

Mathematics Links

NSW Department of Education and Training

Curriculum K-12 Directorate

Volume 2, Number 2, March 2007

Email Alert

Welcome to *Mathematics Links* March 2007

Mathematics Links is an electronic update for mathematics faculty leaders and mathematics teachers informing on the latest additions to the *Curriculum Support* website, professional learning opportunities and links to relevant resources.

Curriculum Support updates

- **Technology in 7-10**

Research undertaken by the Change and Education Research Group (CERG) at the University of Technology, Sydney raised a number of interesting findings. The most important finding in relation to pedagogy was Key finding 6:

In a large proportion of the classrooms we visited, computer-based learning was being integrated in ways that afforded less opportunity for higher-order thinking, deep knowledge and substantive conversation than classrooms where it was not being integrated.

Have a look at the updated technology page on the Curriculum Support website to see lesson ideas that link technology and higher-order thinking.

http://www.curriculumsupport.education.nsw.gov.au/secondary/mathematics/years7_10/technology/index.htm

- **Technology in Stage 6**

The xFunctions applet is meant as an educational tool for exploring several topics in calculus and pre-calculus mathematics. It can be used in teaching with very little class time required to explain how to use it. In addition to basic graphing, xFunctions lets you do animated graphs, parametric curves, derivatives, Riemann sums, integral curves, and 3D graphs. If you haven't used xFunctions to teach calculus in Stage 6 Mathematics to show the relationship of the graph of the function to the graph of the first derivative to the graph of the second derivative your students are missing out on a visual that will enhance their understanding.

http://www.curriculumsupport.education.nsw.gov.au/secondary/mathematics/years11_12/teaching/int_graph.htm

- **Assessment and reporting**

With half yearly reports looming fast, assessment and reporting are hot topics, particularly for Year 9 half yearly reports. The assessment page on the website has been updated to include mathematics specific PowerPoint presentations on A-E reporting. They include – Consistency of teacher judgement in mathematics; Consistency of moderation in mathematics; and Consistency of assessment in mathematics. These presentations could be used with your faculty to begin the discussion on

assessment and reporting. An updated reporting advice statement is also attached to this email.

http://www.curriculumsupport.education.nsw.gov.au/secondary/mathematics/years7_10/assessment/index.htm

- **Programming for understanding**

Are you looking for a different approach to programming 7-10? Heathcote HS may have some answers for you. As well as programs for 7-10, there are Stage 5 spreadsheet assessment tasks included.

http://www.curriculumsupport.education.nsw.gov.au/secondary/mathematics/years7_10/programming/heathcote_hs/index.htm

- **Newman's prompts – finding out why students make mistakes**

The Australian educator Anne Newman (1977) suggested five significant prompts to help determine where errors may occur in students' attempts to solve written problems. She asked students five questions as they attempted problems. On the website you can read about these five simple questions that teachers can ask in a normal lesson situation to identify where students are stumbling. Also, watch a video of a student being interviewed using the Newman's prompts. The question used in the interview was from the 2006 SNAP paper.

<http://www.curriculumsupport.education.nsw.gov.au/secondary/mathematics/numeracy/newman/index.htm>

Newman's work is also mentioned in the Teaching Literacy in Mathematics in Year 7 document on page 20. You can access this at

<http://www.curriculumsupport.education.nsw.gov.au/policies/literacy/material/index.htm>

Scroll down the page.

- **What is a yangma?**

Find out at

http://www.curriculumsupport.education.nsw.gov.au/secondary/mathematics/years7_10/teaching/list.htm

- **Girls do the maths**

The University of NSW is holding a special workshop to highlight some of the unique career and study opportunities mathematics can offer. You may use the attached flyer to promote this opportunity to students at your school. For more information go to their website at

<http://www.maths.unsw.edu.au/highschool/dothemaths/dothemaths.html>

- **Gifted and talented (GAT)**

A Stage 5 GAT unit of work on *Logarithms in the real world* has been added to the website. It uses the Williams model and has been written by Susan Dawson from Campbelltown HS. You may download this unit from

<http://www.curriculumsupport.education.nsw.gov.au/policies/gats/programs/units/mth.htm>

- **NSW Premier Teachers Scholarships**

These scholarships were introduced in 1999. In 2007, 36 scholarships in 16 categories across 15 curriculum areas are offered to all teachers in NSW government and non-government schools and TAFE NSW Institutes. The scholarships are designed to enhance and enrich the learning experiences of students in the classroom whilst presenting a **unique opportunity for teachers** to develop skills and knowledge in their chosen field of expertise. Read more in the attached brochure. Closing date is 4 May 2007.

- **USE CensusAtSchool DATA in 2007**

CensusAtSchool provides real, raw data for students in

Years 5 through to Year 12. Use it in Mathematics, SOSE/HSIE and across the curriculum.

Do blue-eyed girls have more fun? Does having a healthy breakfast mean you will have faster reflexes? Does a relationship exist between foot length and height?

Get random samples of raw data about Australian students.

112,000 students have provided their data for the database. Students have taken 60,000 samples to use in their classrooms.

Real raw data is a very flexible resource that encourages open-ended investigations.

Go to the web site and view this wonderful FREE resource.

<http://www.abs.gov.au> and click on Education Resources in the top right corner, just under the green banner. CensusAtSchool is the first link.

Use the data:

Across many curriculum areas

In authentic investigations

With modern technology

A Teacher Area with:

Professional Development section

Student Activities linked to curriculum

Introductory Excel Activities

CensusAtSchool aims to support teachers to increase the statistical literacy of students by providing them with the resources to learn by “doing statistics”. Using real, raw data that is about themselves, in investigations that they initiate is likely to engage your students in their learning.

- **National Literacy and Numeracy Week Awards**

Does your school have a great numeracy program that has really improved student outcomes in numeracy? Share your work with the nation. For more information on the prize money available and how to apply see their website at <http://www.literacyandnumeracy.gov.au/>

Professional learning opportunities

- **2007 Semester 1 activities**

Head teacher mathematics 2 day workshop, Tuesday 15 and Wednesday 16 May, Sydney
Supporting new scheme mathematics teachers, Tuesday 3 April, Sydney (places are still available for this workshop, enrol now)

Supporting new scheme mathematics teachers, Tuesday 29 May, Inverell

Patterns and algebra Stage 3 and 4, Monday 21 May, Armidale

For more information about these workshops go to

http://www.curriculumsupport.education.nsw.gov.au/secondary/mathematics/prolearn/pl_activity.htm

Registration is an online process and is available from

http://www.curriculumsupport.education.nsw.gov.au/prolearn07/semester1/s_mathematics.htm

Free online mathematics resources

- **Binomial Theorem and Binomial Probability** (HSC Extension 1) and **Curve Sketching** (HSC Extension 2) are two new digital resources produced by the Centre for Learning Innovation (CLI) that are now available in the *Pilot Resources* section of TaLe www.tale.edu.au.

New scheme teachers

- **Professional learning workshops**

Supporting new scheme mathematics teachers, Tuesday 3 April, Sydney (places are still available for this workshop, enrol now)

Supporting new scheme mathematics teachers, Tuesday 29 May, Inverell

This workshop focuses on the professional learning needs of new scheme teachers teaching mathematics 7-12.

- **Classroom management resources**

A complete behaviour management course for new teachers. All resources available for download. See http://www.standards.dfes.gov.uk/primary/publications/banda/behaviour_nqt_course/

Discussion

Thank you to those teachers who responded to the School Certificate survey in last month's email. Results will be published in the April edition.

An excerpt from an article in MANSW Reflections for some food for thought for the Stage 6 syllabus development.

Where to (and why?) for extension mathematics

[Reflections: Journal of the Mathematical Association of NSW](#)

Volume 31 Number 4, November 2006; Pages 11–18

Peter Coutis

Advanced courses in senior school maths should give more emphasis to applied maths and mathematical modelling. Such practical applications of maths have driven the subject's development throughout its history. More attention to modelling of maths would encourage students in advanced senior courses to continue the subject at tertiary level, and would prepare them more effectively for the practical orientation to maths demanded in such courses. The use of modelling in senior school maths can also illustrate the relevance of the subject for many professional careers. The author discusses these issues in the context of the Extension 1 and 2 syllabuses of the final year Higher School Certificate maths course in New South Wales. The author found his extension students responded well to the 'real world' quality of a unit about the effect of wind resistance on projectiles. Advanced courses should pay more attention to topics such as ordinary differential equations and their application to science and engineering. Other valuable topics to cover would be matrices and vectors, as methods to represent and solve 'interesting problems', and aspects of discrete mathematics and number theory relevant to fields such as cryptography and pattern discovery. Room in the NSW extension syllabus could be created for these topics by removing content such as conic sections and polynomials. Computerisation has greatly broadened the range of real-world problems open to mathematical solutions, and has created many more opportunities to show students the real-world relevance of maths. Computers improve the efficiency of teaching time, particularly in multidisciplinary settings. They also provide visual representations to engage learners. However, ICT can compete with mathematical content as a learning objective for students and can be used to 'circumvent rather than supplement their natural thinking processes'. Assessment methods need to be substantially transformed, since research shows that large-scale pen and paper testing is unreliable as a measure of mathematical knowledge. The current emphasis on formative assessment in years 7–10 should also apply to the senior years, where open-ended investigation and problem-solving tasks, peer and self-assessment, and student journal writing should be practised. Advanced students should also be involved in test design.

Until next month!

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