

# SciTalk

ISSN 1323-7667

Number 2 – May 2012

## Science by Video Conferencing

Hasn't the teaching landscape changed in the past few years?

Video conferencing is a new tool in education and is available across Australia. It allows users to see and hear the presenters with whom they are communicating and is very different from other multimedia resources, such as video recordings, U-tube recordings or TV presentations, because video conferences are live and interactive.

Video conferencing brings students and teachers together with experts and educators. The presenters will involve the students face-to-face – it will seem as if the presenters are in the classroom with you, as the data speed of video conferencing today is so good.

Up until a few years ago a traditional Science excursion would involve hiring buses, completing risk assessments, negotiating timetables between departments and collecting student payments, not to mention extra time pressure on classroom teachers. Video conferencing facilities in schools now enable students to access high quality syllabus-linked lessons at a fraction of the cost of an excursion. So video conferencing is ideal for remote and regional schools. A video conference also requires much less effort to organise.

Several Australian Science excursion providers have adapted live lessons to the video conference environment and there are more coming on board each term. You might be surprised at what is available – lecturers from university Science faculties, researchers from major scientific institutions and high quality Science workshops by established Science communicators.

If you have not experienced a video conference before, it might be well worth looking into. Video conferencing is not that much different from having a guest lecturer present live at your school. It provides students with the opportunity to learn by participating in two-way communication forums, which is an exciting and stimulating way to learn.

Video conferences, such as those run by Fizzics Education, can even involve you

... continued on page 4

### Fun Park Excursions to Luna Park Sydney

THE CHEAPEST SCHOOL PRICES  
are through Physics is Fun!

★ ◆ ★ ◆ ★

Come for just a fun day  
or an educational day!

Don't pay more ... save \$\$\$

ANY FACULTY CAN COME


Worksheets (if needed) are available

★ ◆ ★ ◆ ★

Enquiries/bookings: 02 9939 6107

www.odlumgarner.com

Email: robergarner@mac.com


**Get 10, 13 or 17 August 2012**  
 into your school calendar  
 for this year's *Physics is Fun*  
 in National Science Week

★ OUT NOW: 2012 editions Past HSC Questions & Worked Solutions ... see p7 ★

### INSIDE SCITALK ▶▶▶▶

- Science by Video Conferencing .....1
- Fun Park Excursions at Luna Park .....1, 6
- National Science Week & Physics is Fun.....1
- Diary Dates / BOS Update .....2
- Night Stalk .....2
- Out and About .....3
- Australian Museum School Programs .....4
- Work Health & Safety Mandatory Training .....4
- Science Updates .....4, 5
- Factors affecting nuclear stability.....5
- The Nyholm Youth Lecture 2012 .....5
- Senior Science excursion to Luna Park .....5

- Understanding Science: Yrs 7&8 / Yrs 9&10.....6
- Fun Park Excursions at Luna Park .....6
- Past HSC Papers with Worked Solutions .....7
- Photospot: Fly ash .....8
- New WHS laws will affect Science teachers .....8
- Exam Choice: Trial & Prelim Science Exams .....9
- Astronomy: As Autumn heads into Winter .....10
- Transit of Venus, Total Eclipse of Sun.....10
- Science Tests for Year 10 .....11
- Prizes to win: Luna Park, IMAX, Sydney Aquarium... 11
- Macq Uni Observatory Fri Night Observing.....11
- Fizzics Education Science Visits .....12
- NewScientist: Special Education Price .....12
- Lab Coats & more – from Ivy Industries .....12

### ★★ ATTENTION ★★

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

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

Please return to file or noticeboard.

### PRIZES TO WIN!

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

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

## Book Giveaway

WIN your choice of one  
of these books ...

**2001-2011 Past HSC Papers  
with Worked Solutions**



Also available as  
2006-2011 books  
... published by Odlum & Garner

These 2012 editions include a *Past HSC Questions by Topic Guide* for ALL papers, so students can revise topic by topic or use the actual exam papers. They contain complete copies of ALL the 2001-2011 exams with ALL questions, diagrams, etc. plus worked answers that are *an appropriate length* and would score full marks, a guide on *How to Achieve Success in the HSC* and more.

**TO WIN:** Send your name, school & school address (& subject) on an envelope by **29 June 2012** to:  
Book Giveaway, PO Box 442, Freshwater 2096

★ ★ ★

Winners for *SciTalk* 1/12

The Science Faculty, Swansea HS won the *Science and Inquiry* Bks 1 & 2 (rtp \$24.95 ea) published by Pearson Australia.

# Diary Dates



## 2012 – International Year of Sustainable Energy for All

For: Shell Questacon Science Circus 2012 program:  
[www.questacon.edu.au/html/on\\_the\\_road.html](http://www.questacon.edu.au/html/on_the_road.html)

### MAY 2012

- 4, 25 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
- 15 Nyholm Youth Lecture at University of Sydney ... see details on page 4
- 16 Nyholm Youth Lecture at University of Western Sydney ... see details on page 4
- 22 Nyholm Youth Lecture at UNSW ... see details on page 4
- 23 Rio Tinto Big Science Competition: [www.asi.edu.au](http://www.asi.edu.au) Closing date: 27/4/12

### JUNE 2012

- 1, 4, 8 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
- 5 World Environment Day
- 28 Closing date: Crystal Growing Comp. [www.chem.unsw.edu.au/RACI/](http://www.chem.unsw.edu.au/RACI/) Ph: (02) 9663 4960
- 15, 16 (metro) NSW Schools Titration Competition. [www.nswtitration.com/](http://www.nswtitration.com/)  
 (see website for regional dates) ... National Competition: 15 September at UNSW (tbc)
- 21 Winter Solstice (9.09 am EST)

### JULY 2012

- 8–11 CONASTA 61 in Canberra. Theme: ‘Science is critical’. Details: [www.conasta.edu.au/](http://www.conasta.edu.au/)
- 21–28 National Chemistry Week. [www.raci.org.au/national/events/chemistryweek.html](http://www.raci.org.au/national/events/chemistryweek.html)
- 24 Nyholm Youth Lecture at University of Western Sydney ... see details on page 4
- 26 National Chemistry Quiz. [www.raci.org.au/](http://www.raci.org.au/) in “Events”. Details: ph (02) 6331 5125

### AUGUST 2012

- 3 Jeans for Genes Day. [www.jeansforgenes.org.au/](http://www.jeansforgenes.org.au/)
- 8 Chemistry Olympiad Exam. [www.asi.edu.au](http://www.asi.edu.au) Close date: 18/7/12. Ph: 6201 2552
- 10, 13, 17 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105  
 – come on one of these dates to celebrate National Science Week
- 11–19 National Science Week. School theme: ‘Energy Evolution’. [www.scienceweek.net.au](http://www.scienceweek.net.au)
- 13 Biology Olympiad Exam. [www.asi.edu.au](http://www.asi.edu.au) Close date: 18/7/12. Ph: 6201 2552
- 15 Physics Olympiad Exam. [www.asi.edu.au](http://www.asi.edu.au) Close date: 18/7/12. Ph: 6201 2552

### SEPTEMBER 2012

- 14, 17 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
- 23 Spring Equinox (12.49 am EST)

### OCTOBER 2012

- 14–20 Earth Science Week. [www.earthsciweek.org&www.ga.gov.au/education/events,ph\(02\)62499111](http://www.earthsciweek.org&www.ga.gov.au/education/events,ph(02)62499111)
- 19 Biology Teachers PD Day. Museum of Human Disease, UNSW, Ph: 9385 1522
- 20 Astronomy Open Night at Macquarie Uni. Enquiries: ph (02) 9850 7111.  
 Details: <http://physics.mq.edu.au/community/AFA/opennight/>
- 15, 19, 22, 26, 29 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

### NOVEMBER 2012

- 2, 12, 16 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
- 19, 23, 26, 30 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

### DECEMBER 2012

- 3–19 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105
- 21 Summer Solstice (10.11 pm AEDT)

**JANUARY 2013** National Youth Science Forum. Forms to local Rotary club by 29/5/12, interviews from July.  
 Only for Yr 11 in 2012. Enquiries: 6125 2777, email: [nsss@anu.au](mailto:nsss@anu.au), [www.nysf.edu.au/](http://www.nysf.edu.au/)

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

## 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.

### Record of School Achievement (RoSA)

RoSA is the new credential in NSW for students who leave school after Year 10 and before they receive their HSC.

The RoSA will be available electronically and as a verifiable hard copy on demand with the most up-to date information on a student’s achievements, across all subjects and a range of extra-curricular activities.

### New arrangements for Year 10

Starting with students in Year 10 in 2012, there are no more statewide external School Certificate tests in NSW. Schools will still need to enter Year 10 students into Stage 5 courses through *Schools Online* as per usual. Schools are to continue to administer school-based assessments to Year 10 as per the current guidelines and provide grades for those students using the results of school-based assessments at the end of the year, in the same way they did in 2011.

### Curriculum Requirements for NSW Schools in 2012 and 2013 (BOS 37/11)

In 2012 and 2013 schools are to continue using the existing NSW K-12 syllabuses. For Science, this is the *Science Years 7–10 Syllabus* (updated in 2009).

### Syllabus for K–10 Science

Consultation on the Draft Syllabus for K–10 Science Version 2 for the Australian Curriculum took place during Term 1 this year.

### Approved scientific calculators for 2012 HSC exams

The list of approved scientific calculators is now available on the BOS website.

### BOS enquiries

Ph: (02) 9367 8111, fax: (02) 9367 8484  
 Website: [www.boardofstudies.nsw.edu.au/](http://www.boardofstudies.nsw.edu.au/)  
 BOS contacts for Science:  
 • Inspector Science, K–12 & Senior  
 • Assessment Officer – Science

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

Motivation is the art of getting people to do what you want them to do because they want to do it.

... Dwight D Eisenhower

## Night Stalk

1 September–16 October 2012

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 more nights between 1 September and 16 October and spotlight in your local bushland. Record all native/introduced animal species: mammals, birds, bats, 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 14th 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/](http://www.perthzoo.wa.gov.au/Act/Nightstalk/) to download a Spotter’s Log or complete one online or contact Tiwest Night Stalk Coordinator, Suzi Greenway, (08) 9474 0457 (Wed–Fri).

▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶ **OUT AND ABOUT** .....

**IMAX THEATRE SYDNEY**  
 31 Wheat Rd, Darling Harbour, Sydney 2000



**NEW FILMS IN TERM 2**

★ **THE LAST REEF 3D ... starts 3 May**

A parallel is drawn between the ocean's incredible yet delicate coral reef ecosystem and our own cities. Explore an incredible diversity of sea life in these 'cities beneath the sea' and see otherworldly organisms come alive on the giant screen in brilliant clarity and detail.

★ **TO THE ARCTIC 3D ... starts 31 May**

An extraordinary journey to the top of the world as few people have ever seen it, *To The Arctic* tells a compelling tale of survival, with global implications. Through the power of IMAX® students will be transported to one of the most remote and spectacularly beautiful places in the world and experience an emotional story of love, family and hope.

**Free Teacher Previews:** Visit [www.imax.com.au/schoolsrsvp](http://www.imax.com.au/schoolsrsvp) for Free Teacher Preview dates. RSVP now!

Session times are at: [www.imax.com.au/schooltimetables](http://www.imax.com.au/schooltimetables)

School bookings: 9213 1600 Email: [education@imax.com.au](mailto:education@imax.com.au)

Website: [www.imax.com.au/schools](http://www.imax.com.au/schools)

**WILD LIFE SYDNEY & SYDNEY AQUARIUM**



Darling Harbour, Sydney

**WILD LIFE Sydney ...** a rare Golden Brushtail Possum can now be viewed here – this is the third born since 2008 as part of Wild Life Sydney's breeding program. One of Australia's largest arboreal marsupials, yet are rarely seen in the wild, these possums are found mostly in small pockets of Tasmania, where they survive due to a lack of predators.

**Sydney Aquarium ...** a critically endangered Sawfish, measuring 1.6–2 m in length, can be seen in the *Great Barrier Reef* exhibit. These evolutionary marvels can live in both salt and fresh water. Their long saw-like rostrum (nose) has evolved to forage for food under the ocean floor. This exhibit – the world's largest with around 2 million litres of water – also features tropical reef sharks and vibrantly-coloured tropical fish.

For information: [sydneyaquarium.com.au](http://sydneyaquarium.com.au) OR [wildlifesydney.com.au/](http://wildlifesydney.com.au/)

For school bookings: phone 8251 7801

or email: [sydneyaquarium@merlinentertainments.com.au](mailto:sydneyaquarium@merlinentertainments.com.au)

OR [wildlifesydney@merlinentertainments.com.au](mailto:wildlifesydney@merlinentertainments.com.au)

**MUSEUM OF HUMAN DISEASE**

**2012 EXCURSION OPTIONS & TEACHERS DAY**

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

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

The **2012 Professional Development Day** for Senior Biology teachers will be held on Friday 19 October. Information and registration forms will be distributed to schools in Term 2.

**Further information and bookings:**

- T 02 9385 1522
- E [diseasemuseum@unsw.edu.au](mailto:diseasemuseum@unsw.edu.au)
- W [www.diseasemuseum.unsw.edu.au](http://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).

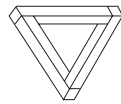
**Bookings & Information:**

- Phone: 02 9298 3655 Fax: 02 9298 3660
- Email: [bookings@anmm.gov.au](mailto:bookings@anmm.gov.au)
- Location: 2 Murray Street, Darling Harbour



**Science Centre & Planetarium**

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



- ★ **Taking bookings for 2012**
- ★ **Star Trails Outreach Program** – visiting schools with Planetarium Shows and interactive Science Shows.
- ★ We have an extensive range of *shows & exhibits*, including:
  - **The Machine**
  - **Stellar Evolution** – planetarium program for HSC Physics
  - **Superconductors & Liquid Nitrogen** – live science show
  - **Energy and Motion**
  - **Changing Worlds and Visions**
  - **Dinosaurs, Fossils & Coal**
- ★ School entry includes two floors of hands-on exhibits, a science show, plus a *planetarium / laser show*.
- ★ **Also available:** environmental field trips, science shop, kiosk, science fun bags, membership programs.
- ★ **Book now** for an excursion. Information/bookings: 02 4286 5000 Website: <http://sciencecentre.uow.edu.au>

**WHY NOT COMBINE A FUN PARK EXCURSION BOOKED THROUGH PHYSICS IS FUN WITH IMAX, SYDNEY AQUARIUM, OR WILD LIFE SYDNEY**

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](http://www.imax.com.au/schools)  
 SYDNEY AQUARIUM: [www.sydneyaquarium.com.au/](http://www.sydneyaquarium.com.au/)  
 WILD LIFE SYDNEY: [www.wildlifesydney.com.au/](http://www.wildlifesydney.com.au/)  
 FUN PARK EXCURSION (through Physics is Fun): [www.odlumgarner.com](http://www.odlumgarner.com)
- **WHAT TO DO:** Allow 1 hr for IMAX (any film), or 2 hrs for a Sydney Aquarium/Wild Life Sydney excursion. Then 2–3 hours for Physics is Fun at Luna Park (rides open 11 am, Mon/Fri + any school day in December).

BOOK & PAY SEPARATELY FOR EACH EXCURSION

## Australian Museum School Programs 2012

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

### New Temporary Exhibition:

#### Deep Oceans

16 June–14 October, 2012

Oceans cover over 70% of our planet, yet despite being the largest habitat for life on Earth, less than a tenth of the deep ocean realm has been explored! What's down there?

Featuring an innovative combination of interactive exhibits, fascinating objects, incredible specimens and some remarkable stories, the Deep Oceans exhibition takes you on a journey to the most inaccessible ecosystems on Earth, home to some of the strangest creatures, living under some of the most inhospitable conditions on the planet. Don't miss this exciting exhibition jointly developed by the Australian Museum and Questacon.

### For visiting school group bookings and further information:

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

### 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 are 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.

**TEACHERS PREVIEW NIGHT:** 26 July, 5.15 pm–7.30 pm

RSVP: [learning.services@austmus.gov.au](mailto:learning.services@austmus.gov.au)

### AUSTRALIAN MUSEUM

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

[www.australianmuseum.net.au](http://www.australianmuseum.net.au)



## Work Health and Safety Mandatory Training

### What do these pictograms mean?



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

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

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

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

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

For more details, prices and availability, email Margaret Lindsay, secretary of the NSW Chemical Education Group, at: [margaret.lindsay@nowt.com.au](mailto:margaret.lindsay@nowt.com.au)

## Science by Video Conferencing

(... continued from page 1)

students running experiments live with the presenter and asking questions back and forth. Fizzics Education offer NSW schools free training on how to use your video conference system. It only takes 10 minutes to get going and they can fit it in with your schedule. Why not try one of their video conferences in 2012 – they have a number of workshops that have been adapted for video conference presentations, including several that fit in with 2012 being the International Year of Sustainable Energy. For more details, go to their website: [www.fizzicseducation.com.au](http://www.fizzicseducation.com.au)

If you are in a NSW public school, NSW Distance and Rural Technologies (DART) provides support for bookings to access video conferences. Go to: <http://dartconnections.org.au> Independent schools can contact providers directly to schedule a virtual excursion. Your school's IT support officer should know how to help you in setting up a video conference excursion.

Some other excursion providers now offering video conference programs include:

- Australian Museum: [www.australianmuseum.net.au/Video-Conferencing](http://www.australianmuseum.net.au/Video-Conferencing)
- Museum of Human Disease: [www.diseasemuseum.unsw.edu.au](http://www.diseasemuseum.unsw.edu.au)
- Reef HQ: [www.reefhq.com.au/education-at-reef-hq-aquarium/plan-a-school-visit/reef-videoconferencing](http://www.reefhq.com.au/education-at-reef-hq-aquarium/plan-a-school-visit/reef-videoconferencing)

## Science Updates

### • Retune your immune system

This article outlines some ways to encourage your immune system to behave and provide strong defence against disease. These ways include eating a plentiful supply of fruit and vegetables, not becoming obese through overeating, having probiotics (daily yogurt drinks), not taking antibiotics unnecessarily, avoiding stress, being optimistic as well as fit and having a sense of humour, keeping your friends and avoiding being lonely, having adequate and good quality sleep, getting enough sunshine to produce adequate vitamin D, exercising adequately on a daily basis.

[Source: NewScientist 7 April 2012]

### • Importance of measuring phytoplankton

Researchers are trying to verify if the number of phytoplankton in our oceans are decreasing or not. Regardless of the results, it has raised the importance of knowing if oceans are healthy and have adequate populations of phytoplankton as they are vital in helping to maintain ocean food webs. Phytoplankton are eaten by zooplankton, which are then eaten by fish. Long-term reliable monitoring needs to be set up to keep a check on ocean life and the fate of the world's fisheries.

[Source: NewScientist 7 April 2012]

## Factors affecting nuclear stability

The reasons for nuclear stability (see Box 1) are not yet fully understood, largely because the exact nature of the forces holding the nucleons together is still only partially understood. The reasons are often oversimplified in Chemistry textbooks.

A number of factors are involved in nuclear stability – and not just the neutron to proton (n:p) ratio. Students also need to consider the size of the nucleus.

The n:p ratio is one important factor in stability. If the n:p ratio is too high or too low, it makes for an unstable nucleus. The stable ratio rises from just over 1:1 for light atoms up to 1.5:1 for heavy atoms. However, the n:p ratio cannot always be used to determine stability (see box 2).

Also, the n:p ratio cannot be used to consider why large atoms are unstable. Large atoms are just too big to be stable. For example, the transuranic isotope copernicium ( $^{278}_{112}\text{Cn}$ ) is unstable. It has an n:p ratio of 1.48:1 which would suggest stability. However, Copernicium is unstable because, like all elements with an atomic number  $> 82$  (Pb)\*, its nucleus is too big to be stable. *Many students answering Q23 in the 2011 HSC Chemistry exam were confused about this.*

Another factor that affects nuclear stability is whether the nucleus contains odd/even numbers of protons and neutrons. This affects the nuclear spin and so affects the stability of a nucleus.

Protons	Neutrons	Stability
Odd	Odd	least stable
Odd	Even	↓
Even	Odd	
Even	Even	most stable

Finally, particular numbers of protons and neutrons form especially stable nuclei. These are known as 'magic numbers'. They are 2, 8, 20, 28, 50, 82 and 126. For example, atoms such as He<sup>4</sup>, O<sup>16</sup>, Ca<sup>40</sup>, Ca<sup>48</sup>, Ni<sup>48</sup> and Pb<sup>208</sup> have magic numbers of both protons and neutrons and are more stable and/or abundant than would otherwise be expected.

**Box 1** A nucleus is stable if it does not spontaneously emit any kind of radioactivity (radiation) and a nucleus is unstable if it emits some kind of radiation, i.e. it is radioactive.

**Box 2** The n:p ratio cannot always be used to determine stability. For example: Ca<sup>40</sup> with a 1:1 ratio is stable, Ca<sup>41</sup> with almost the same 1:1 ratio is unstable – its half life is  $\sim 10^5$  years, and Ca<sup>48</sup> with 8 extra neutrons compared to Ca<sup>40</sup> and a 1.4:1 ratio, has a half life of  $\sim 10^{19}$  years and is much less unstable than Ca<sup>41</sup>.

\* Until 2003, Bi<sup>209</sup> with atomic number 83 was thought to be stable, but it has been found to decay with a half life of  $\sim 2 \times 10^{19}$  years. So Bi<sup>209</sup> is unstable.

## Science Update

### • Master hormone found in plants

Australian researchers have found that a single hormone, called strigolactone, co-ordinates how a plant grows in response to the environment. Strigolactone determines whether a plant grows long and skinny or broad and bushy. When nutrient levels or light levels are low, strigolactone levels rise, suppressing the development of buds into branches and thickening the main stem, so the plant grows tall and skinny. This ensures that it has the structural strength to grow tall. This enables the plant to reach more light, and maximises the amount of energy for reproduction. Energy is therefore focussed on producing flowers and seeds, rather than vegetative growth. When there is a lot of light and nutrients around, strigolactone levels fall, encouraging branching and making a plant that is broad and bushy and able to make the most of abundant resources. Hormones, like auxin, work through strigolactone. When nutrient levels are low, strigolactone levels rise and this stimulates production of root hairs and beneficial mycorrhizal fungi, which both help increase the uptake of nutrients.

[Source: ABC Science Nov 2011]

## Senior Science Fun Park Excursion to Luna Park Sydney

Many first-hand experiences in the Senior Science syllabus are covered by doing a *Senior Science Excursion* to 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 risk of injury; perform an occupational health & safety style audit; determine what safety measures will 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 fun at the same time. Details are on page 6 of this *SciTalk*.

Enquiries: ph 9939 6107, fax 9939 6105, [www.odlumgarner.com](http://www.odlumgarner.com)



## The Nyholm Youth Lecture 2012 Chemistry of the Nucleus

The 2012 Nyholm Youth Lecturer is Dr Joseph Bevitt from ANSTO. His presentation is geared to engage and extend students as they learn the many fascinating uses and properties of radiation. Careers open to students in nuclear science are also illustrated as part of his talk. The lecture will offer an opportunity for Year 10, 11 and 12 students to hear a chemist speak about his work at a level they can comprehend.

The lecture includes visual aids, student participation, PowerPoint and video.

### LECTURE DATES TERM 2

Tuesday 15 May: University of Sydney, 4–5.30 pm (in School of Chemistry Lecture Theatre 2)

Wednesday 16 May: University of Western Sydney, Campbelltown, 4–5.30 pm

Tuesday 22 May: University of New South Wales at 4–5.30 pm

### LECTURE DATES TERM 3

Tuesday 24 July: University of New England, Armidale ... time TBC but probably 1–2.30 pm

### Other venues by arrangement

To ensure that venues are not over-booked, please email Margaret Lindsay at [margaret.lindsay@nowt.com.au](mailto:margaret.lindsay@nowt.com.au) to confirm venues and register the number of student attendees. A donation of \$2 per student at the door is requested for costs.

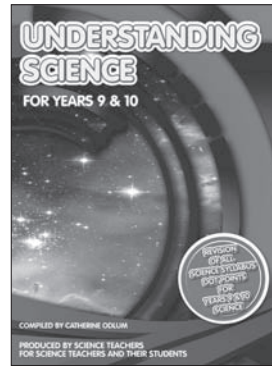
★ Ideal revision guides, or for homework or assignments ... for success in Science 7–10 ★



**Understanding Science for Years 7 & 8**

- Comprehensive coverage of the Syllabus Dot Points using questions & answers
- Covers the Prescribed Focus Areas, plus the Skills and essential content of the Knowledge and Understanding sections of the Science Syllabus
- Includes:
  - STAGE 4 SCIENCE TEST TO HELP STUDENTS REVISE THEIR WORK**

... from only \$26.36 ea after discount!



**Understanding Science for Years 9 & 10**

- Comprehensive coverage of the Syllabus Dot Points using questions & answers
- Ideal revision guide, or for homework or assignments
- 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!

Order a copy ... or get your class sets now, so each student has these books.

**ORDER FORM** Please supply:

.... copies *Understanding Science for Years 7 & 8* ISBN 978-1-875918-08-9 \$32.95 ea

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

Name: .....

School: .....

Address: .....

..... Postcode: .....

Phone no. ....

School orders can be invoiced if a School Order Form is sent. Personal orders need to send payment or Credit Card details (Mastercard/Visa) with order. Make cheques to 'Odlum & Garner'.

Send order to: Odlum & Garner  
 (ABN 54 942 891 924)  
 PO Box 442, Freshwater NSW 2096  
 Ph: 9939 6107 Fax: 9939 6105  
 Email: robertgarner@mac.com  
 Website: www.odlumgarner.com

**20% discount & FREE FREIGHT**  
 for orders of 15+ books  
 (may be mixed).  
 All other orders  
 – \$9 delivery charge.

**SAVE \$\$\$**  
 Buy DIRECT from publisher  
 and get up to 20% disc

Odlum & Garner books are also available from educational booksellers.



**FUN PARK EXCURSIONS**

Schools can book for either a Fun Day OR an Educational Day

**2012 DATES**

For scheduled dates, go to our website: [www.odlumgarner.com](http://www.odlumgarner.com)

**PLUS any Monday/Friday in the school term**

[Note: Luna Park is open every day in December]

**TIME** Rides start from 11 am

**COST** Only \$24.50\*/student plus \$20\* booking fee/school  
 [Non-scheduled days: from \$25.50\*/student]

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

Entry to Luna Park is FREE.

Extra teacher ride tickets are \$25.50\*

\* plus 10% GST (schools can claim this back when doing a curriculum-specific excursion).

Save \$\$\$ ... Why pay more?

We offer the cheapest **DISCOUNT SCHOOL PRICES**

**ALL school faculties can book through Physics is Fun**

If booking just a Fun Day, you do not need to do worksheets – however if doing our Peer Support worksheets, you will not have to charge your students the GST.

Interactive learning is a great way for students to discover that learning is not so dull after all! These excursions are presented by experienced teachers.

**WORKSHEETS AVAILABLE FOR EDUCATIONAL DAYS**

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

**Primary:** Science & Technology, English, & Mathematics; Visual Arts; Peer Support.

★ **BOOK NOW THROUGH PHYSICS IS FUN** ★

**ENQUIRIES/BOOKINGS**

• **www.odlumgarner.com**  
 Robert Garner or Catherine Odlum  
 PO Box 442, Freshwater NSW 2096  
**Ph (02) 9939 6107 Fax (02) 9939 6105**  
**Email: robertgarner@mac.com**

• Send a deposit of \$100 (+ GST) to confirm your booking. Worksheets (if requested) are sent after your deposit is received.

Come for a great fun day!

**Fun Park Excursions**

The original and best

Physics is Fun was co-authored in 1983 by Robert Garner and Sylvia Jennings – 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, 2004-2012) and Wonderland Sydney (1990-2004) – covering many different subject areas.

Please remember: Our excursion notes are only for use 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.

**A RISK ASSESSMENT, TAX INVOICE and BOOKING FORM are available on our website at: [www.odlumgarner.com](http://www.odlumgarner.com)**

# 2012 editions: Past HSC Papers with Worked Solutions

**All books include: PAST HSC QUESTIONS BY TOPIC GUIDE**

- *Biology* • *Chemistry* • *Physics* • *Senior Science*
- *Earth & Environmental Science*

These books contain:

- **PAST HSC QUESTIONS BY TOPIC guide for all the HSC papers in each book** so students can **revise topic by topic**, or **use the actual exam papers**
- complete exam papers with **ALL QUESTIONS & ALL OPTIONS** – includes **all diagrams**, graphs, photos, etc – **PLUS** sample answer sheet for Multiple Choice questions
- **WORKED ANSWERS** to **all** the Core and **all options** that would score full marks **AND** are an **appropriate length**, with full **EXPLANATIONS** for all multiple choice questions
- includes Periodic Table, Data Sheet (Phys/Chem), Formulae Sheet (Phys), Geological Time Scale (EES)

- PLUS**
- **GUIDE ON HOW TO ACHIEVE SUCCESS IN THE HSC** ... with essential exam techniques and how to study effectively to maximise marks in the HSC
  - **GLOSSARY OF EXAMINATION TERMS**
  - **SKILLS REQUIRED FOR INVESTIGATIONS**



**20% discount for bulk orders\***

*Top HSC students and Science teachers use and recommend Odum & Garner books.  
Produced by Science teachers for Science teachers & their students*

Odlum & Garner	Title	ISBN	RRP	QTY
<b>2001–2011 HSC books:</b>	2001–2011 Biology Past HSC Papers with Worked Solutions	978 1 921741 03 6	\$36	
	2001–2011 Chemistry Past HSC Papers with Worked Solutions	978 1 921741 04 3	\$36	
	2001–2011 Physics Past HSC Papers with Worked Solutions	978 1 921741 05 0	\$36	
<b>2006–2011 HSC books:</b>	2006–2011 Biology Past HSC Papers with Worked Solutions	978 1 921741 06 7	\$27	
	2006–2011 Chemistry Past HSC Papers with Worked Solutions	978 1 921741 07 4	\$27	
	2006–2011 Physics Past HSC Papers with Worked Solutions	978 1 921741 08 1	\$27	
<b>HSC Earth Science:</b>	2001–2008 Earth & Environmental Science Past HSC Papers with Worked Solutions	978 1 875918 70 6	\$33	
	2009–2010 Earth & Environmental Science Past HSC Papers with Worked Solutions	978 1 875918 97 3	\$18	
<b>HSC Senior Science:</b>	2001–2008 Senior Science Past HSC Papers with Worked Solutions	978 1 875918 71 3	\$33	
	2009–2010 Senior Science Past HSC Papers with Worked Solutions	978 1 875918 98 0	\$18	

Name: .....

School: .....

Address: .....

..... Postcode: .....

Phone no: .....

**Send to:** Odlum & Garner (ABN 54 942 891 924)  
 PO Box 442, Freshwater NSW 2096  
 Ph: (02) 9939 6107 Fax: (02) 9939 6105  
 Email: robertgarner@mac.com  
 www.odlumgarner.com

**\*20% discount & FREE freight for orders of 15+ books (may be mixed) All other orders – \$9 delivery charge.**

School orders can be invoiced if a School Order Form is sent. Personal orders need to send payment or Credit Card details (Mastercard/Visa) with order. Make cheques to 'Odlum & Garner'.

Name on credit card: .....

Card No: \_\_\_\_\_ Expiry date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Odlum & Garner books are also available from educational booksellers.

## Photo Spot Fly ash

Fly ash is a fine grey powdery material produced as a by-product when coal is burned to heat boilers as in coal fired power stations. Within a power station, coal is fed to a series of mills that pulverise the coal to a very fine powder. This powder is then fed into a boiler which combusts the coal to produce heat that is then used to produce the steam required for power generation. During the coal combustion process, non-combustible inorganic content in the pulverised coal is melted and results in the formation of tiny molten droplets. As these droplets leave the boilers, the temperature drops markedly quenching the fly ash to form mostly fine silt-sized spherical particles ranging in size from about 1–100  $\mu\text{m}$ . Some irregular crystalline particles particularly of silica are usually also present. These spherical particles remain in suspension within the flue gas from the boiler and are ultimately collected downstream by either electrostatic or mechanical precipitation.

Fly ash varies in colour from tan to dark gray, depending on its chemical and mineral constituents. Tan and light colours are typically associated with high lime content in the coal. A brownish colour is typically associated with its iron content. A dark gray to black colour is typically attributed to an elevated unburned carbon content. Fly ash colour is usually very consistent for each power plant and coal source.

The chemical composition of fly ash relates directly to the mineral chemistry of the parent coal and any additional fuels or additives used in the combustion or post-combustion processes. The components vary considerably, but all fly ash includes substantial amounts of silicon dioxide ( $\text{SiO}_2$ ) and calcium oxide ( $\text{CaO}$ ), as well as aluminium oxide ( $\text{Al}_2\text{O}_3$ ) and iron oxide ( $\text{Fe}_2\text{O}_3$ ).

Coal contains trace levels of heavy metals and other substances, e.g. arsenic, barium, beryllium, boron, cadmium, chromium, thallium, selenium, molybdenum and mercury. Thus its ash will contain traces of these. Hence the need for a greener solution regarding the fate of fly ash as its disposal into the environment can result in contaminated groundwater and soils.

In the past, fly ash formed part of the emissions released from power station smoke stacks. However, pollution and health concerns have led to laws requiring the removal of particulates from smoke stack emissions since exposure to fly ash through skin contact, inhalation of fine particle dust and drinking water present health concerns. The fine crystalline silica present in fly ash dust has also been linked to lung damage, in particular silicosis. Thus pollution control equipment mandated in recent decades now require that it be captured prior to release. Today, fly ash is often stored at coal power plants or placed in landfills. However, with increasing landfill costs and current interest in sustainable development, the recycling of fly ash has become an increasing concern. It is now realised that

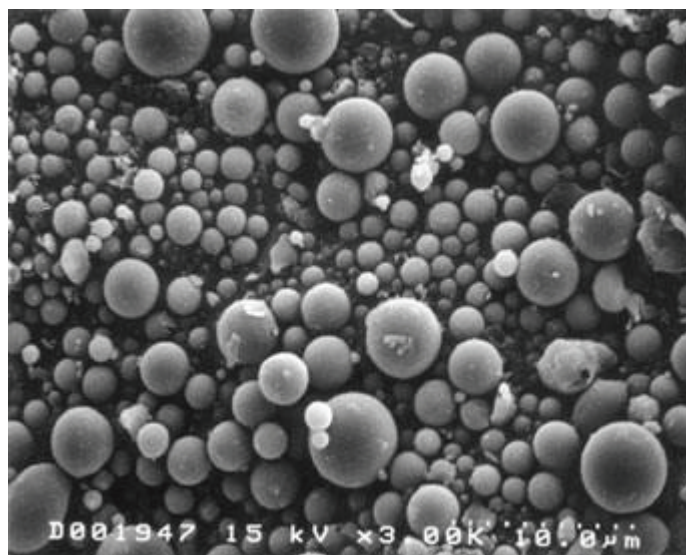


FIGURE 1: Fly ash – this photomicrograph was taken using a scanning electron microscope (US Dept of Transportation).

fly ash needs to be isolated from groundwater as toxins could easily be leached out from such deposits. As a result there has been much research to find methods of re-using fly ash.

Fly ash is very similar in composition to the volcanic ash deposits found in many parts of Italy, such as those which buried Pompeii and Herculaneum in 79 AD. The use of ash in construction materials is not new – the ancient Romans discovered that volcanic ash could be mixed with lime and used as a cement to build concrete structures such as the Colosseum in Rome and the port at Casa, where three piers are still visible today. The underwater portions of these piers are in generally excellent condition even after more than 2100 years!

Fly ash is now being used in making concrete. It has been found to significantly improve concrete performance in different ways, e.g. it helps to create a more dense mix. The push for greener building technology has therefore boosted the use of fly ash as a partial replacement for cement in concrete. Some in the industry say the result is a tighter mix that not only adds strength, but produces a better finish. This concrete can be used for many things, e.g. walls, footings, bridge decks, precast structures and bricks. The fly ash is often mixed with ordinary Portland cement and for many uses, the fly ash blended cement is stronger than ordinary Portland cement. Also, because of its lower porosity, it is more resistant to water absorption and flaking.

#### References:

- [www.flyashaustralia.com.au/WhatIsFlyash.aspx](http://www.flyashaustralia.com.au/WhatIsFlyash.aspx)
- [www.fhwa.dot.gov/PAVEMENT/recycling/fach01.cfm](http://www.fhwa.dot.gov/PAVEMENT/recycling/fach01.cfm)
- [www.caer.uky.edu/kyasheducation/flyash.shtml](http://www.caer.uky.edu/kyasheducation/flyash.shtml)

## New work health & safety laws (WHS) will affect Science teachers

On January 1, 2012, the new Work Health and Safety (WHS) legislation replaced the Occupational Health and Safety (OH&S) legislation.

WorkCover will assist customers to achieve compliance with the new work health and safety laws that must be followed. A period of transition will be allowed for compliance to be fully implemented.

The new laws will provide greater consistency across Australia with regard to health and safety. They may change the way work health and safety is managed in the workplace, but the basics of keeping your workplace safe will remain. Details regarding the new laws, including key changes for NSW, are available on the WorkCover NSW website under 'Work health and safety' at [www.workcover.nsw.gov.au](http://www.workcover.nsw.gov.au)

#### New system for classification and labelling of chemicals

As a result of the new WHS laws, Science teachers will need to implement a new system of chemical classification and hazard communication on labels and Safety Data Sheets (SDS) ... based

on the Globally Harmonised System of Classification and Labelling of Chemicals (GHS). This new system can be used from 1 January 2012, but will be mandatory after 31 December 2016, by which time all workplace chemicals must be classified according to the GHS and labels and SDS must be updated.

#### Mandatory chemical safety awareness training

The new WHS laws also require mandatory chemical safety awareness training at every site where hazardous substances are used or stored. Such training is being provided by the Royal Australian Chemical Institute (RACI) Chemical Education Group ... see page 4 of this issue of *SciTalk*.

The Safe Work Australia website ([www.safeworkaustralia.gov.au](http://www.safeworkaustralia.gov.au)) has information on the GHS – go to 'Safety in your workplace' and then 'Hazardous Substances And Dangerous Goods', and go to the links for 'labels' and 'SDS'.



# Exam Choice

ABN 56 345 318 164

Fax: 02 9975 1886  
PO Box 71 Forestville NSW 2087

## Trial and Preliminary Science Exams

Exam Choice is a group of teachers highly experienced in all facets of the exam process. Once again we are producing **Trial and Preliminary Science Exams** which:

- assess over the **full range of performance** and are mapped to outcomes and the syllabus
- come with **clear marking guidelines** and **sample answers**.

This year the prices of our individual papers have remained unchanged, and we have introduced a **Year 10 Examination** to replace the Trial School Certificate. This will test all Stage 5 work and be of substantially the same style and format as the paper it replaces.

Complete the order form below and fax this sheet back to us.

**Contact Person** .....

**Phone No.** ..... **Fax** .....

**School** .....

**Delivery Address** .....

..... **Postcode** .....

**All papers are supplied both in electronic form, and as printed black line masters.**

	Price	Tick to order
Biology Trial	\$80	
Biology Preliminary	\$70	
Chemistry Trial	\$80	
Chemistry Preliminary	\$70	
Physics Trial	\$80	
Physics Preliminary	\$70	
Senior Science Trial	\$80	
Senior Science Preliminary	\$70	

Total cost of order

Year 10 Examination	<b>\$100</b> Or free when ordered with 6 or more other papers	
---------------------	---	--

All prices include delivery, are current for 2012 and are not inclusive of GST. (10% GST will be added to invoice)

All papers will be delivered in **Week 1 of Term 3**. Invoices will be sent with the papers. Papers can be used as exams at any time after delivery, but are not to be released to students before 13 August (Trial), 17 September (Preliminary) or 29 October (Year 10 Exam).



## As Autumn heads into Winter

... Robert Garner

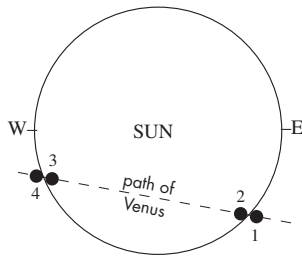
The night skies can be observed earlier in the evening at this time of the year – so there should be many great opportunities for viewing the night skies before your bedtime. Be sure to view the Transit of Venus on 6 June 2012.

### Transit of Venus – 6 June 2012

This will be visible in eastern Australia from beginning to end. In Sydney, it will start at 8.16 am (1st contact) and end at 2.44 pm (last contact) ... see SciTalk No. 1-2012.

Venus will not be transiting again in the lifetime of anyone alive – so don't miss this opportunity to view it! After the June 2012 transit, there will not be another transit until 2117, as these transits are rare events occurring in a repeating cycle separated by 8, 122, 8 and 105 years in turn (i.e. they occur in a 243 years cycle).

When this transit occurs, Venus will be at inferior conjunction (this is when the Sun, Venus and Earth are closest to being in line). The orbits of Venus and Earth are inclined to one another by an angle of 3.25°, so Venus at inferior conjunction is usually above or below the Sun. However, when a transit occurs, the Sun, Earth and Venus are lined up exactly.



Path and contacts for Venus' transit across the Sun  
(as seen from Sydney)

1st to 4th contact times will be:

1 at 8:16, 2 at 8:34, 3 at 14:26, 4 at 14:44

Note: During a transit of the Sun, an inner planet passes from east to west, whereas during a solar/lunar eclipse, the event advances from west to east against the eclipsed body.

A live broadcast of the transit will be at [www.transitofvenus.com.au](http://www.transitofvenus.com.au)

### Total eclipse of the Sun – 14 November 2012

The path of totality for this eclipse will begin in the far north of Australia in Arnhem land, then it crosses the Gulf of Carpentaria, Cape York and around Cairns–Port Douglas. The eclipse will only be a partial eclipse in NSW/ACT. At maximum eclipse, which will occur at 8:05 am in Sydney, about 50% of the Sun will be covered by the Moon's disc, as it moves between the Earth and the Sun.

**WARNING:** Do NOT look directly at either the transit of Venus or the eclipse of the Sun with your eyes or binoculars or a telescope – it is not worth the loss of your vision! Remember, there are no pain sensors on your retina where the damage will occur, so you won't even know the damage is happening! To protect your vision, these events should only be viewed safely at an observatory using the correct type of solar filter – or alternatively, you can make and use a pinhole camera to safely view them.

**To make a pinhole camera** ... use a long box (~1 m in length and 30 cm<sup>2</sup>) – the longer the box, the bigger the image of the Sun. Cut a 10 cm hole in the centre of one end of the box and tape aluminium foil over it. On the side of the box (near opposite end to foil), cut a viewing hole (about 20 cm<sup>2</sup>). Tape a piece of white paper to the inside end of the box near the viewing hole. Use a pin to make a pinhole in the centre of the foil. Point the pinhole towards the Sun. Do not look through the pinhole at the Sun! Look only through the viewing hole at the projected image of the Sun on the white paper. For the transit, a black dot (Venus) will move across the image of the Sun. For the eclipse, the Sun's disk will be partially covered as the Moon eclipses it.

[Reference: Don Whiteman, *SciTalk No. 3, 2002*]

Remember, viewing the night skies is much simpler if you have a Sky Chart / Planisphere to view the skies. See Box 1 for details on how to easily obtain one of these.

### The Planets

*Mercury, Venus, Mars* and *Saturn* can all be seen with the naked eye at present. *Mercury* will be low in the pre-dawn eastern sky early in May, but will not be visible after this until it reappears in the early western evening sky in June. It will remain easy to see in early July and on 20 July will be seen near a young Moon in the evening twilight.

*Venus* will be in Taurus during May, close to the western horizon in the evening twilight. Being bright, it can be found by scanning the horizon about 30 minutes after sunset. On 23 May, the two day old crescent Moon will be 6° above *Venus*. Approaching the end of May, *Venus* will become increasingly difficult to see. *Venus* will transit the Sun on 6 June (see above for details). *Venus* will be the 'morning star' in the eastern morning sky for the next few months. From around 16–27 June, the dawn sky will be spectacular with the Moon, *Jupiter* and *Venus* being in close proximity – with the *Pleiades*, *Aldebaran* and *Orion* also being nearby along the eastern horizon. *Venus* will be seen near *Jupiter* into early July.

In May, *Mars* will be in Leo, high in the northern sky soon after dusk and early evening, while *Saturn* will be slightly to its east in Virgo – both will be close to the Moon from 1–4 May and 28 May–1 June. *Mars* will continue to be visible in the northern evening sky during June, July and on into August. *Mars* can be identified by its orange-red colour,

*Earth* is at aphelion on 5 July 2012 – this is when it is at its greatest distance from the Sun.

### Constellations

*Crux*, the Southern Cross, will be in the southern sky in its Winter orientation. At this time of the year, *Crux* is at its highest point in the sky. The two pointers,  $\alpha$  and  $\beta$  *Centauri* lie to the east of *Crux*. Remember you can see the Jewel Box between the two brightest stars of *Crux*. This open cluster can be seen with either binoculars or a telescope.  $\alpha$  *Centauri* is actually a double star when viewed in binoculars. Its two components are easily resolved. There is actually a third very much fainter companion that is only visible using powerful telescopes.

*Spica*, the brightest star in *Virgo* in which you will find *Saturn* during May, is actually a double star. The two component stars race around one another every four days. They are much too close to be resolved.

### Solstice

The Winter Solstice for the Southern Hemisphere occurs at 9.09 am (EST) on 21 June 2012. This is when our daylight hours are shortest. The Sun will be at its most northerly position to Earth.

#### 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>



# COMPETITION CORNER

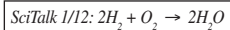
Send in an entry to WIN some *Pearson Science* 7 books!

*Pearson Science ... a series for Years 7–10*

by Rickard et al

Published & donated by Pearson Australia

*Pearson Science*, written for the Australian curriculum, is a complete learning solution for your Science classroom. The components of the series include: • *Student Book* (uses inquiry approach), • *Pearson Reader* (online, interactive version of Student Book, with linked videos, lessons and activities & more), • *Teacher Companion* (student book pages with wrap-around teacher support, answers, teaching suggestions, tips & more), • *Activity Book*, • an *EAL/D Activity Book* (for English as an additional language or dialect). All products are available separately, as well as in Value/ Combo Packs. Find out more at [www.pearson.com.au](http://www.pearson.com.au)



QUIZ QUESTION: Name the heaviest stable element in the Periodic Table.

**HOW TO ENTER:** Send an answer to the Quiz Question, your name, school and school address on an envelope to: Competition Corner, PO Box 442 Freshwater 2096 – by 29 June 2012.

Winner for SciTalk 1/12: *Matter and Energy* (8A), *The Body* (8B), *Geology* (8C) for Secondary Science published & donated by Five Senses Education was won by Julie Nach, San Clemente High.

## ★ NewScientist ★

**SPECIAL DISCOUNT – Save up to 54%**

Teachers and students can save up to 54% off the *NewScientist* subscription rate and gain access to over 15 years of *NewScientist* online archives.

*NewScientist* is the world's leading science and technology weekly, reporting on the latest developments and their impact on our lives. Key developments are reported in an accessible way, highlighting implications for industry, politics, the economy, individuals and the environment.

*NewScientist* is essential reading if you have a passion for knowledge, exploration and discovery! Over 700 000 people have already discovered *NewScientist*. Ensure you stay in-touch with the world you live in. Subscribe or extend your subscription today for only –

- 2 year Subscription: \$399 (incl GST)
- 1 year Subscription: \$219 (incl GST)
- 6 months Subscription: \$129 (incl GST)

To subscribe, please call 1300 360 126 or email to [subscriptions@newscientist.com.au](mailto:subscriptions@newscientist.com.au) and quote code NS11LF05. This offer expires 31 December 2012.



## Stop Press!

We now have video conferencing classes for schools!

Science visits for all NSW & ACT schools!

- Renewable Energies
- Chemistry Show
- Astronomy
- Forces in Physics
- Liquid Nitrogen Show
- Lego Robotics NXT

& an online science store for classroom resources

Plus Free! >100 Online science experiments  
Monthly email newsletter service



02 9674 2191

[www.fizzicseducation.com.au](http://www.fizzicseducation.com.au)

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

## SciTalk

*SciTalk* is a newsletter for secondary Science educators. Now in its 16th year, it has been produced quarterly by Odium & 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:

[www.odiumgarner.com](http://www.odiumgarner.com)

© SciTalk, 2012

## 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 2012 ... Dec 16
- *SciTalk* No. 2–May 2012 ... April 5
- *SciTalk* No. 3–August 2012 ... June 8
- *SciTalk* No. 4–October 2012 ... Sept 21

## ADVERTISING & INSERTS

All enquiries to the *SciTalk* Editor:

Catherine Odium  
PO Box 442, Freshwater NSW 2096  
(34 Ocean View Rd Freshwater 2096)  
Ph (02) 9939 6107. Fax (02) 9939 6105  
Email: [cathie\\_odlum@mac.com](mailto:cathie_odlum@mac.com)  
ABN 54 942 891 924

The opinions expressed in *SciTalk* are those of the contributors, and do not necessarily represent those of either the Editor or the publisher.

**Ivy Industries**  
Unit 6, 260 Wickham Road  
MOORABBIN VIC 3189  
ABN 57 052 929 978

**Contact Carol or John**  
Tel: (03) 9532 2120 Fax: (03) 9532 2126  
[www.ivy.com.au](http://www.ivy.com.au)  
email: [carol@ivy.com.au](mailto:carol@ivy.com.au)

## LAB COATS

### LAB COATS IMPORTED

– \$25 each

White polycotton,  
4 studs at front, 3 pockets  
Sizes XS, S, M, L, XL, 2XL, 3XL

### NEW PRODUCT

**Navy Poly Cotton Lab Coats**

– \$28 each

Sizes XS, S, M, L, XL, 2XL



### AUSTRALIAN MADE LAB COATS

– \$42 each

White polycotton  
or 100% Cotton available POA  
Sizes 1–14

**LAB COATS IN YOUR SCHOOL COLOURS WITH YOUR SCHOOL LOGO**

– \$48 each + extra for logo

## ALSO AVAILABLE

THEATRE GOWNS – short sleeve	\$27	THEATRE GOWNS – long sleeve white	\$30
THEATRE GOWNS – short sleeve blue	\$30	THEATRE GOWNS – long sleeve blue	\$32

**GOGGLES** clear wrap around \$3.90

\* All prices exclude GST and freight \*

★ For quantities over 10, please contact Carol for a special price ★