

2008 MANSW CONFERENCE PRESENTATIONS

FRIDAY KEYNOTE ADDRESS

One English Educator's Perspective on Mathematics Education

Dr Paul Brock AM

Commencing with his reflections on his earlier experience as a student of Mathematics, Dr Brock explores some of the relationships between the knowledge, understanding and skills of the English language, and those of Mathematics. In doing so he refers to the findings of the *National Numeracy Review Report*, commissioned by the Council of Australian Governments (COAG), which was completed in May this year. He draws attention to one of the greatest, yet virtually forgotten, 18thC Mathematicians, whose obscurity is due to the fact that she was a woman. Dr Brock then proceeds to address the serious issue of the lack of sufficient numbers of properly qualified Mathematics teachers in Australian secondary schools. In doing so he reinforces and expands upon some of the most salient recommendations from the Commonwealth Government commissioned research report *Maths? Why Not?*, released in April this year. His paper highlights the key findings of the Mathematics component of the AESOP research project, chaired by Professor John Pegg and Dr Brock, published as *Exceptional Outcomes in Mathematics Education* (Pegg, Lynch and Panizzon 2007). Dr Brock concludes his paper by referring to the broader responsibilities for Australian educators articulated in *The Adelaide Declaration on National Goals for Schooling in the Twenty-First Century*.

Dr Paul Brock AM is the Director of Learning and Development Research in the Office of the Director-General, NSW Department of Education and Training and Adjunct Professor in the Faculty of Education and Social Work, University of Sydney. He is a founding member of that Faculty's Arts, English, Literacy, Education (AELE) Research Network. Dr Brock is also an Honorary Research Fellow, University of New England; and an Honorary Associate, Faculty of Medicine, University of Sydney. Dr Brock is a Vice Patron of the Motor Neurone Disease Association, NSW.

An educator for four decades, he commenced as a secondary school English / History classroom teacher for 14 years. During his subsequent 11 years as an academic at the University of New England, he also accepted invitations to be a visiting scholar at British and North American universities. He then spent 6 years in Canberra as an Adviser to the Hawke and Keating Governments. While on the personal staff of the then Minister for Employment, Education and Training, John Dawkins, Dr Brock's contribution included helping to write the Australian Language and Literacy Policy; representing the Commonwealth on the national committee (CURASS) established by the Commonwealth, State and Territory Ministers of Education to produce a K-12 National Curriculum; and providing advice on Teacher Education. His later contribution as Special Adviser to the Australian Language and Literacy Council of the National Board of Education and Training involved research and publications in curriculum, teaching and learning in the fields of English language and literature; child, adolescent, and adult Literacy; and Languages other than English. He was the principal or co-author of a number of major reports tabled in the Federal Parliament. He has been a Senior Executive in the NSW Department of Education and Training since 1996.

*Throughout his forty year career in education he has researched and published extensively in the field of English literature, language and literacy as well as in the area of professional teaching standards and ethics. His more than 120 publications include books, monographs, chapters in books, refereed journal articles, and poetry. He has also delivered over 130 academic and professional papers to international and Australian conferences and forums. In September 2004 ABC Books published his autobiography, *A Passion for Life*. In 2006 Dr Brock was made a General Member of the Order of Australia "for service to public education, particularly as an adviser and author in the areas of strategic policy development, to maintaining high standards of teaching and professionalism, and to people with Motor Neurone Disease".*

SATURDAY MAJOR ADDRESSES

Motivation and Engagement in Primary School Mathematics Associate Professor Janette Bobis

Motivation and engagement in mathematics at the primary school level can have a significant influence in a child's development, academic success in mathematics and even their choice of career. We now know that what goes on in classrooms can have major influence on a child's desire to try harder and improve his or her learning.

This presentation is aimed at assisting educators to better understand the importance of motivation and engagement in and for the learning of mathematics. It will closely examine specific components of motivation, reasons why it may drop in primary school and suggest teaching strategies to help boost student motivation in mathematics.

Associate Professor Janette Bobis teaches mathematics education and curriculum studies at the University of Sydney. She is Associate Dean for Research in the Faculty of Education and Social Work. Her research focuses on the professional development of teachers in mathematics at primary and middle-school levels. In 2007, Janette received the joint Mathematics Education Research Group of Australasia and the Australian Association of Mathematics Teacher's Practical Implications award for her research involving teacher education. She has also received a Faculty award for teaching excellence and a National Carrick Citation for her outstanding contributions to student learning at a tertiary institution

Student Engagement in Mathematics: A National Imperative Professor John Pegg

Concerns are currently being expressed about Australia's capacity to produce a critical mass of young people with the requisite mathematical background and skills to pursue careers that will help to maintain and enhance this nation's competitiveness. It was this thinking that was the catalyst for the federally-funded "Maths? Why Not?" (MWN) Project that asked the research question: Why is it that capable students are not choosing to take higher-level mathematics in the senior years of schooling?

Based on comments gathered for this Project, a great many students find learning in Mathematics a sequence of unconsolidated experiences with not much opportunity to build positive images about their ability or subject relevance for the future. The purpose of this talk is to offer insights into the MWN Project by drawing on and exploring further the Project's research findings and recommendations. In particular, teacher and student perspectives are explored under influences related to students' self-perception of ability; interest in and liking for higher-level mathematics; perception of difficulty of higher-level mathematics; previous achievement in mathematics; perception of their earlier primary and secondary experiences; perception of career relevance; and parental expectations and aspirations with the view of offering practical ways forward for systems, professional associations, schools and mathematics teachers

John Pegg is Professor and Director of the National Centre for Science, ICT and Mathematics Education for Rural and Regional Australia (SiMERR National Centre). John leads a diverse team including academics in hub universities in each state and territory. Over the past four years SiMERR has been involved in over 120 projects, aimed at enhancing student-learning outcomes as well as addressing teacher professional learning and isolation in rural areas. His work is far ranging, and is particularly known internationally and nationally for his contribution to theory-based cognition research in Assessment and Mathematics Education. Recently he has been involved with many large-scale nationally significant projects linked to: underachieving students in basic Mathematics and Literacy, state-wide diagnostic testing programs in science, developmental-based assessment and instruction in Mathematics, the validation of the NSW professional teaching standards, the AESOP study investigating faculties achieving outstanding student-learning outcomes, the the Partnerships in ICT Learning Project, and the Maths? Why Not? Project.

Multiples of three and winning WW2 in the Pacific

Professor John Mack

In mid-1939, the Imperial Japanese Navy (IJN) introduced a new, high-level operational radio signal code for use across its bases and warships. British codebreaker John Tiltman determined the two-stage structure of this system within a few months, but the task of learning how to decrypt radio messages sent in it was much more difficult, in that little had been achieved by the time of the infamous Japanese attack on Pearl Harbor in December 1941. This stimulated a much greater Allied effort in attacking this coding system. That, together with some critical blunders made by the IJN, led to the interception and decryption of messages in this code becoming a principal source of intelligence to the Allies for the rest of the Pacific War, from the May 1942 Battle for the Coral Sea onwards. Some interesting statistical techniques were developed to exploit the 'multiples of three' blunder underlying the structure of this code, referred to by the Allies as the JN-25 system. I shall describe the code and its structure and explain how its weaknesses were exploited by Allied codebreakers.

John Mack was educated at The Entrance Primary School, Gosford High School, Sydney University and Cambridge University. He joined the staff of the mathematics department at Sydney University in 1960, retired in 1997, and is now an Honorary member of staff. He has been much involved in K-12 mathematics for most of his career and is an Honorary Life Member of both MANSW and AAMT. He was awarded an AM recently for his services to education and remains involved in state and national activities in mathematics education and in enhancing the professional standing of mathematics teachers.

PRESENTATIONS and WORKSHOPS

Karen Ahearn	Primary K-6	Yes, my students are using technology for graphs and it is great!	The use of technology in general primary classrooms has changed the nature of the graphical models students create. With such change comes a new set of issues that potentially facilitate greater understanding of statistical concepts in very young children. Additionally, many other concepts are able to be explored through graphical representations that may have not been available through more traditional models. This presentation explores the impact of using Excel software to generate graphical representations in a Year 2 classroom, identifying issues in student learning that have subsequently become apparent.
Karen Ahearn Georgina Havadjia	Primary K-6	Cut it up, spit it out and bring it back together!	This workshop will examine the different phases of fractional understanding from Stage 1 through to Stage 3. Particular focus will be on the development of visual images generated by students to create understanding. The importance of developing links to place value structure and division concepts will also be explored through learning experiences which ensure meaningful introduction to decimal notation. Participants will be engaged in activities, utilising both digital and concrete resources, to try in their classrooms.
Karen Ahearn Shannon O'Dwyer Georgina Havadjia	Primary K-6	I teach the syllabus! What's the issue?	Knowing the syllabus and integrating across content are separate issues in Mathematics education. To facilitate connectiveness in student learning and hence, meaningful understanding, teachers need to assist students to develop links between content, language and strategy. This workshop explores classroom practice from the experiences of two Stage 2 class teachers. Learning episodes, student work samples and dialogue will be examined in terms of demonstrated effectiveness of integration of skills, language and strategy. Participants will be engaged in activities which can then be applied in classrooms across K-6.

George Anderberg	Secondary 7-12	The case of the diminishing M&Ms	This workshop is based on a similar workshop presented by Mary Coupland in 1994. It looks at a practical example of exponential decay but can be used to demonstrate patterns and relationships at all stage levels from Stage 1 to Stage 6, it is a neat example of how an activity can be used at many different levels.
George Anderberg	Primary 3-6 & Secondary 7-10	Numerical Literacy and Problem Solving	This workshop will look at some of the problems identified by Dr Anne Newman's research but it will go further and explore ideas on how to overcome some of the problems.
Richard Andrew	Secondary 7-10	Teaching Mathematics Conceptually	There is no doubting the importance of our students understanding the concepts that underpin the mathematics we are teaching them. But concepts cannot be 'taught' in the same way that, for example, algebraic methods can be taught. So how do we enable our students to understand conceptually? If you have been nagged by this question then this session is for you. A model for teaching conceptually will be demonstrated through several Stage 4-5 topics. This session is a snippet from two full-day courses run through Teacher Training Australia called "Teaching For Understanding Stage 4"
Richard Andrew	Secondary 7-12	Investigating Mathematics with Graphics Calculators (General Mathematics mainly)	There are two distinctly different aspects of Graphic Calculators used by teachers. One is answering questions from the course. The other is using Graphic Calculators to investigate mathematics. The syllabus requires of us to be adopting quality teaching methodologies which include teaching with an investigative approach. The potential of Graphic Calculators can only be maximized when used to investigate mathematical systems. This session is a hands-on, guided demonstration of several interesting investigations with an emphasis on an appropriate teaching process. The activities will be geared towards General Mathematics but also have relevance to 7-10 and 2-Unit. <i>Casio Graphics Calculators will be provided for participants to use in this session</i>
Richard Andrew	Secondary 7-12	The Beginners Journey	This will be a hands-on, easy-to-follow beginner's 'button pressing' session. You will work through the self-guided instruction sheets of RUN and STAT modes. This means you will walk away with the session "in your hands". Soft copies of these files plus self-guided worksheets for EQUA, TABLE-GRAPH, TVM and SSHT will be made available to you after the session. <i>Casio calculators will be provided for participants to use in this session</i>
Janine Angove	Primary 6 & Secondary 7-10	Working mathematically with HOTmaths	Many classrooms have limited access to technology, so most online resources are of no use. However the flexible nature of the HOTmaths Learning System allows for a wide range of uses in your classroom. This workshop will look at open tasks and practical activities from HOTmaths and explore how they can be used in the classroom, with and without technology. Participants will receive a variety of tasks and ideas about how to incorporate working mathematically into their programs.
Cathy Attard Karen McDaid	Primary 3-6 & Secondary 7-8	Tasks to Motivate and Engage During the Middle Years	This workshop is an interactive session using the latest research in motivation and engagement to inform the design of tasks aimed at getting students excited about mathematics. Tools such as Bloom's Taxonomy, Gardner's Multiple Intelligences and Ryan's Thinkers Keys will be utilised to design rich mathematical investigations. Learn how to use everyday, real-life items and situations to make mathematics more engaging for your students.

Cherie Baddock Rebecca Kurczewski	Primary K-6	Bot your classroom!	Looking for a new way to integrate technology into your mathematics classroom? Come and learn about the Pro-bot and the Bee-bot- What are they and how you can use them in your classroom K-6. The robots are a new visual, engaging, hands-on tool.
Kellie Baker	Primary 3-6	Mathletics - The next generation in learning	Mathletics is Australia's most used educational website - with over 1000 Australian Schools and one million students worldwide using the resource. It is the next generation in learning - captivating, engaging, building confidence and extending every student to achieve outstanding results. The session will focus on how Mathletics can meet a school's numeracy objectives. Particularly differentiation, motivation and results.
Dawn Bartlett	Secondary 11-12	Using Assignments with Students for Focus Studies	This workshop will explore some assignments that have been used with students in a content endorsed course that has a similar structure to the focus studies in the new General 1 course. During the workshop we will also explore how to develop and implement assignments for the new course using what was provided in the draft syllabus documents. Also, there will be discussion of some of the issues in assessment using assignments for students with low levels of literacy and numeracy.
Dawn Bartlett	Secondary 7-12	Using whiteboards to engage lower ability students	This workshop will explore how mini-whiteboards and interactive whiteboards have been used with students in a small rural high school to engage students in Mathematics activities. The activities include ones that focus on learning and practising skills; doing investigations; and developing communicating skills in mathematics. The students are in a lower ability Year 9 class, a mixed ability Year 8 and a Content Endorsed Course class in Year 12. There will also be discussion of issues associated with using the whiteboards in the classroom.
Ann Baxter Kate Baxter	Primary K-6	123 meets ABC: Literacy Strategies to enhance Mathematics teaching and learning	As young children develop their capacity for understanding and interpreting the world around them, language in its varying forms, becomes a vital cognitive link in enabling them to articulate their natural sense of number and other mathematical concepts. The skills of speaking, listening, increasing vocabulary knowledge, reading and writing are as essential to learning Mathematics as they are to learning English. This workshop facilitated by Ann Baxter (University of Wollongong) and Kate Baxter (Nazareth Primary School), explores concepts and ideas around teachers' planning to incorporate specific literacy strategies into their mathematics lesson to enhance student confidence and competence in the mathematics classroom
Jennifer Bell	Primary K-6 & Secondary 7-12	Promoting Mathematics in Schools	This session will provide guidelines for setting up a Maths Club in your school to enliven students' interest in Mathematics and generate a real buzz in your school on various National and International Maths Days. Students who enjoy playing with numbers on paper and online, will love the opportunities that meeting with other passionate mathematicians can provide.
Sahar Bokosmaty	Primary K-6 & Secondary 7-10	Doing Math Just for the Fun of It!	This workshop will present a number of various activities, which feature powerful mathematics investigation from the field of recreational mathematics – doing math just for the fun of it. It will also introduce mathematical and mechanical puzzles that will help teachers discover some of the mathematics inherent in puzzles and show them ways to integrate various puzzles into their classrooms.

Russell Brown	Secondary 11-12	Getting Ready for Data in a Calculus Course!	In the new Preliminary Mathematics Advanced course the unit PMA6: Data analysis requires students to describe and summarise data, compare related sets of data visually and analyse data in order to make conclusions about trends. In this session you will use the interactive TI-Nspire CAS computer software to explore this topic from graphical visualisations through to spreadsheets. The use of technology such as spreadsheets is encouraged in this topic, enabling students to use real data to produce a variety of graphs and tables. Interactive visualisations of the process of finding a least squares line of best fit, correlation and regression can also be addressed using technology
Russell Brown	Secondary 11-12	A Pedagogical Journey through Differential Calculus	This session will look at many of the concepts required in the new Preliminary Mathematics Advanced Unit PMA5: Introduction to differential calculus through the use of technology to complement the "by hand" methods. Students are encouraged to use graphing technology to explore concepts studied in this topic. The use of graphing technology is also encouraged in the learning and teaching process.
Russell Brown	Secondary 11-12	Simultaneous equations on a Graphing Calculator	Whilst graphing calculators are not allowed to be used in examinations their use is encouraged for explorative and learning purposes in the classroom. Use the TI-Nspire CAS handheld to explore several ways of solving simultaneous linear equations that will enhance student understanding. In this hands on session you will use step by step algebraic methods, standard built-in solve functionality, graphical (visual) approaches and matrix methods to solve a selection of both linear and non-linear simultaneous equations. No previous experience using a graphics calculator is necessary for this workshop. <i>TI-Nspire CAS calculators will be provided for participants to use in this session</i>
James Burnett	Primary 3-6	Developing the essential strategies of computation	Simple visual aides and models should be used to help students form a mind picture that links to the thinking strategy. This session will demonstrate the use of these aids and show how the thinking strategies can be generalised and extended beyond the number fact range. Participants will be engaged in practical activities using handouts that will be provided.
Emma Campbell	Secondary 7-10	Programming for Years 7-10	One school's approach to programming in Years 7 to 10. Over the past four years our program for Years 7 to 10 has continued to evolve as we grappled with the "New" Syllabus. We have tried various formats, sequences and types of assessment to incorporate the continuum of learning. We have adapted to feedback from colleagues and finally this year expanded the suggested learning experiences to include hyperlinks to numerous worksheets and websites. Participants are welcome to share their programming experiences. Of course, there is always more to do.
Emma Campbell	Primary K-6 & Secondary 7-12	MS Word (Part 1)	Learn how to use columns, tables, breaks, tabs, outline numbering and Equation Editor/MathType efficiently. Save time by learning how to customise toolbars and create your shortcut keys and autocorrections. You will be surprised by how easy typing worksheets and assessments can be! (Note: Using the Drawing Toolbar in Word will be presented in Part 2).

Anita Chin	Primary K-6	Making the connection. Helping struggling students achieve in K-6 Mathematics	Identifying and understanding conceptual, and not just procedural, holes in student's thinking and communication skills enables us to implement more effective techniques for working with struggling students. Number sense is essential for understanding number relationships, however, many students use inefficient strategies for computation. This hands-on workshop will examine the purposeful use of key models for building connections between concrete, pictorial, verbal and symbolic representations of number concepts. Strategies to cater for all students in a mixed ability classroom will be discussed and practical ideas for implementation will be modelled.
Anita Chin	Secondary 7-10	Making the connection. Helping struggling students achieve in middle years	Identifying and understanding conceptual, and not just procedural, holes in student's thinking and communication skills enables us to implement more effective techniques for working with struggling students. Number sense is essential for understanding number relationships and algebraic techniques, however, many students in middle years use inefficient strategies for computation. This hands-on workshop will examine the purposeful use of key models for building connections between concrete, pictorial, verbal and symbolic representations of number concepts. Strategies to cater for all students in a mixed ability classroom will be discussed and practical ideas for implementation will be modelled.
Tracey Clark	Secondary 11-12	Are you full of hot air?	Here's an opportunity to experience one of the hands on activities of the new Stage 6 General 1 and 2 Focus Studies. Come along and measure just how full of hot air you are. You will measure your lung capacity and have an opportunity to look at the mathematics involved. Come and see: error, algebra, measurement, data collection, normal distributions and technology in action. Activities relevant to both General 1 and General 2 will be investigated.
Tony Collison	Primary K-6	Maths Resource Studio	A hands on demonstration of our new software with its enhanced features, greater flexibility and easy to use learning activities in Maths that can be focussed on one child or a whole class. It can be used as a teaching process or limited to outcomes and form part of your assessment process.
Nick Connolly	Primary 3-6 & Secondary 7-12	Writing effective multiple-choice tests	Multiple-choice tests have a mixed reputation but when well written can provide a wealth of assessment data that compliments other assessments. This presentation looks at the problems, pitfalls and potential of multiple-choice tests.
Tobias Cooper	Secondary 7-12	Using technology for inverse functions and modelling exponential growth	Have you ever wondered what technology you can use to enhance the teaching of inverse functions and exponential growth? This hands-on workshop will show you what technology to use and when in the topic it can be applied effectively. This will involve the use of 'Autograph 3.20', 'The Geometer's Sketchpad' and 'Microsoft Excel' in the context of detailed and structured teaching notes. Bring a memory stick so you can download the materials. Free demo versions of the software will be supplied on CD.
Tobias Cooper	Secondary 7-12	Geometry Expressions: Next generation dynamic geometry software	Geometry Expressions is the first dynamic geometry software system that allows you to work numerically and symbolically. You can constrain angles and sides to be any size you choose, or you can define them symbolically. For the first time, the tests for congruent triangles can be dynamically developed with students. Pythagoras' theorem can be explored in ways that were not possible before. The locus of a parabola has never been as easy as with Geometry Expressions. Come and learn some really useful skills and take home a free demo version of the software. Bring a memory stick to download the materials.
Tobias Cooper	Secondary 7-12	The Geometer's Sketchpad for beginners	The Geometer's Sketchpad is dynamic geometry software that brings mathematics to life with colour, movement and animation. It allows students to understand mathematics in ways that were

			not possible with traditional teaching tools. Sketchpad saves time in the classroom by allowing teachers to teach ideas more simply and easily. Participants will learn basic Sketchpad skills and develop simple and effective files for immediate use in the classroom. We will also explore some ready made files that I use with my students every year.
Tobias Cooper	Secondary 7-12	Functions and Geometry with GeoGebra	GeoGebra is free dynamic geometry software for schools that joins geometry, algebra and calculus. It received several international awards including the European and German educational software awards. GeoGebra is very easy to use and every file created can be saved as a dynamic interactive web page. It is also perfectly suited to interactive whiteboards. This hands-on workshop will explore a range of concepts from year 7 geometry to year 12 calculus. Participants will learn some basic skills and develop simple and effective files for immediate use in the classroom. A CD full of files will be provided at the end of the workshop.
Mary Coupland	Secondary 7-12	Convergence, Currents, and Concrete: What mathematics do students of engineering need?	In this presentation, examples will be given of applications of mathematics to selected engineering subjects at university. We will go from straight lines to linear algebra, from calculus to differential equations, and consider some interesting applications of integration.
Geoff Dix	Secondary 7-12	ICT teaching and learning resources	This is an opportunity to explore a CD of resources for teaching various topics in years 7 to 12. It can be used with a projector in the classroom to explore the concepts, and can also be used in a computer laboratory with minimal supervision. The resources were developed under the ASISTM scheme and consist of a collection of pre-made, interactive Geogebra files linked with related exercises and explanatory questions. They explore geometry in detail, coordinate geometry, parabola and locus etc. The CD is free to use in your classroom and can be modified to suit your needs. Your feedback and suggestions will be invited.
Peter Fox	Secondary 7-12	Thinking Mathematically	Mathematics is more than a series of algorithms to be learned through repetition. By definition, rote learning is 'learning without understanding'. It is difficult to predict the range of skills that will be required in the workforce of the future, but one thing is certain, they will need to have a capacity to think and generate a range of feasible solutions to problems. This session provides examples of student responses that bring to question student understanding of algebraic concepts. Traditional topics, such as Surds (radical expressions) will be investigated through non-traditional techniques. Questions that require a deeper understanding of the mathematical content will be posed. This session will also look at the role technology plays supporting this pedagogical shift in the curriculum.
Peter Fox	Secondary 11-12	Inspirations	"The computer created model is not restricted to the role of illustrating the end product; it can be part of the process of doing mathematics..." (Palais 1999). In 2008, we no longer need access to computers to generate amazing dynamic models. Handheld devices are making these opportunities more accessible and affordable. The power of such visualisation tools can not be over-rated: "Spatial-Temporal reasoning, the ability to transform abstract concepts into visual images is crucial for comprehending mathematics and science concepts." (Shaw 2000). In this session participants will solve rich mathematical problems using technology and see how students are better able to visualise the problem and associated solution processes
Kevin Fuller	Secondary 7-10	Solving Equations Using Plastic Bottle Caps	Coloured plastic bottle caps are an ideal way to introduce Year 7 students to the principles of solving simple equations. These caps can also be used to teach algebra and directed numbers.
Mark Graber Richard	Primary 3-6 &	Have sum fun online	This workshop/presentation will focus on a team- based approach to problem solving in each of Years 5 to10 in a scheme sponsored by MAWA, devised and managed by the presenter, and

Korbosky	Secondary 7-10		called HAVE SUM FUN ON- LINE. Participants will be exposed to the items being used as exemplars of sound mathematical problems across all strands of the mathematics curriculum. The workshop/presentation will demonstrate how the system is managed online, and how all schools can become involved in it. Examples of student teams in action to illustrate various collaborative strategies will be presented, as well as how teachers use the scheme as a focus for aspects of their mathematics teaching, and also as a vehicle for their own research into how children learn mathematics.
Mary Ann Grant Damien Brown	Secondary 7-12	An overview of using Smartboards in the classroom.	An overview of how we have used the Smartboard in our lessons for Years 7-12 and what we have found to be particularly useful. We will show you ways of incorporating learning toolkit applications and math specific software such as efofex and Geometers Sketchpad into your Smartboard lessons. Some time will be given for participants to play with interactive learning activities that we have developed this year.
Mary Ann Grant Damien Brown	Secondary 7-12	Developing Interactive Activities for a Smartboard (Session 2 Practical Hands On)	A hands on session giving participants instruction on using the notebook software and embedded toolkits. Participants will develop their own interactive activity on a topic that they could immediately use in their classroom with a Smartboard. Hopefully some of these activities can be trialed at the end of the session. These activities will be collated and available on the MANSW website after the conference. They could also be used in the classroom with a data projector. Teachers should bring a USB (if they want to save theirs or someone else's activity) and any other resources to help make their activity. This session is aimed at people who have used Smartboards or attended session 1. (It is not a beginners Smartboard session)
Jim Grant Ed Lewis	Primary K-6	'Maths-in-a-box': Creative numeracy contexts for the K-6 classroom	The grounding of mathematics in everyday contexts in order to stimulate students' interests and develop knowledge, skills and understanding in numeracy is an accepted feature of contemporary curricula. The challenge for the busy teacher is in the planning and implementing of these units / topics. Ed Lewis and Jim Grant will present a series of student support materials they have developed and will facilitate discussions regarding how contextual approaches can be implemented.
Jim Grant Ed Lewis	Secondary 7-10	'Maths-in-a-box': Creative numeracy contexts for the 7-10 classroom	The grounding of mathematics in everyday contexts in order to stimulate students' interests and develop knowledge, skills and understanding in numeracy is an accepted feature of contemporary curricula. The challenge for the busy teacher is in the planning and implementing of these units / topics. Ed Lewis and Jim Grant will present a series of student support materials they have developed and will facilitate discussions regarding how contextual approaches can be implemented.
Tal Greengard	Secondary 7-12	Creative Interactive Puzzles	Come and experience a relaxed and practical workshop. We will create a variety of engaging electronic puzzles that you and your classes can enjoy next week! Squaresaws, card sorting, card sequencing etc. It's as easy as typing mathematical expressions into Microsoft Word then pasting them into a puzzle! No experience with technology is necessary - as everything will be explained. The software we will use was developed as part of the Technology Leaders Project at the Macquarie ICT Innovations Centre. Bring your USB drive along so you can save your creations.

Peter Hall	Secondary 7-10	Investigations in Number: Converting fractions to decimals Part 1	This investigation is the first of two and focuses on the patterns that emerge when fractions are converted to decimals: why some fractions produce terminating decimals and others produce repeating decimals and how the prime factors of the denominator can be used to predict its equivalent decimal. The investigation has been trialled with able students from Years 7 to 9, and samples of their own findings are published as part of this paper. The workshop format allows participants to engage with the topic and hence reference the students' responses to their own learning.
Peter Hall	Secondary 7-10	Investigations in Number: Converting decimals to fractions Part 2	The main premise of the workshop is that an investigative style of teaching and learning enhances student engagement and promotes ownership and understanding by the students. This investigation is the second presentation on decimals and their equivalent fractions. It focuses on the development of 3 rules to convert terminating and recurring decimals to fractions. The rules have been developed by talented Year 8 and 9 students and samples of their own conclusions are included in this paper. The workshop format allows participants to reference their own learning with that of the students who have trialled this investigation
Tom Hardy	Secondary 10-12	Motivating and Stimulating Students with Engineering Maths Applications	Too many students in the top half of mathematics ability are not taking the higher level Maths subjects on offer in our High schools. This failure limits their future prospects and options and hurts Australia's economy and social well being. The question "what are we learning this for" is one commonly heard by secondary Maths teachers. Unfortunately many teachers have never applied the Maths they teach, so answering this question is difficult. Ten years of experience in delivering motivating examples of Maths applications has resulted in increases in student numbers in high level Maths subjects, better learning and motivation of students already in these classes, as well as increased intake into university engineering courses.
Anne Hastings	Secondary 7-12	How does the brain learn Mathematics?	David Sousa has recently written a book with this title. He uses research from functional MRIs and other researchers to look at the ways in which the brain learns mathematics. I will summarise some aspects of this book and discuss ways in which teachers can structure lessons to assist learning of mathematics for adolescents.
Kate Highfield	Early childhood, Primary K- 2	Mapping, measurement and robotics	This workshop is hands on and practically explores the use of simple robotic toys (such as Beebots and Probots) in developing mapping and measurement concepts. The activities presented arise from educational research and suggest ways that P-2 teachers can harness robotic toys in measurement and mapping. The suggested activities integrate problem solving, positional concepts and links to other Key Learning Areas such as English and Creative Arts. Adaptations for the activities will be presented for teachers who do not have access to these toys.
Kate Highfield	Early childhood, Primary K- 2	Interactive Whiteboards, how to not become Incredibly bored...	This workshop investigates the use of Interactive Whiteboards (IWBs) in K-2 mathematics. IWBs are powerful tools with the potential to increase student engagement and illustrate challenging mathematical concepts. However if they are not used carefully their interactive features can be lost and IWBs can become just a "pretty board". Using digital photos, virtual manipulatives and simple drawing software this workshop will provide you with practical activities to take back to school. Activities present concepts for each strand in K-2 mathematics and are suitable for novice IWB users.

Tracey Hughes-Butters	Primary 3-6 & Secondary 7-12	How to really USE that interactive whiteboard in your room!	After a 5 week stint around England (thanks to the 2007 Premier's Genworth Financial Mathematics Scholarship!) it's time to share the resources, the innovations, the concerns and the pedagogy that the Interactive Whiteboard brings to the Secondary Mathematics classroom. The workshop will present resources, research and current best practice from various schools and Universities as well as the Promethean Institute. In addition, we will play with "Flexcel" – an excellent freeware which promotes interactive Excel sheets. Participants are encouraged to bring lap tops loaded with Promethean software and Excel BUT this is not essential (However a thumb drive could be very handy!!!!)
Tracey Hughes-Butters	Primary 3-6 & Secondary 7-12	It's simply Math-tastic!!!	After a two year hiatus, this workshop is back again with a variety of innovative and engaging activities, rich tasks and games that will enhance your students' learning (and they won't even notice how much Maths they have done!) All the activities presented have been applied in classrooms – Yes, they really do work!
Ian Iredale Peter Garside	Secondary 7-12	Sowing Seeds of Surveying	A Mathematics in Surveying Field Day was held recently at Bicentennial Park, Homebush Bay. Year 10 Advanced students, under the guidance of surveyors and teachers, were presented with challenging surveying exercises, exploring practical applications of mathematics. Activities included creating an intriguing seed pattern, measuring the height of a tower by various methods, viewing daylight stars, and observing 3D modelling using close range photogrammetry This presentation outlines the organisation of the day and describes some of the activities undertaken.
Marian Kemp	Secondary 11-12	Using a graphics calculator at Stage 6: Data analysis	The Draft Syllabus for Preliminary Mathematics Advanced Stage 6 encourages the use of technology for teaching and learning at this level. In this hands-on workshop, we will explore some of the ways in which a Casio fx-9860G AU graphics calculator can be used effectively for this purpose by students and teachers in the Data Analysis topic, including work with correlation, regression and the normal distribution. No previous experience with graphics calculators will be assumed. <i>Casio graphic calculators will be provided for participants to use in this session.</i>
Marian Kemp Barrie Kissane	Secondary 11-12	Using a graphics calculator at Stage 6: Differential calculus	The Draft Syllabus for Preliminary Mathematics Advanced Stage 6 acknowledges that "...graphing technology is an excellent means of exploring many of the concepts..." associated with the Differential Calculus topic. In this hands-on workshop, we will explore some of the ways in which a Casio fx-9860G AU graphics calculator can be used effectively for this purpose by students and teachers, including work with local linearity, gradient at a point, differentiation from first principles and the derivative function. No previous experience with graphics calculators will be assumed. <i>Casio graphic calculators will be provided for participants to use in this session</i>
Kuldip Khehra	Secondary 7-12	How to make assignments different (literally)	Tired of those assignments where there is only one correct answer and then trying to work out who did or did not cheat. Here is a way with assignments where the questions are the same but the numbers are different, your students will wonder how you did it.

Barrie Kissane Marian Kemp	Secondary 11-12 & Post Secondary	Using a graphics calculator at Stage 6: Trigonometric functions	The Draft Syllabus for Preliminary Mathematics Advanced Stage 6 acknowledges that "...graphing technology is an excellent means of exploring many of the concepts..." associated with the Trigonometric Functions topic. In this hands-on workshop, we will explore some of the ways in which a Casio fx-9860G AU graphics calculator can be used effectively in this topic by students and teachers, focussing on work with circular measures, graphs of trigonometric functions, trigonometric identities and equations. No previous experience with graphics calculators will be assumed. <i>Casio graphic calculators will be provided for participants to use in the session.</i>
Barry Kissane	Secondary 11-12	Using a graphics calculator at Stage 6: Real functions	The Draft Syllabus for Preliminary Mathematics Advanced Stage 6 acknowledges that "...graphing technology is an excellent means of exploring many of the concepts..." associated with the topic of Real Functions and Their Graphs. In this hands-on workshop, we will explore some of the ways in which a Casio fx-9860G AU graphics calculator can be used effectively in this topic by students and teachers, including work with graphs of functions and families of functions, as well as their use with both equations and inequalities. No previous experience with graphics calculators will be assumed. <i>Casio graphic calculators will be provided for participants to use in the session</i>
Richard Korbosky	Primary 3-6 & Secondary 7-8	Pre- algebra and logical thinking	This session explores strategies required for thinking about logical thinking, algebraic thinking and how to solve problems using matchsticks, grid paper and two centimetre wooden blocks. Thinking is supported by the manipulation of maths materials, collecting data, making tables and interpreting results from tables. Pre-algebra thinking involves recognising, describing patterns, following, describing and explaining rules. Come along and experiment with the pre-algebra and logic thinking and try the strategies with your class as soon as you get back to school. This aspect of manipulation to abstract thinking is most important before formal algebra is undertaken by learners.
Richard Korbosky	Primary K- 6	An Introduction Session to Firsts Steps in Mathematics	First Steps in Mathematics (FSIM) is a Professional Development Course designed to enhance teachers' professional judgments. Teachers exercise a high level of professionalism about what to teach, to whom, how to teach it and whether children have learned what we intended them to learn. This judgement-making process is often complex but it is central to the idea of professionalism. The First Steps in Mathematics resource is the result of over five years of intensive research that reveals characteristic phases in the development of students' thinking about major mathematical concepts. If you've been looking for a resource that helps you get to the nitty-gritty of teaching and learning mathematics, and explains why some students just don't get it, First Steps in Mathematics is the resource you've been seeking. This session is an introduction to the FSIM
Rod Krause	Primary 3-6 & Secondary 7-10	Introducing Algebra - Concrete to Abstract thinking using interactive software.	This presentation will demonstrate a step-by-step method of helping students entering Stage 4 Mathematics to move from a concrete to a more abstract mode of algebraic thinking. The steps follow PAS4.1 in the NSW Syllabus. A software package has been developed by the presenter to assist in this process. The software includes question generators, activity sheet generators and interactive learning objects. The software will be made available to all participants to take back to their schools.
John Ley	Secondary 7-10	Integrating Spreadsheets into mathematics using ICT4U	See the new Level 2 ICT4U book demonstrated. It replaces the stage 4 and includes instructions and demonstrations for Excel 2003 and 2007. Have students learn how to use Excel in a mathematical environment with little or no teacher input required. The General Mathematics CD with over 500 multiple choice questions will be demonstrated. Some free samples and lucky door prize.

Sharon London Nikky Vanderhout	All teachers	FORUM --The Pleasures of Mathematics Teaching	Bring along your morning coffee and join us in this beautiful room with a view over the ocean for a relaxed discussion on what makes Mathematics teaching special for you. If you have thoughts and experiences you would like to share with others or you just want to listen, that's fine – come along - all are welcome.
Sharon London Janine Angove	Secondary 7-12	Gathering Data for Reporting and Teaching with HOTmaths	Do you have students in your Years 8, 9 or 10 classes who struggle with basic algebra? Or students in Years 11 or 12 who need to brush up on Percentages or 3D visualization or calculating with world time zones? Would you like a comprehensive diagnostic online tool that can be administered at any time in the teaching and learning process, that will provide a breakdown of your students' strengths and weaknesses in these and other areas of mathematics? And then would you like a program of learning online that allows your students to work on these areas of need, at their own level and their own pace? Would you also like an assessment tool that will feed data into your reporting process? This workshop will demonstrate the powerful online diagnostic, assessment and reporting tools, the flexible messaging system and the linked programs of work, all to be found on the HOTmaths website. Follow two students as they discover what they know and what they don't know in Mathematics and what they can do to improve.
Sharon London	Primary 6 & Secondary 7-10	HOTmaths – Let me count the ways	Discover a wealth of investigations and interactive resources on the HOTmaths website and find out how teachers are using them as part of their normal teaching. For teachers, students and parents – practical, informative, motivational and effective. Curriculum-based HOTmaths includes working mathematically investigations, animations, interactive activities, drill and practice, computer-marked assessment ideas and immediate feedback and progress reports.
Chris Longhurst	Secondary 7-12	Music, Maths and the Calculator	Calculators can be used for more than calculations. In this workshop I will show the participants how to play music on the 40gs graphing and CAS calculator and the mathematics behind it. Yes that right maths can be fun. Why not stretch the imagination and your classroom repertoire. This workshop will be hands on and you don't have to be musical. Each participant will get to keep the graphic/CAS calculator they will use in the session.
Chris Longhurst	Secondary 7-12	Visualization to enhance learning in Mathematics	In this workshop I will outline, briefly, the main points that the movie and book "The Secret" highlight and relate this to visualization in mathematics and its effect on confidence and learning. I will draw on my doctoral research and case studies using visualization as a tool to show how this can be used in mathematics education to promote learning and the confidence of students in the subject. This workshop will provide some interesting insights for the teaching and learning of mathematics and will explore how we might be able to use non-traditional approaches.
John Mack	Secondary 11-12 & Post Secondary	Minimum Surface Area of a Pyramid	Recently, via the AAMT's community list, Anthony Harradine reported on a nice problem (which came to him from Mike Evans) that he had given a Year 10 class wanting a challenge. The problem appealed to me because it combines geometry, symmetry and some simple algebra in an interesting way, and has a link both a well-known simpler problem about a triangle and to a less well-known and by no means simple problem. Here is its statement: P is a pyramid on a square base ABCD with vertex V at height /h/ above the base. What position of V makes the sum of the areas of the four sloping sides of P a minimum? I am sure there are many ways to solve this problem. I will describe one that uses coordinate representation to convert the problem into algebraic form. I'll begin by presenting the Fermat Point problem for triangles and end by sketching a far-reaching generalisation. Anthony and I hope soon to write a short paper on this.

Peter Maher	Primary K-6	Making Mentals Mighty	This workshop concentrates on the importance of creating in schools a K-6 mental arithmetic program in a developmental manner. The session will present a series of games and activities designed to consider the patterns and structure of number. The concepts covered in this hands on presentation will include tests for divisibility, counting, times tables and the four operations. <i>Peter Maher is the author of Mighty Mentals</i>
Peter Maher	Primary K-6	Maths Games On The Go	This session will present a series of games designed to inspire and excite students as well as strengthen concept attainment. 3 varieties of games (play straight away games, copy and play games and make and play games) will be outlined and demonstrated in a hands on manner. The concepts of number, chance, measurement, space and working mathematically will be included in this highly entertaining workshop.
Peter Maher	Primary K-6	How to develop a K-6 problem solving program	This session will outline the problem solving process and present the 9 strategies required to be learned by students to become successful problem solvers. This workshop recognises that problem solving is a difficult intellectual process. It also concentrates on the fact that the first step to improving the logical thinking of our students lies in improving the problem solving capabilities of teachers.
Carol Mason	Primary K-6 & Secondary 7-8	"Geometric Greetings"? It's on the cards	"Greetings from Planet Maths". Measurement and geometry easily lend themselves to creative exploration - even Pythagoras has a part to play in this workshop! Have some fun, combine colour and geometry in attractive greeting cards (and have a little fun along the way!).
Mark McKinnon	Secondary 7-12	An outcomes based markbook	An outcomes based markbook will be presented that gives many more features than a normal electronic markbook. The markbook is much more secure than a spreadsheet as it is impossible for a teacher to delete or mix up lots of marks. I will demonstrate how it helps us to give an "on-balance" school certificate grade which I think sits well within the BOS advice on this matter. Other nice features include individual student feedback sheets, work for absent teacher sheets (with a full class list included), a mark estimator and overall ease of use. Easily adaptable to any school.
Heather McMaster	Secondary 7-8	Games that Teach	In this workshop you will be playing games that are tailored to suit the Number Strand of the Stage 4 mathematics syllabus, namely: "Divisibility Hex", "Doing the Opposite", "Fraction Ladders", "Factor Bingo" and "Decimal Squeeze". These games are also suitable for Stage 3 students. They require no more than a pack of regular playing cards, or a pair of dice, or just pencil and paper. As well as being an enjoyable method of "practice and drill", these games soon result in players developing strategies. Encouraging students to discuss and reflect on their strategies can lead the class to a deeper understanding of the mathematics involved
Diane McPhail	Early childhood & Primary K-6	Developing the critical measurement concepts	This workshop will focus on the concepts which underpin the measurement of length, area, volume, capacity and mass and the need to establish these concepts in the early years of schooling. An understanding of the attribute which is being measured and the processes of aligning and counting the units chosen to subdivide and measure a quantity are critical to the use of formal measurement units and formulae in later years. These concepts will be discussed with references to the Mathematics K-6 syllabus and the DET publications Teaching measurement: Early Stage 1 and Stage 1 and Teaching measurement: Stage 2 and Stage 3 (available for purchase through MANSW).

Catherine Mathews	Primary K-6	Fractimals a new name for an old concept (Fractions & Decimals)	One of the hardest concepts for students to grasp in the K-6 Mathematics curriculum is Fractions and Decimals. This workshop is designed to put the fun into learning and is aimed at Stage 2 and 3 teachers. It combines a fresh look with fun ideas for teaching fractions and decimals, whilst demonstrating how they are interrelated. Technology is pivotal in the teaching and learning activities. Classroom organization and working mathematically outcomes are addressed with ideas for whole class, small group and individual investigations, ensuring students individual needs are met. Upon leaving this workshop you will have practical ideas, games, rich tasks, assessments and interactive websites for teaching fractions and decimals. (Fractimals)
Jim Milford	Secondary 7-12	Visiting other mathematics departments	Following visits to four Victorian schools, one Tasmanian school and four in the USA, we see if teaching / learning is any different from our own school? Well, yes and no. This is a report of what was seen in respect to environs, assessment, curriculum, technology and for head teachers, what happens with staffing.
Rodney Miller	Secondary 7-12	Anyone Can Teach Extension 2 Maths	Teaching Extension 2 can be a daunting, lonely and stressful experience for some. This session will provide encouraging advice in teaching and exam setting so that any Mathematics teacher can have the tools and confidence to undertake the very rewarding experience of teaching Extension 2 Mathematics.
Mike Mitchelmore Heather McMaster	Secondary 7-8	Working Mathematically with Number	Many students come to high school without a strong understanding of our decimal number system and without an ability to think proportionally. As a result, many topics in Stage 4 mathematics and beyond fail to make sense to them. These students only manage to survive mathematics by learning rules like "move the decimal point" and by following procedures like "flip and multiply". In this workshop, participants will look at a variety of activities aimed at uncovering common misconceptions about decimals, fractions and percentages and using a "working mathematically" approach to promote understanding.
Brian Murray	Primary K-6	The effective use of technology in the teaching of primary mathematics	How can teachers of Mathematics combine the effective use of technology with a balance of positive teacher-student interaction and meaningful learning activities? New Nelson Maths for NSW (publication late 2008, Cengage Learning) is intended for the thinking teacher, who wishes to control the amount and type of input needed for each maths lesson, and who does not see a textbook as THE teaching tool. More importantly, it promotes interactive technology as an integral part of the teaching of Mathematics, not as an add-on. <i>Brian Murray is a co-author of New Nelson Maths for NSW</i>
Marilyn Murray	Primary 3-6 & Secondary 7-10	Hot Potatoes & IT Solutions	This session is devoted to using IT in the classroom for all students from Stage 2 to Stage 6. Marilyn will give you a chance to play with her dynamic geometry activities and will overview many interesting interactive websites that she has linked directly to her website at www.members.optushome.com.au/murraymb . She will also allow you to play with her interactive mathematical literacy materials that she is developing through Macquarie University ICT Innovations Centre. These are "Hot Potato" activities that allow students to interact with the literacy of mathematics.
Morris Needleman	Secondary 7-12 & Post Secondary	Mathematics, multimedia, poker and probability	Poker has swept the world. Your students are playing and maybe you should too! This presentation looks at the maths that underpins poker. We explore the probabilities and look at the ways that multi-media impacts on mathematics teaching as well.

Mark O'Brien	Secondary 9-11	Exploring and Applying Reciprocal Functions (Inverse Proportion)	This session will be based around activities and applications from an Integrated Maths Module. It will look at both activities to immerse students in and explore reciprocal functions, as well as applications to allow students to apply the concepts in non-routine, contextual situations. The aims of the session will be twofold: To familiarise participants with a resource they can use when teaching chance processes To promote the ideas of immersion of students into their learning and the subsequent application of understandings
Mark O'Brien	Secondary 8-10	Cooperative Learning in the Maths Classroom	"Research on how people learn has suggested that learning is a social process and that cooperative learning activities are essential if students are able to construct their own knowledge": Alice F Artzt & Claire M Newman "Independence and collaboration: Learning experiences should encourage students to learn both independently and from and with others.": Curriculum Framework Learning & Teaching Principles As mathematics teachers we are not traditionally highly skilled in allowing students to work cooperatively. However, there is a lot of information available on both the how and why of cooperative learning and this workshop aims to impart some of that information and also some of the presenters experience from the classroom
Mark O'Brien	Secondary 8-10	Focussing On Learning in the Maths Classroom	Changes in our society, changes in the attitude of our students and a rapid increase in knowledge of how people learn have made it necessary for teachers who trained many years ago to examine their teaching methodology and look for new ways to increase student learning and motivation. This session will look at how the presenter changed his classroom structure to better facilitate student learning. Its aim is to suggest ways and means of making a classroom environment more student centred, making learning more constructivist based, and allowing students to work cooperatively. It will also look at the resources developed by a group of teachers to support this learning environment. The session would be of interest to people who are trying to make changes in their own classroom or their own department and are looking at how an alternative learning process can be managed. The session will be in the form of a presentation followed by discussion
Mark O'Brien	Secondary 8-12	Are We Still Investigating Mathematics?	Investigations may be defined as "a situation originating in mathematics or the real world which lends itself to inquiry". They allow students to examine the situation using various techniques, and in the process of their exploration, develop skills that can be applied to other problems. The type of skills normally associated with investigations are generally higher order skills or processes; including data collection, symbolizing, classifying, simplifying, abstracting, following and extending patterns, conjecturing, communicating, generalising, justifying, proving, hypothesising and predicting. These processes fall under the broad heading of Working Mathematically. Having developed and practised these thinking skills students become more able to apply and transfer this knowledge to new, non-routine situations as they arise. This session aims to look at the reasons Investigations became an important part of our mathematics classrooms, and how and why we should still be using them.
Kay O'Carroll	Early childhood & Primary K-2	Rolling In the Dough - Box Cars Money Games	Children love money and they love games so let's play and learn coin values, trading of coins, counting patterns of coins and real life connections. Come prepared to play and take away great ideas to implement easily in the classroom.

Kay O'Carroll	Early childhood & K-2	Shuffling Into Maths with Box Cars K-2 Games	Come prepared to play and have fun. Box Cars games develop skills and concepts using a motivating approach with no teacher preparation time. Following this workshop your students will love playing number recognition, place value and addition and subtraction games in the classroom using simple card and dice equipment.
Kay O'Carroll	Early childhood & Primary K-6	Shake Rattle and Roll out the Maths with Box Car Games	Come prepared to play & be amazed at the teaching, learning and assessment opportunities created with a Box Cars game pedagogy. Box Car games develop skills and concepts, creating a fun, motivating approach to the teaching of maths with no teacher preparation time. Following this workshop your students will love playing number recognition, operation, place value, and pre algebra games in the classroom using simple cards and dice equipment. Make maths great in 2008!
Kay O'Carroll	Primary 3-6	I Spy The Pie - Box Cars Fraction Games	Come prepared to play games to teach fraction names, comparing fractions, operations with fractions, equivalence and more! Box Car games teach concepts through play which helps to develop understanding of fractions before algorithms are introduced. Make your maths classroom an exciting place in 2008.
Michelle Ostberg	Secondary 7-10	Working mathematically - one WA approach	I will briefly outline the process I use to develop my students' skills in working mathematically. Combining investigative work (to help students think like a mathematician and be able to write about their processes) with developing a repertoire of problem solving strategies, I aim to enable my students to cope with any problem they may face and enjoy the wonder of discovery. We will also briefly look at some resources developed by MAWA to support this.
Michelle Ostberg	Secondary 7-10	These have worked for me	A collection of different strategies that I use to engage, extend, enrich and empower students, but most of all to help them enjoy their mathematics learning. These strategies include activities, games and the use of video to make my classroom come alive.
Kay Owens	Primary K-6 & Secondary 7-12	The importance of fuzzy mathematics	"Mathematics must be rigid and precise" say some. Others beg to differ. This session will draw on eminent researchers' discussions of "fuzzy" mathematics and its central importance in learning mathematics. We will explore several practical examples of ways teachers can draw out fuzzy mathematics and develop its potential. Fuzzy maths is a basis for true understanding.
Michael Palme	Secondary 7-12	Isometric Sketching and Introducing Latitude & Longitude	It's rarely tested in the exam so we don't need to spend much time on it!" or "I'm not very good at that so I won't spend much time on it." How many times have you heard this or even thought it yourself? Here are two lessons which we have developed that give students the chance to learn the skills in an engaging and enjoyable way and they get to use the internet as a bonus!
Stuart Palmer	Secondary 9-12	Introducing Logarithms (with a bap!)	Many students meet logarithms for the first time in Year 12 (or very late in Year 10) For many of them, it is a baffling topic indeed, especially if the early lessons are rushed in order to get to the calculus bits. During this session, you will see some novel and unusual methods for building student confidence and understanding. What is a bap? Not sure? Come along and find out (and you might even get to eat one!).
Stuart Palmer	Secondary 11-12	Trigonometric Functions and Radians	The shift from degrees to radians causes a great deal of confusion for many Year 12 students. A data projector, 3 plastic rulers and the Geometer's Sketchpad file that is the basis of this session really helped my current crop of Year 12 students make this shift. You will also see a free web-site that makes it soooooo much easier for students to learn how to draw those tricky trig graphs on paper.

Stuart Palmer	Secondary 7-12	Dealing With Data in Stages 4, 5 and 6	Are you and your students totally bored with the traditional text-book approach to Data Analysis? This unit of work is a fresh approach to statistics that incorporates the use of real data and the power of technology to breathe new life into a very dry topic. You will leave the session with some original PowerPoints, Excel files and movies that can be used in class the next day with Year 7 to 10 or your General Mathematics class (or your Year 11 2 Unit Advanced class in 2010!)
John Pegg	Secondary 7-10	ÆSOP Project on Effective Mathematics Faculties: The findings	This second session builds on the findings identified in the previous Session. Having come to understand the key features of outstanding Faculties in Session 11, the focus here is on a deeper analysis of the findings identified earlier in terms of what members of the audience might attempt to achieve within their individual Faculties. This session is interactive with input and practical suggestions on ways forward for Mathematics Faculties.
John Pegg Margaret Bigelow Peter Osland	Secondary 7-10	ÆSOP Project on Effective Mathematics Faculties: Implications for practice	Why do some Faculties perform better than others? Why do some Faculties within a school perform better than others in the same school? What are the characteristics of these outstanding/exceptional Faculties? ÆSOP stands for "An Exceptional Schooling Outcomes Project". The project identified and explored the factors leading to outstanding outcomes in faculties related to junior secondary education. The project was based on selected case studies. Quantitative and qualitative data were used to identify a number of 'sites' in which the past four years of student cohorts had either scored consistently highly on value-added measures or demonstrated consistent improvement on the same scores. Importantly, sites had to demonstrate their ability to 'value add' for students in low, middle and high achievement bands. Sites were selected to cover as wide a socio-economic and geographical cross-section of schools as possible. This session concentrates on discussion of the findings.
Zdena Pethers	Primary 5-6 & Secondary 7-8	Magnificent 7 (& 5 & 6 & 8) When it's fun, you learn!	This workshop will explore seven practical, enjoyable numeracy activities for stages three and four (middle years) that are designed to engage students with different learning styles and ability levels. The 'Magnificent 7' activities will demonstrate how Quality Teaching Principles help support the acquisition of numeracy skills and enhance the understanding of mathematical concepts through application using familiar items.
Anne Prescott	Secondary 11-12	Student misconceptions about Projectile Motion	Misconceptions about projectile motion make it very hard for students to understand what is happening. They resort to learning the techniques of solving projectile motion problems without understanding the process. This presentation will show ways the students can be helped to make sense of projectile motion.
Simon Price Peter Hargraves	Secondary 7-12	HSC, UAC and Schools based scaling of results	This presentation will attempt to explain the various scaling procedures that are used by the BOS and UAC. This will include an overview of scaling of HSC results and the UAI. The Tertiary Entrance Scores (Scaled marks) for many 2007 HSC subjects will be compared. The effect of Standardisation and Multi Linear mapping will be compared for inschool scaling. Participants will be able to download Powerpoint and Excel files to use after the presentation for demonstrations and PD back at their own school
Jayne Rafferty Nicola Dennis	Primary 3-6 & Secondary 7-10	Teaching Number for Understanding	Who hasn't experienced shock and disappointment when in a "Percentages" topic test the question "Find 2% of 350" is asked, you get back an answer of 70. What are we doing wrong? My hope is that after this session on teaching Percentages and other Number topics your students will never think that they can find 20% of a number by dividing by 20. We will employ cheap and easy hands on methods for you to use in the classroom so that your students really understand numbers.

Diane Read Carolyn McGinty	Primary 3-6 & Secondary 7-10	Supporting an Interactive Classroom environment	The State Government's Connected Classrooms initiative aims to provide an interactive collaborative environment in each NSW Public School. This session will provide support for teachers in creating an interactive classroom environment using learning objects on Interactive Whiteboards effectively to teach mathematics.
Paul Rehill	Secondary 7-10	Interactive Maths Series Software Training Session	In this workshop, you will learn about and explore the following features of G S Rehill's Year 7-10 Interactive Maths (Second Edition) software in terms of NSW Year 7-10 Syllabus outcomes: 1. The 1222 interactive exercises accessible by students. 2. Using performance analysis tools to monitor student achievement and identify strengths and weaknesses to accelerate learning 3. The randomised worksheet and solution sheet generator for 1222 topics 4. Creating reusable Revision Templates to form new miscellaneous exercises, worksheets or tests for students 5. Exploring the software series quickly and efficiently as a teacher.
Chris Robertson	Secondary 7-12	Mathematics through the Centre for Learning Innovation (CLI)	The Centre for Learning Innovation's key products and services are designed to help teachers in schools and TAFE integrate innovative learning design and the use of ICTs into their teaching. Participants at this session will be given an introduction to the products and services offered by CLI. The session will examine the ICT requirements of the Stages 4, 5 and 6 mathematics syllabuses and will look at some of the ways that technology-based activities can be used to support mathematics learning. The presentation will review the resources available to DET schools via the Teaching and Learning Exchange (TaLE) and will give participants the skills to search, find and download these resources.
Robert Rowland Lynette Schultz	Secondary 11-12	Thinking about Focus Studies	With the new Mathematics General courses to begin in 2010 the biggest change will be the introduction of focus studies. Teachers have many questions. • What is the difference between "Areas of study" and "Focus studies"? • Will Focus studies need to be taught differently? • How are Focus studies different to themes and MIS option topics? • How are focus studies different between the General 1 and 2? • How will Focus studies be examined? We will look at these questions and others with specific reference to preliminary course Focus studies "Mathematics and Communication" and "Mathematics and Driving".
Robert Rowland Lynette Schultz	Secondary 11-12	Data Analysis in the Mathematics Advanced Course	With the introduction of Data Analysis into Mathematics Advanced Course the question becomes how should we be teaching this material as the syllabus provides us with the what? In this session we will explore the Data Analysis section of the syllabus and look at teaching strategies that will assist students in building upon their knowledge developed in the Stage 5 course. Further we will take time to focus on comparison and discussion about data which is at the heart of the syllabus rather than calculation.
Theresa Shellshear	Early childhood; Primary K- 6	How will I calculate? - Mentally	A presentation / workshop investigating the underlying skills necessary for the successful application of mental computation. The focus will include addition, subtraction, multiplication and division tasks as presented in 'Mental Computation - a strategy approach' (Alistair McIntosh & Shelley Dole).

Karen Skilling	Primary K-6 & Secondary 7-10	Engagement In Mathematics in Middle Years	Recognising the particular social, emotional and cognitive needs of students in the middle years as a distinct group, this pilot study aims to elicit students' beliefs, experiences and expectations about mathematics as they transit from junior to secondary school. For students it is hoped that reflecting on, articulating and sharing thoughts, beliefs and experiences with mathematics will provide clarity about mathematics study and consideration of engagement in mathematics from both a Year 6 and 7 perspective. For teachers this information may lead to a better understanding of students' needs, approach to pedagogy and classroom practice.
Duncan Smith	Primary K-6	Mathletics - The next generation in learning	Mathletics is Australia's most used educational website - with over 1000 Australian Schools and one million students worldwide using the resource. It is the next generation in learning - captivating, engaging, building confidence and extending every student to achieve outstanding results. The session will focus on how Mathletics can meet a school's numeracy objectives. Particularly differentiation, motivation and results.
Gerry Sozio	Secondary 7-10	Self Directed Learning in Mathematics	The introduction of the one to one laptop program at St Mary Star of the Sea College Wollongong, has provided an excellent opportunity for students to be involved in self-directed learning experiences. In order to prepare students for life experiences and in making mathematics more relevant for students, the laptop program provides an excellent medium for this to occur. The self-directed approach creates a learning environment in which students are responsible for their own learning. The role of the teacher becomes to facilitate rather than to direct.
Liz Spielman	Secondary 7-10	Patty Paper Geometry proofs	Teaching Geometry with patty paper is the brainchild of Michael Serra in his book 'Discovering Geometry'. This practical session will demonstrate how students can perform investigations in geometry to develop proofs and discover properties of shapes using tracing paper.
Chris Stocks	Primary K-6 & Secondary 7-10	Reach for the Stars	<i>Reach for the Stars</i> is about hands-on classroom investigations, and the collection, sharing and analysis of real data. Conducted by the Australian Association of Mathematics Teachers, this free activity is designed for students of all ages (pre-school to secondary) and involves many hundreds of schools from all over Australia. Workshop participants will explore the 2008 activity - a nation-wide experiment investigating accuracy in throwing a coin onto a target - including sharing the experiences of some participating teachers.
Jan Stone Kristen Tripett	Primary 5-6 & Secondary 7-8	Enlightenment through Growing Patterns	Many stage 3 & 4 students find it difficult to move from additive to multiplicative (functional) thinking when working with growing patterns. Come & workshop a strategy that is proving useful to many stage 3 & 4 students.
Salma Tahir Heather McMaster	Secondary 7-10	Multifaceted Variable Approach to teach Algebra in junior secondary	Studying algebra has always been a difficult journey for most students. Previous research suggests that these difficulties are due to the misconceptions regarding meaning of variables in algebra. I am studying the effect of a multifaceted variable approach on teaching and learning of algebra in junior secondary school. Using: a.) A new algebra syllabus arrangement focusing on meaning building activities regarding variables in Year 7 and algebraic manipulations in Year 8 b) Workbooks "Working mathematically in patterns and algebra" by McMaster and Mitchelmore are used as teaching resources. Ms Salma Tahir and Dr. Heather McMaster will conduct this workshop during which research will be discussed and some activities from the workbook will be presented

Sue Thomson	Secondary 9-12	Introducing investments and loan repayments using recursion	Using the recursive menu on a graphics calculator as an introduction to savings and loans can assist students to understand the processes involved. In this workshop participants will have the opportunity to experiment with the recursive mode on the Casio 9860 calculator. I will be covering simple and compound interest as well as savings and reducible loans. If time permits, we will look at some interesting recursive functions.
Sue Thomson	Primary 5-6 and Secondary 7-10	Using Casio 82A Plus scientific calculator Stages 3-5	This workshop will feature some short puzzles and problems suitable for stages 3, 4 and 5 that can be solved with some insight and a scientific calculator. In addition the workshop will cover some scientific calculator activities that can be incorporated into teaching and learning for stages 3 to 5. If you have a Casio 82AU Plus calculator, bring it with you. I will have some calculators available for participants to use.
Sue Thomson	Secondary 7-12	Games to enhance learning	In this practical workshop participants will get an opportunity to play games designed to foster student understanding and language in topics such as place value, number theory and geometry. Some games use a normal pack of playing cards and participants will receive photocopy masters for the remaining games.
Sue Thomson	Primary K-6	CONSUMER AND FINANCIAL LITERACY	This workshop will show you how to incorporate the Consumer and Financial Literacy outcomes into your Mathematics lessons. We will look at how the Professional package for this, in your Conference satchel, can be used to develop your program. In addition Sue will show you some really good activities that will help you to assist your students to become financially literate citizens with a knowledge base that grows throughout their Primary years. <i>This workshop is funded by the Australian Government Quality Teacher Programme (AGQTP)</i>
Sue Thomson	Secondary 7-10	CONSUMER AND FINANCIAL LITERACY	This workshop will show you how to incorporate the Consumer and Financial Literacy outcomes into your Mathematics lessons. We will look at how the Professional package for this, in your Conference satchel, can be used to develop your program. In addition Sue will show you some really good activities that will help you to assist your students to become financially literate citizens with a knowledge base that grows throughout their Secondary years. <i>This workshop is funded by the Australian Government Quality Teacher Programme (AGQTP)</i>
Susan Turnbull	Primary K-6	Establishing a Maths Enrichment Program in a Primary School	By the time students reach Secondary School many have already decided that maths is boring. To counter this I have established a maths enrichment program at Middle Harbour Public School. The program began as a GAT initiative with selected students receiving small group tuition once a week but proved so popular amongst the students and parents that it has progressed to a whole school project. This involves in-servicing the teachers so they are able to introduce maths enrichment ideas in their classrooms for all students regardless of ability. The aim is for students to become excited about maths by introducing them to concepts outside the curriculum such as fractals, using an abacus, visual-spatial puzzles, big numbers, infinity and maths games to name but a few!
Allan Turton	Primary K-6	Taking Tangrams Further	The value of tangrams goes far beyond just entertaining recreation. From the very early years to upper primary, tangram pieces can be used for many investigations into compound shapes, angles, fractions, area and visual thinking in general. In this hands-on workshop, participants will explore these topics using the familiar seven-piece tangram, at their desks and with exciting new software.
Allan Turton	Primary 5-6 & Secondary 7-10	Picture This: Activities for Developing Visualisation Skills	Modern mathematics curricula emphasise the development of visual thinking. In this session, participants will engage in a number of easily implemented activities designed to help develop and practise visualisation skills. Participants will leave with many ideas to try in their classrooms as well as a puzzle to take home.

Allan Turton	Primary K-6 & Secondary 7-8	Flare Interactive Teaching Tools	Many interactive teaching tools suffer from an excess of some things and a deficit of others. Some software is easy to use, but lacks flexibility; some grab students' attention, but direct it away from the topic; and some may have everything you need, if only you knew what to do with it. The "Flare" series from Origo Education gets the balance right. Carefully written lesson notes are coupled with flexible software to help teachers focus on the maths, and reach students' at their level of understanding. With the ability to work on all interactive whiteboards (or even just a data projector and desktop computer), the first eight titles in this powerful new series are definitely worth seeing.
Nikky Vanderhout	Secondary 7-10	A Baby Boomer approach to teaching Gen Z Mathematics	Making the transition from teaching mathematics in traditional ways to teaching with a strong technological focus can be very daunting. This workshop explores the journey of teachers of one mathematics faculty as they have responded to the challenge of teaching students whose technological awareness exceeds their own. Discussion of successful strategies and pitfalls to avoid will provide participants with ideas for using technology, group work and problem solving challenges in purposeful and engaging ways.
Sandra Walker Sharon Cooke	Primary K-6	Numeracy Backpacks - School to Home Project- "Maths is Fun"	The aim of this project is to improve the numeracy outcomes for all students, K-2, but especially our Aboriginal students, through increasing their enjoyment of Maths. 99 backpacks have been shared between the 5 schools in our Diocese with the largest Aboriginal student population in a pilot of this project K-2, in 2008. A Maths Backpack, containing a variety of Maths games and activities covering the different strands, is sent home for at least 1 week per term with each class member. The intention is to raise the profile of Maths with both students and their families, leading to increased student engagement and participation in the classroom and the education of parents and carers at home about what their children are learning in Maths. This project is relevant to all schools who wish to promote Maths in the home
Phil Walsh	Secondary 7-12	Teaching Maths in a e-Learning World	Mathletics is Australia's most used educational website - with over 1000 Australian Schools and one million students worldwide using the resource. It is the next generation in learning - captivating, engaging, building confidence and extending every student to achieve outstanding results. The session will focus on how Mathletics can meet a school's numeracy objectives. Particularly differentiation, motivation and results.
Garry Webb Chris Thompson	Secondary 11-12	Use of multiple-choice items in Year 12 external examinations	Multiple choice items are effective measurement items that are used for assessing mathematical knowledge and skills in many contexts from primary education through to tertiary. Multiple choice items have been used in NSW HSC examinations for many years in the non-calculus courses. The draft examination specifications for the new syllabuses include multiple-choice and other objective-response items in the calculus-based courses for the first time from the 2011 HSC examinations. This session will examine how this type of item can contribute to effective assessment of achievement in these courses.
Neville Weber	Secondary 11-12	Data Analysis	This presentation will focus on the PMA6:Data Analysis topic in the Draft Syllabus for Mathematics Advanced. The theme "Putting it Together" is a reference to a song in Stephen Sondheim's Sunday in the Park with George", emphasising how different statistics help us build a picture about the behaviour of a population. We will review means and variances, correlation and regression. The Data Analysis section can lend itself to some interesting mathematics. Some alternative ways of presenting the regression line will be presented for more able students.

Allan White UWS trainee teachers	Primary K-6	The Mathematics Guide to the NSW Global Education Site	Participants will be given a draft guide to the NSW Global Education Site. The guide is structured along the NSW K-6 Mathematics Syllabus. It is designed to assist teachers access to this “gold mine” of resources.
Allan White UWS trainee teachers	Secondary 7-12	The Mathematics Guide to the NSW Global Education Site	Participants will be given a draft guide to the NSW Global Education Site. The guide is structured along the NSW 7-12 Mathematics Syllabus. It is designed to assist teachers access to this “gold mine” of resources.
Ian Wong	Primary K-6 & Secondary 7-12	Experience Using the CensusAtSchool data	Take the opportunity to experience the CensusAtSchool data and see for yourself how to use it in the classroom. CensusAtSchool data is a rich resource for all statistics studies and problem solving from upper primary to Year 12. You will find out how to obtain the sample you want and tailor it to the needs of your students. You will have the opportunity to use Excel to analyse your data, use functions and draw graphs. You don't need to have used CensusAtSchool data before but, having seen the questionnaire would be an advantage. See what else is available on the web site to support you.
Ian Wong	Primary K-6 & Secondary 7-10	CensusAtSchool: A Great Resource for Statistics and Problem Solving	A look at how students can be engaged by real, up to date, Australian raw data. See examples of how students can use the data from primary through to Year 12. Students love using data that is about themselves and you'll love the wide range of applications and how easy CensusAtSchool is to use. This workshop is ideal for those who know nothing or a little about CensusAtSchool or using data in the classroom..
Sally Wynne Karen Skilling	Primary K-2	Working Mathematically in Stage One	The focus of this presentation will be on developing mathematical thinking in Stage 1. The incorporation of the Working Mathematically processes are emphasised in the NSW syllabus through using a variety of different strategies across a range of topics to solve problems. It will show examples of how students have been encouraged to reflect on their thinking to solve problems, identifying strategies used and to make judgments about successful strategy use. It will provide teachers with ideas about how to incorporate working mathematically into their programmes.
Robert Yen	Secondary 7-10	Solving equations for students who can't and New Century Maths 8	Students often have trouble in solving equations because their teachers teach only one method, the method they were taught themselves. This session will review and compare the various models and methods for teaching equations as described in the Stage 4 syllabus and New Century Maths textbook, including guess-check-and-improve, balancing and backtracking. The use of concrete objects, diagrams and appropriate terminology will be examined and discussed, with opportunities for teachers to share ideas and classroom experiences. Features of two new editions of the New Century Maths 8 text will also be demonstrated. <i>Robert Yen is author of New Century Maths 8</i>