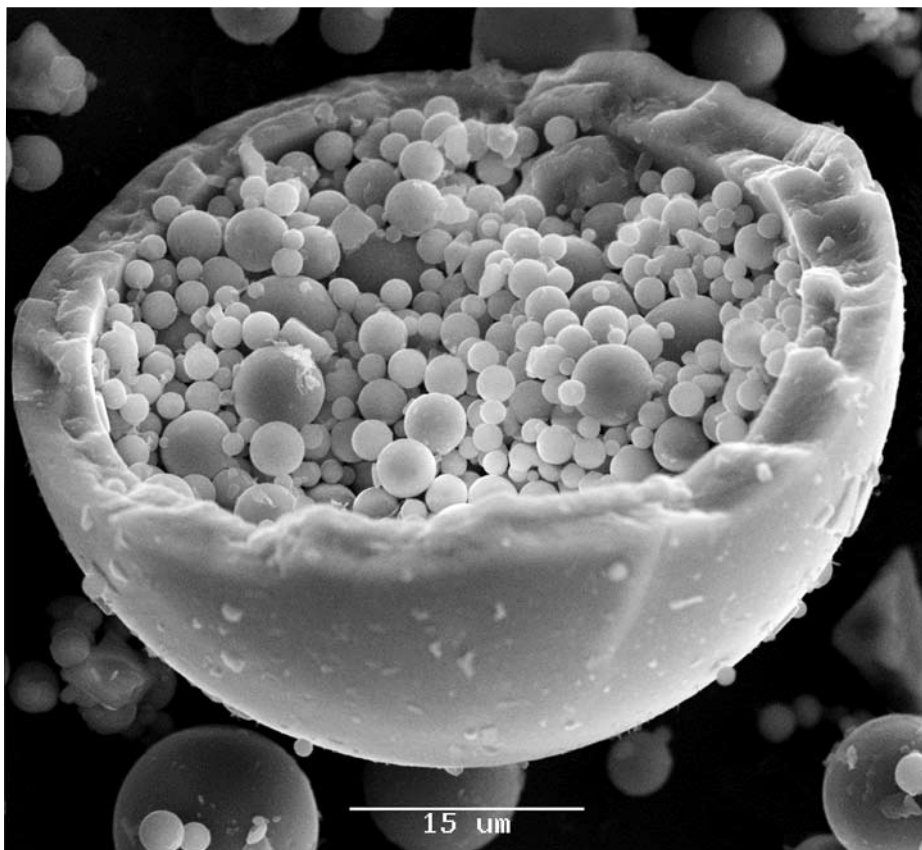


FIGURE 1: ‘Silica spheres’ – this shows a cracked silica sphere with even smaller silica spheres inside it. This photomicrograph was taken using a scanning electron microscope. It was taken by Joel Davis (ANSTO & CeramiSphere).

example, the transparency of silica suggests applications in optical sensors. Pigment-sized dyed ceramic particles added to paint could

also be used to release anti-fouling agents over a long time period. □

An interesting fact about precious opal

Precious opal shows a variable interplay of internal colors and even though it is a mineraloid, it does have an internal structure. At the micro scale precious opal is composed of silica spheres some 150–300 nm in diameter in a hexagonal or cubic close-packed lattice. These ordered silica spheres produce the internal colors of opal by causing the interference and diffraction of light passing through the microstructure of the opal. It is the regularity of the sizes and the packing of these spheres that determines the quality of precious opal.

Progress towards a National Curriculum

In April 2008, the National Curriculum Board (NCB) began preparing an Australian national curriculum for K–12, starting with English, Mathematics, the Sciences and History.

The focus of 2009 will be the development of the curriculum. The NCB will examine current curricula from across Australia and samples from other high-performing countries to contribute to its work.

The NCB has consulted on the issues it raised in the *National Curriculum Development Paper*, released in June 2008, and now sets down answers to its questions

in a new document *The Shape of the National Curriculum: A Proposal for Discussion* (link to this on NCB website). This should be read in conjunction with the national curriculum framing papers, which are available for review and comment on the NCB website at www.ncb.org.au/our_work/preparing_for_2009.html

Feedback is to be submitted by 28 February 2009, either by email to feedback@ncb.org.au or by mail to: National Curriculum Board Feedback, PO Box 177, Carlton South, Victoria 3053.

The purpose of the papers is to generate

broad-ranging discussions in the community about the proposed directions and provide opportunities to comment. The framing papers for English, Mathematics, Science and History propose broad directions for what teachers should teach and young people should learn from K–12.

The NCB will determine its final recommendations in Term 1 2009.

You can be fully involved and up-to-date with national curriculum development by registering for the online consultation and feedback system available on the NCB website in the ‘Getting involved’ section. □

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All papers will be delivered in Week 1 of Term 3. Invoices will be sent with the papers.
Papers can be used as exams at any time after delivery but are not to be released to students before 17 August (Trial) or 14 September (Preliminary and School Certificate.)



Summer–Autumn Sky Views

... Robert Garner

The morning and night skies promise some great sights during Term 1. This year is the International Year of Astronomy 2009. The article below will help you to enthuse your students in astronomy as it highlights some interesting stellar objects that should be visible and when.

Locating constellations

The summer constellations, Orion, Taurus and Gemini are now in the northwestern evening sky. Orion is one of the easiest constellations to recognise. The very bright, hot star, Rigel lies above and to the west of 'Orion's belt', while the cooler red giant Betelgeuse lies below and to the east of 'Orion's belt'.

The constellations Cancer and Leo are in the northeastern evening sky, while Virgo rises in the east by late evening. The well-known star cluster, The Pleiades, is at the western end of Taurus and is easy to find in the western sky just after the end of twilight.

Gemini, 'the Twins', lies below and a little to the east of Orion. Its two brightest stars, 'the twins', are Castor and Pollux. Castor is below and slightly west of Pollux. Castor is very interesting because it appears as a bright star to the naked eye, however a small telescope can resolve Castor as a double star with two stars orbiting their centre of mass about every 400 years. A much larger telescope can detect another fainter star orbiting the other two over a very long period >10000 years. Spectroscopic analysis of these 3 stars reveals that each star is a spectroscopic binary. Thus, Castor is actually a system of 6 separate stars held together by gravitation as a complex system.

Crux, the Southern Cross, lies on its side to the southeast above the pointers, α -Centauri and β -Centauri. β -Centauri is closer to the Southern Cross and α -Centauri is just below it. The α -Centauri system contains the closest stars to Earth after the Sun. Looking at it through even a small telescope resolves it as a binary system containing two bright stars. A large telescope reveals that α -Centauri contains a third star, proxima Centauri, which is actually the closest star of the group to Earth, at a distance of just over 4 light years. β -Centauri is actually much further away than α -Centauri, at 525 light years.

A planisphere (star wheel) is a worthwhile aid for exploring the stars and locating constellations. These are inexpensive and available from astronomy shops, or you can download one from the internet (see Box 1). May sure it is for the Southern Hemisphere.

Locating Planets

Venus, Mars and Jupiter are all morning sky objects in February March and April. Mercury is with them until mid-March when it is lost in the dawn sunlight. The three planets, Mercury, Mars and Jupiter are extremely close together in the dawn sky during the last week of February and will be close to the crescent Moon on 23 February. On 25 February, Mercury and Jupiter are less than 1° apart, making the fainter Mercury easy to find. Mercury drops towards the dawn horizon in the second half of March as it moves behind the Sun to reach superior conjunction on 31 March and will reappear in the evening twilight sky in April. Mercury will be hard to find until 27 April when it will be only 2° from the 2 day old Moon with Pleiades between them, so this will make it easier to locate.

Saturn is in the evening sky for the first half of the year. At the moment, Saturn's rings are edge-on to viewers from Earth, so a clear view of the planet can be seen. On both 24 February around 11:45 pm and on 12 March around 10:45 pm, it will be possible to observe the transit of Titan (and its shadow) across the face of Saturn. This is only possible every 14 or 15 years and so is a rare event. Titan, Saturn's largest moon and the second largest moon in the solar system after Ganymede, is larger in size (though less massive) than the planet, Mercury. On the evening of 12 March, Sydney Observatory will be open to view this event as one of the events of International Year of Astronomy 2009.

Meteors

For those of you who can get up a few hours before dawn, the *Eta-aquarids* should be active 19 April–28 May, peaking around 6 May. They move swiftly, have a striking yellow colour and it is usually well worth making the effort to view them.

'Harmonious Revolutions: Galileo & Music of the Spheres' – a music concert in Canberra on 4 March 2009 –

This event for the International Year of Astronomy 2009 will take place in Canberra in early March. Consort Astraea will present a musical tribute to Galileo, his father Vincenzo and his younger brother, Michaelagnolo. It will consist of a free performance of images, dialogue and Renaissance and Baroque music on period instruments at the National Press Club in Canberra on 4 March. Featured composers include Vincenzo and Michaelagnolo Galilei, Kapsperger, Cavalieri, Peri, Caccini, Monteverdi, Malvezzi, Allegri, Boeset and Gabrieli. Did you know Galileo was part of a musical family? Although this concert is free, bookings are essential. □

Aboriginal perspectives on the origin of the Moon

The Aboriginal people have many dreamtime stories to explain the world around them. One such dreamtime story to explain 'how the Moon was created' is told by the Adnyamathanha people from the northern Flinders Ranges, who describe how the Moon was created by a greedy nephew who kept stealing his uncle's food. Every time the uncle hunted a kangaroo he would bring it to the camp, prepare it and cook it in a ground oven with hot coals. The nephew would steal the cooked kangaroo as his uncle slept. He was punished by his uncle who made him climb a tall tree which was then cut down, leaving his now very fat round nephew in the sky in the form of the Moon.

Another dreamtime story from Cape York gives a different account about how the Moon got into the sky. Many years ago, people realised that a light was needed at night time, as the Sun lit up their daytime. They thought about collecting a huge pile of fire wood during the daytime hours and setting fire to it just as the Sun set. However, most of the people thought that this idea was impractical. One member of the tribe had

a great idea: why not make a special boomerang that would shine, throw it high in to the sky and at night this boomerang would give enough light to allow people and animals to see at night. They made a giant boomerang. People tried to throw it high into the sky. They tried but they just couldn't throw it high enough. Then, a very thin, old, weak man stepped forward and politely asked if he could try. Everyone laughed at him when they saw his weak, thin arms. One of the elders was a kind and wise man and said the old man should be allowed to throw the boomerang. And throw the boomerang the old man did! It went higher and higher and higher and finally stayed up in the sky as the Moon, shining down onto the people. The shape of the boomerang can still be seen in the Moon every month. □



BOX 1 Sky Charts & Planispheres

- You can download free sky charts each month to explore the night sky from: <http://skymaps.com/downloads.html>
- Better still, there is a planisphere (star wheel) to print and use at: <http://members.ozemail.com.au/~starrylady/Planis1.htm>

February is the time to view Comet Lulin

Comet C/2007 N3 (Lulin), discovered in July 2007 by astronomers in Taiwan and China, is predicted to reach about 5th magnitude around 21–27 February 2009. This comet has already swung around the Sun and is currently approaching Earth. It will be closest to Earth on 24 February 2009.

As of mid-February, it's easily visible in binoculars near Saturn (between the stars Spica and Regulus) in the evening – if you have good viewing conditions. Some observers have even reported detecting it with the unaided eye on a dark, moonless sky. In telescopes and low-light images, it should show a dim tail and antitail. Sharp-eyed observers may even be able to spot it with unaided eyes. It will become more difficult to see in March as it recedes from Earth, so get out quickly if you want to see Comet Lulin.



Comet Lulin on 2 February 2009 – visible with a magnitude of 6.5, it shows both a tail and an antitail. Photograph taken by Paolo Candy.

IYA 2009 Star Night at Parramatta Park

A Star Night will be held in the evening at Parramatta Park as a special event for the International Year of Astronomy 2009 on 2 May 2009. Admission will be FREE!

Parramatta Park includes the site of the old Parramatta Observatory, which was adjacent to the old Government House. The date of this 2009 Star Night is the anniversary of the opening of Parramatta Observatory in 1822.

It will be supported by a number of Sydney-based astronomical societies, and between 50–100 telescopes should be available for viewing the night sky, weather permitting, adjacent to the closed Long Avenue side of the park. Public parking will be available nearby, adjacent to both Parramatta Swimming Centre and Parramatta Stadium. It is a short walk from either Parramatta / Westmead train station.

Daytime activities before the Star Night will be provided by Parramatta Park Trust and will probably include a virtual archeological dig, art displays, aboriginal heritage and models of instruments that were/would have been in the old observatory.

Challenges can be stepping stones
or stumbling blocks.
It's just a matter of how you view them.

... Unknown

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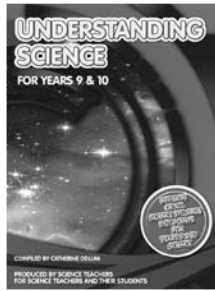
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- University of Technology, Sydney Eureka Prize for Science Teaching (secondary science teachers)

Entries close 1 May 2009. For more details, including teachers' Resources and Lesson Plans, email eureka@austmus.gov.au or go to www.australianmuseum.net.au/eureka

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SciTalk

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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.

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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CONTRIBUTIONS

SciTalk is due into schools mid-term. All contributions for *SciTalk* should be directed to the Editor (see below).

CLOSING DATES

- *SciTalk* No. 1–February 2009 ... Jan 30
- *SciTalk* No. 2–May 2009 ... April 28
- *SciTalk* No. 3–August 2009 ... July 27
- *SciTalk* No. 4–October 2009 ... Oct 2

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