Providing support and promoting excellence in science education

SciTalk

ISSN 1323-7667

Number 2 – May 2008

Book Giveaway

WIN these books ...

Biology 1 & Biology 2

by Judith Kinnear & Marjory Martin

ISBN:
Prelim: 9780701634247, HSC: 9780701634650
RRP: Prelim: $63.95, HSC: $65.95
Published by Jacaranda

WIN

Written specifically for the NSW Biology Stage 6 Syllabus, these books offer in-depth coverage of the topics. They are in full-colour with an attractive format to stimulate students' interest and enhance their learning. They cover the syllabus requirements, including essential background information to understand biological concepts, up-to-date information, case studies, topical information, and more to sustain and extend student interest.

TO WIN: Send in your name, school and school address, on the back of an envelope **by 4 July 2008 to:**
Book Giveaway, PO Box 442, Freshwater 2096

★ ★ ★

Winner for *SciTalk 1/08*

Congratulations to J Gibbons, Bankstown GHS, who won *Chemistry 1 & 2* (1:$63.95, 2:$65.95) published by Jacaranda.

★★ 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, 5 & 12

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

This *SciTalk* & past issues are available at http://www.odlumgarner.com

INSIDE SCITALK ▶▶▶▶

Diary Dates 2008

planetearth Earth Sciences for Society 2007 – 2009

International Year of Planet Earth 2007–2009

(Also: *International Polar Year, International Year of the Reef, International Heliophysical Year, & International Year of Sanitation)*

MAY 2008

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

JUNE 2008

2, 6 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

5 World Environment Day: www.unep.org/wed/2008/english/

8 World Ocean Day: www.theoceanproject.org/wod/

12 & 13 Science Teachers' Workshop 2008: (2 days) School of Physics, Uni of Sydney – details on p 4

20 Closing date Crystal Growing Comp. (02) 9888 9077, www.chem.unsw.edu.au/raci

20 & 21 NSW Schools Titration Competition: www.nswtitration.com – for country dates & details

22 Winter Solstice: Occurs at 4.06 am EST on 22 June

JULY 2008

4 Professional Devt Day for Biology Teachers: HD Museum, UNSW, see page 3

6–9 CONASTA 57: *Surfing the Wave of Change*. (07) 3861 5444. Fax (07) 3861 5701. Griffith Uni Gold Coast Campus. www.astmanagement.com.au/conasta57/

22 & 23, 25 Science Teachers' Workshop 2008: Wagga Wagga (22/23) and Dubbo (25) – details on page 4

28 & 29 Science Teachers' Workshop 2008: Armidale – details on page 4

21–25 National Chemistry Week. www.raci.org.au/national/events/chemistryweek.html

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

AUGUST 2008

1 Jeans for Genes Day – helps to fund scientists working at Children's Medical Research Institute. 1800 436 437, http://www.jeans4genes.com.au/

16–24 National Science Week: *Planet Earth – Planet of Change*. www.scienceweek.info.au/

16–24 Australian Science Festival, ACT. School Activities will be at: www.sciencefestival.com.au

15, 18, 21 Science Week events: Physics is Fun at Luna Park. http://www.odlumgarner.com

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

22–26 Ultimo Science Festival: RACI, (02) 9663 4960, www.chem.unsw.edu.au/raci

24 Geoscience Australia Open Day: 10 am–4 pm, www.ga.gov.au/about/event/openday2008.jsp

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

SEPTEMBER 2008

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

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

22 Spring Equinox

OCTOBER 2008

12–18 Earth Science Week. www.ga.gov.au/education/events, 6249 9859 (www.earthsciweek.org)

17, 20, 24, 27, 30 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

NOVEMBER 2008

10, 14, 21, 24, 27, 28 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

DECEMBER 2008

4, 5, 12 Physics is Fun at Luna Park Sydney. Enquiries: ph (02) 9939 6107, fax (02) 9939 6105

21 Summer Solstice

JANUARY 2009 National Youth Science Forum. Forms to local Rotary club by 15/5/08, interviews in July. Only for Yr 11 in 2008. Enquiries: 6125 2777, fax 6125 8015, email: nsss@anu.au, www.nysf.edu.au/

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

The Great Australian Marsupial Night Stalk in partnership with Tiwest

The Great Australian Marsupial Night Stalk

1 September–16 October 2008

Many Australian marsupials are on the brink of extinction and need your help. If you would like to help Australian scientists and conservationists, you can take part in this year's Night Stalk.

Anyone can do a Night Stalk survey – all you need is a torch. It's fun! It's free, and easy to do! Get a group together, count the number of marsupials you see in your local bush, record your findings on a spotter's log and send your results to Perth Zoo.

This annual national survey, now in its 10th year, runs from 1 September–16 October, and is designed to collect information about marsupial and feral animal numbers and their distribution.

For details, contact:

The Great Australian Marsupial Night Stalk, in partnership with Tiwest.

Ph: (08) 9474 0497 Fax: (08) 9474 4113

Email: nightstalk@perthzoo.wa.gov.au

Visit: www.perthzoo.wa.gov.au/staticpages/nightstalk/index.html

PERTH ZOO TIWEST

Update on BOS matters

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

2008 Higher School Certificate (HSC) exam and School Certificate timetables & 2008 Approved Scientific Calculators

These are now on the BOS website. The HSC exam period is from 16 October–13 November, while the School Certificate test period is 10–14 November 2008.

Official Notices go online

Official Notices will be effective from the date they are on the BOS website. They will still appear in print form for at least 2008, but will be on the website prior to the Board Bulletin reaching schools.

BOS enquiries:

Ph (02) 9367 8111, fax (02) 9367 8484

Website *www.boardofstudies.nsw.edu.au/*

BOS contacts for Science:

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

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

There is never a wrong time to do the right thing.

… Unknown

OUT AND ABOUT

Science Centre & Planetarium

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

★ ***Taking bookings for 2008!***

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

★ We have an extensive range of ***shows & exhibits***, including:
- **Stellar Evolution** – planetarium program for HSC Physics
- **Superconductors & Liquid Nitrogen** – live science show
- **Zap! Understanding Electricity**
- **Energy and Motion**
- **The Changing Earth**
- **Dinosaurs, Fossils & Coal**

★ School entry includes two floors of hands-on exhibits, a science show, plus a ***planetarium / laser show***.

★ ***Also available***: environmental field trips, science shop, kiosk, science fun bags, membership programs.

★ ***Book now*** for an excursion. Information/bookings: (02) 4286 5000. Website: http://sciencecentre.uow.edu.au

IMAX THEATRE SYDNEY

31 Wheat Rd, Darling Harbour, Sydney 2000

IMAX has 2 great new films available for schools in Term 2:

★ **COSMIC VOYAGE**
A must for secondary Science teachers, this classic film will take you on a journey through space and time, to look at the work of atoms and molecules and the origins of our universe. Spectacular computer generated images create a 'cosmic zoom' from a single point on the surface of the Earth, to the furthest reaches of outer space.

★ **GRAND CANYON 3D**
This white water adventure down the Colorado River aims to raise awareness of issues that impact river systems and the important need for water conservation. The spectacular Grand Canyon provides a backdrop for this expose of one of the greatest challenges of our era – providing enough water for our increasingly parched planet.

★ **TERM 2 TEACHER PREVIEWS**
- Wed 21 May: 5 pm Cosmic Voyage 6 pm Grand Canyon 3D
- Sun 25 May: 10 am Cosmic Voyage 11 am Grand Canyon 3D

RSVP online now: www.imax.com.au/schoolsrsvp

★ **School Bookings, call Miya on:**
ph: 9213 1600 fax: 9281 3833, email: education@imax.com.au

land's edge
SYDNEY HARBOUR

Land's Edge, one of Australia's leading providers of curriculum based field studies and outdoor education for schools, has opened a Sydney Harbour education/accommodation facility. The facility provides:

- Acclaimed Land's Edge programming (primary/secondary earth science subjects including data collection, water/soil testing, stormwater analysis etc)
- Outstanding marine site (programs in conjunction with the Sydney Institute of Marine Science)
- Walking tracks through native bushland
- Safe bay for sea rafting/snorkelling/swimming
- Affordable accommodation (75 beds) on the stunning foreshore of Chowder Bay

For further information visit www.landsedge.com.au, email michele@landsedge.com.au or phone (02) 9969 0038.

KIDS GO WILD!

Special offer!

Sydney Aquarium and Sydney Wildlife World combine to give your students a totally wild day of discovery.

For only $16 incl GST (a saving of $3 on regular school rates), your students can study Australia's unique aquatic and terrestrial flora, fauna and habitats all in the one convenient all-weather location.

NSW teachers are invited to preview the venues at any time. Simply show teacher ID (Federation Card/payslip) on arrival for complimentary entry.

For more information and education resources go to:
- www.sydneyaquarium.com.au … and go to *Aqua School*
- www.sydneywildlifeworld.com.au/ … and go to *For Teachers*

Email: education@sydneyattractions.com.au
Ph: (02) 8251 7811 Fax: (02) 9262 2385
Location: Aquarium Pier, Darling Harbour, Sydney

MUSEUM OF HUMAN DISEASE

2008 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 **2008 Professional Development Day** for teachers of HSC Biology will be on **Friday 4 July**. Further information and registration forms will be distributed to schools at the beginning of Term 2.

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

MUSEUM OF HUMAN DISEASE
UNSW THE UNIVERSITY OF NEW SOUTH WALES

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 HMAS *Bounty*. Students then participate in a hands-on workshop focusing on desalination of metal objects, metal and corrosion product identification, methods of protecting metals and rates of corrosion.

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

The program is 4 hours, at a cost of $20.00 per student (teachers free).

Bookings & Information:
Phone: 92983655 Fax: 9298 3660
Email: bookings@anmm.gov.au
Location: 2 Murray Street, Darling Harbour

AUSTRALIAN NATIONAL MARITIME MUSEUM

The University of Sydney

The Science Foundation for Physics & The School of Physics

New Horizons: Science Teachers' Workshop 2008

***Sydney**: Thursday 12 & Friday 13 June 2008*
School of Physics, The University of Sydney
***Wagga Wagga Christian College:** Tuesday 22 & Wednesday 23 July*
***Dubbo College Senior Campus:** Friday 25 July*
***University of New England, Armidale:** Monday 28 & Tuesday 29 July*

The two-day *Science Teachers' Workshop 2008* (*STW2008*) will focus on the NSW Physics syllabus, giving you a chance to improve your understanding of physics, share classroom tips and tricks and learn new ways to get your students excited. *STW2008* includes a lecture series covering physics concepts and ideas, including sessions for new physics teachers, while hands-on sessions will provide practical ideas and classroom resources. *STW2008* will run in Sydney on Thurs 12 and Fri 13 June 2008, and in regional centres in conjunction with *KickStart* HSC Physics student workshops.

Check www.physics.usyd.edu.au/foundation for more information on STW2008 (Sydney and regional), and http://www.physics.usyd.edu.au/schools_community/kickstart_regional.shtml for more information on the regional Kickstart program.

For more information:
Ms Alex Viglienzone
Science Foundation for Physics
School of Physics A28
The University of Sydney NSW 2006

Phone: 02 9036 6188
Fax: 02 9351 7726
Email: alexv@physics.usyd.edu.au
Web: www.physics.usyd.edu.au/foundation/

planetearth®
Earth Sciences for Society
2007 – 2009

The *International Year of Planet Earth* (IYPE) is running from 2007–2009. The UN has proclaimed 2008, the central year of the triennium, as the *UN Year of Planet Earth*. Projects like this will only be a success if people all over the world do something about it. In Australia, schools are using National Science Week from 16–24 August 2008 in particular to raise public awareness of the issues and what can be done about them. The school theme is 'Planet Earth – Planet of Change'. More information will become available on this at *www.scienceweek.info.au/*

Humans were reminded of the Earth's incredible power when the 2004 Tsunami occurred as a result of an undersea earthquake off the west coast of Sumatra. The earthquake triggered a series of devastating tsunamis along the coasts of most landmasses bordering the Indian Ocean, killing more than 225 000 people in eleven countries, and inundating coastal communities with waves of up to 30 metres. It was one of the deadliest natural disasters in history.

More effective use of geoscientific knowledge can save lives and protect property. Such knowledge enables us to satisfy, in a sustainable manner, the growing need for Earth's resources by an expanding human population. This knowledge is readily available in the practical experience and publications of some half a million Earth scientists all over the world. It is important that societies, especially in less developed countries, seek the guidance of Earth scientists in the many aspects of everyday life including, for example, identification of the best areas for urban expansion, sites to avoid for waste disposal, the location of new underground fresh water resources, and where certain toxic agents implicated in Earth-related diseases may be located, etc.

The IYPE will cooperate, where possible and appropriate, with the other international years that are running: International Heliophysical Year, electronic Geophysical Year, and the International Polar Year.

The IYPE: 2007–2009 aims to show that the Earth Sciences can improve the quality of life and safeguard the planet. Some of the objectives are to: • reduce risks posed by natural and human-induced hazards; • reduce health problems of humans by improving understanding of the medical aspects of Earth Science; • discover new natural resources and make them available in a sustainable manner; • build safer structures and expand urban areas, utilising natural subsurface conditions; • determine the non-human factors in climatic change; • improve knowledge concerning the occurrence of natural resources (such as groundwater), which are often sources of political tension between neighbouring countries; • improve understanding of unique conditions on ocean floors relevant to the evolution of life; • expand the number of students studying Earth Sciences; • promote sustainable extraction of Earth's resources.

The scientific themes are: • Groundwater: reservoir for a thirsty planet? • Earth and Health: building a safer environment; • Climate change: the 'stone tape'; • Resources: towards sustainable use; • Megacities: our global urban future; • Deep Earth: from crust to core; • Ocean: abyss of time; • Soil: Earth's living skin; • Earth and Life: origins of diversity; • Hazards: minimising risk, maximising awareness.

Brochures have been printed for all science themes and are downloadable from the Year's website at *www.yearofplanetearth.org*

Other **websites** with useful information for schools to use will be posted on the SciTalk website at *www.odlumgarner.com* □

The sad truth about onions

I'm sure you've all had a tear-wrenching onion experience – but do you actually know why onions make you cry? Or of more practical use, how to avoid your tear ducts going into overdrive every time you slice or dice an onion?

When the innocent chef starts wielding a knife into an onion it damages the onion's cells. This causes the release of a biological catalyst (an alliinase enzyme). Alliinase enzymes break down amino acid sulfoxides in the onion and generate sulfenic acids. Sulfenic acids are unstable and spontaneously rearrange into a volatile gas (syn-propanethial-S-oxide). This gas diffuses through the air and thus travels upwards towards your eyes, where it reacts with the water in your eyes to form dilute sulfuric acid. Not surprisingly, your eyes dislike mixing with the acid – it irritates the nerve endings, causing a stinging sensation. Your tear glands react to this by producing tears to dilute and flush out the acid.

Alliinases are part of the plant's defence against herbivores. When the plant is damaged by a feeding animal, the alliinase enzymes are released to catalyse the production of the pungent chemicals. This tends to have a deterrent effect on the animal, stopping it from eating the plant.

So the question then remains – what can you do to avoid this acid-eye acquaintance?

The most effective method by far is to wear swimming goggles while cutting up onions. You may look and feel a bit silly, however goggles prevent the gas released by onions from reaching your eyes, and so you will remain 'tear free'. A more practical method is to chop your onions underneath a kitchen fan, such as those found above cook tops. This helps draw the gases out of the kitchen and away from your eyes. Similarly, chopping onions with an air flow from an open window or door will decrease the onion-waterworks. Cutting onions under running water or submerging them in a basin of water is another recommendation, as this causes the gas released to dissolve in the water, rather than in the fluids in your eyes. The side-effects of the knife slipping and cutting you may be a deterrent to attempting this method.

Other practical tips include: chilling/lightly freezing the onion, as this prevents the enzyme from activating; using a sharp blade to minimise the damage to the cells, which decreases the amount of gas produced; chopping next to a flame/fire, as the heat draws the onion gas towards it and burns it; avoiding cutting off the root of the onion, or doing it last, as the root has the highest concentration of enzymes. Alternatively, avoid cutting onions altogether!

Onions belong to the genus *Allium*, and there are about 1 250 species. They include, for example, onions, shallots, leeks and herbs such as garlic and chives. The volume of sulphenic *acids* released, and the irritation effect, differs among *Allium* species.

Scientists recently claimed to have created a 'tear-free' onion using Australian-developed biotechnology to switch off the gene behind the enzyme that makes us cry. Dr Colin Eady of Crop & Food Research in New Zealand and his collaborators in Japan have been using a gene-silencing technology, called RNAi, developed by Dr Peter Waterhouse at CSIRO in Australia. The technology creates a sequence that switches off the tear-inducing gene in the onion so that it doesn't produce the enzyme. So when you slice the onion, it doesn't produce tears. The scientists even hope that by stopping sulphur compounds from being converted to the tearing agent and redirecting them into compounds responsible for flavour and health, the process could even improve the taste of the onion. Despite this breakthrough, a GM 'no tears' onion is still probably 10–15 years away from being produced commercially.

The scientists have justified their research by saying that onions are such a versatile and nutritious vegetable, that if they can manage to get more people cooking and eating fresh onions as a result, then a GM onion has got to be a positive outcome.

Some onion trivia

The ancient Egyptians worshipped the onion, believing its spherical shape and concentric rings to be symbols of eternal life. The Egyptians also believed that the strong scent of onions had the power to bring life back to the dead, and hence they were used in Egyptian burials. Ancient Roman gladiators believed onions would firm their muscles, and so gladiators rubbed each other down with onion prior to competing.

In the Middle Ages, onions could be used to pay rent, were given as gifts and were prescribed by doctors to relieve headaches, coughs, snakebites and hair loss – and most people were of the opinion that onions were better than leeches!

In 1991 a Canadian firm tried to market a tear-gas made from onions for civilian use. However, this product did not succeed, as it only had a shelf-life of 3 months.

Wide-ranging claims have been made for the effectiveness of onions against conditions ranging from the common cold to heart disease, diabetes, osteoporosis, and other diseases. However, the health benefits of onions other than as a source of carbohydrate have yet to be demonstrated. □

– Katrina Garner

WIN A FAMILY PASS TO SYDNEY AQUARIUM

Sydney Aquarium at Darling Harbour is a great science excursion venue. It showcases Australian aquatic habitats, their fauna and flora, information on habitat characteristics, animal adaptations and conservation issues. Bookings are essential. Excursions are self-guided. Information: *www.sydneyaquarium.com.au*

* * * * *

TO WIN A FAMILY PASS TO SYDNEY AQUARIUM:
(for 2 adults & 2 children worth $68) … send in your name, school, & school address on an envelope by **4 July 2008** to:

Sydney Aquarium Teacher Offer, PO Box 442, Freshwater NSW 2096

WINNER: Lisa Hayes, Waratah Tech HS, Callaghan College won the Sydney Aquarium family pass for *SciTalk No. 1–2008*.

WIN A FAMILY PASS TO IMAX

IMAX Sydney, at Darling Harbour, is open every day. More than 8 storeys high, it has the world's biggest cinema screen to give the ultimate film experience. IMAX films are entertaining and educational. They constantly change and cover a wide range of themes. Quality resource materials & teacher guides are provided for schools.

★ ✧ ★ ✧ ★ ✧ ★

TO WIN A FAMILY PASS* TO IMAX: (for 2 adults and 2 children worth $50) … send in your name, school, & school address on an envelope **by 4 July 2008** to:

IMAX Give Away, PO Box 442, Freshwater NSW 2096

* This pass will be valid for any one film for any session, except public holidays and films advertised as 'no free list'.

WINNER: Lesley Parker, Vincentia High won the IMAX Sydney family pass for *SciTalk No. 1–2008*.

WIN A FAMILY PASS TO SYDNEY WILDLIFE WORLD

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

* * * * *

TO WIN A FAMILY PASS TO SYDNEY WILDLIFE WORLD
(for 2 adults & 2 children worth $68)

Send in your name, school, & school address on an envelope by **4 July 2008** to: *Sydney Wildlife World Teacher Offer PO Box 442, Freshwater NSW 2096.*

WINNER: Steve Garthwin, Korowal School, Leura won a Sydney Wildlife World family pass for *SciTalk No. 1–2008*.

FUN PARK EXCURSIONS

2008 DATES*

March 14, 17, 31. May 8, 9, 30. June 2, 6. Aug 15, 18, 21, 25. Sept 11. Oct 17, 20, 24, 27, 30. Nov 10, 14, 21, 24, 27, 28. Dec 4, 5, 12.

Note: ALL OTHER SCHOOL DAYS (not Tues/Wed) are also available … from $22* per student …

TIME 11 am–6 pm

COST $21* / student (2008) plus $20* booking fee / school

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

Entry to Luna Park is FREE. Extra teacher ride tickets are $24.50* ea.

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

SPECIAL SCHOOL PRICES

ONLY THROUGH PHYSICS IS FUN

Save $$$ … Why pay more?

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

ALL school faculties can book through Physics is Fun and save $$$.

Numbers are limited to ensure minimal queues. Come and join us for a fun-filled day at LUNA PARK Sydney. Curriculum-based worksheets are available, unless you just want a fun day.

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

WORKSHEETS … secondary / primary

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

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

JOINT EXCURSIONS

Save $$$ – see an IMAX film or visit Sydney Aquarium, before or after Luna Park … see p3.

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

Come for a great day. Hands-on learning is fantastic fun!

Physics is Fun

Fun Park Excursions

The original and best

Physics is Fun was co-authored in 1983 by Robert Garner and Sylvia Jennings and was based on their earlier excursions at Luna Park in the 1970s. Robert has conducted these fun park excursions since their inception … both at **Luna Park** (1983-1987, 1995, 2004-2007) and **Wonderland Sydney** (1990-2004) – **covering many different subject areas.** With the closure of Wonderland Sydney in early 2004, these Fun Park Excursions have been at **Luna Park Sydney** since its re-opening in April 2004.

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

★ Book NOW – don't miss out! ★

ENQUIRIES/BOOKINGS

Book now by ph/fax/email, then send a deposit of $100 (+ 10% GST) to confirm your booking and receive your worksheets.

Robert Garner or Catherine Odlum
PO Box 442, Freshwater NSW 2096
Ph (02) 9939 6107 Fax (02) 9939 6105
Email: robertgarner@mac.com
Physics is Fun – The original and best
ABN 54 942 891 924

BOOK FUN PARK EXCURSIONS FOR ALL SCHOOL FACULTIES TO LUNA PARK SYDNEY THROUGH PHYSICS IS FUN

Science Resource

Thinking About Climate Change: A Guide for Teachers and Students

This resource was sent FREE to all secondary schools in late 2007 – and can now be downloaded under the 'Learning Resources icon' for FREE from:

www.theweathermakers.org/tacc

This site is regularly updated with activities, news, links and additional teaching resources.

Adapted from Tim Flannery's book, *We Are the Weather Makers, Thinking About Climate Change,* this resource contains lesson plans, research aids and discussion suggestions to allow teachers and students to explore the implications and complexities of climate change and to learn and practice relevant skills. The guide was compiled and tested by curriculum professionals and practising teachers and fact-checked by respected climate experts.

This book was designed for students in years 7–10 across the curriculum disciplines of Maths, Science, the Humanities and Information Technology. It should help students respond effectively to climate change. □

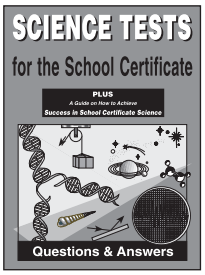
Choose a job you love,
and you will never have
to work a day in your life.
… Confucius

★ For Success in School Certificate Science ★

Science Tests for the School Certificate

by Catherine Odlum, Robert Garner, Mitch O'Toole, Rob Mahon

ESSENTIAL PRACTICE FOR YEAR 10 STUDENTS FOR SUCCESS IN THEIR SCHOOL CERTIFICATE SCIENCE TEST



- **6 specimen Science Tests, complete worked answers (= Band 6) that would score full marks, explanations for all MC answers, & BONUS section of longer free response questions**
- **Glossary of Terms, & Appendices on the use of syllabus verbs in Science Tests.**
- **Includes: *How to Achieve Success in School Certificate Science***
- **Covers content and outcomes of the NEW School Certificate Science Syllabus.**
- **322 pages in layout and format of School Certificate Science Tests.**
- **Past Year 10 students claim they did better in the real School Certificate Science Test as a result of this book.**
- **Make sure each student in Year 10 has one. Order your class sets now.**

Price: $32.95

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

AVAILABLE FROM ODLUM & GARNER. Ph 9939 6107. Fax 9939 6105. PO Box 442, Freshwater 2096
http://www.odlumgarner.com AND FROM ALL LEADING BOOKSELLERS

ORDER FORM Please supply:

…. *copies Science Tests for the School Certificate ISBN 978-1-875918-49-2 $32.95 ea*

Name: .....

School: .....

Address: .....

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

Phone no. .....

Orders of more than 15 books are supplied at 20% discount and are delivered freight free. All other orders attract a delivery charge of $6.00

Please send invoice to school: Yes / No *If yes … please send a School Order form.*
If no … please send a cheque OR your Mastercard / Visa Card details (name on card, card no, expiry date)

Photo Spot 'Crystals' in melted glass

Glass can be found in nature, as the volcanic material obsidian and as tektites (small dark-coloured glassy objects, possibly from a meteorite impact). These have a similar composition to synthetic glass.

Glass has been made by humans for about 9 000 years. It was first known to be developed in the Middle East around 7 000 BC. Coloured glass, crystal and mirrors had all been developed by the Renaissance and were being made in Venice. Glass has been used in many ways, e.g. to make useful vessels, as well as decorative and ornamental objects, including jewellery. Glass also has architectural and industrial applications.

Structure and colour of glass

Glass is neither a solid nor a liquid but exists in a vitreous, or glassy, state. It is a homogeneous material (i.e. it has a uniform composition or structure) with a random, liquid-like (non-crystalline) molecular structure that has sufficient cohesion to produce mechanical rigidity. Glass is cooled to a rigid state without the occurrence of crystallisation; heat can reconvert glass to a liquid form.

Usually transparent, glass can also be translucent or opaque. Colours in glass may be obtained by addition of colouring ions that are homogeneously distributed and by precipitation of finely dispersed particles (such as in photochromic glasses – see Box 2).

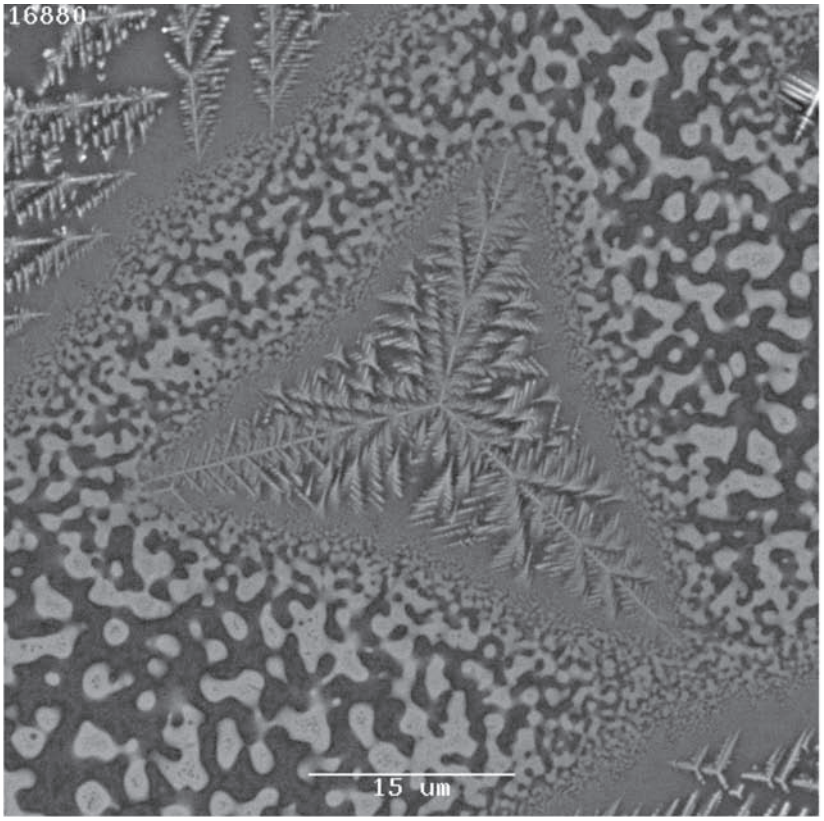


FIGURE 1: 'Crystals' in glass – artistic structures seen in melted glass (polished surface). This photomicrograph is an SEM backscattered image (see Box 1) of melted glass in a cold crucible. It was taken by Huijin Li,

Glass manufacture

Glass manufacturing requires that the raw materials be heated to a temperature sufficient to produce a completely fused melt. When cooled rapidly, this becomes rigid without crystallising. Special crucibles ('cold' crucibles) with non-polluting walls are often used today as 'melting furnaces' in glass manufacture. They have metal sectors cooled by water circulation in which the material to be prepared is heated by a peripheral induction coil. Separating the crucible into sectors limits temperature rises due to induction in the crucible wall, and enables direct induction heating of the material contained in the furnace. As molten glass is cooled, it is either pressed into plates or channelled into moulds. It is then further cooled before being put into storage. Glass products are often coated with a special spray to prevent scratching.

Ingredients in glass

Glass is made primarily of silica (SiO_2), derived from sand, flint, or quartz. This is usually fused at high temperatures with other ingredients to simplify its processing, e.g. sodium carbonate lowers the melting point to about 1 500°C (melting point of pure silica is >2 300°C) and calcium oxide, magnesium oxide and aluminium oxide provide for a better chemical durability. The resulting glass contains about 70–74% silica by weight and is called a soda-lime glass. Soda-lime glass accounts for about 90% of manufactured glass. Various other ingredients are added to change the properties of glass, e.g. lead glass, such as lead crystal or flint glass, is more 'brilliant' because lead increases the refractive index, while boron may be added to change the thermal and electrical properties, as in Pyrex. Adding barium also increases the refractive index. Thorium oxide gives glass a high refractive index and low dispersion, and was formerly used in producing high-quality lenses, but due to its radioactivity has been replaced by lanthanum oxide in modern glasses. Large amounts of iron are used in glass that absorbs infrared energy, such as heat absorbing filters for movie projectors, while cerium(IV) oxide can be used for glass that absorbs UV wavelengths.

In some furnaces, recycled glass ('cullet') is added. Cullet leads to savings not only in the raw materials, but also in the energy consumption of the glass furnace. However, impurities in the cullet may lead to product and equipment failure. Fining agents such as sodium sulfate, sodium chloride, or antimony oxide are added to reduce the bubble content in the glass. □

Box 1 Backscattered SEM images

In scanning electron microscopy (SEM), images are generated by electrons that have been aimed at a sample and are reflected back because they encountered the nuclei of atoms. The number of backscattered particles is a function of the atomic number of the elements on the surface of the sample – the elements with the higher atomic numbers will backscatter more electrons.

Box 2 Photochromic lenses

Photochromic lenses (also called photochromatic lenses) darken on exposure to UV radiation. Once the UV is removed (e.g. by walking indoors), the lenses gradually return to their clear state. Photochromic lenses may be made of either glass or plastic. The glass version of these lenses achieve their photochromic properties through the embedding of microcrystalline silver halides (usually silver chloride), or molecules in a glass substrate. Plastic photochromic lenses rely on organic photochromic molecules (e.g. oxazines and naphthopyrans) to achieve the reversible darkening effect. Photochromic compounds fade back to their clear state by a thermal process. This 'temperature dependency' prevents them from achieving true sunglass darkness in very hot weather, and makes them get very dark in cold weather conditions, which makes them more suitable for snow skiers than beachgoers while outside.

Astronomy

Observing some constellations, meteors, Jupiter and its Galilean moons

... Robert Garner and Catherine Odlum

Naked eye observing and using binoculars will enable you and your students to see some great things this winter.

Some constellations to observe

The last of our summer constellations, *Orion* and *Taurus*, are now setting soon after the end of evening twilight. In a few weeks, they will be rising in the pre-dawn morning sky.

The winter sky will be dominated by constellations such as *Scorpio*, *Sagittarius*, *Aquila*, *Cygnus* and *Lyra*. All of these lie close to the band of the Milky Way. The brightest stars of *Aquila*, *Cygnus* and *Lyra* are *Altair*, *Deneb* and *Vega* respectively. These three stars are all among the twenty brightest stars as seen from Earth and can be seen in the southern hemisphere in winter, rising in the eastern night sky around midnight during June and will be overhead by 1–2 am. They form quite a conspicuous bright triangle that is larger than the Southern Cross (*Crux*). By mid-July the triangle will be directly to the north and overhead around 11 pm–midnight. By mid-August, they are overhead around 9–10 pm. This imaginary triangle is called the 'summer triangle' in the northern hemisphere.

Meteors

The α-Capricornid meteor shower is active from early July to mid-August with peak activity around 30 July. There is a new Moon on 1 August, so the dark moonless sky around this time should provide good viewing conditions from late evening until dawn.

Let the Moon be your guide

The Moon acts as a good pointer to objects in the sky over the winter months. You will find the following near the Moon in June: on 6th – the twin stars (*Pollux* and *Castor*) in the *Gemini* constellation; on 7th – the Beehive cluster; on 8th – Mars; on 9th – *Regulus* (the brightest star in *Leo*) and the planet Saturn; and on 17th – *Antares*, the red giant star in the *Scorpio* constellation.

Observing Jupiter and its Galilean moons

Jupiter is in a good position for viewing over winter as it approaches opposition (i.e. Earth and Jupiter are in line on the same side of the Sun). This means that Earth and Jupiter are closest to one another in their orbits. Jupiter appears almost twice as big now as it did back in January when it was at conjunction (i.e. Earth and Jupiter on opposite sides of the Sun). Not only are conditions good for viewing Jupiter itself this winter, but it is also a good time for observing the four Galilean moons of Jupiter, Ganymede, Callisto, Europa. and Io. The Galilean moons appear like tiny stars travelling with Jupiter across the sky. Nightly observation of their 'dance' with the giant planet, Jupiter should be rewarding.

All four moons can be easily seen using binoculars. It is best if the binoculars are tripod-mounted, but support on any steady surface is sufficient. Over June and July, you can repeat the observations made by the Italian astronomer Galileo Galilei when he discovered these moons in 1610.

Jupiter will be near the Moon on 20 June and again on 17 July. The full Moon on these dates will make observing Jupiter's Galilean moons difficult, so earlier or later dates will be better for observing these moons.

Some good dates should be on 9 June at 1 am and 15 June at 10 pm when the three moons, Ganymede, Callisto and Europa can be seen to the east of Jupiter with Io to the west.

The best dates in July are 2 July at 7.15 pm (Callisto, Io and Europa to the east, Ganymede to the west), 3 July at 10 pm (Europa to the east, the other 3 moons to the west), 21 July at 8.20 pm (3 moons to the east, Callisto to the far west), 22 July at 10.46 pm (4 moons to the west), and 28 July 10.10 pm (4 moons to the east).

Note about Sky Charts & Planispheres:

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

Galileo's discovery of Jupiter's moons

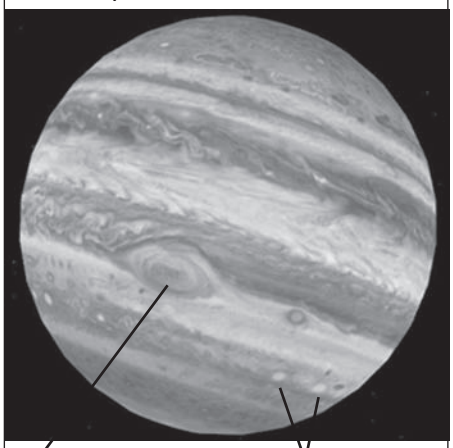
Back in December 1609, Jupiter was at opposition just like now. So Galileo had good observing conditions when he turned his telescope onto Jupiter.

On 7 January 1610, Galileo saw three little 'stars' just to the left of Jupiter. Over the next few nights, he discovered that there were four little 'stars' not three and that they moved along with Jupiter. He recorded their positions over several nights. Galileo continued his observations of Jupiter's moons over the period 1609–1613. He figured out that he was seeing four moons orbiting Jupiter. This showed that the Earth was not the centre of all motion in the heavens, as accepted in Aristotelian astronomy. This was a turning point in the gradual acceptance of Copernicus' heliocentric solar system. It was a slow process. Galileo was not formally forgiven until 1992 by Pope John Paul II on behalf of the Catholic Church for suggesting that the Earth was not the centre of all motion in the heavens.

Remember, that until Galileo first used a telescope almost 400 years ago, all astronomical observations were performed using only the naked eye. A lot of astronomy pre-dates Galileo's first use of the telescope by thousands of years. Chinese astronomical observations have been recorded for over 3 500 years. Galileo's first telescopes onlyhad a magnification of about ×4. In later improved versions, he achieved magnifications up to ×20. His telescopes also had a big problem with chromatic aberration. Modern day observers can do much better than Galileo's primitive telescopes with modern ×7 or ×10 binoculars that will have achromatic coated lenses.

More than 60 moons orbit Jupiter. The four Galilean moons are the biggest and are about the size of our Moon (mass 7.34 × 1 022 kg, diameter 3 475 km) or bigger. □

Figure 1: Jupiter, taken by NASA's Cassini spacecraft, on 8 Oct 2000



Jupiter's Great Red Spot – a giant atmospheric storm as wide as two Earths and over 300 yrs old, with peripheral winds of 483 km hr^{-1}

The bright white spots in this region are lightning storms

Figure 2: Some data on Jupiter's Galilean moons

Galilean moons	*Mass (kg)*	*Diameter (km)*	*Period (days)*
Io	8.93×10^{22}	3 643	1.77
Europa	4.8×10^{22}	3 122	3.55
Ganymede	1.48×10^{23}	5 262	7.16
Callisto	1.08×10^{23}	4 821	16.69

AN INTERESTING FACT:

In 1989 a space probe was launched to investigate Jupiter. It made a total of 34 orbits of Jupiter and made many discoveries before the end of its mission in 2003. This probe was aptly named 'Galileo'.

Exam Choice

ABN 56 345 318 164

Fax: 02 9975 1886
PO Box 71 Forestville NSW 2087

Trial HSC, School Certificate and Preliminary Science Exams

Exam Choice is a group of teachers highly experienced in all facets of the exam process.

This is our fourth year of producing **Trial and Preliminary Science Exams** which:

- assess over the **full range of performance**
- are mapped to outcomes and the NSW syllabuses
- use the prescribed verbs in clearly worded questions
- come with **clear marking guidelines** and sample answers
- are delivered **on time** and are reasonably priced

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

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

Contact Person .....

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

School .....

Delivery Address .....

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

	Price	Tick to order	Total
Biology Trial	$65		
Biology Preliminary	$55		
Chemistry Trial	$65		
Chemistry Preliminary	$55		
Physics Trial	$65		
Physics Preliminary	$55		
Senior Combination pack (all six senior papers)	$300		

Trial Science School Certificate	$80		

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 18 August (Trial) or 15 September (Preliminary and School Certificate.)

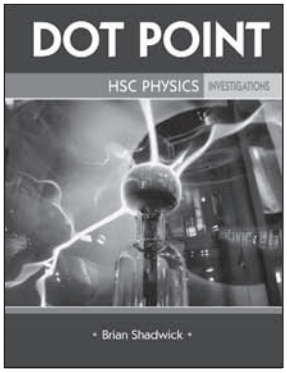
COMPETITION CORNER

Send in an entry to WIN this text:

Dot Point HSC Physics Investigations

by Brian Shadwick

Published & donated by Science Press ($44.95 ea)



This book covers the mandatory experiments and research investigations in column 3 of the HSC Physics syllabus.

It has been designed to help students plan, record and evaluate experimental procedures and research activities.

It also includes extension questions.

HOW TO ENTER: Send an answer to the Quiz Question, your name, school, & school address, on an envelope to: Competition Corner, PO Box 442 Freshwater NSW 2096 – by 4 July 2008

SciTalk 1/08 answer: diamond

QUIZ QUESTION: Where are the convection currents which move tectonic plates located?

ISBN 9780855835507
RRP: $44.95
Published by Science Press

Winner for *SciTalk 1/08*: *Physics 1 (2nd Ed)* ($62.95) & *Physics 2 (2nd Ed)* ($64.95 ea) published by Jacaranda was won by K van Zanen, Keira High, Fairy Meadow.

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

SciTalk

SciTalk is a newsletter for secondary Science educators. Now in its 14th year, it is produced quarterly by Odlum & Garner as a service to Science teachers. It is sent FREE-of-charge to all secondary Science faculties in schools and TAFEs throughout NSW and the ACT.

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

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

Contributions, advertising and inserts are welcome.

Copies of *SciTalk* are also available at:
http://www.odlumgarner.com

CONTRIBUTIONS

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

CLOSING DATES

- *SciTalk* No. 1–February 2008 … Feb 15
- *SciTalk* No. 2–June 2008 … April 11
- *SciTalk* No. 3–August 2008 … June 27
- *SciTalk* No. 4–October 2008 … Sept 26

ADVERTISING & INSERTS

All enquiries to the *SciTalk* Editor:
Catherine Odlum
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
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.