Providing support and promoting excellence in science education

SciTalk

ISSN 1323-7667

Number 4 – November 2009

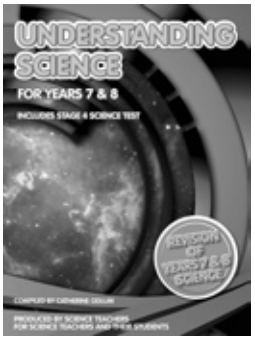
Understanding Science for Years 7 & 8

This book is the ideal revision guide for Years 7 & 8 Science students. It uses questions and answers to cover the Stage 4 Science Syllabus Dot Points for Years 7 & 8.

It also includes a Stage 4 Science Test for students to practise their exam techniques in preparation for school-based Science tests and statewide Science Tests, such as the ESSA Test.

The worksheets cover the Prescribed Focus Areas, plus the Skills and essential content of the Knowledge and Understanding sections of the Science Syllabus. The questions and answers have been prepared by highly experienced Science teachers. Each answer is clearly written in an easy to understand style for Stage 4 students.

Published by Odlum & Garner, this book is part of the *Understanding Science* series. For more information and **special school discount prices**, see pages 5–6 of this *SciTalk*. ☐



★ OUT NOW ★

Make sure your students use this book to revise their Years 7 & 8 Science.

Odlum & Garner books are produced by Science teachers for Science teachers & their students

National Curriculum progress

If you wish to follow the progress of the National Curriculum, go to: *www.ncb.org.au/our_work/curriculum_development_process.html*

The curriculum development timelines for writing the national curriculum and consultation are set out on this website.

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 Australian Curriculum, Assessment and Reporting Authority (ACARA) website in the 'Get involved' section. ☐

Get 13, 16 or 20 August 2010 into your school calendar for next year's Physics is Fun in National Science Week

INSIDE SCITALK ▶▶▶▶

★★ ATTENTION ★★

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

☐ 1. .....
☐ 2. .....
☐ 3. .....
☐ 4. .....
☐ 5. .....

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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

WIN a copy of these books ...

WIN

Core Science

Stage 4 Complete Course & eBook

Stage 5 Complete Course & eBook

by Paul Arena, et al

Published by Jacaranda

ISBN 9780731408733 RRP: $72.95 (Stage 4)

ISBN 9781742161136 RRP: $72.95 (Stage 5)

This series has a Stage 4 and Stage 5 text, plus workbooks and eBooks for Year 7 & 8 and Year 9 & 10 students respectively. Each text contains all topics and provides in-depth coverage of syllabus essential and additional content. Students can access an eBook version of the text and weblinks through *www.jacplus.com*, along with interactivities, games and video eLessons. Each series has a teacher resource book and eGuide. For details, go to *www.jaconline.com.au*

TO WIN: Send in your name, school & school address, on the back of an envelope **by 18 December 2009 to:** Book Giveaway, PO Box 442, Freshwater 2096

★ ★ ★

Winner for *SciTalk 3/09*

Congratulations to Mary Paull, St Ursula's College who won *in2Physics@preliminary (complete student pack)* (rrp $79.95) published by Pearson.

Diary Dates 2009–2010

2009 – International Year of Astronomy

NOVEMBER 2009

2, 16, 20 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
9–13 School Certificate Tests.
23 Science Teachers' Forum. Children's Medical Research Institute. www.cmri.com.au
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
22 Summer Solstice (3:47 am EST)

JANUARY 2010 National Youth Science Forum. Forms to local Rotary club by 29/5/09, interviews from July. Only for Yr 11 in 2009. Enquiries: 6125 2777, email: nsss@anu.au, www.nysf.edu.au/

2010 – International Year of Biodiversity

For: Shell Questacon Science Circus 2010 program: www.questacon.edu.au/html/on_the_road.html
tba: Astronomy Open Nights & Lectures: Macquarie Uni, www.physics.mq.edu.au/astronomy

MARCH 2010

1–7 Seaweek 2010: www.mesa.edu.au Some resources will also be at: www.ausmepa.org.au Theme: 'Oceans of Life; Oceans to explore, ours to restore'
5 Schools' Clean Up Australia Day. Ph: 1800 282 329. Details. www.cleanup.com.au
22, 26, 29 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
20 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/]
21 Autumn Equinox (3.32 am EST)

MAY 2010

5–7 Science at the Shine Dome conference, Australian Academy of Science: Details on Teacher Awards to attend soon at: www.science.org.au/events.sats
tba Science Teachers' Forum. Children's Medical Research Institute. www.cmri.com.au
7, 28 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

JUNE 2010

7, 11 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
tba NSW Schools Titration Competition. www.nswtitration.com/
21 Winter Solstice (9.28 pm EST)

JULY 2010

4–7 CONASTA 59 at UTS: *Celebrating Diversity – in Science, in Learning and in the Environment*. More details soon at www.conasta.edu.au/
19–24 National Chemistry Week. www.raci.org.au/national/events/chemistryweek.html
22 National Chemistry Quiz. www.raci.org.au/national/events/nationalchemistryquiz.html

AUGUST 2010

2–15 Australian Science Festival, ACT. For school Activities visit: www.sciencefestival.com.au
6 Jeans for Genes Day. www.jeansforgenes.org.au/
9, 13, 16, 20 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
14–22 National Science Week. *Australian Biodiversity.*
13, 16, 20 National Science Week events: Physics is Fun at Luna Park. www.odlumgarner.com
23 Physics Olympiad Nat. Qualifying Exam. www.aso.edu.au/ Close date: tba. 6125 9645
26 Biology Olympiad Nat. Qualifying Exam. www.aso.edu.au/ Close date: tba. 6125 9645
31 Chemistry Olympiad Nat. Qualifying Exam. www.aso.edu.au/ Close date: tba. 6125 9645

SEPTEMBER 2010

2 Rio Tinto Big Science Competition: www.asi.edu.au
10, 13 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
23 Spring Equinox

OCTOBER 2010

10–16 Earth Science Week. www.earthsciweek.org & www.ga.gov.au/education/events, 6249 9859
18, 22, 25, 29 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

NOVEMBER 2010

tba Science Teachers' Forum. Children's Medical Research Institute. www.cmri.com.au
1, 5, 15, 19 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
22, 26, 29 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

DECEMBER 2010

3, 10, 13 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
22 Summer Solstice (9.38 am EST)

JANUARY 2011 National Youth Science Forum. Forms to local Rotary club by 29/5/10, interviews from July. Only for Yr 11 in 2010. Enquiries: 6125 2777, 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.

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, the statistics archive & more.

Official Notices are now online ONLY

Official Notices will be effective from the date they are appear on the BOS website.

Minor amendments to 2010 Syllabuses for Senior Science, Earth & Environmental Science, Biology, Chemistry and Physics *(BOS 31/09, 32/09, 33/09, 34/09* and *35/09)*

A summary of the amendments, the amended Stage 6 Syllabuses and a Summary of the HSC exam specifications and assessment requirements from 2010 are in the HSC Syllabus section of the BOS website.

Update of the Science Stage 6 Revised Support Document 2007 *(BOS 40/09)*

The Support Document for each of the Stage 6 Science courses has been updated and is available with each of the HSC syllabuses on the BOS website.

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

"Time you enjoyed wasting, was not wasted."
... John Lennon

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.

▸▸▸▸▸▸▸▸▸▸▸▸▸▸▸▸ 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@anmm.gov.au
Location: 2 Murray Street, Darling Harbour

AUSTRALIAN NATIONAL MARITIME MUSEUM

MUSEUM OF HUMAN DISEASE

2009 EXCURSION OPTIONS

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*

JuniorScience–*Infectious&Non-infectiousdiseases,microorganisms*

Further information and bookings:

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

MUSEUM OF HUMAN DISEASE

UNSW

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LG WORLD'S BIGGEST IMAX THEATRE

BOOK NOW FOR EXCURSIONS IN 2010
New Science films coming soon!

Ultimate Wave Tahiti 3D … starts Feb 2010
The ultimate look at the science of waves, with cool surfing footage featuring 9× world champion Kelly Slater. What better hook for your Science students than that! An excellent Science-based educational resource guide will accompany the film.

Hubble 3D … starts May 2010
With the winding down on the space shuttle program, this new IMAX film marks a milestone in giant screen space films. You'll not only see into space – and back to Earth – but you'll be taken to the edge of time.

Legends of Flight 3D … starts October 2010
This long awaited film features footage of the design, construction and flight of a range of aircraft from modern history, including the ground breaking Airbus and Dreamliner. Extraordinary computer special effects will take you inside the design of the aircraft.

Book now for 2010. Call (02) 9213 1600
or email: education@imax.com.au

SYDNEY AQUARIUM

Aquarium Pier, Darling Harbour, Sydney

SYDNEY AQUARIUM

Sydney Aquarium is home to an exciting exhibit called ***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 kg 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 *School Visits*.

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* … then go to *School Visits*

Science Centre & Planetarium

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

- ★ ***Taking bookings for 2010***
- ★ **Star Trails Outreach Program** – visiting schools with interactive Science Shows.
- ★ We have an extensive range of ***shows & exhibits***, including:
  - ***NEW EXHIBITION: The Machine***
  - **Stellar Evolution** – planetarium program for HSC Physics
  - **Superconductors & Liquid Nitrogen** – live science show
  - **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

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 (rides open 11 am, Mon/Fri only)

BOOK & PAY SEPARATELY FOR EACH EXCURSION

Science on the Web

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

www.science.org.au/nova

Maintained and updated regularly by the Australian Academy of Science, this site provides reliable and up-to-date information on many topical issues in Science. It is great for research, assignments, as well as for encouraging an interest in Science.

- **Hot rocks with geothermal energy**

www.science.org.au/nova

Geothermal energy is a clean, green resource with the potential to power Australia for centuries. If the energy stored in hot rocks inside the Earth could be tapped and used instead of fossil fuels, it could help to reduce the threat of climate change. Hot rocks hold promise as a major contributor to Australia's future energy supplies, but our geothermal resources are only now starting to be understood. Despite the need for more data, it is clear that Australia has massive geothermal resources. The challenge is tapping into it in a cost-effective way.

- **Science for sustainable reefs**

www.science.org.au/nova

Pollution, overfishing, coastal development and climate change are putting the world's coral reefs under increasing pressure. With millions of people relying on them, how can Science help make our reefs sustainable? Read this article to find out more.

Science Updates

- **Colour detection in humans**

Global Colour: Clues and Taboo – by J L Morgan **and** ***www.colormatters.com***

Do men and women have the same colour vision? There are many differences between the sexes – both physiological and psychological. Could it extend to colour vision? The main difference between male and female colour perception is colour blindness. Approximately one in twelve males and one in two hundred females have some form of colour vision deficiency. Of this group, 99% exhibit insensitivity to the red and green colours of the spectrum. It should be noted that colour blindness is not an inability to see all colours – the colour-blind eye is insensitive to a specific colour range and so sees very muted variations of a colour or a different colour.

Recent research has revealed that women have a better ability to discriminate colours in the red-orange spectrum. Researchers found that the gene that allows people to see the colour red comes in an unusually high number of variations. This may explain why women see crimson, vermilion and tomato, but it's all just red to a male. Previous research in other primates suggested that enhanced red vision in females allows them to better distinguish between berries and foliage when they are gathering food. Scientists speculate that this colour sensitivity may be explained by the fact that human females did the gathering in prehistoric times.

Most colour scientists agree that the main difference in colour perception between males and females tends to be more psychological rather than physiological. Since women are more focused on the subtleties of colour in fashion and cosmetics, they are more apt to develop a greater sensitivity to colour and a better colour vocabulary. Men are generally not faced with any degree of colour matching and psychologically do not need or use such colour terminology. Also, Radeloff's (1990) gender-based study found that women were more likely than men to have a favourite colour, but there was no significant difference between men and women for preferences for light versus dark colour. However, in expressing the preference for bright and soft (muted) colours, women preferred soft colours and men preferred bright ones. Research has also shown that females are better and faster than males in naming colours. In 1977, Majeres concluded that women have a substantial advantage in verbally encoding colours.

- **Ice on fire**

NewScientist 27 June 2009

Burning methane trapped in ice could starve off the energy crisis for hundreds of years. Deep in the Arctic Circle in the Messoyakha gas field of western Siberia lies a mystery. In the late 1970s, the Russian engineers who were pumping natural gas from here thought they had obtained all the available gas, when the gas just kept coming and continues to power Norilsk today. The mystery methane has been discovered to be coming from the icy permafrost. Using such methane would lower carbon emissions, but it is not known yet whether releasing permafrost methane will exacerbate global warming if it leaks from reserves.

- **Reverse aging**

Cosmos magazine Issue 26 Apr/May 2009

Recent neurological research has shown that exercise might reverse the decline of the brain with age. Strong evidence is now emerging that cardiovascular exercise such as running, walking, cycling, skipping and swimming can have a far more potent impact on the brain that simply making people feel good. Hence it is thought that such exercise may help to push back the effects of aging that lead to a slow decline of the body and mind. It does have to be aerobic exercise though, as this increases blood flow and so transports more oxygen to the brain, which encourages the growth of small vessels and helps the brain grow and stay healthy. The article suggests six steps to help your brain stay young: exercise regularly, eat well, socialise, get a good night's sleep, get rid of stress, and 'think, think, think'. The more you use your brain, the better it will work. So, read, learn to do something new, speak another language, etc. This way you may help to delay the onset of senility or dementia.

Chemical Safety Mandatory Training

Would your school pass a Workcover inspection?

- Is there a record in the school files of the date and who attended the previous Chemical Safety Mandatory Training?
- Is there a system in place to record whether the teachers have read the risk assessment prior to doing the experiment or procedure?
- Does the school exceed the statutory amount of ammonium nitrate stored on site?

If you are not sure, perhaps you need to refresh the **Chemical Safety Mandatory Training** at your school.

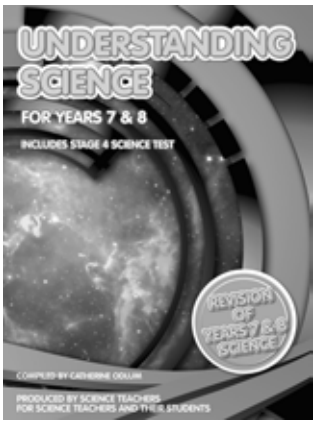
Representatives of the Royal Australian Chemical Institute (RACI), NSW Chemical Education group can come to the school and present a training course that:

- is up-to-date with the latest legislation and the latest list of DET banned substances
- is presented by experienced trainers who are members or fellows of the RACI
- is illustrated with PowerPoint and has interactive engagement with adult participants
- comes complete with participants notes and customised certificates of completion are provided
- is registered with the NSW Institute of Teachers for the maintenance of Professional Competence in DET schools
- Takes 2¼ hrs for the non-technical group, 3 hrs for the technical group, including a break
- A Risk Assessment workshop or a *Chemwatch* workshop can also be arranged.

Contact details – Booking information

Cost is $1000 in Sydney area, $2000 plus travel and accommodation expenses for country areas.
A flier can be sent to you if you require more information.
Email course convener Margaret Lindsay at: margaret.lindsay@nowt.com.au
or phone 0403 079 788 to discuss terms and available dates.

Understanding Science for Years 7 & 8 … NOW AVAILABLE



This book is the ideal revision guide for Year 7 & 8 Science students. It provides comprehensive coverage of the essential content of the Stage 4 Science Syllabus Dot Points , using questions and answers.

PLUS it has an 'ESSA-style' Stage 4 Science Test for students to practise their exam techniques.

It covers the Prescribed Focus Areas, plus the Knowledge and Understanding and the Skills sections of the Science Syllabus. The questions and answers have been prepared by highly experienced Science teachers. Each answer is clearly written in an easy to understand style for Stage 4 students. Make sure your students get this book to revise their work and prepare for school-based Science tests and statewide tests in Science.

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Email: robertgarner@mac.com
Website: www.odlumgarner.com

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FUN PARK EXCURSIONS

2009 DATES
Nov 2, 16, 20, 23, 27, 30. Dec 4, 11.

2010 DATES
March 22, 26, 29. May 7, 28.
June 7, 11. Aug 9, 13, 16, 20.
Sept 10, 13. Oct 18, 22, 25, 29. Nov 1, 5, 15, 19, 22, 26, 29. Dec 3, 10, 13.

PLUS: OTHER SCHOOL DAYS are also available

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

TIME Rides start at 11 am

COST (2009) 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).

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We offer the cheapest DISCOUNT SCHOOL PRICES for either FUN DAYS or EDUCATIONAL DAYS

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Numbers are limited to ensure minimal queues. Come and join us for a fun-filled day at LUNA PARK Sydney. You can come for just a fun day, or curriculum-based worksheets are available.

Interactive learning is a great way for students to discover that learning is not so dull after all! Students learn as they ride at these fun-filled excursions, which are presented by experienced teachers.

WORKSHEETS … secondary / primary

Secondary: Science 7–10, Physics, Biology, Senior Science; Technology; Visual Arts; Maths; Peer Support; Commerce; Business Studies, Tourism; Photography.

Primary: Science & Technology, English, & Mathematics; Art; or Peer Support.

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A RISK ASSESSMENT, TAX INVOICE and BOOKING FORM are available on our website at: www.odlumgarner.com

ENQUIRIES/BOOKINGS

- Book now by ph/fax/email:
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  Ph (02) 9939 6107 Fax (02) 9939 6105
  Email: robertgarner@mac.com
- Then send a deposit of $100 (+ 10% GST) to confirm your booking.
- Worksheets (if requested) are sent after your deposit is received.

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Physics is Fun was co-authored in 1983 by Robert Garner and Sylvia Jennings and was based on their earlier excursions at Luna Park in the 1970s. Robert has conducted these fun park excursions since their inception … both at **Luna Park** (1983-1987, 1995, 2004-2009) and **Wonderland Sydney** (1990-2004) – **covering many different subject areas.** With the closure of Wonderland Sydney in early 2004, these Fun Park Excursions have been at **Luna Park Sydney** since its re-opening in April 2004.

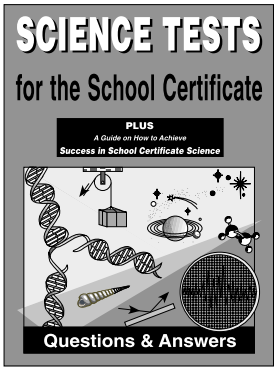
Please note: Our excursion notes are only for use when on an excursion day booked through Physics is Fun. It is an offence under Copyright Laws to use them on any other occasion without written permission from Physics is Fun.

★ For Success in School Certificate Science ★

Understanding Science for Years 9 & 10

- Comprehensive coverage of the Science Syllabus Dot Points for Years 9 and 10, using questions and answers
- Ideal revision guide
- Covers the Prescribed Focus Areas, plus the Skills and essential content of the Knowledge and Understanding sections of the Science Syllabus

… from only $21.56 ea after discount!



Science Tests for the School Certificate

- 6 specimen Science Tests, complete worked answers (= Band 6) that would score full marks, explanations for all MC answers, & BONUS section of longer free response questions
- Glossary of Terms, & Appendices on use of syllabus verbs in Science Tests.
- Includes: How to achieve success in school certificate science

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Photo Spot 'Star of David' ... *a silicoflagellate*

The silicoflagellates are a group of unicellular protists found among the phytoplankton that live in marine environments. They live in the upper part of oceans and are adapted for life in tropical, temperate and cold waters.

The best-known stage of a silicoflagellate's life cycle consists of a naked cell body with a single flagellum at the front and numerous plastids contained within an external skeleton. The flagellum is related to buoyancy and to orienting them to the available light to carry out photosynthesis more than for locomotion.

The skeleton is composed of hollow beams of opaline silica (SiO_2). There are various shapes with different types of spines. The skeleton supports its pseudopodia and cytoplasmic strands that exist during the photosynthetic stage of their life-cycle. During this stage, they undergo asexual reproduction by cellular division.

When a silicoflagellate dies, the cell disintegrates and leaves a skeleton (see Figure 1), which settles to the ocean bottom, similarly to other siliceous organisms such as diatoms and radiolarians. The skeletons of silicoflagellates generally make up 1–3 % of the siliceous component of deep-sea sediment and so are sometimes found as microfossils in sedimentary rocks.

Micro-palaeontologists use differences in the abundance of microfossils in rocks in the correlation and age dating of sedimentary rock strata, particular when searching for petroleum.

It may seem hard to believe that microscopic silicoflagellates only 40 µm long can be related to the giant kelps, which may grow as long as 50 m. But they are related and placed together into the group of Protista called 'Chromista' (meaning 'coloured').

Even though they are photosynthetic, chromists are not at all closely related to plants, or even to other algae. Unlike plants, the Chromista have chlorophyll *c*, and do not store their energy in the form of starch. Also, photosynthetic chromists often carry various pigments in addition to chlorophyll, which are not found in plants. It is these pigments that give them their characteristic brown or golden colour. Despite having a flagellum, which is an animal-like feature, the silicoflagellates are classified as a group of algae in the Division Chrysophyta, or golden algae, on the basis of their pigmentation and the structure of their chloroplasts.

They are of ancient evolutionary origins, dating back to the Early Cretaceous period. They became more common in the Late Cretaceous, and were much more diverse in the early Cenozoic than they are today. There is one living genus of silicoflagellates, the Dictyocha, with three commonly recognised species. □

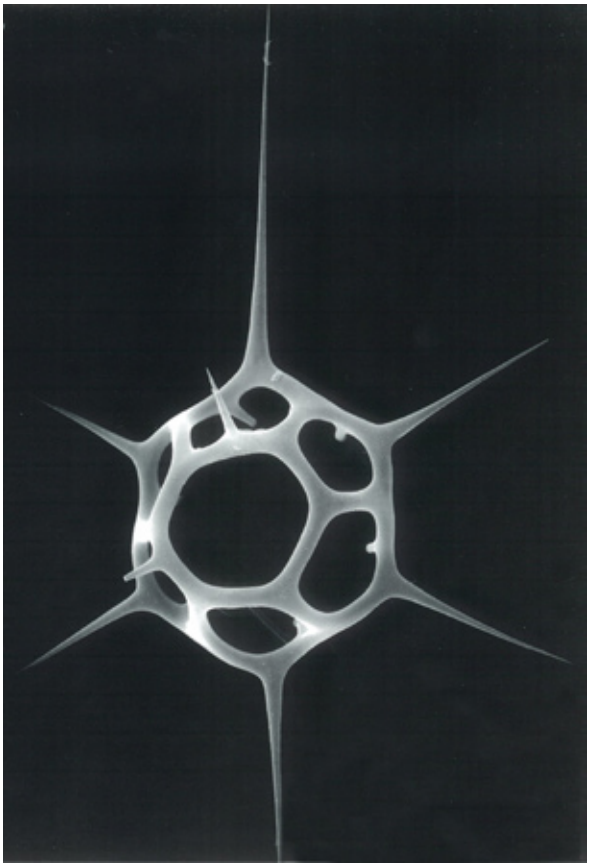


FIGURE 1 (above): A silicoflagellate skeleton, which resembles a 'Star of David'. The length of silicoflagellates ranges from around 40–116 µm.

This photomicrograph was taken using a scanning electron microscope (SEM) by Gerry Nash & Harvey Marchant (Antarctic Division EM Unit, Hobart).

AUSTRALIA'S BRIGHTEST WIN OLYMPIAD MEDALS

Students representing Australia in the 2009 International Science Olympiads during July in Mexico (Physics), the UK (Chemistry) and Japan (Biology) achieved impressive results – with a medal tally of 2 Gold, 6 Silver, 3 Bronze and 1 Honourable Mention.

The Australian Science Olympiad (ASO) program enables bright young minds to extend their scientific knowledge, understanding and skills. After battling through the ASO National Qualifying Exams, 56 students went on to be ASO Scholars and attended a residential training school in Canberra. The teams were selected after completing a final exam and eventually 13 students represented Australia.

"Science education and research (are) a vital part of the future growth of our country. … the Australian Science Olympiad program is a tangible way of enhancing students' interests in developments in Science, opening them up to the future career opportunities they can provide," said Professor Adam Shoemaker, Monash University Deputy Vice-Chancellor (Education).

Congratulations to the following students:

- **PHYSICS** (Merida, Mexico):
40th International Physics Olympiad

1 Silver Medal – Thomas Lacy (Sydney Grammar, NSW); 2 Bronze Medals – Fiona Naughton (North Sydney Girls HS, NSW), Cathryn McDonald, (Immanuel College, SA); 1 Honourable Mention – Christopher Herron (Gosford HS, NSW); Withdrew: Robert Holt (Christ Church Grammar, WA).

- **CHEMISTRY** (in Cambridge, UK):
41st International Chemistry Olympiad

3 Silver Medals – Fangzhi Jia (Northern Beaches Sec. College, NSW), Bill Huang (Melbourne HS, VIC), Jason Kong (Christ Church Grammar, WA); 1 Bronze Medal – Kelvin Cheung (James Ruse Ag HS, NSW).

- **BIOLOGY** (in Tsukuba, Japan):
20th International Biology Olympiad

AUSTRALIAN SCIENCE OLYMPIADS

2 Gold Medals – James Woodmansey (Sydney Grammar, NSW), Thomas Brereton, Nth Sydney BHS, NSW); 2 Silver Medals – Kristijan Jovanoski (Melbourne HS, VIC), Mel Chen (Brighton Grammar, VIC).

* * * * *

Enquiries: ph 6125 9645, www.aso.edu.au □

Happiness is when
what you think, what
you say, and what you
do are in harmony.

… Mahatma Gandhi

The Nobel story

Alfred Nobel, for whom the Nobel Prizes are named, was born in Stockholm (1833). He was the owner of a company that manufactured weapons, which earned him a great fortune. In 1867, Nobel invented a way in which nitroglycerin, invented by the Italian chemist Asciano Sobrero, could be handled safely by mixing it with a silica-based packing material. At first he thought of calling this product 'Nobel's Safety Powder' but in the end settled on 'dynamite', as this was related to the Greek word for strength. Nobel found that dynamite could be shaped into rods that were relatively safe to use in blasting and could be easily detonated for use in mining and construction projects. He was not pleased when he discovered that his invention of dynamite was being used for destructive purposes.

Nobel's enormous legacy to the world was to leave the prize money that is now awarded to Nobel laureates – this actually stemmed from an event that left him with feelings of great indignation. After his older brother Ludvig died, a French newspaper printed a scathing obituary of Alfred Nobel, who was in fact alive and well. The writer was allegedly confused about who had died and used the obituary to write a condemnation of Alfred's life and work. 'Le marchand de la mort est mort ('The merchant of death is dead'),' the newspaper proclaimed – and also, 'Dr Alfred Nobel, who became rich by finding ways to kill more people faster than ever before, died yesterday.' Alfred Nobel was so upset from reading the obituary about himself that he rewrote his will to establish a set of prizes to celebrate humankind's greatest achievements. He left 94% of his assets to create and endow five Nobel Prizes: physics, chemistry, physiology or medical works, literature, and peace. The first four were to be chosen by Swedish committees and presented in Stockholm and the peace prize was delegated to a Norwegian committee and is presented in Oslo.

The Nobel awards ceremony is held every year on 10 December, the anniversary of Nobel's death. Laureates are announced in October. During 'Nobel Week' the year's laureates give speeches and then receive their prizes – a gold medal featuring the face of Alfred Nobel, a diploma and about a million dollars. □

Biologist Elizabeth Blackburn has won 2009 Nobel Prize for Physiology or Medicine

Professor Elizabeth Blackburn, a Hobart-born graduate of Melbourne University who has worked in the US for many years, along with her co-workers Carol Greider and Jack Szostak, were awarded a Nobel prize for solving a major problem in biology: how the chromosomes can be copied in a complete way during cell divisions and how they are protected against degradation.

The Nobel Laureates have shown that the solution is to be found in the ends of the chromosomes – the telomeres – and in an enzyme that forms them – telomerase. Their discovery of how telomeres protect genetic information has opened up new lines of inquiry into growth, ageing and disease. Their work with psychologists on telomeres, stress and meditation seems to prove a mind-body connection.

The long, thread-like DNA molecules that carry our genes are packed into chromosomes, the telomeres being the caps on their ends. Elizabeth Blackburn (see Box 1) and Jack Szostak discovered that a unique DNA sequence in the telomeres protects the chromosomes from degradation. Carol Greider and Elizabeth Blackburn identified telomerase, the enzyme that makes telomere DNA. These discoveries explained how the ends of the chromosomes are protected by the telomeres and that they are built by telomerase.

If the telomeres are shortened, cells age. Conversely, if telomerase activity is high, telomere length is maintained, and cellular senescence is delayed. This is the case in cancer cells, which are considered to have eternal life. Certain inherited diseases, in contrast, are characterised by a defective telomerase, resulting in damaged cells. The award of the Nobel Prize recognises the discovery of a fundamental mechanism in the cell, a discovery that has stimulated the development of new therapeutic strategies. □

BOX 1: Elizabeth Blackburn and other Australian Nobel prize winners

Elizabeth Blackburn has Australian and US citizenship. She was born in 1948 in Hobart, Australia. After undergraduate studies at the University of Melbourne, she received her PhD in 1975 from the University of Cambridge, England and was a postdoctoral researcher at Yale University, US. She was on the faculty at the University of California, Berkeley and since 1990 has been professor of biology and physiology at the University of California, San Francisco.

Professor Blackburn is the 11th Australian to receive a Nobel prize. The eleven Australian Nobel prize winners are:

Sir William Henry Bragg - Physics (1915)
Sir William Lawrence Bragg - Physics (1915)
Howard Florey - Physiology or medicine (1945)
Sir Frank MacFarlane Burnet - Physiology or medicine (1960)
Sir John Carew Eccles - Physiology or medicine (1963)
Patrick White - Literature (1973)
Sir John Warcup Cornforth - Chemistry (1975)
Professor Peter Doherty - Physiology or medicine (1996)
Professor Barry Marshall - Physiology or medicine (2005)
Dr Robin Warren - Physiology or medicine (2005)
Professor Elizabeth Blackburn - Physiology or medicine (2009)

Some fun reading: Winners of the Ig® Nobel Prize

The Ig® Nobel Prize annual awards, established in 1991, are a parody of the Nobel awards. They are for achievements that 'first make people LAUGH, then make them THINK'. The awards are held on campus at Harvard University and handed out by real Nobel laureates.

Some recent science and technology awards have gone to vets in France 'for discovering that the fleas that live on a dog can jump higher than the fleas that live on a cat' (Biology); and to Argentinian scientists 'for their discovery that Viagra aids jet lag recovery in hamsters' (Aviation); and a Princeton professor claimed the prize in literature recently for his 17-page cognitive psychology report entitled 'Consequences of Erudite Vernacular Utilized Irrespective of Necessity: Problems with Using Long Words Needlessly.'

The 2009 Ig Nobel Prizes were awarded on 1 October. At the 2009 ceremony, Public Health Prize winner Dr Elena Bodnar demonstrated her invention – a brassiere that, in an emergency, can be quickly converted into a pair of protective face masks, one for the brassiere wearer and one to be given to some needy bystander.

You can read more about the 2009 prizes or browse the archives at *http://improbable.com/ig/winners/#ig2009* for a good laugh. □

Phasing out incandescent light bulbs will save energy

Incandescent light bulbs (ILB) have not changed much since Thomas Edison first experimented with burning a tungsten wire inside a vacuum over a century ago. To produce light, these light bulbs push electricity through a thin metal filament, turning the electrical energy into heat and light. However, while the light is useful, 90% of the energy is lost as useless heat.

It is estimated that there are over 200 million ILB currently installed in Australian homes and businesses. However, the familiar old pear-shaped globes are being phased out by the Australian Government. If your incandescent bulb flickers its last spark after November this year, you will need to choose from a compact fluorescent lamp (CFL), a light emitting diode (LED) or a halogen light to replace it. These alternatives are much more energy efficient than ILBs and will result in less fossil fuels needing to be burned, e.g. CFLs use 80% less electricity than ILBs. Since lighting represents about 12% of our household greenhouse gas emissions, this change-over will be a more sustainable form of lighting.

Being sustainable does not always mean paying more. While incandescent bulbs are cheaper, they burn out after 1000 hours. Compare that with the 10 000 hours of your average CFL – and LED lights have even more impressive figures. So these alternatives should result in a reduction in your overall lighting bill. □

Astronomy

Viewing the summer skies

... Robert Garner

As we move towards summer, the nights will be warmer for looking up at the skies. The summer solstice occurs on 22 December this year. Since this year is the International Year of Astronomy, it is the ideal time to get your students interested in astronomy.

Locating constellations and the Magellanic Clouds

As we pass into Summer, the constellations *Taurus* (the bull) and *Orion* (the hunter) will be the most prominent. They rise in the East in the evening and will be high in the sky overhead later in the night. Looking low in the sky towards the south, the constellation *Crux* (Southern Cross) will be upside down with its pointers, α- and β-Centaurus to the west (on the right) and the bright star, Canopus to the east (on the left). α-Centaurus, closest to *Crux*, is a yellow star and β-Centaurus is blue.

You can use *Crux* to locate the **large and small Magellanic Clouds** – these are higher in the sky, towards the south and above *Crux* and can be seen as fuzzy patches in the dark sky if away from city lights.

Locating Planets

Mercury will be visible in late November in the evening twilight. On 18 December, you can locate it using the New Moon, which will be very close to Mercury about 45 minutes after sunset.

Venus is near the eastern dawn horizon at the start of November, but cannot be observed over Summer due to its closeness to the Sun. It will reappear in late February as the Evening Star.

Mars will be visible late at night and in the early morning sky throughout Summer. It rises after midnight at the start of November appearing a little earlier each night. By New Year, Mars rises around 11 pm. Mars is stationary on 22 December, i.e. its normal west to east motion ceases and Mars goes into a period of retrograde motion until mid-March. Retrograde motion occurs as the faster moving Earth catches up to Mars in its orbit. Earth and Mars will be closest to one another on 27 January 2010 and will be in inferior conjunction (Sun, Earth and Mars closest to being in line with the Earth in the middle) on 29 January 2010. Due to their relative positions in their elliptical orbits at this time, this event will not be a close encounter.

Jupiter will be visible after twilight in the western evening sky during November. You can use the Moon to guide you to Jupiter on 23 and 24 November around 10.30–11 pm. The setting time gets a little earlier each night and by mid-December Jupiter is setting around 11 pm.

Saturn will be in the eastern sky about one hour before sunrise. On 13 November, the crescent Moon will be just above it. By around 10–12 December, Saturn will be best seen around 2p am, just below the Moon. Saturn's rings are again becoming visible in December and we are now seeing them from a northern aspect for the first time since 1996. We will see the rings from 'above' until Earth next passes through the ring plane in 2025. The rings will 'open up' to reach their widest in 2016, before they again begin to close up until we again see them edge on by 2025.

Meteors

Meteor showers appear as streaks in the night sky and can be quite spectacular. The *Taurids* south (peak 5 November) and north (peak 12 November) are best seen from late evening until dawn, high in the eastern sky. Good rates can usually be observed on consecutive nights around these dates. Unfortunately, the *Southern Taurids* peak is just after Full Moon on 3 November, but the sky will be darker the week later for the *Northern Taurids*. The *Leonids* occur in late November (peak 18 November). This corresponds to a New Moon so the sky will be dark. The *Geminids* are usually better seen from the northern hemisphere, but there is a chance you will see them from the southern hemisphere this year if you are not too far south as they peak around 13–14 December and there is a New Moon on 16 December. □

The Magellanic Clouds

The Magellanic Clouds (also called Clouds of Magellan) are two dwarf galaxies orbiting our Milky Way Galaxy. They are named after the explorer Ferdinand Magellan, whose crew saw them during their first voyage around the world in 1519 and introduced them to Western knowledge.

The Magellanic Clouds share a gaseous envelope and lie about 22° apart in the sky near the southern celestial pole. They will be visible to the unaided eye as fuzzy light patches towards the south and above *Crux* during this Summer in the Southern Hemisphere. They cannot be seen from northern latitudes.

The larger of the two, the Large Magellanic Cloud (LMC) is more than 160 000 light-years from Earth and is located mostly in the constellation Dorado. The LMC has irregular shaped arms (not in a spiral configuration) and so it is also known as the Tarantula Galaxy. It is rich in gas and dust, but is currently undergoing vigorous star formation activity. The bright star Canopus to the east of the LMC is 310 000 light years from Earth.

The Small Magellanic Cloud (SMC) is roughly 200 000 light-years away. It is almost completely in the constellation Tucana.

If your students can locate the LMC, SMC and Canopus, this will help them to begin to appreciate the great distances that exist in our Universe.

Figure 1 – The Magellanic Clouds (LMC on left, SMC on right)
[Credit: Taken at Mt Olive (north of Singleton) NSW, 2004 by Tony Hitchcock]

MACQUARIE UNI OBSERVATORY FRIDAY NIGHT OBSERVING

On clear nights, our 'starfinder' (planisphere) sessions demonstrate how to identify bright stars, constellations and planets. This is followed by observing with the telescopes (12" & 16" Meade telescopes). Even with the light pollution of the city, we can easily see double and multiple stars, open and globular star clusters, and the brighter nebulae. The Moon and planets, when in suitable positions, are easily viewed with any of our instruments. On dark, moonless nights with good seeing, we may also observe the brightest galaxies. In the event of cloud, our program includes a mixed al fresco presentation of slides, posters and scale models.

Located in the grounds of Macquarie Uni (access via Gymnasium Rd), the observatory is open to the public every Friday night, March–Nov inclusive, 7:30–9 pm, subject to bookings or rain. You can phone 0427 433 388 if the weather is doubtful.

Aboriginal perspectives on the origin of the Magellanic Clouds

Although relatively insignificant, the Magellanic Clouds feature in many Aboriginal legends as the camps of sky people. On Groote Eylandt they are believed to be the camps of an old couple, the Jukara, grown too feeble to catch their own food. Other star people catch fish and lily bulbs for them in the Milky Way and bring them to the Jukara to cook on their fires.

The Large Magellanic Cloud is the camp of the old man and the Small Cloud that of the woman. In the space between them a bright star called Agnura (probably Achernar-Alpha Eridani, magnitude 0.49) represents their cooking fire (see Figure 2).This story suggests a celestial model of compassion for the aged. □

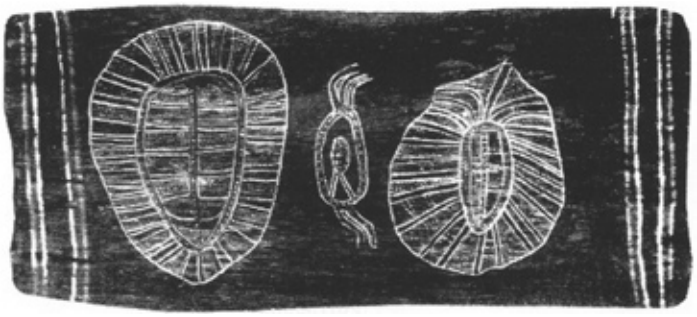


Figure 2 – Drawing of a bark painting from Groote Eylandt of the Magellanic Clouds. The large cloud at the left is the camp of the old Jukara man, and the one at the right, that of the old woman. Between them is their cooking fire, the star Agnura.

[Source: Mountford Collection, State Library of South Australia]

BOX 1 Sky Charts & Planispheres

- You can download free sky charts each month to explore the night sky from: *http://skymaps.com/downloads.html*
- A planisphere (star wheel) is a great aid for exploring the stars and locating 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/Planis1.htm

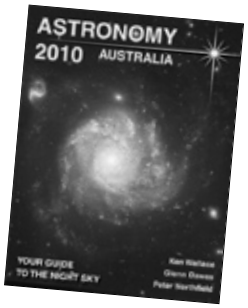
"Learn from yesterday, live for today, hope for tomorrow. The important thing is not to stop questioning."

... Albert Einstein

★ WIN ONE OF TWO COPIES ★

ASTRONOMY 2010 – A PRACTICAL GUIDE TO THE NIGHT SKY

by Glenn Dawes, Peter Northfield, Ken Wallace



From beginners to advanced amateur astronomers, this book is great for observing the night sky with eyes, binoculars or telescope.

With its many pages of facts, figures, charts, maps and illustrations of stars and planets for 2010, this book is great for Science teachers to guide their students in observing the night skies. All sky-watchers should have a copy.

It includes: tips on observing, Sun rise/set times & positions, Moon: phases & rise/set times, planets – positions & conjunctions, explanations of astronomy terms, eclipses, meteor showers, comets, predictions to help you find Jupiter's Great Red Spot, a guide to the opposition of Mars, All Sky charts for the night sky visible from Australian latitudes, and more.

It is available from book, telescope and Australian Geographic shops, or direct from Quasar Publishing (www.quasarastronomy.com.au) whose website offers much useful information.

★ ✧ ★ ✧ ★

TO WIN ... send in your name, school, home address & ph. no. on the back of an envelope by 18 December 2009 to:
Astronomy Giveaway, PO Box 442, Freshwater NSW 2096

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WINNER: Nathan Reynolds, Riverina Anglican College won the Sydney Aquarium family pass for *SciTalk No. 3–2009*.

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★ ✧ ★ ✧ ★ ✧ ★

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IMAX Give Away, PO Box 442, Freshwater NSW 2096

* 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: Jenny Perry, Ambarvale HS won the IMAX Sydney family pass for *SciTalk No. 3–2009*.

WIN A FAMILY PASS TO SYDNEY WILDLIFE WORLD

Sydney Wildlife World at Darling Harbour is a great Science excursion venue. It opened back in 2006 and displays Australian fauna and flora in 9 different habitats. With over 6000 animals, this will link well to the syllabus. Details: *www.sydneywildlifeworld.com.au*

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TO WIN A FAMILY PASS TO SYDNEY WILDLIFE WORLD
(for 2 adults & 2 children worth $85.00)

Send in your name, school, & school address on an envelope by **18 December 2009** to: *Sydney Wildlife World Teacher Offer PO Box 442, Freshwater NSW 2096.*

WINNER: Elizabeth Thrum, Mt St Benedict College won a Sydney Wildlife World family pass for *SciTalk No. 3–2009*.

COMPETITION CORNER

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by Susan Margan

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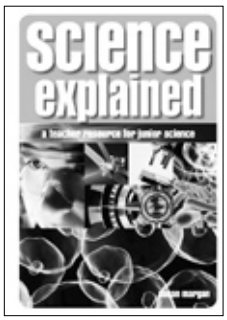

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HOW TO ENTER: Send an answer to the Quiz Question, your name, school, & school address, on an envelope to: Competition Corner, PO Box 442 Freshwater 2096 – by 18 December 2009

SciTalk 3/09 answer: dwarf planet

QUIZ QUESTION: What name is likely to be given to the heavy element (112) recently added to the Periodic Table?

Winner for *SciTalk 3/09*: *Physics 1 & 2 (3rd ed)* (rrp Prelim: $64.95, HSC: $66.95) published by Jacaranda was won by Andrew Griffiths, Illawarra Senior College.

SUBSCRIPTIONS … *SciTalk* is available FREE to all secondary science faculties in NSW and the ACT. However, if you would like to receive your OWN personal copy or extra copies of *SciTalk*, subscriptions are available for just $20 per 4 issues. Please send a cheque for $20 + GST = $22.00 (to *SciTalk*), plus your name, address and telephone number … and you will receive the next four issues of *SciTalk*.

SciTalk

SciTalk is a newsletter for secondary Science educators. Now in its 15th year, it is produced quarterly by Odlum & Garner as a service to Science teachers. 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.

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.

Copies of *SciTalk* are also available at:

www.odlumgarner.com

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–January 2010 … Jan 15
- *SciTalk* No. 2–May 2010 … April 19
- *SciTalk* No. 3–August 2010 … July 19
- *SciTalk* No. 4–October 2010 … Oct 11

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