

SciTalk

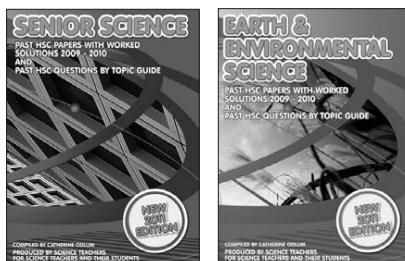
ISSN 1323-7667

Number 3 – August 2011

Past HSC Papers with Worked Solutions

NEW – just released!

- **Senior Science: 2009–2010**
... OUT NOW, RRP \$17.95
- **Earth & Environmental Science: 2009–2010**
... OUT SOON, RRP \$17.95



ALL books include:

Past HSC Questions by Topic Guide

(see Order Form on page 7)

Still available:

- **Senior Science:** 2001–08, RRP \$33
- **Earth & Environmental Science:** 2001–08, RRP \$33

Science Update

No School Certificate from 2012

On 4 August 2011, the NSW Minister for Education announced that School Certificate tests would not continue beyond 2011.

There are plans for the BOS to continue to consult with stakeholders to develop a plan for a new credential for students who leave school before receiving their HSC.

Delay of classroom implementation of Australian curriculum

In August 2011, the NSW Education Minister announced that the implementation of the Australian curriculum in NSW will be delayed, with schools not required to teach the new K–10 English, Mathematics, Science and History syllabuses until 2014.

This will allow sufficient time for the syllabuses to be finalised, and for teachers to prepare for implementation. All four K–10 syllabuses are currently in draft form and the Board of Studies schedule of consultations will not be affected by the announcement.

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Luna Park Sydney will be open every day from 1–17 December 2011

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www.odlumgarner.com

(see ad on page 6)

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

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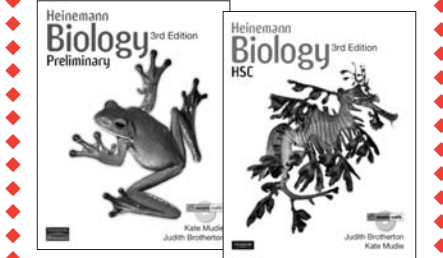
PRIZES TO WIN!
See pages 1, 11 & 12
Send in your entries now
(ALL IN THE ONE ENVELOPE if you prefer!)

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

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Heinemann Biology Preliminary & HSC 3rd Edition



Prelim + CD, 3e: ISBN 9781442508385
HSC & Exam Cafe CD, 3e: ISBN 9781442517943
RRP \$64.95 ea ... published by Pearson

These texts are the most up-to-date and complete packages for Stage 6 Biology and have been fully revised and updated following extensive teacher consultation. The *Heinemann Biology* Third Edition suite includes a student book and CD, an innovative teacher edition with pages of the student book with wrap-around teacher notes and strategies, and comprehensive online support at www.pearsonplaces.com.au

TO WIN: Send in your name, school & school address on an envelope by **23 Sept 2011** to:
Book Giveaway, PO Box 442, Freshwater 2096

★ ★ ★
Winner for SciTalk 2/11
Congratulations to J Hart, Ivanhoe Central, A Barber, St Mary's Cathedral College, J Povey, All Saints College, Bathurst, who respectively won *Biol/Chem/Phys 2001–10 Past HSC Papers with Worked Solutions* (rrp \$32.95 ea), published by Odlum & Garner.

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Diary Dates



International Year of
CHEMISTRY
2011

Update on BOS matters

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

2011 SC Science Test (BOS 23/11)

There will be minor changes to the layout of the Science Test – there will be no separate Stimulus Booklet ... all stimulus material will appear in the body of the test with the related question(s).

Clarification Stage 6 Earth and Environmental Science Syllabus

This syllabus has a minor amendment for the 9.7 Option – Mining and the Australian Environment ... ‘Official Notice BOS 14/11.

Updated Periodic Table of the Elements (BOS 15/11)

The Periodic Table used by the BOS has been updated in line with the International Union of Pure and Applied Chemistry (IUPAC) recommendations (Feb 2010). Key amendments: the element Copernicium (symbol: Cn) has been added and small changes have been made to the standard atomic weight of some elements. Elements without stable nuclides do not have atomic weights reported. This Periodic Table is included in the ‘Physics data and formula sheet’, and ‘Chemistry data sheet’ attached to the HSC exams in Physics and Chemistry.

New Answer Books for all HSC Science exams from 2011 (BOS 19/11)

Students will record responses to Section II (Option) questions in all HSC Science exams in two Section II Answer Booklets, rather than in the one generic writing booklet as in the past. These Answer booklets will be part of the 2011 HSC Science exam papers. Sample Science Section II Answer Booklets can be downloaded from each HSC Science syllabus page 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

For: Shell Questacon Science Circus 2011 program:
www.questacon.edu.au/html/on_the_road.html

SEPTEMBER 2011

- 9, 12 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
- 23 Spring Equinox (7.04 pm EST)

OCTOBER 2011

- 9–15 Earth Science Week. www.earthsciweek.org & www.ga.gov.au/education/events, ph (02) 6249 9111
- 17 HSC Examinations start: EES 21/10, Bio 28/10, Chem 2/11, Phys 4/11, Sen Sc 9/11
- 17, 21, 24, 28 31 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

NOVEMBER 2011

- 5 Astronomy Open Night. Macquarie Uni, 6.30–10 pm, use E7B courtyard entrance, no bookings required, ph: (02) 9850 7111, www.physics.mq.edu.au/community/FFA/opennight/
- 7–11 School Certificate tests take place: Science Test is on 7 Nov ... 12.50–3 pm
- 4, 14, 18 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
- 21, 25, 28 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

DECEMBER 2011

- 1, 2, 5-9, 12-16 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

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.

2011 Science HSC Examination Dates

- 21 Oct Earth & Environmental Science: 9.25 am–12.30 pm
- 28 Oct Biology: 9.25 am–12.30 pm
- 2 Nov Chemistry: 9.25 am–12.30 pm
- 4 Nov Physics: 9.25 am–12.30 pm
- 9 Nov Senior Science: 1.55 pm–5 pm

2011 School Certificate Tests

7 November

- English: 9.20–11.30 am (includes 10 mins reading time)
- Science: 12.50–3 pm (includes 10 mins reading time)

8 November

- Maths: 9.25–11.30 am (includes 5 mins preparation time)
- Australian History, Geography, Civics & Citizenship: 12.50–3 pm (incl 10 mins reading time)

9–11 November (all schools do online test)

- Computing Skills Test (online): 8 am–5 pm

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Worksheets (if needed) are available for:

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

Book your date now by ph (02) 9939 6107

**** Risk Assessment package provided ****

NOTE: Your purchase of the Odum & 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.

TIWEST Night Stalk

You can help Australian scientists and conservationists to save our native species by taking part in this year's national Tiwest Night Stalk spotlight survey.

It's easy, fun and free. Schools can participate by focusing on the numbers and distribution of native animals and feral pests. All you need is a torch and a Spotter's Log. Choose one or several nights between

1 September and 16 October and spotlight in your local bushland. Record all native/introduced animal species: mammals, birds, bats,

1 September–16 October 2011

reptiles and frogs that you find and send your Spotter's Log to Perth Zoo. You can download a Night Stalk Teacher Support Pack to find out how to incorporate conservation into your science program.

Student Activity Sheets are also available.

Now in its 13th year, this survey collects information about animals still living in the wild, especially near urban areas, and their distribution over time.

For information: Tiwest Night Stalk

PO Box 489 South Perth WA 6151

Visit: www.perthzoo.wa.gov.au/Act/Nightstalk/ to download a Spotter's Log or complete one online.



▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶ **OUT AND ABOUT**

LG IMAX THEATRE SYDNEY

31 Wheat Rd, Darling Harbour, Sydney 2000

You're invited to preview two exciting new films from IMAX –



★ **FLYING MONSTERS**
... starts 11 August

Take a look at the evolution of pterosaurs, narrated by Sir David Attenborough and produced by National Geographic.

★ **TORNADO ALLEY 3D**
... starts 29 September

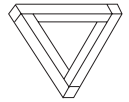
Go inside the eye of a tornado with storm chaser Sean Casey and a team of scientists in this extraordinary 3D IMAX film.

For more details on the free teacher previews, and to RSVP online now, just visit: www.imax.com.au/schoolsrsvp/

You can visit our website for session times up to 12 months in advance for schools: www.imax.com.au/schooltimetables

For school bookings, call 02 9213 1600 or email education@imax.com.au

Science Centre & Planetarium



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

- ★ *Taking bookings for 2011*
- ★ **Star Trails Outreach Program** – visiting schools with interactive Science Shows.
- ★ We have an extensive range of *shows & exhibits*, including:
 - **The Machine**
 - **Stellar Evolution** – planetarium program for HSC Physics
 - **Superconductors & Liquid Nitrogen** – live science show
 - **Energy and Motion**
 - **Changing Worlds and Visions**
 - **Dinosaurs, Fossils & Coal**
- ★ School entry includes two floors of hands-on exhibits, a science show, plus a *planetarium / laser show*.
- ★ **Also available:** environmental field trips, science shop, kiosk, science fun bags, membership programs.
- ★ **Book now** for an excursion. Information/bookings: 02 4286 5000
Website: <http://sciencecentre.uow.edu.au>

MUSEUM OF HUMAN DISEASE

2011 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-infectious diseases, microorganisms**

Further information and bookings:
T 02 9385 1522
E diseasemuseum@unsw.edu.au
W www.diseasemuseum.unsw.edu.au



**SHIPWRECKS, CORROSION & CONSERVATION
STAGE 6 CHEMISTRY**

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

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

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

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



**WILDLIFE SYDNEY
& SYDNEY AQUARIUM**

Darling Harbour, Sydney



Exciting times at Sydney's best attractions

WildLife Sydney re-launches 15 September ... after its renovation and transformation. Its newest residents include 6 baby emus – who will join the kangaroos and other longstanding residents – the koalas, wallabies, wombats, echidna, reptiles, butterflies, birds, the nocturnal party animals, as well as Rex, one of the largest crocodiles in the world. With even more regular keeper talks and animal encounters, this will be your FAVOURITE school excursion or holiday destination!

Sydney Aquarium ... the world's largest and most intriguing crab, the Giant Japanese Spider crab will be crawling into town to take centre stage in **CLAWS**, a spectacular new exhibition opening these school holidays. Sharing the exhibition and avoiding that 3 metre claw span will be the colourful Darwin Prawn, Murray Crayfish, Banded Coral Shrimp and Red Bait crabs. This is a stunning exhibition!

For more information go to: www.sydneyaquarium.com.au OR www.wildlifesydney.com.au/ For school bookings, phone 8251 7801.

**COMBINE A FUN PARK EXCURSION
BOOKED THROUGH PHYSICS IS FUN
WITH IMAX, SYDNEY AQUARIUM, OR
SYDNEY WILDLIFE WORLD**

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

- **DETAILS:**
IMAX: www.imax.com.au/schools
SYDNEY AQUARIUM: www.sydneyaquarium.com.au/
WILD LIFE SYDNEY: www.wildlifesydney.com.au/
FUN PARK EXCURSION (through Physics is Fun): www.odlumgarner.com
- **WHAT TO DO:** Allow 1 hr for IMAX (any film), or 2 hrs for a Sydney Aquarium/Wild Life Sydney 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

Australian Museum School Programs 2011

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

New Temporary Exhibition:

Beauty from Nature: art of the Scott sisters

3 Sept – 27 Nov, 2011. Free entry after admission.

Students learn about the remarkable skill of these wildlife illustrators in an exhibition of 60 watercoloured paintings created between 1846 and 1851. The exhibition features over 100 of the original moths and butterflies and includes sets of the first Australia-themed Christmas cards designed by Helena Scott in 1879.

Participate in our special one hour workshops offered with one of our art educators and design and make your own inspired Christmas card or bookmark for someone special!

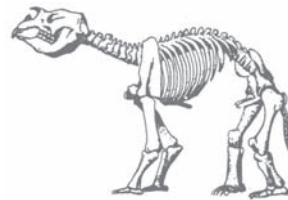
Workshops only offered Mondays to Fridays 12 Sept–25 Nov, 2011. Cost \$6.60 per student after admission.

For visiting school group bookings and further information:

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

Permanent exhibitions to explore:

- Dinosaurs
- Surviving Australia
- Birds and Insects
- Skeletons
- Planet of Minerals
- Albert Chapman Mineral Collection
- Search and Discover
- Indigenous Australians



FOR SECONDARY SCHOOLS

Hands-on sessions with a Museum educator included with:

- Evolution of Australia Biota (Yr 11–12)
- Human Story (Yr 11–12)
- Fossils (Yr 7–12)
- Earth and Environmental Science Sessions (Yr 11–12)
- Evolution Trail Combo (Yr 9–10)

K–12 self-guided activities are also available from website.

AUSTRALIAN MUSEUM

6 College Street, Sydney
(opp. Hyde Park)
open daily 9.30 am – 5 pm

www.australianmuseum.net.au



Changes to Essential Secondary Science Assessment (ESSA)

– ESSAonline begins in 2011

ESSA, an initiative of the Department of Education and Training, is a statewide diagnostic Science assessment program for students who have completed two years of secondary schooling and learning in Science. Tasks in the test are framed on Stage 4 outcomes and essential content in the NSW Science Years 7–10 Syllabus (2003).

ESSA provides information about the scientific knowledge, understanding, skills and attitudes of Year 8 students.

From 2011, the ESSA test will be an interactive multimedia assessment called *ESSAonline*. *ESSAonline 2011* will occur on Tuesday 22 November 2011 and will take approximately 80 minutes.

Students will complete it using earphones and a computer. It will contain multiple choice, short response and extended response tasks that are grouped around real-world issues, including a simulated investigation.

ESSAonline will consist of video, audio, animations, text, graphics and a variety of test items. Students will be tested on their:

- knowledge and understanding of science
- understanding and skills in the process of scientific investigation, including a simulated experiment
- ability to evaluate evidence, make judgments and think critically
- ability to access information and communicate scientific ideas using a variety of strategies.

ESSAonline will be done by all Year 8 students in NSW government schools. Non-government schools in NSW and independent schools outside NSW are welcome to register for *ESSAonline*.

Enquiries: www.schools.nsw.edu.au/learning/7-12assessments/essa/index.php
Ph 02 9707 6295, fax 02 9707 6235.

Email: essa.program@det.nsw.edu.au

DID YOU KNOW?

2011 is the 'International Year of Forests'

This year is not only the 'International Year of Chemistry 2011', but it is also the '2011 International Year of Forests'.

The United Nations (UN) declared 2011 the *International Year of Forests* to encourage us to take the opportunity to celebrate people's action to sustainably manage the world's forests.

You can visit the UN website to get more information about this at: www.un.org/en/events/iyof2011/index.shtml as well as the Australian website at: www.internationalyearofforests.com.au/

It is important that we teach our students about the need for sustainable management, conservation and sustainable development of our world's forests. Forests provide shelter to people and habitat to biodiversity. They are a source of food, medicine and clean water and play a vital role in maintaining a stable global climate and environment. Forests are vital to the survival and well-being of people all over the world – all 7 billion of us.

The logo for the *International Year of Forests 2011* has been designed to convey the theme of *Forests for People*.



INTERNATIONAL YEAR OF FORESTS • 2011

If you go to the FAO website at www.fao.org/forestry/iyf2011/69190/en/ there is a Forests 2011 logo that allows you to click on the various parts and so learn what each icon stands for. This interactive logo will help you teach your students how people have a central role to play in the sustainable management and conservation of the world's forests, and how the functions of forests have significance for nearly all areas of our life.

In the logo, 'the crown is the source of oxygen, worker of the magic of photosynthesis. The many parts of the crown represent the multiple values of forests. Forests provide shelter for people and habitat for great plant and animal biodiversity. They protect soil and water and help maintain a stable climate. They provide us with the environmentally

sound renewable resource of wood, fuel for energy and many non-wood products, including food, fodder, medicines, building materials and cosmetics. They provide jobs, recreation and the experience of nature, and they are part of our spiritual and cultural life, our myths and folktales. Each of these values is interlinked with the others.' □

"The happiest of people don't necessarily have the best of everything, they just make the most of everything that comes along their way."

... Karen S Magee



Chemical Safety Mandatory Training

- Run by members of the Royal Australian Chemical Institute (RACI), NSW Chemical Education Group, Chemical Safety Mandatory Training can be organised at your school.
- The training is registered with the NSW Institute of Teachers as an accredited in-service for 2½ hours.
- Phone course convenor Margaret Lindsay, secretary of the Chemical Education Group, on 0403 079 788 or email margaret.lindsay@nowt.com.au

Chemical Safety One-day Courses for Laboratory Assistants

- This course includes the handling and storage of hazardous and dangerous goods. Participants are also shown how to minimise dangerous wastes.
- Hands-on computer work includes the labelling and manifest functions on *Chemgold 3*, as well as using customised *Word* and *Excel* files for labels and the chemical inventory.
- Participants will also learn how to find the risk and safety phrases and correct DG diamonds for labels of chemical mixtures they make themselves.
- Expressions of interest for courses in September, October and November to course convenor, Margaret Lindsay (details as above).



Whooping cough vaccine may be losing its punch

Although scientists have successfully used vaccines to eradicate the disease small pox in humans and the viral disease 'rinderpest' (also called cattle plague) in cattle and similar animals, the battle against whooping cough continues.

Vaccination programs against whooping cough may not be fully effective because the bacteria that cause the disease have evolved new strains. A team of Australian scientists has shown that two of the most common strains of *Bordetella pertussis* bacteria in Australia have undergone significant genetic changes since 1997. These mutations coincided with changes to the type of vaccine used in Australia and with apparent increases in the number of cases of Australians contracting the highly contagious respiratory disease.

Before 1997, a 'whole cell' vaccine was used. That was phased out over two years – due to concerns about side-effects – and since 1999 a new 'acellular' vaccine has been used. The whole cell vaccine contained hundreds of antigens, which gave broad protection against many strains of pertussis, however the acellular vaccine contains only three to five antigens. The study's findings suggest that the use of the acellular vaccine may be one factor contributing to these genetic changes.

The team analysed more than 200 samples of the bacterium, collected at various times over the past 40 years or so in Australia, and compared them with samples from Japan, Canada, USA and Finland. Their findings suggest that while vaccination remains effective against some strains circulating in Australia, it may no longer protect against two strains in particular – MT27 and MT70.

There has been growing concern among public health officials in recent years about the rising incidence of whooping cough, or pertussis, in Australia. Several significant outbreaks occurred a few years ago in western Sydney, for example. Until

this study, researchers had debated whether the increase was a result of improvements in laboratory diagnosis, the use of a different vaccine or because not enough people had been vaccinated recently (since immunity can wane over time).

Based on their findings, the researchers now think that the vaccine change could be a contributing factor. However, more research is required for a definitive proof. If that is the case, the vaccine may need to be modified to give greater protection against the new strains, without increasing side-effects, or over time it could lose effectiveness as the organism evolves.

The death rate for babies under the age of 6 months who catch pertussis is 1 in 200, according to NSW Health, which says adults

and adolescents are at particular risk of contracting whooping cough and can pass it on to babies who are too young to be immunised. It says the vaccine is at least 85% effective in preventing most strains of whooping cough in Australia. In NSW, vaccinations are routinely given to infants at 2, 4 and 6 months. Boosters are needed at age 4 years and again at age 15 years, free vaccine is offered to adolescents in Years 7 and 10 of high school. NSW Health also recommends that new parents and carers of young infants receive boosters. □

[Source: 'Bordetella pertussis Clones Identified by Multilocus Variable-Number Tandem-Repeat Analysis' by Kurniawan, *et al* in *Emerging Infectious Diseases* Vol 16, No 2, February 2010. & 'Whooping cough vaccine may be losing its punch: study' by Bob Beale (February 2010)]

Senior Science Fun Park Excursion to Luna Park Sydney

Many of the first-hand experiences in the Senior Science syllabus are covered by doing a *Senior Science Excursion* at Luna Park Sydney through *Physics is Fun*. Worksheets are provided for:

- ★ **Preliminary Topic 8.4 Humans at Work** – students assess the impact of science in the design/construction of safe rides; identify & assess potential hazards & factors that increase the risk of injury; perform an occupational health & safety style audit; & determine what safety measures are needed to protect the human body from injury.

- ★ **HSC Option 9.8 Disasters** – students explore the possible consequences of a disaster such as the collapse of a ride at Luna Park Sydney, and how emergency services would assist in the minimisation of the effects of such a disaster.
- ★ **HSC Topic 9.4 Information Systems** – students investigate the need/use of these.
- ★ **HSC Option 9.5 Polymers** – students investigate the types used & their impact.

Interactive learning is a great way for students to learn and have fantastic fun at the same time. What better way to put fun into your lessons than to do a *Senior Science excursion* to Luna Park Sydney through *Physics is Fun*!

For details, see page 6 of this *SciTalk*. Enquiries: ph 9939 6107, fax 9939 6105, www.odlumgarner.com □

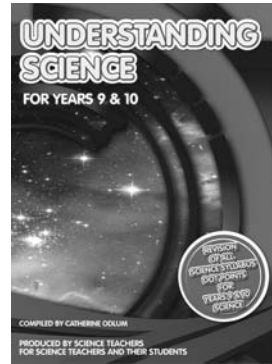
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 copies *Understanding Science for Years 9 & 10* ISBN 978-1-875918-06-5 \$26.95 ea

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

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FUN PARK EXCURSIONS

SPECIAL SCHOOL PRICES THROUGH PHYSICS IS FUN

2011 DATES ... still to go!

Sept 9, 12
 Oct 17, 21, 24, 28, 31
 Nov 4, 14, 18, 21, 25, 28.
 Dec 1, 2, 5–9, 12–16

PLUS OTHER SCHOOL DAYS are also available

[Note: Luna Park is only open on Mondays & Fridays, except during December]

TIME Rides start at 11 am

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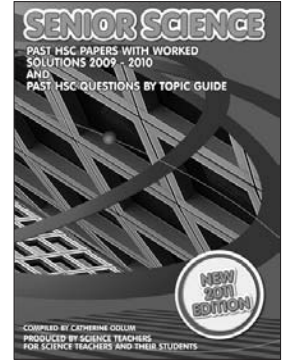
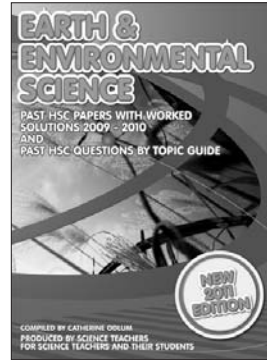
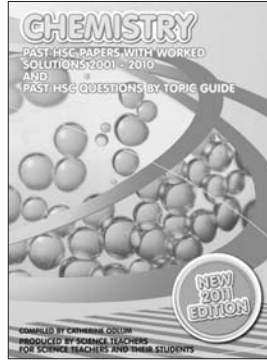
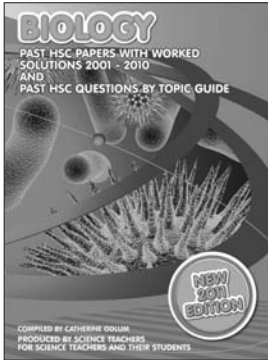
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Photo Spot Mayflies – a fisherman’s delight

Mayflies are popular with fly fishermen as they are good fish food, even the dead adults. Mayflies are insects that belong to the Order Ephemeroptera (from the Greek word *ephemeros* = ‘short-lived’, *pteron* = ‘wing’, referring to the brief lifespan of adults). They have been placed into an ancient group of insects termed Palaeoptera, which also contains dragonflies and damselflies. About 3000 species of mayflies are known worldwide. The common name, mayfly, comes from Europe where they emerge in May. In Australia they generally emerge in spring to summer.

The immature stages are called ‘nymphs’ or ‘naiads’. They live from several months to several years, with a number of moults (12–45 instars) along the way. Mayflies are unique among insects because their last immature stage has functional wings and after this stage they metamorphose again to become an adult. This last nymphal stage resembles an adult – however, it is usually sexually immature. It usually lives for a few hours, is generally a poor flier, and typically lacks the colouration patterns used to attract mates. It is known as a ‘subimago’ or to fly fishermen as a ‘dun’. The subimago eventually moults to reveal the full adult, known to fishermen as the ‘spinner’. Mayflies in the subimago stage are a favourite food of many fish, and so many fishing flies are modelled to resemble them.

The nymphs of most species are herbivores – grazing on diatoms and algae, or detritivores – scraping detritus off submerged stones and leaves. However, a few species prey on minute animals. Adult mayflies do not feed.

The species are adapted to many freshwater habitats ranging from warm standing waters and coastal waterholes to the melted snow of subalpine areas. Nymphs are aquatic and have gills along the sides of their abdomen. They live on the bottom of streams and lakes, either in crevices of logs or buried in mud, gravel and leaf litter or clinging to submerged plants. Adult mayflies usually live

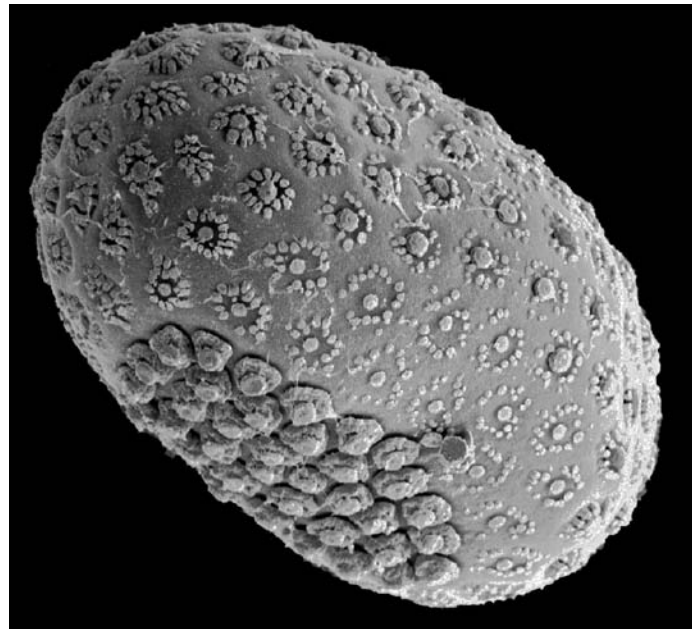


FIGURE 1: Mayfly egg. ... taken using a scanning electron microscope by Joan Clark, Microscopy & Imaging Research Facility, Monash University

near fast flowing streams, but also near lakes and reservoirs in either unsheltered stony areas or in weedy sheltered bays. Most Australian mayflies prefer cooler habitats and are therefore more abundant in mountain streams.

Adult mayflies (see Fig 2) have an average wingspan up to 15 mm. The primary function of the adult stage is reproduction. They mate in flight and females typically lay 500–3000 eggs in flight, ‘bombing’ the water’s surface. Small eggs, varied in shape, colour and sculpturing, (see Figure 1) sink to the substratum or adhere to submerged plants by way of an adhesive outer layer. Early instar nymphs hatch from one week to a year later depending on species and temperature. Temperature affects both egg development and emergence.

The adult lifespan ranges from a few minutes to 24 hours depending on the species (hence the name). Common names for mayflies include ‘dayfly’, ‘one-day fly’, ‘shadfly’, ‘Green Bay fly’, ‘lake fly’, ‘fishfly’ (in the Great Lakes region of North America), ‘midgee’, ‘canadian soldiers’ and ‘jinx fly’.

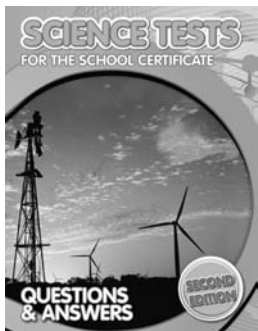
References:

- www.ento.csiro.au/education/insects/ephemeroptera.html
- 129.123.92.202/biol5530/Lab_Palaeoptera08_small.pdf at www.usu.edu/
- www.mdfr.org.au/bugguide/display.asp?type=3&class=17&subclass=&Order=6&couplet=0



FIGURE 2: Adult mayfly

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The discovery of new elements for the Periodic Table

As you would know by now, the IUPAC ratified the discovery of element number 112 in 1996 and its naming as ‘copernicium’ in 2010. Hence the NSW BOS including copernicium, with symbol Cn, in the Periodic Table to be used in future HSC exams from 2011.

Copernicium is usually considered to be a super-heavy element (or transactinide element). It should be noted that the definition of super-heavy elements (SHE) varies among different groups of people. Some claim they include all transuranic elements (i.e. element 93 onwards), while others claim that the actinides are elements 89–102, and that the transactinides (elements 103 and above) are to be called super-heavy, while those from 93–102 are heavy elements. No doubt, IUPAC will eventually have to arbitrate on this matter.

The SHE from element 103 onwards have only been made artificially, and currently serve no practical purpose because their short half-lives cause them to decay after a few minutes to just a few milliseconds, which also makes them extremely hard to study. The types of nuclear reactions that have been successfully used to produce SHE in the last decade are cold fusion reactions (elements 104–112) and hot fusion reactions (elements 113–116 and 118).

There are three pieces of special equipment used to do these reactions: (1) a cyclotron, which produces the intense beams of calcium-48 ions used to produce the superheavy elements; (2) a separator that separates the atoms of interest from everything else produced in these reactions; and (3) a detection system that can observe and record all of the events that take place during the experiment.

Since around 1998, scientists in Russia and the USA have collaborated together to produce new superheavy elements. By 2007, they had announced the discovery of a total of five new elements: 113, 114, 115, 116 and 118.

At this stage, IUPAC have determined that these collaborations share in the fulfilment of the criteria for the discovery of both elements 114 and 116 (in June 2011), but not yet for the other elements 113, 115, and 118. IUPAC have yet to consider the evidence for element 117. With the priority for the discovery established, the scientists who discovered elements 114 and 116 are invited to propose a name for these two super-heavy elements. The suggested names will then go through a review process before adoption by the IUPAC Council.

Element 116 was produced when calcium ions were bombarded into a curium target, and element 114 when they smashed calcium together with plutonium. Element 114 had a relatively long half-life compared to the other SHE. □

Could student research result in rainbow poo?

Back in 2009, seven Cambridge University undergraduates spent the summer genetically engineering bacteria to secrete a variety of coloured pigments, visible to the naked eye. They designed standardised sequences of DNA, known as BioBricks, and inserted them into *Escherichia coli* bacteria – the bacteria normally found in the intestines of humans. Each BioBrick part contained genes selected from existing organisms, enabling the bacteria to produce a colour: red, yellow, green, blue, brown or violet. The synthetically engineered bacteria were called *Escherichia Chromi*.

By combining these with other BioBricks, the *E chromi* bacteria could work safely as a biosensor that could detect the presence of toxins and secrete an indicator pigment. Thus they could be used to test water or air samples to indicate if pollutants such as arsenic or carbon dioxide are present and in what concentration, e.g. by turning blue if arsenic is present. *E chromi* won the Grand Prize at the 2009 International Genetically Engineered Machine Competition.

The team also worked together to explore the potential of this new technology and designed a timeline proposing ways that *E chromi* might develop over the next century, e.g. *E Chromi* could be mixed in with a special probiotic yogurt, which when eaten, would colonise the bowels and release pigments in the presence of diseases such as cancer, stomach ulcers and salmonella. If your poo was green, for example, you might have an ulcer, or if it turned orange, you may want to get tested for colon cancer.

It will be interesting to see if this new field of synthetic biology has a future? The video clip at the website below is worth viewing.

Reference: <http://news.discovery.com/tech/rainbow-poo-110426.html>

“Reputation is what people think you are,
but character is what you are.”

... John Wooden

References:

- www.iupac.org/publications/pac/pdf/2011/pdf/8307x1485.pdf
- https://www-pls.llnl.gov/?url=science_and_technology-chemistry-element_118
- https://www-pls.llnl.gov/?url=science_and_technology-chemistry-elements_113_and_115
- <http://news.discovery.com/earth/new-elements-periodic-table-110610.html>

AUSTRALIANS VICTORIOUS AT INTERNATIONAL SCIENCE OLYMPIADS

The 13 students representing Australia in the 2011 International Science Olympiads during July in Thailand (Physics), Turkey (Chemistry) and Taiwan (Biology) returned in triumph with a tally of 12 medals. The International Science Olympiads are an annual competition for exceptionally talented secondary school students from more than 100 countries, and represent the pinnacle of achievement in each discipline.

The Australian Science Olympiad (ASO) program selects Year 10, 11 and 12 students to represent Australia based on their outstanding achievements in a series of challenging exams and training sessions. From an original 2700 students who sat the ASO National Qualifying Exams in Biology, Chemistry or Physics, 70 students went on to be ASO Scholars and attended an intense training school at Monash University in Canberra. The teams were selected after completing a final exam and eventually 13 students represented Australia.

‘The program provides outstanding training for top-performing students to develop their talents in Science, enabling them to become the next generation of Australia’s scientists, engineers and researchers’, said Professor Adam Shoemaker, Monash University Deputy Vice-Chancellor and Vice-President (Education). □

Congratulations to the following students:

- **PHYSICS** (Bangkok, Thailand):
1 Silver Medal – Emilio Pace (St Peters College, SA); 3 Bronze Medals – Jinghang Luo (James Ruse Ag HS, NSW); Justin Cheung (Sydney Grammar, NSW); Tom Pearson (Burgmann Anglican, ACT); plus team member Katie Quail (Roseville College, NSW).
- **CHEMISTRY** (in Ankara, Turkey):
3 Silver Medals – Thushan Hettige (Scotch College, VIC); Peter Hall (University HS, VIC); Jonathan Lay (Newington, NSW); 1 Bronze Medal – Lachlan Vom (Sydney Grammar, NSW).
- **BIOLOGY** (in Taipei, Taiwan):
2 Silver Medals – Philip O’Riordan (University HS, VIC); Darcy Gray (Pittwater HS, NSW); 2 Bronze Medals – Callum Gray (Pittwater HS, NSW); Nathan Isaacson (Nth Sydney BHS, NSW).

* * * * *

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Observing the Spring skies

... Robert Garner

Spring spotlights for the planets, meteor showers and constellations should help to enthuse your Science students into learning about astronomy.

The Planets

On 28 August, *Mercury* reappears just below a thin crescent Moon in the eastern dawn sky. It will be low in the dawn sky for only a few days before sinking into the Sun's glow as it moves behind the Sun, approaching superior conjunction (= the planet and Sun are in the same direction from Earth). *Mercury* will reappear in the western evening sky in mid-October along with the much brighter *Venus*.

Venus is behind the Sun in early Spring and so cannot be seen. It appears in the western sky around mid-September just after sunset. On 28 September, *Venus*, *Saturn* and a thin crescent Moon are a few degrees above the western horizon half a hour after sunset. The next night, *Venus* and *Mercury* are still together but the Moon is now higher in the sky with the bright star, Spica between the Moon and the two planets.

During Spring, *Mars* will be found in the north-eastern dawn sky. *Mars* remains near the Beehive Cluster at this time, crossing it on 1–2 October. This cluster has been known since ancient times and was described as early as 250 BC and later by the astronomer, Ptolemy in 130 AD. In 1609, Galileo turned his low power telescope on it and described it as 'a mass of more than forty small stars'. The Beehive Cluster is easily resolved into a large group of stars with modern binoculars and finding *Mars* will show you where to look.

Jupiter rises in the east around 10.30 pm in September. It rises earlier each subsequent night to rise closer and closer to sunset as it approaches opposition (= when the Sun and planet are on opposite sides of the sky when viewed from Earth). *Jupiter* reaches opposition on 29 October when the Earth passes between *Jupiter* and the Sun. It is a favourable opposition and *Jupiter* is very bright. Jupiter's oppositions occur every thirteen months. These will decrease in brightness until 2017, so this year is a good time to observe *Jupiter* and its Galilean moons using binoculars or a telescope.

Saturn can be found low in the northwest August sky at sunset. It gets closer to the horizon each night and, approaching conjunction, disappears during September. It will not be visible again until well into November in the dawn sky.

This Spring provides an opportunity to see *Uranus*, which is usually too dim for naked eye observing. As *Uranus* reaches opposition on 26 September, it brightens to magnitude +5.7 and only fades to +5.8 by December. At these magnitudes it will be a naked eye object, but only in clear, dark skies. It is located in Pisces in the northeast sky after evening twilight. In Sydney's light polluted sky, binoculars or a small telescope will be needed to see the greenish blue disc of the planet.

Constellations

The Milky Way can be seen during Spring running almost north to south in the night sky.

Crux (the Southern Cross) can be seen all night. During Spring in the early evening, it is tipped over on its side in the southern skies with the two pointers (α - and β -Centauri) almost vertical above it. α -Centauri (the pointer closest to the Southern Cross) is a yellow double star (using binoculars) and β -Centauri is a blue star.

The Magellanic Clouds are near *Crux* and at this time of the year are to the east of it. They will be rising higher as the months progress into October.

Sagittarius ('the teapot') and *Scorpius* (the 'scorpion') can be seen in early evenings this Spring. Look overhead and slightly to the north, as they are close to the ecliptic (= the sky directly above the equator). The curl of *Scorpius*' tail can be seen next to the teapot shape in *Sagittarius*. *Scorpius* has many bright stars and is one of the few constellations that does not require a vivid imagination to recognise its shape. Above the western horizon, the bright star Spica in the constellation *Virgo* can be seen.

See Box 1 for getting a Sky Chart / Planisphere to view the skies.

Spring Equinox

This occurs on 23 September and is when night and day are closest to being equal. In Sydney, the Sun will rise directly from the east at 5.45 am and set directly to the west at 5.52 pm. The exact time that the Sun crosses from the Northern Hemisphere to the Southern Hemisphere (i.e. it crosses the ecliptic) will occur 7.04 pm EST.

International Space Station (ISS) and other satellites

It is possible to observe the various satellites and International Space Station (ISS) as they pass overhead. To know where and when to look, use the website: <http://www.heavens-above.com/>

To use this website, you need to know the precise longitude/latitude of your location. For Sydney, this is: Latitude: -33.8830 (33.8830°S), Longitude: +151.2170 (151.2170°E). A local map should provide this data for elsewhere.

For example, if looking for the ISS ... clicking on the date will then give you a 'Whole Sky Chart' with the ISS path on it, and above this, click to get a 'Ground Track Plot' map showing the path of ISS across Australia. This site has lots of information and works really well!

MACQUARIE UNI OBSERVATORY PUBLIC FRIDAY NIGHT OBSERVING

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 (in non-DST), 8.30–10 pm (when DST). Bookings are essential – ph 9850 4409 or email starinfo@mq.edu.au before 4 pm. If doubtful weather, ph 9850 8914 after 5 pm or check at www.physics.mq.edu.au/community/observatory/public/

On clear nights, our 'starfinder' (planisphere) sessions demonstrate how to identify bright stars, constellations and planets. This is followed by observing with the 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.

Box 1: Sky Charts & Planispheres

- You can download free sky charts each month to explore the night sky (planets, stars & constellations) from: <http://skymaps.com/downloads.html> Make sure you scroll down to the 'Southern Hemisphere Edition'.
- 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>

Astronomy Open night ... Macquarie University

Date: 5 November at Macquarie University, from 6.30–10 pm.
Use E7B courtyard entrance, no bookings required. Cost: \$5 Child (under 18) & seniors, \$10 Adult, \$25 Family. Enquiries: ph 9850 7111, www.physics.mq.edu.au/community/FFA/opennight/

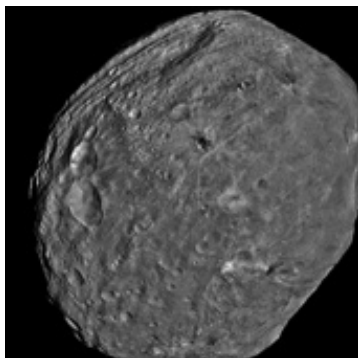
Asteroid Vesta & Dwarf Planet Ceres

Vesta and Ceres are two of the largest surviving protoplanets – bodies that almost became planets. They reside in the asteroid belt – between *Mars* and *Jupiter*. Vesta is an asteroid and Ceres is a dwarf planet.

Vesta is the brightest object in the asteroid belt as seen from Earth and is thought to be the source of a large number of meteorites that fall to Earth. In its past, it underwent a massive collision in space creating a crater about 460 km across and 13 km deep. This put much debris into irregular orbits. About one twentieth of the meteorites that reach Earth originate from that collision. We thus have more of Vesta on Earth to investigate than we have from the Moon as Moon rocks.

Vesta can be seen from Earth – it is so small (only 530 km in diameter) and so far away (184 million km) that it appears as a star-like point of light, even in a large telescope.

NASA's Dawn spacecraft, the first ever to orbit an object in the main asteroid belt, arrived at Vesta in July 2011. Dawn will leave Vesta in 2012 and head for Ceres – reaching it in 2015.



At each target, Dawn will acquire colour photographs, search for new moons, compile a topographic map, measure the gravity field, map the elemental composition and also map the mineralogical

FIGURE 1: Vesta Asteroid
[Credit: NASA/JPL-Caltech
UCLA/MPS/DLR/IDA]

composition. The data gathered by Dawn will enable scientists to understand the conditions under which these objects formed, determine the nature of the building blocks from which the terrestrial planets formed and contrast the formation and evolution of Vesta and Ceres.

For more information, go to: <http://dawn.jpl.nasa.gov/>

Earth's Trojan Asteroid

In 1772, French mathematician Joseph-Louis Lagrange calculated that small bodies could share the same orbit as a planet if they remain near 'triangular points' 60° ahead of or behind the planet in its orbit. Such points are now known as Lagrangian points with point L4 ahead of the planet and point L5 behind the planet.

Called 'Trojan asteroids', about 5000 have been found for *Jupiter*, with about 60% ahead of the planet at point L4 and about 40% behind the planet at point L5. So far five such asteroids have been discovered sharing *Mars*' orbit at its L5 point. While six similar asteroids have been identified at *Neptune*'s L5 point, some astronomers predict that there are many more Trojans that will only be discovered by spacecraft travelling nearby in the future. Some of *Saturn*'s moons seem to be in stable Lagrangian orbits with other moons of *Saturn*. There may also be smaller Trojans yet to be found.

Finding Earth's Trojan has proven difficult because the Lagrange points lie towards the Sun in the sky. However, by using data from an infra-red satellite, astronomers have confirmed that Earth has its own Trojan asteroid, classified as 2010TK7, about 300 metres in diameter. It is in a complicated elliptical orbit at Earth's L4 point, ahead of Earth in its orbit. It travels around the Sun in exactly one year the same as Earth, and repeats its complicated orbit approximately every 395 years. Its orbit is well defined and stable for at least the next 10 000 years. At its closest approach, it is about 24 000 km from Earth, which is several times the distance to the Moon.

You can look at an excellent video clip showing the orbit that Earth's Trojan Asteroid shares with Earth by going to: www.nasa.gov/mission_pages/WISE/news/wise20110727vid.html

You can read more about Earth's Trojan at both the NASA website and at: www.smh.com.au/technology/sci-tech/found-earths-orbital-sidekick-20110728-1i0wp.html

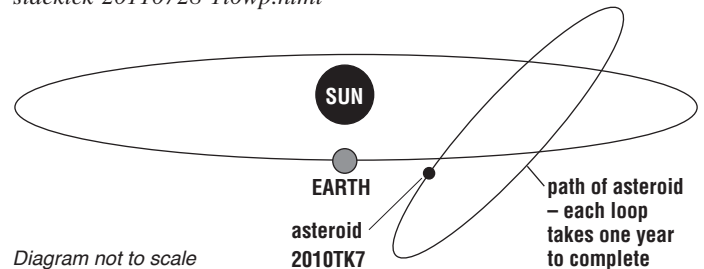


Diagram not to scale

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To find out more about shows/concerts in Luna Park Sydney's Big Top, or their function venues or The Deck restaurant with their spectacular harbour views, go to: www.lunaparksydney.com

* * * * *

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WINNER: Peter O'Neill, All Saints College, won the IMAX Sydney family pass for *SciTalk* No. 2-2011.



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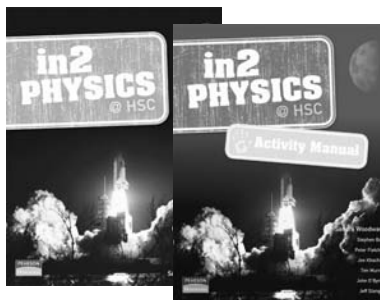
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This program is run by The Science Schools Foundation, which makes arrangements with and assists, the universities and tertiary institutions to conduct these annual programs.

For more information, contact: ph 03 8288 1001 or go to: www.scienceexperience.com.au

SciTalk

SciTalk is a newsletter for secondary Science educators. Now in its 16th year, it has been produced quarterly by Odlum & Garner as a service to Science teachers since 1995. It is sent FREE-of-charge to all secondary Science faculties in schools and TAFEs throughout NSW and the ACT.

SciTalk aims to provide science teachers with up-to-date information, important dates, the latest products available, plus 'what's on' in various excursion venues, and more.

Please pass *SciTalk* on to all Science teachers at your school so they can benefit from it – or put it up on your notice board for reference.

Contributions, advertising and inserts are welcome. Copies of *SciTalk* are also available at:

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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–January 2011 ... Dec 17
- *SciTalk* No. 2–May 2011 ... April 8
- *SciTalk* No. 3–August 2011 ... July 1
- *SciTalk* No. 4–October 2011 ... Sept 23

ADVERTISING & INSERTS

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